Dyadic Partner Perspectives of Ageing with Hearing Handicap in the Audible World

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Abstract

Background and Purpose: Grounded in Green and Kreuter's (1991) flexible research framework (the PRECEDE model), the prime purpose of this doctoral research agenda has been to enhance our understanding of the frequently obscure psychosocial implications of ageing with hearing handicap (HH) in the audible world, by focusing on the dyadic perspectives of older New Zealand (NZ) ex-service personnel and their spouses. Glass and Balfour's (2003) Ecological Model of Ageing guided the multidisciplinary literature review, in order to accommodate the functional implications of age-related losses which could potentially exacerbate the social and emotional sequelae of ageing with HH and tinnitus. In addition, Cohen's (1992) Transactional Model of Stress (which integrates three social support constructs with Lazarus and Folkman's [1984] model describing adaptations to stressful events), illustrates how on-going social and emotional adjustments to hearing losses could potentially affect older adults' health-related quality of life (H-QoL). Infused by these transdisciplinary ecological perspectives, a composite model of Ageing with Hearing Handicap was proposed to explore older dyadic partner perspectives of NZ veterans' adjustment to ageing with hearing handicap; and to identify which factors exerted the most influence over the veterans' self-reported perceptions of HH and H-QoL.

Methods: A purposive pilot study sample (*N*=51 veterans) initially guided the appropriate selection of ecologically relevant biopsychosocial variables and data collection methods (self-report mail out booklets) for two subsequent studies: (i) The main 'parent' study (referred to as the Hearing Aid Research Project [HARP]), which examined the predictors of hearing aid use in veterans aged 50 year and older; and (ii) The doctoral study, which explored dyadic perspectives of ageing with HH. The doctoral study's dyadic partner sample (*N*=671 dyads) comprised a subset of the 1249 HARP veterans. This subset met the doctoral study's inclusion criteria of male veterans aged 65 years plus, who had responded with a female partner/spouse residing in the same household. Only dyads with reasonably complete mail out survey response sets were selected. The dyadic partner response sets included social demographic details and responses to a number of constructs relevant to the doctoral research context including: aural rehabilitation, HH, H-QoL, emotional wellbeing, social support and memory in everyday life.

Results: The results describe significantly different aural rehabilitation coping trajectories between the self-identified 'first time' and more experienced hearing aid users; and dyadic partner comparisons which highlight that the female partners were more acutely aware of the stigmatising impact of hearing losses on the veterans' social and emotional agency. Analyses of the intersecting structural and functional features of social support illustrated that increasing levels of the veterans' hearing handicap (HH) exacerbated both partners' social isolation. Wenger's (1994) support network typology illustrated how both partners' depressive symptoms and the veterans' frequency of forgetting increased significantly across a socially integrated to isolated support network continuum. The composite model of Ageing with Hearing Handicap accounted for 71.5% of the variation in the veterans' self-reported HH; 62.6% of their physical and 37.3% of their mental H-QoL. The multivariate analyses also demonstrated that HH produced a direct and negative impact on the veterans' mental H-QoL, by constraining their social and emotional agency; but only indirectly on their physical H-QoL, through reducing their energy levels and constraining their social participation.

Conclusions: These transdisciplinary perspectives provide cross-sectional insights about the social and emotional wellbeing of veterans ageing with HH and their spouses, and suggest downstream links that affect their H-QoL. These findings highlight the importance of hearing health policy agendas and the communication contexts of health service delivery across all age groups. Moreover, by resolving the complex methodological and conceptual challenges inherent in focussing on older dyadic partners' everyday experiences, targets have become apparent for further investigation, to enhance and refine our understandings of engaging ecological perspectives when conducting health research.

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This thesis reflects the perspectives of older New Zealand veterans and their spouses. I thank them for their willing participation; and share their wishes that the time they have so generously invested in this research will be repaid, by enhancing local knowledge and understanding to assist veterans and their family/whanau cope more effectively to minimise the invisible burden of hearing handicap.

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List of Abbreviations & Acronyms

3MS	Modified Mini Mental State questionnaire
AAT	Acute acoustic trauma
ADLs	Activities of daily living
AHEAD	Assets and Health Dynamics of the Oldest-Old study (University of Michigan, USA)
ALD	Assistive listening device
ALSA	Australian Longitudinal Study of Ageing
ANOVA	Analysis of Variance
AQoL	Assessment of Quality of Life questionnaire (constructed and used by Hawthorne et al. [2000] in Australia)
ARHL	Age-related hearing losses
ASP	Attending during Semantic Processing MAC-S factor gauging self-reported memory in everyday life
BAS	Berlin Ageing Study
β	Beta coefficient – a value indicating the strength of prediction of the independent variable on the criterion or dependent variable
BL	Borderline or transitional Wenger support network (due to co-alignment with two types of networks)
BMHS	Blue Mountain Hearing Study (Australia)
BP	Bodily Pain SF-36 subscale
χ^2	Chi-squared statistical measure of difference
cf	Confer or compare
COPD	Chronic obstructive pulmonary disease
CPU	Central Processing Unit
DU	Self-reported frequency of daily hearing aid use
DV	Dependent variable
EMA	Ecological Model of Ageing

EPESE	Establishment of a Population/Populations for Epidemiological Studies of the Elderly (USA)
η^2	Eta squared (statistical measure of the effect of the IV on the DV in an ANOVA)
F test	Compares the variance in two sets of data by dividing one by the other; used in all ANOVA tests
FCL	First Contact Letter
FD	Family Dependent Wenger support network
GDS-15	15 item Geriatric Depression Scale
GF	General Forgetfulness MAC-S factor gauging self-reported memory in everyday life
GH	General Health SF-36 subscale
GR	General Retrieval MAC-S factor gauging self-reported memory in everyday life
GU	Self-reported frequency of general hearing aid use
HANZ	Hearing Association New Zealand Te Kähui Rongo o Aotearoa
HAPI	Hearing Aid Performance Inventory
HARP	Hearing Aid Research Project
HH	Hearing handicap
HHI	Hearing Handicap Inventory
HHIA	Hearing Handicap Inventory for Adults (i.e. 25 item questionnaire for those < 65 years)
HHIE	Hearing Handicap Inventory for the Elderly (i.e. 25 item questionnaire for those ≥ 65 years)
HHIEe	Hearing Handicap Inventory for the Elderly *emotional subscale* score (total of responses to 13 designated items)
HHIEs	Hearing Handicap Inventory for the Elderly *social subscale* score (total of responses to 12 designated items)
HHIE-S	Ten item screening version of the Hearing Handicap Inventory for the Elderly (i.e. for those ≥ 65 years)

HHIE-S (SP)	Ten item screening version that gauges spousal perceptions of someone with hearing losses, utilising the Hearing Handicap Inventory for the Elderly (i.e. for those ≥ 65 years)
HL	Hearing loss/es
H-QoL	Health-related quality of life
HU	Self-reported number of hours hearing aid/s used during an average day
IADLs	Instrumental activities of daily living
ICIDH-2	International classification of functioning, disability, and health 2
IN	Inconclusive Wenger support network (due to co-alignment with more than two types of networks)
IV	Independent variable
LASA	Longitudinal Ageing Study Amsterdam
LI	Locally Integrated Wenger support network
LNI	Lower North Island pool of veterans invited to participate in the research
LSC	Local Self-Contained Wenger support network
M	Mean – a measure of central tendency
MAC-S	Memory Assessment Clinic Self-report scale
MCS	Mental Component Summary – a composite of four SF-36 mental health subscales
$\mathrm{MCS}_{\mathrm{MR}}$ / $\mathrm{MCS}_{\mathrm{S/P}}$	SF-36 Mental Component Summary score of the Main Respondent (i.e. $\mathrm{MCS}_{\mathrm{MR}}$) or their spouse/partner (i.e. $\mathrm{MCS}_{\mathrm{S/P}}$)
MH	Mental Health SF-36 subscale
MH-QoL	Mental health-related quality of life
MMSE	Mini Mental State Examination
MOS	Mail out survey

MR	Main respondent (i.e. the veteran)
NAC	National Audiology Centre (in Auckland)
NAI	Network Assessment Instrument
NAL	National Acoustics Laboratory (Australia)
NAL% HL	National Acoustics Laboratory (Australia) percentage bilateral hearing loss
NHIS	National Health Interview Survey (USA)
NI	North Island
NIHL	Noise-induced hearing losses
NZ	New Zealand
NZWP	New Zealand War Pensions
p	Probability of chance of occurrence reported in inferential statistics result
PCA	Principal components analysis
PCS	Physical Component Summary – a composite of four SF-36 physical health subscales
$\textbf{PCS}_{\textbf{MR}}$ **/** $\textbf{PCS}_{\textbf{S/P}}$	SF-36 Physical Component Summary score of the Main Respondent (i.e. PCS_{MR}) or their spouse/partner (i.e. $\text{PCS}_{\text{S/P}}$)
PF	Role limitations due to Physical Functioning SF-36 subscale
PH-QoL	Physical health-related quality of life
PR	Private Restricted Wenger support network
PRECEDE-PROCEED	**P**redisposing, **R**einforcing and **E**nabling **C**onstructs in **E**ducational **D**iagnosis and **E**valuation – **P**olicy, **R**egulatory and **O**rganisational **C**onstructs in **E**ducational and **E**nvironmental **D**evelopment
PTS	Permanent threshold shift
r	Correlation coefficient – a value indicating the strength of the relationship between two measures/variables

R	Measures the correlation in a multiple regression equation between (a) the actual values of the criterion or dependent variable and (b) the shared unique variance in the criterion variable that is explained by the independent variables
R^2	Estimates the amount of variance in the criterion or dependent variable that is explained by other variables
RE	Role limitations due to Emotional health SF-36 subscale
RONZ	Rest of New Zealand pool of veterans invited to participate in the research
RP	Role limitations due to Physical health SF-36 subscale
RSA	Royal New Zealand Returned and Services' Association
SAHS	South Australian Hearing Study
SD	Standard Deviation or measure of dispersion within a range of scores
SES	Socio-economic status
SF	Social Functioning SF-36 subscale
SF-36	Short form health-related quality of life questionnaire (36 items)
SHAPI	Shortened Hearing Aid Performance Inventory (38 items)
SNT	Wenger's support network typology
S/P	Spouse/partner (i.e. of the veteran / main respondent [MR])
SPSS	Statistical Package for the Social Sciences computer software
SSQ / SSQ6	Social Support Questionnaire / 6 item version of SSQ developed by Sarason et al. (1987)
SSQn / SSQ6n	Average number of people listed available to provide emotional support in response to Sarason et al.'s brief 6 item measure of social support
SSQs / SSQ6s	Average perceived satisfaction with the availability of emotional support in response to Sarason et al.'s brief 6 item measure of social support

***t* test**	A *t* test determines whether the difference between two means is significant
TICS	Telephone Interview for Cognitive Status
TICS-m	Modified Telephone Interview for Cognitive Status
TMS	Transaction Model of Stress (Cohen, 1992)
TTS	Temporary threshold shift
UN	United Nations
US / USA	United States of America
VT	Vitality SF-36 subscale
WC	Wider Community Wenger support network
WCF	Wenger Community Focus factor scores
WFF	Wenger Family Focus factor scores
WHO	World Health Organisation
WWII	World War II
z	The z-score determines whether the proportional difference between two sample means is significant

CHAPTER ONE: INTRODUCTION AND OVERVIEW

1.1 Impairment, disability and handicap: An evolving conceptual glossary

1.2 The PRECEDE-PROCEED model of health programme development

1.3 Overview of the PRECEDE-PROCEED model: Implications for the current research agenda

1.4 The prelude: Orchestrating the research agenda
1.4.1 Research aims
1.4.2 Chapter previews

Chapter One presents a rationale for taking an anthropological perspective to enhance our understanding of the psychosocial impact of hearing handicap in everyday life. The discussion initially presents the World Health Organisation's (WHO) original 1980 definitions of impairment, disability, and handicap (as applied to audiology); followed by the revised 2001 terminology that engages health promotion perspectives (WHO, 2001), and refers to body function, activity, and participation. The PRECEDE-PROCEED model of health programme development's flexible research framework introduces gerontological concepts of coping with normal, pathological and successful ageing trajectories, and explains the suitability of this model to explore the quality of life of both older hearing impaired individuals and their dyadic partners. The ecological focus of the current research context emerges in the applied descriptions of the first four phases of the PRECEDE portion of this model. Finally, the broad aims of the doctoral research agenda are stated, alongside the Hearing Aid Research Project's (HARP's) complementary goal, which focuses on the veterans' hearing aid use; and concludes with a preview of each succeeding chapter. This overview provides a synopsis of the inter-disciplinary literature reviewed in Chapters Two to Five, and an account of the doctoral research programme in Chapters Six to Nine.

Understanding the psychosocial impact of hearing handicap in everyday life is a complex process. Recent explorations within this field have seen the convergence of information from a variety of sources, including hard-of-hearing individuals, clinicians and researchers from wide-ranging disciplines such as audiology, engineering, linguistics, nursing, psychology, sociology, and social epidemiology. Pichora-Fuller (1994) is one of a number of Canadian audiologists who advocates using an anthropological framework, in order to facilitate a more coherent view of the handicapping effects of hearing losses. This perspective integrates everyday listening situations into the evaluation and decision-making that informs the selection of both an appropriate intervention, and outcome measurements that gauge the impact of the ongoing aural rehabilitation process (Kiessling, Pichora-Fuller, Gatehouse, Stephens, Arlinger, Chisolm, et al. 2003). Pichora-Fuller and Souza (2003) draw attention to the fact that older adults in particular experience more difficulties than younger adults comprehending spoken language, especially in challenging listening situations. Given the ageing of Western industrial populations, and the increasing prevalence of age-associated hearing losses, it is imperative that health professionals consider the specific needs of older adults in the context of realistic, complex acoustic environments, as the vast majority of candidates for assistive listening technologies are senior citizens (Holmes, 2003; Lesner, 2003; Pichora-Fuller & Souza).

1.1 Impairment, disability and handicap: An evolving conceptual glossary

Any discussion of the nature of communication dysfunction and its psychosocial sequelae requires clarification of the terminology. Stephens and Hétu (1991) have advised following the definitions of the WHO (1980) as applied to audiology; Hyde and Riko (1994) have drawn further attention to the need for a coherent conceptual framework, with appropriate terminology that describes both the situation faced by persons with hearing disorders, and the appropriate health care resources and processes that are needed. The WHO's 1980 conceptual model of pathology (refer below) accommodates the chain of events that link chronic, progressive, and irreversible diseases with a variety of complex factors that may potentially influence a person's self-image, their capacities to sustain their societal roles, and their quality of life (Hyde & Riko):

Disease or disorder → Impairment → Disability → Handicap

Within this chain of events initially something abnormal occurs. These changes in structure or function at the organ or system level are referred to as impairment.

Definition: *Impairment* is any loss or abnormality of psychological, physiological, or anatomical structure or function (p. 348, Hyde & Riko, 1994).

Impairment is therefore a deviation from the norm that can exist in the absence of active disease, may not be perceived by the individual, and can be measured objectively in a laboratory or clinic (e.g. the audiometric patterns depicted in an audiogram that assesses hearing sensitivity across a frequency range for each ear that can be used to calculate a bi-lateral percentage hearing loss).

Functional performance or behaviour may subsequently change at the level of the body as a whole, or the person; either directly, or through cognitive mediation. The resulting deviation from normal functioning is referred to by the WHO (1980) as a disability.

Definition: *Disability* is any restriction or lack (resulting from impairment) of ability to perform an activity in a manner or within the range considered normal for a human being (p. 348, Hyde & Riko, 1994).

Disability therefore reflects actual functional limitation in real life, and the measures are usually subjective (e.g. difficulty understanding speech in a noisy environment such as the Royal New Zealand Returned and Services' Association [RSA] club meeting room, which can be assessed by questionnaire and interview).

Socialisation of an impairment or disability reflects the altered status or performance of the individual relative to others, and includes attitudinal responses such as stigma. This is the domain of handicap.

Definition: *Handicap* is the disadvantage for a given individual, resulting from an impairment or a disability that limits or prevents the fulfilment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual (p. 348, Hyde & Riko, 1994).

Handicap is therefore an intrinsically social phenomenon that reflects cultural norms of time, place, status and role, in response to an individual's interaction with and adaptation to their environment (Hyde & Riko, 1994). Handicap may be experienced in at least three ways, namely: Firstly, by the affected individual (e.g. veterans with hearing impairment not attending noisy social gatherings at their local RSAs, as they have difficulty with speech perception in those environments); secondly by another person with whom they have a close relationship, such as their spouse/partner (e.g. the spouse/partner of a veteran with hearing impairment who has to endure listening to television and radio broadcasts at excessively loud volume settings, so their partner can also hear, which may ultimately lead to marital conflict); and thirdly, by the community as a whole (e.g. older veteran groups being unwilling to attend memorial day parades, as they are unable to comprehend what is being said in acoustically challenging environments, and consequently feel isolated and unappreciated). Hyde and Riko observe that these complexities remain a challenge for researchers wishing to define and quantify handicap, in particular regarding appropriate self-report measures that are applicable to both hearing impaired persons and their partners.

Table 1.1

WHO Classification of major domains within impairment, disability, and handicap

Impairment *Organ/system level* *[Body function[a]]*	**Disability** *Personal activity level* *[Activity[a]]*	**Handicap** *Social role level* *[Participation[a]]*
1. Aural	1. Behaviour	1. Economic Sufficiency
2. Disfiguring	2. Body Disposition	2. Mobility
3. Intellectual	3. Communication	3. Occupation
4. Generalised	4. Dexterity	4. Orientation
5. Language	5. Locomotor	5. Physical Independence
6. Ocular	6. Particular Skill	6. Social Integration
7. Other Psychological	7. Personal Care	*7. Reductions to Quality of Life[b]*
8. Skeletal	8. Situational	
9. Visceral		

[a] *WHO's (2001b) ICIDH-2 terminology reflecting health promotion principles.*
[b] *Hyde & Riko (1994) recommend adding this entry to the WHO list of 6 Handicap dimensions.*

Table 1.1 (adapted from Hyde & Riko's [1994] Table 1, Part A, p. 349, with entries ordered alphabetically) depicts the WHO's three-tier classification scheme of the domains of organ/system level impairment, the everyday functional activities linked to disability, and the major role areas that affect handicap. In the handicap domain, six transcultural societal roles cover most of what is crucial in daily activities. Hyde and Riko suggest, however, that a seventh dimension should be added to this domain, to designate specific disadvantages that *reduce* an individual's *quality of life*. In addition, Table 1.2 adapts Hyde and Riko's Table 1, Part B (p. 349), to list some of the WHO disabilities that may be caused by hearing impairment, which they categorise (using their own terminology) as primary, secondary and ancillary disabilities.

Table 1.2

Hyde & Riko's (1994) specific auditory-related disability sub domains (ranked alphabetically)

Primary Disabilities	Secondary Disabilities	Ancillary Disabilities
1. Identification *e.g., persons, events, objects*	1. Affective relationship *e.g., with partner*	1. Detailed visual tasks
2. Listening to 'nonspeech'	2. Crisis conduct	2. Lip reading
3. Listening to speech	3. Household activities	3. Nonverbal cues
4. Localization in space & time *e.g. self, others, events, objects*	4. Knowledge acquisition	
5. Noise tolerance	5. Motivation to work	
	6. Other family roles	
	7. Parental role	
	8. Personal safety	
	9. Recreation	
	10. Situation comprehension	
	11. Situation coping	
	12. Situation interpretation	
	13. Social cooperation	
	14. Social presentation	
	15. Speech comprehension	
	16. Speech production	
	17. Work performance/output	
	18. Work routine	
	19. Work seeking	

The subsequent WHO revisions of these classifications in 2001 (refer International Classification of Functioning, Disability, and Health [ICIDH-2]) reflect health promotion principles articulated in the Ottawa Charter (WHO, 1986). These principles focus more positively on function than dysfunction, and provide a multipurpose classification designed to support people (individually or in a community) gain greater control over the determinants of their own health (Pichora-Fuller & Carson, 2001). This re-labelling (which is incorporated in the italicised column headings of Table 1.1) has recast impairment as *body function*; disability as *activity* (which refers to actual performance); and handicap as *participation* (which encompasses the complex, dynamic interaction with various contextual factors - such as age, gender, health issues, coping styles, social background and education - among others, that influence the experience of a particular condition). Contextual factors thus facilitate or pose barriers to both activities and participation. This new interactive WHO schematisation is depicted in Figure 1.1 below.

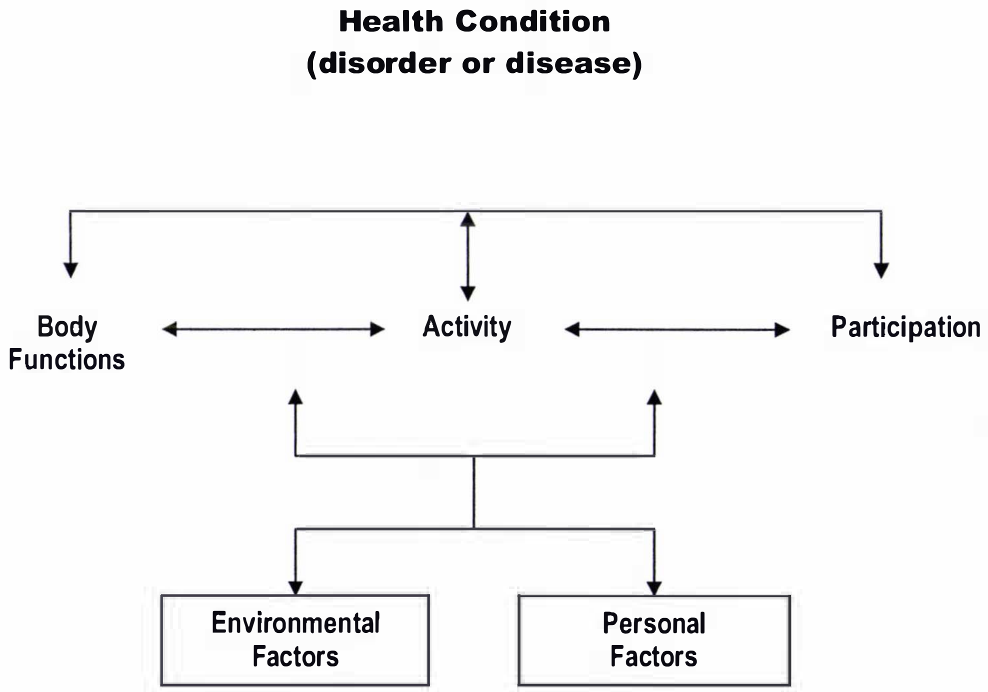

Figure 1.1. The WHO model of the ICIDH-2 (copied from Pichora-Fuller & Carson, 2001, p. 47).

Within New Zealand (NZ), recent guidelines that refer to disability in population groups aged 65 years and older mention "age related disability … which is likely to continue for a minimum of six months and result in a reduction of independent function" that will generate a need for ongoing support (p.54, NZ Guidelines Group, & NZ Ministry of Health, 2003) to sustain participation. In addition, Hickson and Worrall's (2003) 'Keep on talking' program, which evolved to sustain communication skills in the face of hearing losses for older adults living in the community in Queensland, Australia, provides a clear example of the application of the revised terminology within a gerontological context. These two examples illustrate changes in policy frameworks and applied research that stress the importance for older adults of optimising contextual and environmental supports to enhance participation (Pichora-Fuller & Carson, 2001).

Traditional quantitative assessments of disability and impairment in clinical settings do not incorporate any inputs from the contexts in which the individuals live (Gatehouse, 2003; Carson & Pichora-Fuller, 1997). During the past decade audiologists have become increasingly aware of the limitations of their diagnostic medical model, which has focused on impairment, and have realised the need to shift to a more rehabilitative model, focusing on disability (e.g., Chartrand, 1999). Pichora-Fuller (1994) acknowledged that to complete the clinical paradigm shift, so that hearing handicap is a dynamic component of the assessment and rehabilitation phases, audiologists will "need to adopt an accessibility model that would be more anthropological in nature" (p. 210). Adopting such an ecological approach to aural rehabilitation in the present study will accommodate the exploration of a number of contextual variables (including social support), to identify those which influence the psychosocial sequelae of hearing handicap.

Carson and Pichora-Fuller (1997) acknowledge that the philosophical tenets underpinning health promotion, which focuses on contextual issues, increasingly shaped changes in health care practices during the 1980's and 1990's. The resulting confluence of a client-centred approach to aural rehabilitation, within an ecological perspective, encourages a more community-minded approach; and that perspective, in turn, stresses the importance of hearing accessibility issues (Pichora-Fuller, 1994). Carson and Pichora-Fuller recommend using Green & Kreuter's (1991) PRECEDE-PROCEED model of health promotion planning as a promising audiological research framework within which to organise the evolving concepts and practices.

1.2 The PRECEDE-PROCEED model of health programme development

The PRECEDE-PROCEED model (Green & Kreuter, 1991) offers a flexible framework that facilitates the exploration of unmet needs of those who are hard-of-hearing, by contextualising their life experiences and situations.

Green's model is one that gained popularity in the research literature during the 1990s, with over 400 publications referring to it (Sussman, 2001). The original PRECEDE model was developed by Lawrence Green (Green, Kreuter, Deeds & Partridge, 1980) to assist health educators conduct thorough evaluations of all factors that may be involved in planning a community-wide health programme. The model was expanded and named the PRECEDE-PROCEED model (Green & Kreuter, 1991), to accommodate more fully the implementation and evaluation phases of health programmes (Kaplan, Sallis, & Patterson, 1993)

PRECEDE stands for "Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation" and represents the diagnostic or planning portion of the model. PROCEED encompasses "Policy, Regulatory, and Organisational Constructs in Educational and Environmental Development", which are the implementation and evaluation portions of the model that emphasise multi-level administrative and environmental aspects of health programs. Investigators have become increasingly aware of the model's utility as a research framework, when organising health research aims that identify target health behaviours (Kaplan, Sallis, & Patterson, 1993).

The PRECEDE-PROCEED planning model tackles health issues at the community or institutional level by stressing the importance of education, combined with environmental changes in health promotion. Health is defined by the WHO (1980) as the ability to adapt to, or cope with, challenges or changes in circumstance, such that activity limitations and participation restrictions are minimised (WHO, 2001).

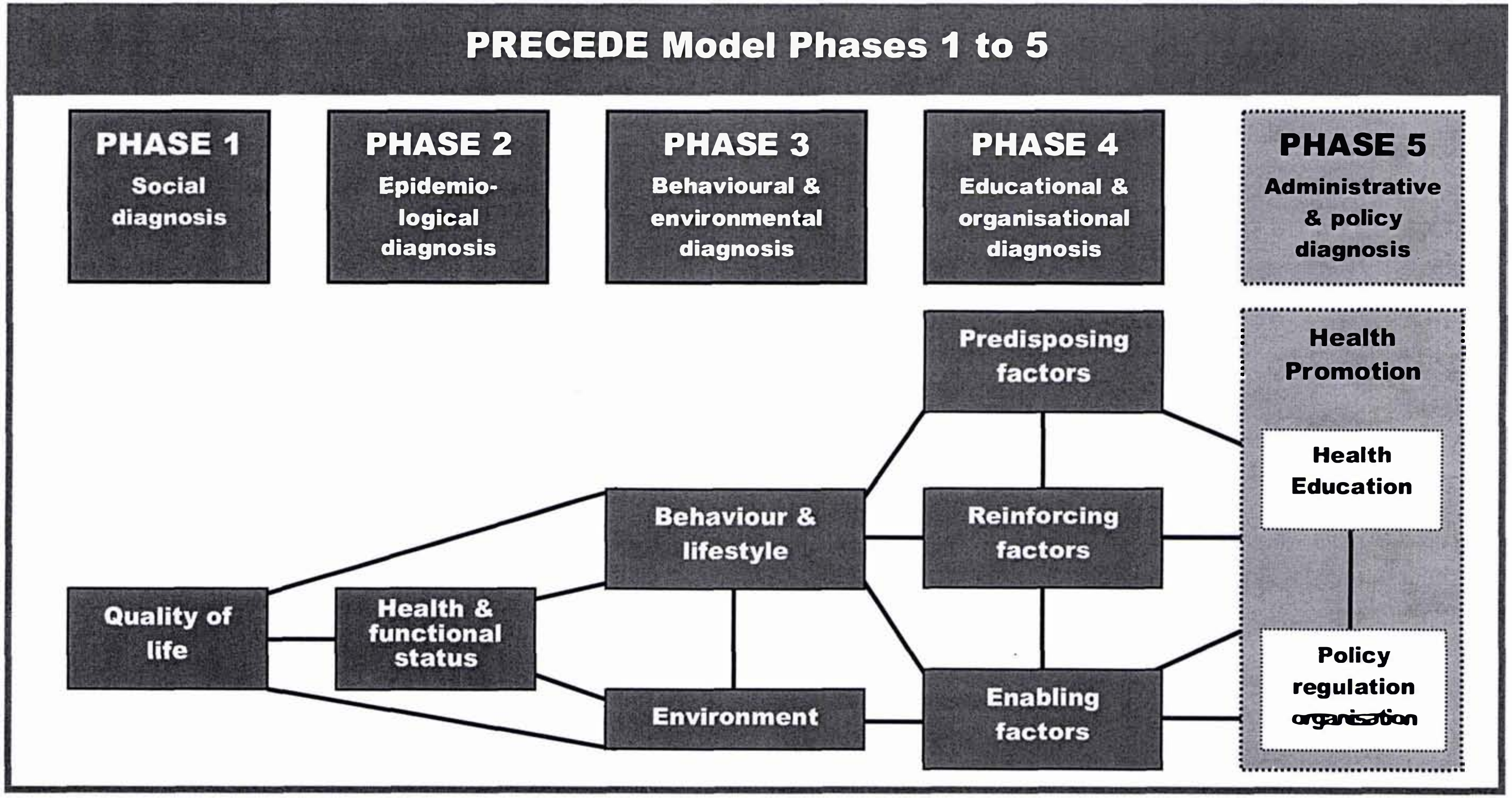

Figure 1.2. The PRECEDE phases of the PRECEDE-PROCEED model for health promotion planning and evaluation. (Adapted from Kaplan, Sallis, & Patterson's [1993] *Health and human behaviour* [Figure 3-3, p. 57]; original diagram derived from *Health Promotion Planning: An Educational and Environmental Approach* by Lawrence W. Green and Marshall W. Kreuter by permission of Mayfield Publishing Company. Copyright © 1991 Mayfield Publishing Company.)

Note: Phase 5 was not included in the current research process, but is shown for the sake of completeness.

The gerontology literature documents how within and across older adults' physical, psychological, and social domains of health, changes may follow normal, pathological, or successful trajectories across their lifespan (Friedrich, 2001b). Average or *normal ageing* profiles are generated across chronological age cohorts, within populations. *Pathological ageing* is usually associated with the physical domain, and refers to the early onset, and rapid progression, of a life-threatening disease. *Successful ageing* demonstrates older adults' capacities to select activities that optimise potential gains, whilst compensating for the effects of age-related losses (Baltes & Baltes, 1990), and thereby reflects (a) acceptance of lowered personal standards (across domains) and (b) alternative opportunities to maintain positive senses of self (Friedrich, 2001b). Preventive strategies that promote healthy ageing practices enable people, either individually or within communities, to gain greater control over the determinants of their own health (WHO, 1986). By construing health as a resource for everyday life, and as a means for achieving other goals in life, it is feasible to include improved quality of life as a desirable health-related goal for hearing impaired individuals, and their dyadic partners.

Carson and Pichora-Fuller (1997) state that the quality of life concerns arising from hearing losses are well-suited to study using this model, especially considering the model's emphasis on community. They are particularly impressed by the model's flexibility, as it provides a way of organising evolving concepts and practices in audiological rehabilitation. The model also avoids the "top-down" planning endemic in many health care programs, by focusing on collaboration and participation with the target communities, and directs attention to research outcomes.

1.3 Overview of the PRECEDE-PROCEED model: Implications for the current research agenda

The model's structure facilitates research of health issues within the community context, rather than working primarily with individuals in isolation (Carson & Pichora-Fuller, 1997).

In ***Phase 1***, the social analysis, the reciprocal relationship between health and social issues is considered. The researcher identifies a target population's social priorities, which in turn reflect that population's quality of life priorities. Successful programmes tend to deal directly, or indirectly, with the issues that people are most concerned with, and will therefore be motivated to change (Kaplan, Sallis, & Patterson, 1993).

Within the NZ population of people who have significant post-lingual hearing losses, military service personnel constitute one sub-group that is at higher risk of developing hearing related disorders (MacDonald, Chamberlain, Long, & Mirfin, 1996; Neville & Alpass, 1999; Salmond & Geddes, 1977; Vincent, Long, & Chamberlain, 1994; Withers, Flett, Long, & Chamberlain, 1997). This is mainly due to exposure to explosive devices, extreme and prolonged engine noise, and, particularly for older ex-service personnel, the historical lack of awareness of the need for hearing protection (Boswell & Newell, 1984). New Zealand War Pensions' (NZWP) management recognised that there are unmet needs for services to ex-service personnel with noise-induced hearing losses (NIHL), and little information available on the efficacy of aural rehabilitation, including hearing aid utilisation. Concern about the negative psychological consequences of hearing losses for ex-service personnel (which will be presented in greater detail later), together with the attendant resource implications related to the under/non-utilisation of hearing aid technology, resulted in NZWP contracting a team of researchers in the School of Psychology at Massey University in March 1999 to investigate these issues. The overall goal of the two year, externally funded research project was to determine predictors of hearing aid use in older ex-service personnel. (This research is summarised in a report by Alpass, Long, Pachana, & Blakey [2003], presented to the NZWP Medical Trust Board: *Optimising use of hearing aid devices in older service personnel.*)

Phase 2, the epidemiological analysis, identifies the specific health goals or problems that may contribute to the social goals or concerns identified in Phase 1 (Kaplan, Sallis, & Patterson, 1993).

Within the context of research on the health of NZ ex-service personnel, varying levels of self-reported hearing impairment have been found in different veteran populations. However, as personal communication with both Statistics NZ and NZWP has indicated that neither government agency has figures to show what proportion of the NZ population is comprised of ex-service personnel, nor what percentage of the NZ ex-service personnel population is aged 65 years and older, it is difficult to establish prevalence rates for the NZ population. An early study of world war two (WWII) veterans (Salmond & Geddes, 1977) reported significant levels of hearing impairment (51.9%) in returned servicemen. More recently in two studies of NZ Vietnam War veterans (see Vincent, Long, & Chamberlain, 1994; and Withers, Flett, Long, & Chamberlain, 1997) the participants reported that their most frequent and severe adverse health symptoms were hearing impairment and hearing problems (59% and 63% respectively). Another recent study of older NZ males found 63% of those who had seen active war duty reporting some degree of hearing losses (Neville & Alpass, 1999). In addition, at least one third (34%) of NZ service personnel involved in United Nations (UN) peacekeeping duties also report experiencing temporary deafness and hearing difficulties six months after deployment (MacDonald, Chamberlain, Long, & Mirfin, 1996). This epidemiological evidence clearly illustrates that historically a significant number of NZ ex-service personnel (especially those involved in combat zones) have returned to civilian life with a legacy of hearing problems. In January 2000, 8957 NZ ex-service personnel aged 50 years and older were listed on the NZWP's database as recipients of hearing aid battery benefits.

In ***Phase 3,*** the behavioural and environmental analysis, specific behaviours and environmental factors linked to the health problems under study are identified and ranked, in terms of relative importance and the degree to which they are changeable, so that clear behavioural and environmental objectives emerge. For instance, research shows that the majority of older people with hearing impairments do *not* present for audiological services (Hickson & Worrall, 2003). Reviewing the gerontological aural rehabilitation literature, Gatehouse (2003) identified seven dimensions that could potentially influence the rehabilitation process in older adults including: personal priorities, expectations and motivations for successful intervention; the presence of existing comorbid conditions such as cognitive impairment and other sensory losses; the management of social and physical listening environments; and the impact of significant others on hearing-impaired persons' disabilities and handicaps. Ageist attitudes present in many social environments fail to support the dynamic problem-solving processes required to optimise older adults' auditory activities, and consequently amplify the restrictions on their social participation (Carson & Pichora-Fuller, 1997; Kiessling, et al. 2003).

The phase 3 data analysis in this study aims to challenge the confines of what Gatehouse (2003) termed our 'Hearing Ghetto' (p. 2S81), by identifying salient behavioural and environmental variables associated with hearing handicap that impact on older ex-service personnel's quality of life. Three theoretical models become prominent in this analysis as they shape significant sections of the multi-disciplinary literatures reviewed, inform the rationale for selecting specific behavioural and environmental variables in the doctoral programme's data collection procedures, and guide the subsequent phase 4 data analyses: Glass and Balfour's (2003) Ecological Model of Ageing (EMA) describes older adults' adaptations to functional losses in late life that impinge on their quality of life; furthermore, Baltes and Carstensen (1996b) describe older adults' social and emotional functional adaptations over their lifespan, while Cohen's (1992) Transactional Model of Stress (TMS) focuses more specifically on the consequences of dynamic exchanges between appraisals of exposure to stress and access to provisions of support that interact and affect people's well-being.

In ***Phase 4,*** the educational and organisational analysis, the researcher evaluates the relationships between those variables comprising the behavioural and environmental factors identified in Phase 3, and groups them into three broad categories, viz.:

(i) *predisposing factors* (motivation-related variables, e.g. knowledge, perceived skills [coping efficacy], attitudes, beliefs, and values that can affect motivation to change);

(ii) positive/negative *reinforcing factors* (usually social-feedback variables that influence behaviours or environments and maintain behaviour change, e.g. the availability of a range of social support mechanisms); and

(iii) *dis/enabling factors* (variables that hinder or help motivation-related variables from becoming realised, e.g. ready and timely access to a range of appropriate aural rehabilitation services, actual skills to perform a behaviour, lack of income or health insurance, restrictive customs, laws or other barriers created by societal forces or systems (Carson & Pichora-Fuller, 1997; Kaplan, Sallis & Patterson, 1993).

For the purposes of this study, the Phase 4 data analyses will initially describe a range of biopsychosocial predisposing, reinforcing, and dis/enabling variables within the dataset, and then explore the empirical links between these variables and the veterans' self-reported hearing handicap (HH) and health-related quality of life (H- QoL).

This research concentrates only on Phases 1 through 4 of the PRECEDE portion of the model, focusing on the most significant issues identified by the current research literature that relate aspects of hearing losses (i.e. body functions), associated disability (activity restrictions) and handicap (implications regarding participation) to quality of life issues (including social and emotional wellbeing) in older ex-service personnel.

Phase 5, the administrative and policy analysis, marks the transition from the planning to the action stages of the model. Within the disability policy context the priority is not only to prevent the onset of disability, but also to formulate policies that alleviate the impact of becoming disabled (Burchardt, 2000). Within the current research context, this phase will reflect the receptiveness of those engaged in health service planning for both older ex-service personnel and civilians to assist those "living with the unwished-for loss (and not just of hearing)" so that "the concomitant discomfort can be eased" (p. 12, Simmons, 2005).

Phases 6-9, are the PROCEED components of the model that implement and evaluate the program in terms of process, impact, and outcomes. As these phases were not relevant within the current research programme, they are not described.

1.4 The prelude: Orchestrating the research agenda

Pichora-Fuller (1994) states that the aim of adopting an ecological approach to aural rehabilitation is to manipulate the contexts, in order to minimise the handicap that individuals or groups experience. Accordingly, the prime goal of the doctoral study research agenda is to enhance our understanding of the frequently obscure psychosocial implications of coping with ageing in an audible world, where at least one partner in a dyad has a pre-existing hearing disability. This goal complements that of the companion main study of the New Zealand War Pensions' (NZWP) Medical Research Trust Board's Hearing Aid Research Project (HARP), which examined the respondent dataset of 1242 veterans aged 50 plus years with hearing losses, to identify what variables in the dataset explained significant variations in their hearing aid use. By contrast, the doctoral study's focus on the dyadic partner perspectives of ageing with hearing losses, aims to distil insights about the potential links within the dyadic dataset between the veterans' hearing handicap, the partners' social support and their health-related quality of life (H-QoL). The following section articulates the doctoral research agenda in terms of four linked aims.

1.4.1 Research aims

More specifically, the aims of this doctoral research project include:

i) Describing the coping trajectories of veterans aged 65 years or older, to depict how they have accommodated ageing with noise induced hearing losses (NIHL) in the audible world.

ii) Comparing dyadic partner appraisals of the legacies of ageing with hearing handicap (HH).

iii) Describing the intersecting structural and functional features of the dyadic partners' social support networks, including the associated sociodemographic characteristics and potential links with the partners' emotional wellbeing and veterans' memory in everyday life.

iv) Finally, identifying which biopsychosocial variables within the dyadic partner dataset explain the most variance in the veterans' perceptions of their self-reported HH and health-related quality of life (H-QoL).

This information will contribute much needed evidence regarding the hearing health issues and communication challenges that confront NZ's older veterans and their spouses/partners, and illustrate how living with hearing handicap impacts on the respective partners' social and emotional well-being, and ultimately their quality of life.

1.4.2 Chapter previews

The first four chapters review the theoretical literature and research evidence that link salient constructs in relation to these stated research aims. The subsequent four chapters describe the research undertaken.

Chapter Two is a prelude to the first research aim, as it reviews the emergent cross-disciplinary gerontological literature that examines how older adults adapt to functional changes in late life. Baltes and colleagues' meta-model of successful ageing describes these adaptive transitions, accommodating Glass and Balfour's (2003) focus on the significance of the person-environment fit in their Ecological Model of Ageing (EMA), in addition to Carstensen's socioemotional selectivity theory (Baltes & Carstensen, 1996a & 1996b). The interdependent features of sensory and cognitive functions in later life lead on to a more detailed consideration of the functional implications of age-related hearing losses (ARHL), which exacerbate the existing limitations associated with noise-induced-hearing losses (NIHL) and tinnitus.

Chapter Three previews literature related to the second research aim, using the EMA to structure the disparate body of research evidence about how older adults and their partners attempt to sustain their social and emotional agency, as they cope with the challenging functional implications of living with hearing losses. The review also refers to the potentially exacerbating presence of chronic conditions, cognitive deterioration, and depression, which are known to marginalise the H-QoL of older adults with hearing losses. Finally, insights from the literature exploring older adults' on-going engagement with aural rehabilitation processes alludes to the emerging literature promoting hearing health within NZ's ageing agenda.

Chapter Four reviews the evolving conceptual approaches to defining and measuring social support, including Lareiter and Baumann's (1992) taxonomy of constructs, and Cohen's (1992) model that recommends focusing on three constructs, namely: social networks, perceived social support and support behaviours. This theoretical exposition informs the empirical rationale implicit in the third research aim, by focussing on the structural and functional features of social support.

Chapter Five previews the empirical links between hearing health, social support, and H-QoL, which are central to the final two research aims. This chapter begins by defining health and functional status in relation to positive ageing and H-QoL, presenting social epidemiological perspectives of stress and health that accommodate Cohen and Syme's (1985) 'main effects' and 'stress buffering' explanatory models. Cohen (1992) embedded these potential explanatory links within his organising theoretical framework (the Transactional Model of Stress or TMS), by integrating a three component model of social support with Lazarus and Folkman's (1984) model describing adaptations to stressful events. The research evidence reviewed subsequently summarises the varying impact of each of the three social support constructs on the health and well-being of older adults. The chapter concludes by focusing on hearing health, social well-being, and older adults' adherence to treatment regimes. Finally, a summary of the evidence linking hearing losses with cognitive deterioration, social isolation and depression precedes an overview of the pilot study's objectives.

Chapter Six provides a synopsis of the pilot study, including a concise exposition of the aims and objectives, research design, the data collection methods, data analysis, and results. The discussion reflects on how the outcomes of these processes influenced the subsequent main study, in particular regarding the need to engage an ecological perspective that included dyadic partner respondents, and the associated consideration of selecting appropriate biopsychosocial variables and data collection methods. Finally, the doctoral hypotheses linked to the study's first three aims focus on the respondents' self-reported HH, social support, and H-QoL. An integrated model of Ageing with Hearing Handicap subsequently provides a generic framework to select salient blocks of independent variables for three hierarchical regression analyses. The fourth and final research aim's associated hypotheses explore the relative contributions of these variable blocks to the explained variance in the veterans' self-reported perceptions of their HH, physical and mental H-QoL.

Chapter Seven describes the doctoral study research process, including the research design, participant recruitment of the respondent dyads, data collection procedures, and variables measured (biographic information, hearing-related information, psychological well-being, general, physical, and mental health, social support, and memory in everyday life).

Chapter Eight describes the data screening methods used, before summarising an array of biopsychosocial variables from each dyadic partner sample that encapsulate the ecological perspectives of the study's aims. Analyses of variance examine the impact of gender and the respondents' social support networks on their perceptions of emotional support and the presence of depressive symptoms. Theoretical perspectives subsequently guide the selection of salient blocks of independent variables for the hierarchical regression analyses. This flexible data analysis technique (Tabachnick & Fidell, 2001a) provides opportunities to explore the potential empirical links between and within blocks of salient ecological independent variables and three specific dependent variables, namely the veterans' self-reported perceptions of their: (i) HH; (ii) Physical H-QoL; and (iii) Mental H-QoL.

Chapter Nine discusses the study's findings in terms of the four aims and their associated hypotheses, drawing on relevant theoretical perspectives presented in the literature review to explain the significant cross-sectional links that emerged. Suggested methodological implications are presented at the end of each section, before using the generic composite model of Ageing with Hearing Handicap to focus on the conceptual and ecological implications of the study's multivariate findings. Concluding comments consider the response rates, which ultimately impact on the study's strengths and weaknesses. These in turn highlight the importance of socioemotional selectivity within the positive ageing agenda, and the need for coordinated ecological interventions to mitigate the diverse effects of ageing with hearing losses on both those afflicted and their communication partners. Finally, some suggestions are made in relation to potential policy implications of the study's findings and future research, before summarising the contributions of the present research.

CHAPTER TWO: ADAPTING TO FUNCTIONAL CHANGES: AGEING SENSORY FUNCTIONS

2.1 Functional limitations in old age
  2.1.1 Adaptive transitions in late life
  2.1.2 Normative perspectives: New Zealand's ageing population
  2.1.3 Ageing and functional limitations
  2.1.4 An ecological model of ageing

2.2 Ageing sensory functions
  2.2.1 Sensory synthesis and cognitive ageing
  2.2.2 Changing visual acuity in older adults
  2.2.3 Age-related changes in hearing
  2.2.4 Prevalence of age-related hearing losses
  2.2.5 Noise-induced hearing losses
  2.2.6 Tinnitus

2.3 Summary

Chapter Two comprises two complementary sections. The first section reviews the emerging cross-disciplinary literatures that explore older adults' adaptive transitions to functional changes in late life, by presenting three significant explanatory models. Firstly, Baltes, Staudinger, and Lindenberger's (1999) metamodel of 'successful ageing' describes the psychological processes of selective optimisation with compensation that occur throughout the lifespan, which subsumes Carstensen's theory of socioemotional selectivity (refer Baltes & Carstensen, 1996a & 1996b); and secondly, Verbrugge and Jette (1994) explore the sociomedical consequences of 'the disablement process' in late life. Finally, Glass and Balfour's (2003) Ecological Model of Ageing (EMA) provides a relevant theoretical framework for researchers who wish to focus on the interaction between environmental factors, and older adults' adaptive responses to their functional limitations. These intersecting models inform the subsequent section's focus on ageing sensory functions, and highlight the complex interactions between visual and auditory perceptions, and cognitive factors that support *communication. A description of age-related changes in vision and hearing precedes a discussion of the objective and subjective measurement of hearing losses in ageing populations, which affects the prevalence reported in the epidemiological evidence. The section concludes by describing salient features of noise-induced hearing losses (NIHL) and tinnitus, two commonly occurring conditions in ex-service personnel. The final summary highlights salient features that foreshadow Chapter Three's focus on older adults' experiences of coping with hearing handicap.*

2.1 Functional limitations in old age

Ageing populations create demographic shifts that inevitably produce significant social transformations, particularly in the domains of health and well-being (Glass & Balfour, 2003). For example, whilst infectious disease has preoccupied public health in the past century, the dominant epidemics of this century are likely to be the "chronic, progressively degenerative, complex diseases of late life" (Glass & Balfour, p. 304) such as functional disabilities associated with dementia.

2.1.1 Adaptive transitions in late life

Friedrich's (2001a) distillation of gerontological theories within the lifespan perspective drew attention to the unfolding interplay between biological and cultural factors as people age. In particular, he focused on Paul Baltes' advocacy for successful ageing in both research and model building (refer Baltes, Staudinger, & Lindenberger, 1999; Friedrich, 2001b). Baltes has stated that whilst succeeding in adding years to average life expectancy, society and individuals appear to be uncertain as to how to add life to the years gained (Friedrich, 2001b). Paul and Mary Baltes (1998) have also observed that research and knowledge about ageing well lags behind the remarkable increase in biological longevity.

Integrating the myriad multi-disciplinary facts and ideas about the primary determinants of normative patterns of functional changes across the lifespan is difficult. For example, as the definition of quality of life is likely to vary at successive stages of the lifespan, so are the associated primary human attributes that predict a long and positive life (Friedrich, 2001b). Whilst *pathological ageing* associated with chronic illnesses of later life emphasises the importance of physical attributes and genetic endowment, *normal ageing* also acknowledges the presence of significant declines in physical attributes (refer Fries, 2003). Clearly, age-related physical changes contribute to both the length and the quality of life (Stuck, Walthert, Nikolaus, Büla, Hohmann, & Beck, 1999); however, researchers within the lifespan development field (such as Baltes & Mayer, 1999; Schaie & Willis, 1996) also draw attention to a wide range of inter- and intra-individual variability in age related abilities that characterises the later stages of the lifespan. As a result, Friedrich warns that reported normative age-related changes in human abilities should be viewed only as guides, not grading scales, when interpreting individual assessments of 'successful', 'normal', and 'pathological' ageing.

When individuals experience the erosion (loss) of previously held goal-relevant means to desired outcomes, they have access to compensation irrespective of their lifespan developmental phase (Friedrich, 2001b). Baltes and his colleagues' exploration of the concepts of selection, optimisation and compensation over the lifespan provide insights into successful ageing (see for example Baltes & Baltes, 1990; 1998; Baltes & Carstensen, 1996b; Baltes & Smith, 2003; Freund & Baltes, 1998; 1999). Psychological adaptation for the inevitable loss of previous levels of functioning and/or significant others occur throughout the lifespan, but compensation strategies for successful ageing are maximised if individuals "actively seek (select) and maintain (optimize) multiple goals" (p. 132, Friedrich, 2001b). In their examination of coping styles and psychological resilience, Staudinger, Freund, Linden, and Maas (1999) found that for those with high socioeconomic risks wanting to know what was going on was unhelpful, whereas seeking support from others was protective. Similarly, regarding somatic risks and ageing satisfaction, correlational data from the Berlin Ageing Study (BAS) indicated that 'giving up' was protective, whereas 'keeping going' and 'wishing for information' was not. Staudinger and colleagues suggested that Baltes and Baltes' (1990) psychological perspectives on successful ageing explain how increasing selectivity becomes adaptive, as the somatic risks associated with ageing increase. Thus, the development and maintenance of older adults' coping abilities requires informed understanding of the dynamic selection processes which range from "the nexus between motivation and volition, to the phase of action control in achieving set goals" (Staudinger et al., 1999, p. 315; see also Heckhausen, 2001). Carstensen's (1992) lifespan theory of socioemotional selectivity offers insights regarding socially constricting adaptive transitions that characterise social ageing (see also Baltes & Carstensen [1996a & 1996b] and *5.4 Social support and health in older adults*, in Chapter Five).

An examination of the current range and prevalence of functional limitations within New Zealand's ageing population supplies a normative contextual backdrop for the current research.

2.1.2 Normative perspectives: New Zealand's ageing population

In New Zealand (NZ), the proportion of people in the population aged 65 and over will increase from 12 percent in 2001, to 26 percent by 2051 (Ministry of Health, 1999b). Increases in life expectancy will inevitably be associated with increases in the prevalence, incidence, and progression of non-fatal disabling conditions (including mental illness, cognitive impairment, hearing and vision losses, and musculoskeletal disorders such as arthritis). Table 2.1 (below) provides a snapshot of the 2001 incidence rates of different types of disability, by residential status, for New Zealanders aged 65 years and over.

Whilst these data provide a normative framework of the incidence and prevalence of functional declines associated with ageing in NZ, the prevailing patterns of comorbidity are not evident; and yet a multiplicity of chronic conditions is the general rule in the older population (Jette, 1996). For example, Verbrugge, Lepkowski, and Imanaka (1989) reported that for adults aged 55+ in the 1984 US National Health Interview Survey (NHIS), over 60% reported having *more* than one chronic condition, and that the mean number of conditions for this age group was 2.6. Despite this, there is limited research evidence of the impact of specific combinations of chronic conditions on the lives of older people (Jette).

Table 2.1

Rank ordered incidence of specific types of disability within the New Zealand population aged 65 and over, by residential status: 2001[a]

Type of disability	Household (rates per 1000)	Residential (rates per 1000)	Total
1. Mobility	382	914	413
2. Agility	295	887	329
3. Hearing impaired/deaf	221	404	231
4. Partially sighted/blind	77	452	99
5. Remembering	68	533	95
6. Learning disability	29	480	55
7. Speaking	28	272	42
8. Psychiatric/psychological	25	327	42
9. Intellectual	9	106	15

[a] *Adapted from the Ministry of Health's (2002a) "Health of Older People in New Zealand: A Statistical Reference", Table 4, p. 54.*

2.1.3 Ageing and functional limitations

Jette (1996) argues that by assessing the type and severity of functional impairments present in older populations, it is possible to illuminate the links that exist between the presence of chronic conditions and their impact on older adults' life functioning. In their sociomedical model of disability (referred to as 'the disablement process'), Verbrugge and Jette (1994) advocate the need for researchers to focus on the relational consequences of the disablement process, to develop a better understanding of three key aspects, viz.: (i) Older person's subjective perceptions of their disablement situation, including their reactions to it (e.g., denial and/or depression). (ii) The subjective perceptions of those with whom the older person interacts within their disablement situation and the expectations these people hold of that person. (iii) The environmental characteristics that enable the older person to function normally (e.g., by identifying enabling environmental features, and potentially modifiable barriers).

Gerontological reviews of functional limitations

An earlier, systematic literature review of 78 longitudinal studies (published between 1985 and 1997) that reported statistical associations between individual base-line risk factors and subsequent functional status in community-living older persons, identified 14 domains of significant risk of functional decline (Stuck, Walthert, Nikolaus, Büla, Hohmann, & Beck, 1999). Table 2.2 lists nine of these domains (and their associated definitions) that are salient in the current research context. Although many studies in Stuck et al.'s review reported the impact of self-reported conditions and clinical findings on functional status, some methodological inconsistencies between the studies limited opportunities for comparative analysis. Despite this, the authors identified four conditions for which 10 or more studies reported significant associations with subsequent functional status decline, namely: hypertension, stroke or transient ischemic attacks, diabetes, and arthritis.

Table 2.2

Stuck et al.'s (1999) synthesis of risk factors for functional status decline in community-dwelling older adults: Nine salient main risk factor domains with related definitions[a]

Domain	Specific definition	Strength of Evidence[b]
1. Affect	Depression	+++
2. Alcohol	Heavy alcohol consumption	++
	No alcohol consumption	+++
3. Cognition	Cognitive impairment	+++
4. Comorbidity	Number of prevalent chronic conditions	+++
	Number of incident chronic conditions	+++
5. Hearing	Decline hearing function	(+)
	Reduced measured hearing	(+)
	Poor self-reported hearing	+
6. Physical activity	Low physical activity	+++
7. Self-rated health	Poor self-rated health	+++
8. Social	Low level of social activity	++
	Low frequency of social contact	+++
	Low level of social support	Not rateable
9. Vision	Decline in visual function	(+)
	Reduced measured visual acuity	++
	Poor self-reported vision	+++

[a] *Domains are adapted from Stuck et al.'s (1999) Table 3, pp. 454-455, and ranked alphabetically.*

[b] *(+) significant risk noted, but also methodological limitations; + one appropriate analysis included people with functional impairment at baseline who showed significant increased risk of functional status decline for those with the risk factor(s) at baseline; ++ >= 2 appropriate analyses showed increased risk; +++ >= 2 appropriate analyses showed increased risk, in comparison to people without a risk factor.*

Chronological age is consistently the most important sociodemographic factor that predicts functional status in late life (Guralnik, LaCroix, Abbott, Berkman, Satterfield, Evans, et al., 1993). However, Stuck et al. (1999) also report that females survived longer with incident disability than males, which explained the higher prevalence of disability among females (refer Strawbridge, Kaplan, Camacho, & Cohen, 1992). In addition, higher education was associated with better functional status in older adults (Guralnik et al.; see also Gibson, 2003).

Jette (1996) acknowledged the contributions of sociological perspectives to our understanding of the disablement process in late life, and described three different opportunities where disability prevention strategies could be used: Firstly, at the *primary level*, to encourage individuals to avoid exposure to pathological agents (such as toxic noise). At the *secondary level*, early detection is crucial to ameliorate or slow the progression of an impairment (e.g., the provision of primary health screening for hearing losses in older adults), and should be linked to the provision of efficacious interventions (e.g., appropriate aural rehabilitation services). Finally, at the *tertiary level*, it is necessary to engage in community-wide initiatives that minimise secondary complications (such as older communicators avoiding public venues like theatres, cinemas, churches, shops and even different modes of public transport, as no provision is made for those who rely on amplification to understand speech), and thereby sustain social participation within community settings.

Stuck et al. (1999) noted that not one study in their review focused on the physical environment as a predictive factor of functional limitations in old age, and only a few studies addressed interactions between the risk factors. One of these studies reported that the combination of hearing and vision impairments had a greater effect on functional decline than either sensory limitation alone (refer Laforge, Spector & Sternberg, 1992). Another study focused on the interactive effects of emotional and instrumental support, illustrating the complexity of interactions between social support risk factors and physical performance (Seeman, Berkman, Charpentier, Blazer, Albert, & Tinetti, 1995). Kington and Smith (1997) also demonstrated that socio-economic status was the main determinant of functional effects for people in the United States with three specific chronic conditions (namely hypertension, arthritis and diabetes).

2.1.4 An ecological model of ageing

Until recently, the study of environmental influences on health has tended to reside in the field of environmental psychology, and focus on mental health outcomes (Glass & Balfour, 2003). In their selective review of this literature, Glass and Balfour cite Halpern's (1995) conclusions that the planned environment can potentially influence the mental health of people of all ages through: (i) stress; (ii) social networks and support; (iii) social labelling; and (iv) the planning process itself (Glass & Balfour, p. 310). They added that whilst well-being is a multidimensional construct, few studies within the environmental psychology literature have used clinical indicators, or recognised measures of psychological and emotional function.

Lawton and colleagues' ecological model of ageing (refer Lawton & Nahemow, 1973; Lawton, 1988 & 1999), and Macintyre and Ellaway's (2000) resuscitation of an ecological approach that accommodates interventions at both the individual and environmental levels, provided the conceptual framework for Glass and Balfour's (2003) model, including possible etiological pathways (refer Figure 2.1 below). Lawton and Nahemow's original ecological model described the dynamic interplay between the environmental demands (called press) and the individual's ability to deal with them (referred to as competence). These environmental demands referred to both the physical and the social features. Glass and Balfour's ecological model attempts to address the limitations of Lawton's original model, and facilitate the selection, definition and measurement of potential constructs, by elaborating clear causal pathways that explore how the person-environment fit may ultimately influence health and functioning.

Glass and Balfour's (2003) Ecological Model of Ageing

Glass and Balfour's (2003) Ecological Model of Ageing (EMA) depicted in Figure 2.1 (below) provides an opportunity for researchers to generate testable hypotheses about the conditions under which an older adult might 'use' or 'lose' relevant competencies (e.g., speech recognition in noise). The model comprises five components. The first component includes four specific dimensions of neighbourhoods, which Glass and Balfour hypothesise shape the degree of person-environment fit. The degree of fit occurs through the interactions between the ebb and flow of environmental press and buoy, which elicit, affirm or diminish personal competencies. These competencies in turn shape adaptive/maladaptive cognitive behavioural responses, observed through behavioural channels such as coping responses, interactive communication and physical activities, social engagement, and health service utilisation.

Glass and Balfour also include three factors that can potentially exacerbate the environmental press and/or patterns of behavioural responses in older adults: the presence of chronic conditions, cognitive impairment and depression.

The EMA provides a more elaborate contextual explanation of possible interactions that may occur between the PRECEDE model's depictions of behavioural lifestyle and environmental factors in Phase 3, and the predisposing, reinforcing, and dis/enabling factors identified in Phase 4 (refer Figure 1.2, Chapter 1). In essence, the *Neighbourhood factors or characteristics* encapsulate **predisposing sociodemographic characteristics** of the PRECEDE model's environmental analysis. The *Person-environment fit* encapsulates the behaviour and lifestyle aspects, including positive (i.e. environmental buoying) and negative (i.e. environmental press) **reinforcing structural support factors** that elicit and support/suppress the expression of *Personal coping competencies.* These competencies in turn intersect with a range of **dis/enabling functional support factors** (such as active versus passive coping, interactive communication, sustained social participation, hearing health and uptake of aural rehabilitation services), enlisted in the *Adaptive/maladaptive responses.* The presence of chronic conditions, cognitive impairment, and depressive symptomatology also affect older adult's coping competencies and their social agency. Chapter Three describes the functional implications of ageing with hearing losses articulated by Glass and Balfour's (2003) EMA; and Chapter Five elucidates further on possible explanatory social support mechanisms subsumed within the interactive predisposing, reinforcing, dis/enabling, and potentially exacerbating factors of the EMA's social epidemiological perspectives.

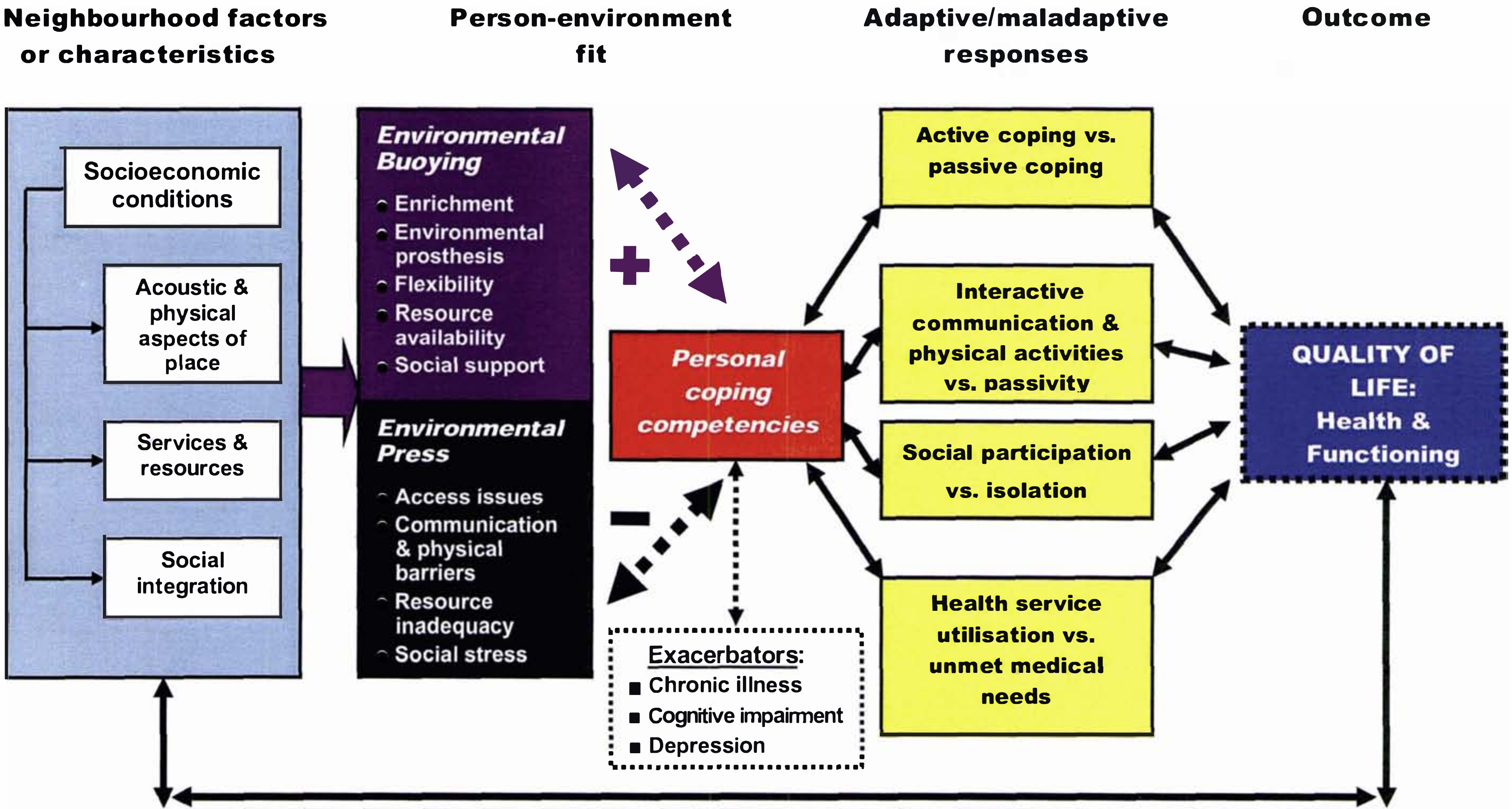

Figure 2.1. Glass and Balfour's (2003) adapted Ecological Model of Ageing (EMA), which suggests possible etiological pathways of potential predictors of successful adaptation and/or functional decline. (Adapted from Glass & Balfour [2003], Figure 14-2, p. 314.)

2.2 Ageing sensory functions

This section describes the effects of ageing sensory functions on cognition and communication in older adults.

Individuals' internal representations of the external world mediate their links to it (Lawton & Nahemow, 1973), and their sensory systems provide the critical channels through which they access and connect with their physical and social environments. Whilst the term 'ageing sensory functions' refers to vision, hearing, taste, olfaction, and cutaneous sensitivity (Schieber, 1992), the ensuing literature review will focus mainly on hearing, but also include vision.

As most age-related sensory losses are gradual, there is an enhanced risk that they might go unrecognised and untreated (Wallhagen, Strawbridge, Shema, Kurata, & Kaplan, 2001). Yet even mild sensory impairments affect older adults' everyday functioning and ultimately their quality of life (Wallhagen et al.). (Refer also to Clark, Bond & Sanchez, 1999 and Marsiske, Klumb, & Baltes, 1997.)

Wallhagen et al.'s (2001) findings from a 1994-1995 prospective cohort data set (N=2,442) that controlled for baseline assessments and used two levels of impairment, established a dose-response effect that strengthened the links between both hearing and vision impairment, and reduced physical and psychosocial functioning. Whilst the impact of vision impairment on functional status was more wide ranging, even mild hearing impairment influenced functional status. Brennan's (2003) review of the prevalence rates of dual sensory losses in three longitudinal studies reported a substantial decrease from 21 percent in the 1984 baseline Longitudinal Study of Aging, to 12 percent in the 1993 baseline Assets and Health Dynamics of the Oldest-Old (AHEAD) study, and 9 percent in the 1994 baseline NHIS study. Brennan suggested that this decrease is consistent with Fries' (1980; 2001; 2003) "compression of morbidity" thesis that predicts delays in the onset of functional limitations until the last years of life, in current and future cohorts of older adults.

2.2.1 Sensory synthesis and cognitive ageing

Understanding older listeners' comprehension difficulties requires an appreciation of the complex interactions between the perceptual and cognitive factors that support communication, such as language comprehension (refer Schneider, Daneman, & Pichora-Fuller, 2002). In order to explain how normal ageing trajectories intersect with sensory and cognitive functioning domains, gerontological researchers have suggested two alternative theoretical models (refer Figure 2.2, below). The first, based on Birren's *cascade hypothesis*, suggests that a 'domino effect' occurs on other areas of functioning, due to the presence of sensory deficits (Wahl & Heyl, 2003). The competing *common cause hypothesis* suggests that the associations between sensory and cognitive losses are a product of age-related neuronal deterioration. Wahl and Heyl state that current evidence, supported by strong physiological findings, favours the latter interpretation.

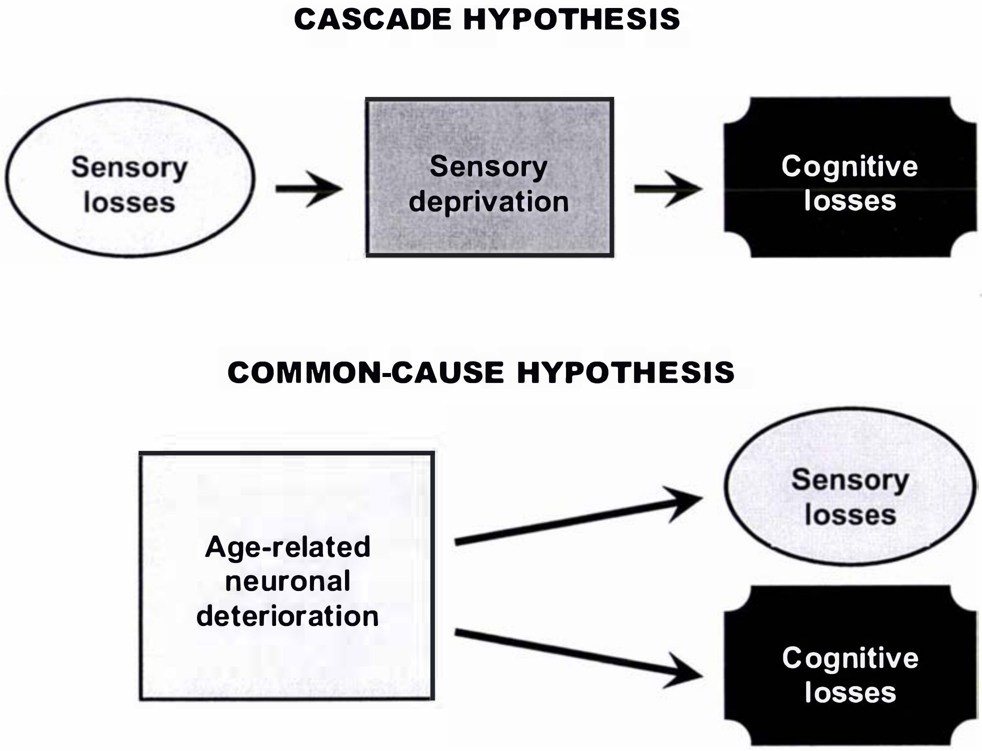

Figure 2.2. Theoretical models relating sensory functioning and cognitive capacity in old age. (Adapted from Wahl & Heyl [Spring, 2003], Figure 1, p. 42.)

Salthouse (2003) noted that although memory starts to age in early adulthood, it overlapped with other aspects of cognitive ageing in later adulthood, including declines in sensory functioning (see also Anstey, Hofer, & Luszcz, 2003). In addition, although longitudinal data from both the Australian Longitudinal Study of Ageing (ALSA; Anstey, Luszcz, & Sanchez, 2001a) and the BAS (Lindenberger & Baltes, 1994) suggest that changes in sensory and intellectual functioning are interrelated (Li & Lindenberger, 2002), Anstey et al. question the causal nature of this relationship. They suggest that the evidence in cross-sectional as opposed to longitudinal research designs may be more pronounced (Anstey, Luszcz, & Sanchez, 2001b). In addition, a group of researchers attached to the BAS have queried the impact of short-term, intra-individual fluctuations on the performance of older adults, suggesting that these should not be labelled measurement errors, but as potentially important empirical variables for understanding the characteristics of sensory and cognitive ageing (Li, Aggen, Nesselroade, & Baltes, 2001).

Significant declines in both hearing acuity and cognitive performance have predicted mortality over 4- and 6-year periods, in the ALSA's stratified random sample of 1,947 males and females aged over 70 years (Anstey, Luszcz, Giles, & Andrews, 2001). However, 5-year predictors of mortality in the Canadian Study of Health and Aging (1991; cited in Ostbye, Steenhuis, Wolfson, Walton, & Hill, 1999) that showed strong associations for vision, hearing, and the presence of heart disease, stroke, and diabetes in unadjusted univariate analyses, reflected minimal contributions in the multivariate analyses. Despite this, the multivariate analysis of cross-sectional data from the AHEAD study in the United States (which surveyed 7,320 community-dwelling persons aged 70 years and older), demonstrated significant independent relationships between self reports of visual and hearing impairment, and overall self-rated functional status in the oldest old (Lee, Smith, & Kington, 1999). Lee et al. reported that irrespective of education, marital status, and income or wealth, those respondents who reported either their vision (27%) or hearing (25%) as fair or poor, were significantly more likely to experience declines in overall functioning, even after adjusting for medical conditions, other symptoms, and general health status.

Given the possibility of potential additive effects of dual sensory declines (Fozard & Gordon-Salant, 2001), older adults with lower levels of education and self-efficacy have demonstrated a higher risk of developing subsequent functional limitations (Kempen, van Heuvelen, van Sonderen, van den Brink, Kooijman, & Ormel, 1999). This ultimately affects their quality of life (Horowitz & Steun, 2003), especially in the domain of mental health (Kempen, Brilman, Ranchor, & Ormel, 1999). For example, Appollonio and colleagues' initial cross-sectional study (baseline 1986) of 1192 older community-dwelling residents (aged 70-75 years) of Brescia, Northern Italy, demonstrated that uncorrected declining visual and hearing acuity was associated with a significant and independent impairment of mood, self-sufficiency in instrumental activities of daily living (IADLs), and poor social relationships (Appollonio, Carabellese, Frattola, & Trabucchi, 1996). The authors' subsequent follow-up of participant mortality six years later showed men with uncorrected sensory impairment were almost twice as likely to die. This highlighted the double jeopardy of uncorrected sensory losses, as the impact of restrictions to social participation are not readily apparent (refer Bassuk, Glass, & Berkman, 1999). Verbrugge and Patrick (1995) also draw attention to this in their concluding comments, following an analysis of the impact of seven chronic conditions on US adults' activity levels and use of medical services. They stated that research focused on mortality is nourished by a biomedical ethos that fails to prioritise the needs of those with nonfatal disabling conditions (such as sensory losses), and consequently also fails to realign health services appropriately, in order to provide for "conditions that bother and disable many persons for many years" (p. 181).

The fact that between 15%-20% of older participants were identified with dual sensory losses in an Australian study (Hickson, Lind, Worrall, Yiu, Barnett, 1999) and an American study (Klein, Cruickshanks, Klein, Nondahl, & Wiley, 1998) highlights the importance of assessing *both* vision *and* hearing in older people, in order to provide appropriate rehabilitation (refer also Hull, 1995b). In their edited review of normative age-related sensory changes, the prevalence and risk factors associated with major age-related disorders, their functional consequences, treatments and interventions, Horowitz and Steun (2003) draw attention to the need to expand current conceptualisations of rehabilitation, in order to cater for chronic age-related impairments such as sensory losses. They stated sensory impairments are *not* normal, do *not* have to be accepted, and that treatment options *are* available. However, Kricos, Holmes, and Doyle (1992) highlighted the lack of documentation evaluating the effectiveness of audiological rehabilitation for older adults; and Wahl and Heyl (2003) noted that the timing of rehabilitation is particularly crucial for the success of interventions in old age.

The remaining sections briefly describe age-related changes that occur in vision and hearing.

2.2.2 Changing visual acuity in older adults

Many of the optical and neural features of an adult's visual system change with increasing age (Schieber, 1992), with reported prevalence rates of vision impairment in older adults ranging between 10% and 30% (Hickson et al., 1999). The five principal types of visual complaints that older adults commonly report include problems seeing under low light levels, difficulties processing rapidly changing displays, problems searching for visual targets in the environment, difficulties with near visual tasks, and resolving fine detail in a moving target (Kosnik, Winslow, Kline, Rasinski & Sekuler, 1988). Kosnik et al. conclude that the rates of decline for different tasks vary, due to the differential ageing rates of different aspects of vision.

As visual losses usually occur gradually and may be undetected for some time, primary screening is important to preserve sight, and prevent disability and loss of function (Abyad, 1997). This is particularly important, as profound visual impairment is more likely to occur in older populations (Schieber, 1992), with the four major potentially treatable causes of visual losses in older adults including cataracts, age-related macular degeneration, glaucoma, and diabetic retinopathy (Lee & Beaver, 2003). The more commonly occurring disorders such as cataracts and macular degeneration compromise the perception of oral and facial cues, which are essential for those with acquired hearing losses, who rely on vision and lip reading to compensate for their listening limitations (Erber, 2003). Erber illustrated how communication conditions such as impaired or limited vision can affect individuals' capacities to communicate fluently in face-to-face conversations. Figure 2.3 (below) depicts graphically the dynamic reflexivity of dual sensory losses in older adults that modulate hearing impairment in differing communication conditions. People with hearing thresholds below about 1000 Hz are particularly vulnerable, as the audibility of conversational speech is seriously impaired when the perception of oral and facial cues deteriorates, and no longer provides an effective compensatory mechanism for age-related hearing losses (ARHL). When these dual sensory changes occur, the older person typically requires assistance from communication partners (e.g., slower speech and shorter sentences to avoid the need for repetition), and will require louder directed sound (e.g., closer distances between communicators to minimise competing ambient sounds, increased voice level and electronic amplification).

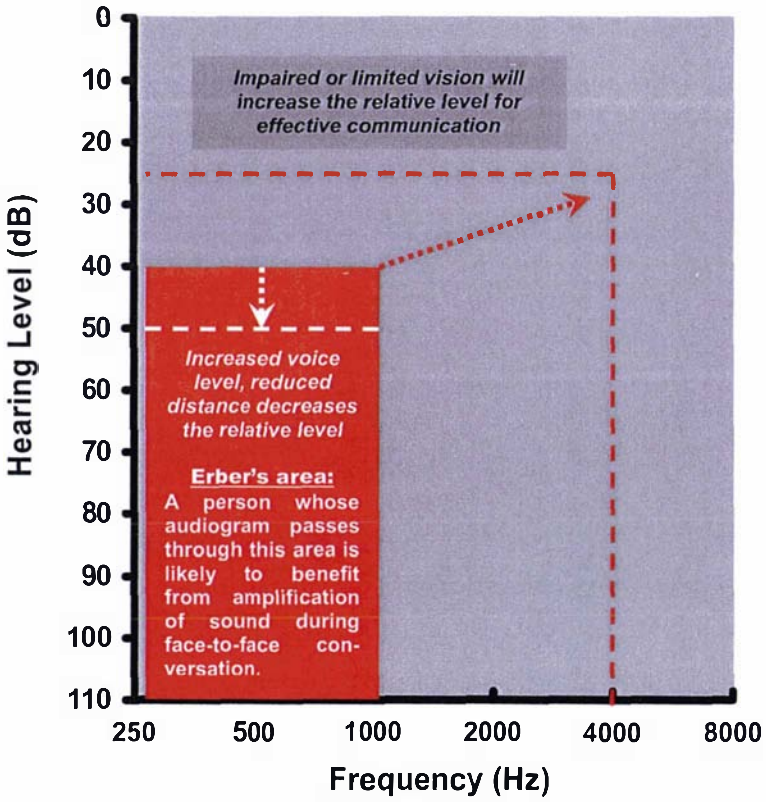

Figure 2.3. Audiogram depicting the profiles of people who require amplification to sustain fluent face-to-face conversation. The size of *Erber's area* is likely to change as a function of the communication conditions (e.g., acquired vision impairment).
(Adapted from Erber [2003], Figure 2, p. 2S23; but originally cited in Erber [2002].)

2.2.3 Age-related changes in hearing

There is substantial evidence that hearing losses in older adults are under-diagnosed and under-treated (Yueh, Shapiro, MacLean, & Shekelle, 2003). In a comprehensive review of the otogerontology literature examining age-related anatomic and physiologic changes, Chisolm, Willott, and Lister (2003) cite Willott's (1991) formal definition of age-related hearing losses (ARHL) as "hearing impairment associated with various types of auditory system dysfunction, peripheral or central, that accompany ageing and cannot be accounted for by extraordinary ototraumatic, genetic, or pathological conditions" (p. S3). Based on this definition, the authors identified three interconnected processes for hearing well and understanding speech. The first process refers to the peripheral auditory system, which detects, responds to, and encodes acoustic stimuli, by converting sound waves into electrical impulses referred to as action potentials (refer to Figure 2.4, below, which shows the anatomy of the external, middle and inner ear).

The second process refers to the central auditory system, which modifies and analyzes myriad action potentials within complex neural circuitry, into 'heard sounds.' Finally, cognitive processes enhance perception, facilitate comprehension, and store information in memory for future use. As age-related changes at each stage affect processes in other stages, aural rehabilitation needs to address the interdependent, synergistic interactions of all three stages (Chisolm et al.).

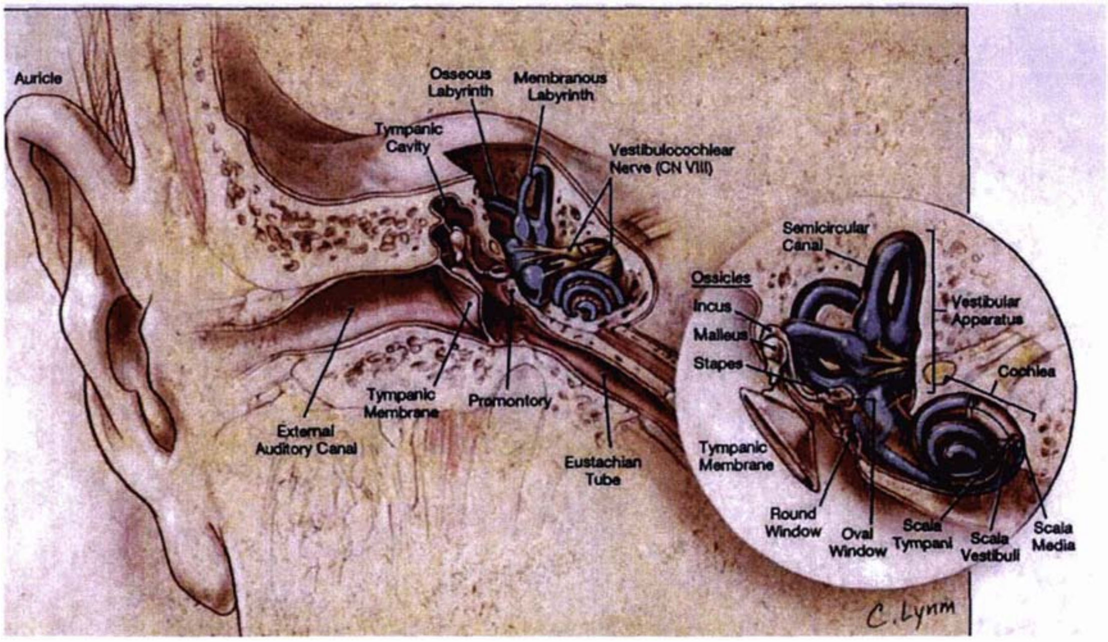

Figure 2.4. Anatomy of the external, middle and inner ear (coronal view). (Copied from, Yueh, Shapiro, MacLean, & Shekelle, 2003, Figure 1, p. 1979. Copyrighted © (2003), American Medical Association. All Rights reserved.)

The **external ear** comprises the pinna (auricle) and external auditory canal. The **middle ear** is bounded laterally by the tympanic membrane, and medially by the osseous labyrinth, and includes the three ossicles (malleus, incus and stapes). The **inner ear** is bounded by the osseous labyrinth and includes the vestibular apparatus, the fluid-filled channels of the cochlea (scala vestibule, tympani, and media), and the vestibulocochlear nerve (cranial nerve [CN] VIII).

2.2.4 Prevalence of age-related hearing losses

Given the functional complexities of ageing hearing alluded to in this chapter, it is difficult for professionals who assess and treat older adults with communication difficulties to agree on reliable criteria that gauge hearing impairment in old age, which can also be used to determine prevalence. Consequently, there has been some controversy about the estimates of hearing losses among those aged 65 years and beyond, with reported prevalence rates varying from as low as 30% to as high as 80% (Hull, 1995c). Whatever the definition, the evidence shows clearly that both the incidence *and* the prevalence of hearing losses increase with age (Pichora-Fuller & Cheesman, 1997). Hearing losses are the third most prevalent chronic disability among older adults in most Western industrialised nations, superseded only by arthritis and hypertension (Haber, 2003; refer also to Table 2.1 above, which ranks the incidence of specific types of disability, for adults aged 65 and over, within New Zealand, in 2001).

Objective audiometric measures:

The gold standard when defining hearing impairment refers to limitations of function depicted by raised hearing thresholds (Gordon-Salant & Leek, 2004), "measured as decibels of hearing loss (dB HL) relative to the hearing of a normal population, at specific frequencies, usually 250, 500, 1000, 2000 and 4000 Hz" (p. 954, Patterson, 1994). However, as hearing disability is multifaceted and multifactorial (Stephens & Hétu, 1991), these thresholds only reflect a restricted portion of hearing activities and the associated limitations. For example, as people age, they typically begin to experience a loss of acuity in the higher frequencies. This loss initially occurs around the 4 KHz level, but cascades downwards across increasingly lower frequencies as age increases (refer to Hull's [1995f] Figure 2.5, below). While the frequency of most speech occurs within the 500-4000 Hz range, certain consonants in spoken English (e.g. f, s, th) have higher frequencies, and as the higher frequency phonemes become inaudible, received speech patterns appear incomplete and muffled, particularly when competing with background noise (Patterson; Scheuerle, 2000).

Although many simple tests of hearing losses exist (e.g., the Whispered Voice Test), they are difficult to standardise sufficiently to include in a systematic screening programme. Several authors have suggested combining physiological *and* functional measures to provide the most reliable means of identifying people with different types of hearing losses (Yueh, et al., 2003).

Combining objective and subjective measures:

On reviewing the hearing losses literature (1985-2001), Yueh and his colleagues recommended a screening protocol that uses a combination of audioscopes (hand-held otoscopes with audiometers) to gauge hearing thresholds, *and* the 10-item self-administered Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) version (Ventry & Weinstein, 1983; Weinstein, 1986) to gauge the social and emotional impact of living with hearing handicap. (The methodology chapter provides psychometric details of Ventry and Weinstein's full 25-item Hearing Handicap Inventory [HHI], and the 10-item screening version for 'significant others'.)

Over the past decade, three major Australian epidemiological studies have used objective and subjective measures to examine hearing losses in adults (Sanchez, 2004). The South Australian Hearing Study (SAHS) has provided the first measured audiological estimates of hearing impairment for an Australian population (Wilson, Walsh, Sanchez, & Read, 1998; Wilson, Walsh, Sanchez, Davis, Taylor, Tucker, et al., 1999). Wilson et al. noted that their data shows how self-reported estimates of hearing impairment can result in a higher probability of both false positives and false negatives. Sanchez illustrated this caveat with positive and negative predictive values of self-reported hearing questions from both the SAHS (which included people under 70 years old) and the ALSA, whose sample excluded those under 70 years). The self-report sensitivity rates of hearing problems improved in the older age groups (from 17.1% for those < 70 years to 78.7% for those ≥ 80), whilst the specificity rates decreased (from 100% for those < 70 years to 54.8% for those ≥ 80; refer Sanchez, p. 36, Table 2). This feature endorses Weinstein and Ventry's (1983) earlier recommendations which noted that, given the variability in older adults' responses to hearing impairment questions, coupled with the fact that audiometric measures only explain less than half the variance in hearing handicap, a self-report format of hearing handicap in older adults is more appropriate than any inferences based on audiometric data (see also Rosenhall, Pedersen, & Moller, 1987).

Evidence from the third Australian study, the Blue Mountain Hearing Study (BMHS), indicated that both a single, 'global' question and a score of > 8 on the HHIE-S were sufficiently sensitive and specific to provide a reasonable estimate of hearing losses (Sindhusake, Mitchell, Smith, Golding, Newall, Hartley, et al., 2001). The authors noted the single question was minimally affected by gender or age, and performed relatively better identifying those with mild hearing losses. On the other hand, the HHIE-S scores were more effective identifying those with moderate hearing losses, and performed better in younger, male participants. Sindhusake et al. concluded that both question formats are suitable for use in epidemiological studies that aim to assess the magnitude of the burden from age-related hearing impairment.

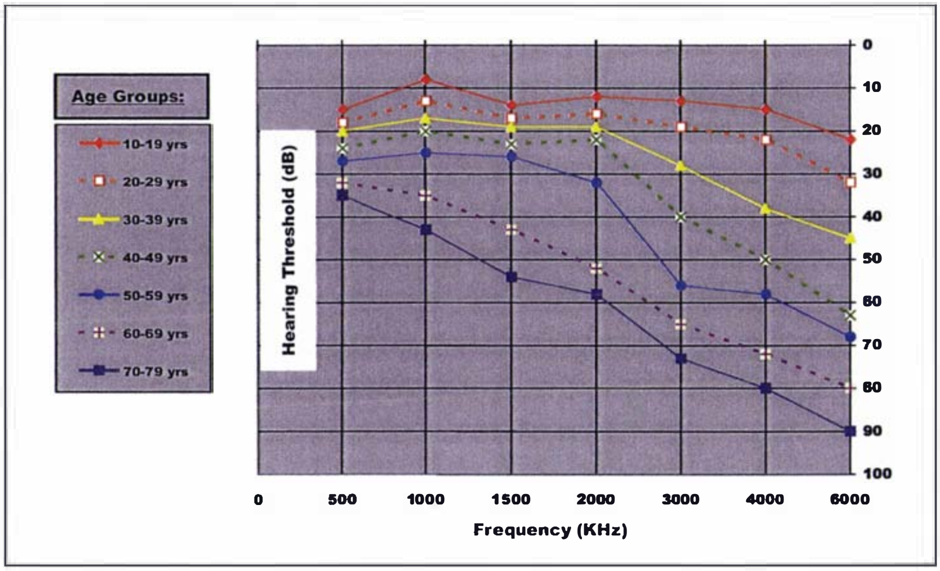

Figure 2.5. Median pure-tone hearing thresholds for males from ages 10-79. The data are converted to ANSI-1969 reference.
(Copied from in Hull [1995f], Figure 2-1, p. 17. Hull cites Glorig et al.'s [1957] Wisconsin state fair hearing survey as the source of these data.)

The epidemiological evidence:

Due to slightly different definitions of hearing impairment, and age differences in the target populations, there are few comparable population-based studies (Mäki-Torkko, Brorsson, Davis, Mair, Myhre, Parving et al., 2001). The challenge remains, however, to examine the growing body of evidence, and identify potential moderating factors that affect the activities, social participation, and ultimately quality of life of those affected by hearing losses (Chisolm, et al., 2003; Mulrow, Aguilar, Endicott, Tuley, Velez, Charlip, et al., 1990a).

Epidemiological evidence from a variety of sources suggests that genetic endowments (including anthropomorphic characteristics in humans such as cochlear pigmentation - refer Humes [1984]; and Lee, Carlson, Lee, Ray & Markides, [1991]) interact with sociodemographic variables (such as age, sex, education, occupational status and residential location), for different age cohorts (Jönsson & Rosenhall, 1998; Jönsson, Rosenhall, Gause-Nilsson, & Steen, 1998; Rosenhall, Pederson, & Moller, 1987). (Refer also to these international longitudinal studies, listed in chronological order: Wallhagen, Strawbridge, Cohen, & Kaplan's [1997] focus on health and mortality in California; Cruickshanks, Wiley, Tweed, Klein, Klein, Mares-Perlman's, et al., [1998] Beaver Dam prevalence of hearing losses study and the 5-year follow-up of the progression of hearing losses - Cruickshanks, Tweed, Wiley, Klein, Klein, Chappell, et al. [2003]; Rosenhall, Jönsson, & Soderlind's [1999] Swedish demographic study of self-assessed hearing problems; and Sanchez' [2004] review of three Australian studies that focus on hearing problems.)

Older adults' hearing health reflects a variety of exposures to different agents through their life course, such as noise (refer Seidman, 1999); ototoxic drugs (refer Wallhagen, Strawbridge, Cohen, & Kaplan, 1997); and smoke (refer Cruickshanks, Tweed, Wiley, Klein, Klein, Chappell, et al., 2003; Palmer, Griffin, Syddall, Davis, Pannett, & Coggon, 2004). Researchers have also noted interactions between these agents (for example Ferrite & Santana [2005] examined the relative effects of smoke exposure and age). In addition, it is essential to remain aware of the potentially exacerbating impact of living with chronic medical conditions associated with later years that can affect mobility, such as cardiovascular and respiratory conditions (refer Palmer, Griffin, Syddall, Pannett, Cooper, & Coggon, 2002; Quaranta, Assennato, & Sallustio, 1996; and Wallhagen et al., 1997), and kidney function (for example, diabetic nephropathy – refer Dalton, Cruickshanks, Klein, Klein, & Wiley, 1998).

Although Newman and Weinstein (1986) developed a spouse/partner's version of the HHI, no epidemiological studies have reported spousal perceptions of their partner's hearing handicap, or attempted to gauge the collateral effects of living with a partner with hearing losses (Christakis, 2004).

2.2.5 Noise-induced hearing losses

The systematic evaluation and diagnosis of different types of hearing losses has its origins in the post-World War II period, as many veterans returned from combat zones with noise-induced hearing losses (NIHL; Gordon-Salant & Leek, 2004). Noise is a generic hazard (McBride, 2004), and currently the leading cause of hearing impairment in industrialised countries is overexposure to loud sounds (Seidman, 1999). The ensuing section focuses on descriptive definitions of NIHL, followed by a brief exposition of the effects of causal antecedents, current research directions, and observations regarding the interaction between NIHL and ARHL.

Seidman (1999) defined NIHL as 'loss of hearing secondary to over-stimulation by sound energy'. Exposure to such an event typically results in one of two major types of hearing losses: Either a temporary threshold shift (TTS) in a person's hearing threshold, which recovers within a few hours or days; or a permanent threshold shift (PTS), which results in irrecoverable reductions in hearing. A TTS occurs following exposure to a loud sound (e.g. a loud concert or jet engine), and may be accompanied by tinnitus (refer below). On the other hand, a PTS occurs following a longer and higher intensity sound exposure such as an explosion (refer to Price & Kalb's [1999] discussion of auditory hazard from airbag noise exposure).

Excessively loud sounds (> 120 dB) that lead to an irreversible PTS may also rupture the tympanic membrane, displace middle ear bones, or permanently damage the inner-ear membranous structures of the cochlear (Seidman, 1999). Sounds in the 85-105 dB range cause metabolic and chemical disturbances that may lead to swelling of inner ear cells, damage to hair cells, reduced blood flow to the inner ear, and damage to the hearing nerve. Although these effects are reversible, with prolonged exposure there may be cumulative changes, which result in progressive, permanent hearing losses (Seidman). Several studies have shown that noise exposure reduces the cochlear blood supply, thereby increasing the accumulation of harmful free radicals that damage the mitochondria, and ultimately affect inner ear functioning (see for example Kopke, Coleman, Liu, Campbell, & Riffenburgh, 2002); consequently, recent research attention has been directed at the self-repair mechanisms of cochlear hair cells (refer Schneider, Belyantseva, Azevedo, & Kachar, 2002).

Classically, NIHL results in hearing acuity losses in the higher frequencies (3000-6000 Hz), and once they occur they are usually permanent (Seidman, 1999). Cross-sectional data from 535 adult male workers in a large Brazilian metal processing plant indicated a consistent and synergistic effect between age and exposures to both noise and substances in smoke, which impacted on hearing acuity (Ferrite & Santana, 2005). Recent publications examining the predictions of the combined effects of noise and age have begun to question the accuracy of models based on linear additivity (Wiley, Cruickshanks, Nondahl, Tweed, Klein, & Klein, 1998). Even studies examining the effects of ageing in animals previously exposed to noise in controlled laboratory settings, report difficulties separating the ageing and noise effects (Mills, Dubno, & Boettcher, 1998). Furthermore, an examination of audiometric threshold changes over 15 years, in 203 men (mean age at baseline, 64 years) from the Framingham Heart Study cohort in the USA, has provided further evidence that noise-damaged ears do not 'age' at the same rate as those without evidence of such damage (Gates, Schmid, Kujawa, Nam, & D'Agostino, 2000). In particular, Gates et al. postulated that the accelerated rate of losses in hearing thresholds, which were most apparent at 2 kHz in their data, is evidence that ears with substantial noise damage are altered in a way that fosters continuing declines over time, in hearing sensitivity in adjacent areas.

Less research attention has been devoted to the experiences of people who live with the handicapping effects of NIHL. Drawing on the contributions of Getty and Hétu (refer Getty & Hétu, 1994; Hétu & Getty, 1993; Hétu, Jones, & Getty, 1993), Suter (1999) has identified four domains where these handicaps are apparent, namely: (i) Communication, (ii) Self-esteem, (iii) Interactions with the environment, and (iv) Intimacy in relationships. These domains will be explored in greater detail in Chapter Three, which explores the psychosocial consequences of hearing losses in the older people.

2.2.6 Tinnitus

Hinchcliffe's (2002b) historical perspectives of the clinical picture of NIHL noted that the first systematic study of occupational NIHL in Great Britain (compiled in 1886 by

Barr) reported that tinnitus (i.e. the perception of sound from within the head, in the absence of external acoustic stimulation) occurred early, if at all, but was not a prominent feature of the condition. Subsequent research has identified a heterogeneous cluster of psychosomatic symptoms related to NIHL that include vertigo, insomnia, headaches, and nervousness, which illustrate that the subjective experience of tinnitus linked to NIHL can be distressing and debilitating (Baldo, Cook, Dooley, Lazzarini, & Molin, 2002). More recently, researchers have reported that people commonly refer to their tinnitus 'driving them mad', and that some experience heightened anxiety about the possibility of being mentally ill, as 'hearing things' is also a popular way of describing mental illness (Sherbourne & White, 1999).

Features and correlates of subjective tinnitus:

Researchers cannot substantiate tinnitus, or measure the condition objectively (Luxon, 1993). Although far more common in subjects with hearing difficulties (Palmer, Griffin, Syddall, Davis, Pannett, & Coggon, 2002), the complaint of tinnitus is not associated with the type or severity of the associated hearing impairment, but is significantly correlated with a range of psychological symptoms, particularly those linked to stress-inducing negative life events (Luxon). Tinnitus is a phantom auditory perception of an intermittent or continuous tonal, whizzing, ringing, whistling, hissing, clicking or roaring sound (Mrena, Savolainen, Kuokkanen, & Ylikoski, 2002), which seems to be "internally localised in one or both ears, or in the head" (p. 310, Attias, Reshef, Shemesh, & Salomon, 2002). Jastreboff (1990) stated tinnitus "is not a single, well-defined disease," but rather "a symptom of many pathologies," and that "even in one patient, several different types of tinnitus might coexist" (p. 243). Furthermore, he challenged the notion that tinnitus should be simply classified as central or peripheral, stressing that all the sensorineural components involved are essential (i.e. the mechanism that generates the auditory perception, the pattern recognition neural networks, and the associated circuits such as the limbic system and prefrontal cortex, which assign emotional links); although one particular component may dominate. Bilateral tinnitus with evidence of sensorineural hearing losses is commonly associated with NIHL from acute acoustical traumas (AAT) such as gunfire or blast injury, or noise exposure (at work or during recreational activities), in addition to ARHL. Unilateral tinnitus requires further investigation to exclude any underlying pathology, in particular acoustic neurinoma (Luxon). A number of Swedish studies report that tinnitus located on the left side was significantly more frequent in those exposed to impulsive compared to steady-state noise exposure, occurred more in patients with depressed mood, and was a negative predictor of treatment effects (refer Hallberg & Erlandsson, 1993).

The epidemiological evidence:

In a review of ten international studies reporting the prevalence of tinnitus, Sindhusake and colleagues noted that the rates varied from 10% (in a 1990 National Study of Hearing in the UK) to 49.8% (in two Canadian studies conducted in 1984 and 1988). They attributed this variability to the use of differing definitions of tinnitus (Sindhusake, Mitchell, Newall, Golding, Rochtchina, & Rubin, 2003). Responses from the Australian BMHS representative sample yielded a 30.3% prevalence of prolonged spontaneous tinnitus lasting more than five minutes (Sindhusake, Golding, Newall, Rubin, Jakobsen, & Mitchell, 2003). Multivariate analysis of the BMHS's cross-sectional data showed that for every 10% decrease in hearing levels, the researchers observed a 10% increased likelihood of reporting tinnitus; that the odds of developing tinnitus for those exposed to noise increased by 53%; and that the reduced hearing was associated with damage to outer hair cells in the cochlea (Sindhusake, Golding, et al.).

McCombe et al.'s (2001) summary of the findings from a number of epidemiological studies stated that the five main categories of complaint of those with tinnitus distress included: Emotional distress (e.g., anxiety and depression); sleep disturbance; auditory perceptual difficulties; interference with work and leisure; and the effects on general health (McCombe, Baguley, Coles, McKenna, McKinney, & Windle-Taylor, 2001).

Tinnitus associated with NIHL:

Research examining the development and course of chronic tinnitus associated with NIHL requires interdisciplinary collaboration, because different biological, psychological and social factors can affect the coping mechanisms and emotional responses of those who experience tinnitus (Hiller & Goebel, 1999). Increasing evidence points to the psychological vulnerability of those who develop tinnitus, so that those who have a variety of distress-related symptoms may be more susceptible to developing clinically severe tinnitus in periods of stressful life events (refer Erlandsson, Hallberg, & Axelsson, 1992). For example, Hallberg and Erlandsson (1993) reported similarities between patients with chronic pain and those with severe tinnitus, in terms of both their psychological profiles, and their levels of depression.

Hallberg, Johnsson, and Axelsson (1993) stated that the emotional distress associated with tinnitus was due to lack of control of the tinnitus sounds. Following their analysis of coping strategies in 106 Swedish middle-aged males with NIHL, Hallberg et al. concluded that the variables 'acceptance of hearing problems' and 'social support related to tinnitus' were the key predictors of coping with the perceived handicap.

Tinnitus in ex-military service personnel:

Certain occupations, especially those associated with the military, carry an increased risk of exposure to acute acoustic trauma (AAT; Mrena, Savolainen, et al., 2002). Spontaneous tinnitus resolution is uncommon, and approximately 65% of the patients who suffer from tinnitus at discharge from the Finnish military service continued to do so 10-15 years later (Mrena, Savolainen, Pirvola, & Ylikoski, 2004). In a study of 418 Finnish former male conscripts who had been exposed to AAT from firearm shooting, Mrena and colleagues reported that tinnitus caused by AAT compromised everyday life satisfaction. The most prominent symptoms affecting the participants' quality of life were sleep disturbances and difficulties concentrating. Two thirds of the participants also considered that having tinnitus was equally or more disabling than being hearing impaired.

A recent military epidemiologic study of tinnitus perception within Israeli military personnel aged 18-50 years offered support for the neurophysiologic approach to tinnitus originally advocated by Jastreboff (1990). (See also Jastreboff & Hazell, 1993; Jastreboff, Gray, & Gold, 1996; and Henry, Jastreboff, Jastreboff, Scheckter & Fausti's [2003] guidelines.) According to this approach, "a dysfunction of the subconscious filter in the sub-cortical limbic areas, which normally prevents spurious, irrelevant sounds from reaching conscious levels" (p. 302, Attias et al.) causes the subjective experience of tinnitus. Attias et al. also drew attention to the need to explore further research in relation to the effect of vitamins B_1 and B_{12} on neural functioning, and their role in moderating the effects of age, fatigue or other central dysfunctions.

Despite their high prevalence, NIHL and tinnitus make low demands of the health services (Verbrugge & Patrick, 1995), and Henry, Dennis, and Schechter's (2005) general review of the tinnitus literature concluded: "Professional training of clinicians to manage tinnitus patients is generally lacking" (p. 1226). Henry at al. also noted that although there were many diverse methodologies effective in the treatment of tinnitus (including prosthetic, pharmacological, and psychological options such as cognitive-behavioural therapy), there was a paucity of randomised control trials and hence scant clinical evidence to guide and implement evidence-based standards of practice for the clinical management of tinnitus. Langenbach, Olderog, Michel, Albus, and Köhle (2005) recommended that tinnitus treatments should refocus attention on the distress of individual patients, and deal with the associated problems of anxiety and low life satisfaction.

Tinnitus, hearing losses and ageing:

Henry, Dennis, et al. (2005) drew attention to the fact that because hearing losses and tinnitus are so closely related, "populations with more prevalent hearing losses have a correspondingly greater prevalence of tinnitus" (p. 1209). They also noted Hoffman and Reed's (2004) caveat that despite increased tinnitus prevalence in older adults, this was no greater than that expected for older patients with hearing losses and other age-related diseases. However, these authors warn that tinnitus may go unreported in older adults, or be accorded less attention in the context of other significant medical problems with or without concomitant hearing losses. Furthermore, they warned that for some older adults the increasing use of medications to manage chronic conditions could exacerbate tinnitus severity, or even cause the emergence of tinnitus.

2.3 Summary

Chapter Two comprised two sections: a theoretical exposition of functional changes in late life; and empirical evidence of specific sensory losses associated with ageing. At the outset, the meaning of the terms 'normal', 'pathological' and 'successful' ageing were clarified by referring to gerontological texts focused on adaptive transitions in late life. Baltes et al.'s (1999) psychological model of 'successful ageing' described how life-long processes involving the selection and optimisation of multiple goals encouraged older adults to actively develop compensatory coping strategies that accommodate normal functional losses associated with ageing. Normative perspectives of the prevalence of disabilities within NZ's ageing population grounded the theoretical perspectives of both Jette's (1996) description of the disablement process in late life, and Glass and Balfour's (2003) EMA within the current research context. The EMA is particularly suited to research focused on a cross-sectional snapshot of older veterans with hearing losses, as it provides opportunities to explore a range of salient predisposing, reinforcing, dis/enabling and potentially exacerbating factors.

The subsequent literature review of age-related sensory losses that influence communication initially described the complex interaction between perceptual and cognitive factors that support listeners' comprehension, and included a brief consideration of the importance of visual acuity in communication exchanges. Current understandings of age-related changes in the peripheral (i.e. outer, middle and inner ear) and central auditory systems were summarised, prior to presenting epidemiological evidence of the prevalence of ARHL in older populations. The chapter concluded with a more focused examination of two topics that are central to the communication difficulties facing ageing veterans, namely NIHL and tinnitus. Following a description of the characteristics of NIHL, observations were made of the intersections between NIHL and ARHL. Epidemiological evidence of tinnitus demonstrated the empirical links between tinnitus and NIHL, and the prevalence of both of these conditions in ex-military personnel. The ensuing chapter uses Glass and Balfour's EMA as an organising template to explore the functional implications of coping with these sensory changes in more detail.

CHAPTER THREE: HEARING HANDICAP IN LATE LIFE

3.1 Ecological perspectives of hearing handicap in late life
  3.1.1 Living with hearing losses in the audible world
  3.1.2 Evolving aural rehabilitation perspectives
  3.1.3 Accommodating hearing health in an ecological model of ageing

3.2 Coping with hearing handicap in late life: The psychosocial implications
  3.2.1 Active versus passive coping: The functional implications of disrupted communication
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3.5 Hearing health: Emerging evidence within New Zealand's ageing agenda

3.6 Summary

Chapter Three reviews the psychosocial impact of coping with hearing handicap in an audible world. Evolving aural rehabilitation perspectives demonstrate the utility of engaging ecological perspectives that reach beyond the individual with hearing impairment to their communication partners. These perspectives are readily accommodated within Glass and Balfour's (2003) Ecological Model of Ageing (EMA), which integrates the predisposing, enabling, reinforcing, and potentially exacerbating factors that shape the trajectories of late life disability. Coping strategies are described that encapsulate the social validation processes involved in communication exchanges, and manage the spoiled social identities and stigma experienced by both those with hearing losses and their communication partners. Stephen's (1996) sociomedical model explains the development of hearing handicap within a dyad, and includes the interactive coping responses of both partners. The downstream costs for older adults of diminished social participation due to ineffective or inadequate communication frequently occur alongside declining functional status, linked to co-morbid conditions such as other chronic illnesses, cognitive impairment and depression. The presence of these potentially exacerbating conditions reflects the complexities that confront hearing health professionals who provide ongoing aural rehabilitation services for older adults. A review of the gerontological literature focuses on older adults' engagement with ongoing aural rehabilitation that includes topics such as evaluating the benefits of amplification, patterns of hearing aid use, and the need to involve communication partners in the rehabilitation process. The chapter concludes by examining emerging evidence related to hearing health within New Zealand's ageing agenda.

3.1 Ecological perspectives of hearing handicap in late life

Ageing and hearing losses are both socially differentiating characteristics whose meaning emerges from the collective attributions of actors within specific cultural contexts. Mindful of the increasing proportions of older persons in the world population, agencies such as the United Nations have stressed the need to mainstream the concerns of older persons, to limit the marginalising isolation and social exclusion associated with age discrimination (United Nations, 2005). These initiatives take account of the growing body of evidence that demonstrates how the quality of social life of a society is one of the most powerful determinants of population health (Wilkinson, 1996). Older adults who face the additional daily challenges of living with hearing handicap are particularly vulnerable to exclusion from the majority, normal-hearing culture. Noble (1983) stated that this stigmatising process restricted social participation because of

> feelings of isolation and neglect; feelings of worthlessness and 'stranger-hood' ... in relation to the 'normal' world; limitation of the 'auditory horizon', and all of this going to an undermining of self. The identity is spoiled, and depression, anxiety, feelings of persecution and abuse result, which is hardly surprising (p. 335).

3.1.1 Living with hearing losses in the audible world

Noble's (1983) theoretical essay on hearing, hearing impairment, and the audible world is one of the earlier publications to challenge the limitations of the biological model of hearing, which failed to take account of the perspectives of those living with hearing losses. Although his essay does not address the needs of older adults per se, it certainly previews salient issues that have surfaced within the gerontological aural rehabilitation discourse over the past two decades.

By focusing on the role of the perceiver in the audible world, Noble (1983) drew attention to the differences between visual and auditory perception, especially regarding the discontinuity and location of auditory events within the individual's 'soundscape'; and highlighted that to operate successfully perceivers need to be able to actively explore their environments, to locate the sources of sound. Noble stated that decoding modulating sound vibrations comprising spoken language remained the most crucial auditory event in the audible world; and that the emotional tones of utterances were as important as their content. Citing Goffman's (1963) essay on stigma, Noble described the social actions of hearing-impaired people who employed coping strategies that revolved around managing their 'spoiled identity'; and concluded that hearing-impaired actors primarily "need to engage their energy in understanding that which the normal hearer takes for granted" (p. 335).

In considering the implications of engaging an ecological approach to assessing hearing losses, Noble (1983) stated that rehabilitation could redefine what is understood by the 'normal' audible world, to accommodate "those who are different in a variety of novel ways" (p. 337).

3.1.2 Evolving aural rehabilitation perspectives

While Noble (1983) suggested that an ecological account of auditory perception should include monitoring and listening, as well as interactive communicating between people, nonhuman creatures and environmental objects, Rosen (1978) observed that aural rehabilitative management was largely based on 'clinical intuition', and that publications document a high percentage of patients who fail to heed their audiologists' recommendations. Rosen concluded that in the audiological setting, the broader dimensions of human communication and of communication breakdown were deserving of more considered attention.

In a subsequent publication, Noble and Hétu (1994) challenged the notion of handicap being a functional impairment situated within the individual. Instead, they emphasised the interactive nature of communication, and the importance of the nexus between the individual and the collective within their 'sociosphere' ("historically contingent conditions of society, covering all forms and levels of connection between individual and collective"; p. 121). The implications for clinical assessment and diagnosis of this collective construction of handicap included: (i) the identification of real life situations that triggered the experience of handicap; (ii) the assessment of the need for psychosocial support; (iii) providing a range of strategies to reduce the experience of handicap; and (iv) negotiating adoption of a strategic plan to reduce the disabilities. Noble and Hétu concluded that by focusing on the sociosphere, researchers could explore how older adults "value listening and communication, ascribe particular meanings to the use of hearing aids or rely on particular networks for support" (p. 125). They advocated that aural rehabilitation interventions engage an ecological approach, to accommodate variable contexts and needs.

Getty and Hétu's (1994) ecological approach to research among 60 Canadian noise-exposed workers showed very clearly that the workers' methods of coping with their hearing handicap reflected how stigmatised they felt within their work and social environments; and that the problem-solving strategies hearing-impaired workers adopted depended in most cases on the support of their spouses. Getty and Hétu also reported gender differences in response to hearing handicap: women expressed dissatisfaction with their diminishing social roles as nurturers and communicators in their intimate relationships, while men did not mention this aspect. They concluded that audiologists should avoid thinking they were providing short-term cures (a point endorsed by Stephens, 1996), and engage more readily in considering the diverse life experiences of the people they served.

Hétu, Getty, and Tran Quoc's (1995) ecological analysis of the social activities, work and family lives of Canadian workers exposed to occupational noise reported that the participants were initially unaware of their hearing impairment, and typically simply attributed their deteriorating communication to lack of attention and concentration. On the other hand, co-workers or significant others perceived the slow progression of noise-induced hearing losses (NIHL) in these workers as their unwillingness to communicate. The coping strategies adopted by affected workers typically concealed their hearing difficulties to avoid becoming stigmatised. Unfortunately, these camouflage tactics actually underplayed the insidious impact of hearing impairment in the work place, and consequently made it even more challenging to promote the importance of preserving hearing by limiting noise exposure.

Gagné, Hétu, and Getty's (1995) subsequent exposition of functional evaluative research paradigms asserted that aural rehabilitation should be a client-centred, problem-solving process that alleviated situations of disability and handicap. However, there has been a paucity of research focusing on the psychosocial and behavioural implications of age-related hearing losses (ARHL). Consequently there is a limited appreciation of the effects of communication dysfunction on the quality of life of older adults with hearing losses (refer Brennan, 2003; Cacciatore, Napoli, Abete, Marciano, Triassi, & Rengo, 1999; Carabellese, Appollonio, Rozzini, Bianchetti, Frisoni., Frattola, et al., 1993; Dalton, Cruickshanks, Klein, Klein, Wiley, & Nondahl, 2003; Erdman & Demorest, 1998a; 1998b; Mulrow, Aguilar, Endicott, Tuley, Velez, Charlip, et al., 1990). Researchers are also beginning to pay attention to the impact on communication partners (Gomez & Madey, 2001; Hallberg, & Barrenäs, 1994; Hétu, Getty, & Tran Quoc, 1995; Stephens, 1996).

Kathleen Pichora-Fuller's (1994) promotion of aural rehabilitation research engaging an anthropological framework has developed a more coherent understanding of the handicapping effects of ARHL. Acknowledging the importance of preserving communication to promote successful ageing (Hummert & Nussbaum, 2001; Pichora-Fuller & Robertson, 1994), Pichora-Fuller and Kirson (1994) explored the differences between normal-hearing and hard-of-hearing older adults in attributing reasons for their hearing difficulties. They reported that few participants attributed communication problems in comprehending spoken language to perceptual difficulties such as problems with hearing or visual acuity. Most of the attributions referred to the state of the listener (for example, lack of motivation, lack of interest, lack of attention, divided attention, fatigue, emotional stress, or inebriation). The second largest group of attributions referred to the listener's cognitive status (for example, lack of knowledge, inability to use context resulting in wrong expectations, poor ability to anticipate or plan, inappropriate culture-specific schema, or difficulty with complex tasks).

The "Hearing and Aging" (June, 1997) special issue of the *Journal of Speech-Language Pathology and Audiology* referred to new interdisciplinary approaches to aural rehabilitation service provision, implemented within a health promotion framework (refer Kaplan, Sallis, & Patterson, 1993) geared to improving the everyday quality of life of older Canadians (refer Carson & Pichora-Fuller, 1997; Pichora-Fuller & Cheesman, 1997). More recently, Scialfa, Pichora-Fuller, and Spadafora (2004) have highlighted the need for interdisciplinary approaches to research training on the topic of communication as a crucial contributor to sustaining the quality of life of older adults.

Carson and Pichora-Fuller's (1997) study involving 154 residents of the Porter Home for older adults, in Vancouver, Canada, illustrated the utility of employing the PRECEDE-PROCEED model to design an intervention that promoted hearing health and improved communication in a publicly funded, intermediate aged-care facility. Porter Home was typical of many aged care facilities, in that there was inadequate hearing assessment of residents; lack of training for staff about hearing losses, hearing aids, and assistive listening devices; and a belief that nothing could be done about ARHL (refer to Kennie's [1993] review). Activities comprising the PRECEDE model's social analysis phase, that encouraged active participation by key stakeholders and fostered a collective responsibility to improve the residents' quality of life, were consistent with the ecological approach to aural rehabilitation.

The (Phase 3) behavioural and environmental analyses at Porter Home (refer to the examples in Table 3.1, below) isolated high priority avoidance behaviours among both residents and staff that had been conditioned and reinforced by the prevailing ageist attitudes in the institution. These attitudes and behaviours stigmatised the 71% of Porter Home residents whose hearing thresholds in their better ear were greater than 30dB HL; a considerably higher prevalence of hearing loss than the estimated 50% of residents in Canada's institutionalised population (Carson & Pichora-Fuller, 1997).

Table 3.1

Examples of behavioural and environmental factors contributing to communication problems in Porter Home (cited by Carson & Pichora-Fuller, 1997)[a]

Factor	Changeability
Behavioural Avoidance	
Participating Residents	
Getting hearing tested	High
Trying/using a hearing aid or ALD[b]	High
Using appropriate communication strategies	Medium
Reporting hearing aid problems	Medium
Informing others of hearing losses	Low/Medium
Participating staff and family	
Using appropriate communication strategies	High
Helping resident with hearing aid or ALD[b]	High
Environmental	
Participating Residents	
Lack of ALDs[b] in setting	High
Malfunctioning hearing aid or ALD[b]	High
Poor acoustics	Medium/High
Inappropriate lighting	Medium/High
Lack of family support	Low/Medium
Lack of physician support	Low/Medium
Participating staff and family	
Lack of training re hearing losses/aids	High

[a] *Extracted from Carson & Pichora-Fuller, 1997, p.42, Table 1.*

[b] *ALD = Assistive Listening Device*

The subsequent (Phase 4) educational and organisational analyses yielded a range of predisposing, enabling, and reinforcing factors associated with each of the avoidant behaviours and environmental factors listed in the Phase 3 inventory (refer to the examples listed in Table 3.2 below associated with the avoidance behaviour of "not using a hearing aid").

Table 3.2

Examples of predisposing, dis/enabling, and reinforcing factors associated with problematic communication in Porter Home and the avoidant behaviour of "not using a hearing aid" (cited by Carson & Pichora-Fuller, 1997)[a]

Factors
Predisposing
Lack of knowledge of impact of hearing losses
Lack of knowledge that hearing aid fitting is adjustable (i.e., may need new one)
Lack of skills operating hearing aid
Lack of skills using aid in conjunction with ALD[b]
Lack of skills in supportive communication strategies
Belief "don't have a hearing loss"
Belief "my hearing aid will not help my hearing loss"
Belief "hearing aid cost (batteries, adjustment, new aid) is not worth it"
Belief "using my hearing aid will lead to my friends' rejection of me"
Reinforcing (hearing aid non-use)
Lack of support from family/peers/caregivers
Lack of communication success due to poorly adjusted/functioning hearing aid
Dis/enabling
Lack of access to hearing aid follow-up visits
Physical limitations in using hearing aid (e.g., problems with manual dexterity)
Lack of/limited funds for hearing aid batteries, maintenance
Lack of ALD[b]
Lack of acoustical modifications

[a] *Extracted from Carson & Pichora-Fuller, 1997, p.44, Table 2.*

[b] *ALD = Assistive Listening Device*

The researchers examined the ecologically derived observations to explore how these factors interacted to influence the hearing health of residents, and to determine the modifiability of each factor within the setting. Carson and Pichora-Fuller (1997) noted that at the time of publication, aural rehabilitation research had focused primarily on dis/enabling factors (such as the provision of services or technology), with very little attention directed to predisposing or reinforcing factors. (The authors did refer to rare exceptions, notably: Noh, Gagné, & Kaspar's [1994] focus on predisposing motivational factors; and Getty & Hétu's [1994] examination of reinforcing social factors.) Carson and Pichora-Fuller concluded that the integrated, stepwise approach of the PRECEDE-PROCEED model provided a systematic and inclusive problem-solving approach that met the aural rehabilitation needs of the Porter Home residents, and thereby facilitated their sustained social participation within that community.

More recently, the supplement to the *International Journal of Audiology* presented papers from the Eriksholm Workshop, focusing on the special aural rehabilitation needs of older adults (Kiessling, 2003). The final paper integrated the workshop proceedings, and described the functional implications of age-related changes that impact how older adults hear, listen, comprehend and communicate (Kiessling, Pichora-Fuller, Gatehouse, Stephens, Arlinger, Chisolm, et al, 2003; see also Pichora-Fuller & Carson, 2001).

Table 3.3 (below) encapsulates salient extracts from Kiessling et al.'s (2003) paper that illustrate the utility of endorsing ecological perspectives to understand how vision, cognition and the presence of other health conditions modulate the experience of hearing handicap in late life.

3.1.3 Accommodating hearing health in an ecological model of ageing

Before considering Glass and Balfour's (2003) ecological model of ageing (EMA), it is useful to have a fleeting glance at the differences between lifelong and late-life disability (Verbrugge & Jette, 1994). Late-life disablement generally occurs gradually (as in ARHL); and with incremental use of external supports (including communication partners, and compensatory communication strategies such as the use of hearing aids and assistive listening devices [ALDs]). Although personal choice is often thought to determine the individual's adjustments to the disablement process (for example regarding when, where, what communication aids, and why a person involved in aural rehabilitation might choose *not* to use their aids), the choices available are in fact influenced by factors within their 'sociosphere' (refer Nobel and Hétu, 1994).

Verbrugge and Jette's (1994) model of the disablement process is conceptually very similar to the PRECEDE-PROCEED health promotion framework, in that it refers to three aspects that accelerate or slow down the disablement process. Firstly, *predisposing risk factors* (such as genetic predisposition, age, gender, and exposure to toxic substances, including noise) affect the presence and severity of impairment, functional limitations and disability. Secondly, *appropriate interventions* can avoid, retard, or reverse the disablement process (for example, the use of ALDs to facilitate communication; or ill-fitting hearing aids with whistling feedback that trigger tinnitus). Finally, *exacerbators* can accelerate the process (for example, cognitive impairment that affects the hearing aid user's capacities to follow instructions when inserting their aids).

The conceptual similarities between Verbrugge and Jette's (1994) model and the PRECEDE model's Phase 4 (refer Figure 1.2) are self-evident: they both include references to predisposing and enabling factors. Likewise, neither model accommodates the contextual complexities of interactive ecological factors pertinent to the disablement process in late life. Glass and Balfour's (2003) inclusive Ecological Model of Ageing (EMA - refer to Figure 2.1 and the Chapter Two descriptions) successfully integrates the conceptual elements of both of these models in the predisposing factors located within the neighbourhood characteristics and personal competencies; and enabling factors that provide perspectives of environmental 'buoying or press'. The EMA also takes account of the influence of reinforcing social factors that shape older adults' mal/adaptive responses to the disablement process. Similarly, the model also reflects the potentially disabling impact of exacerbating conditions commonly associated with late-life (such as chronic illness, cognitive impairment, and depression –which Kiessling et al. [2003] cited as examples, in Table 3.3).

The literature review that follows uses the conceptual prism provided by the adjustment phase of the EMA to organise the constituent topics within recent research publications that focus on coping with hearing handicap in late life. These topics include exploring the nature of active versus passive coping; describing the role of communication partners in mediating the functional implications of communication breakdown (which subsumes coping with loss and spoiled identity); and restating the links between hearing health and effective communication strategies in order to sustain social participation.

Table 3.3

Age-related changes in hearing, listening, comprehending, and communicating[a]

Vision	Cognition	Other health conditions
Hearing: ***(Availability of cues at input for higher-level processing)***		
Visual impairments alter articulatory cues, as well as cues about environmental objects & events	Sensory impairments ↓ cues used in attention Sensory & motor impairments ↑ demands, which divert resources from memory & comprehension Depression & mind-altering medications ↓ perception, attention, memory, & comprehension Diseases (e.g., Alzheimer's & Parkinson's) affect sensory perception, memory, & planning	Age-related comorbid conditions ↑ fatigue, discomfort, &/or pain Medications ↓ perceptual & cognitive abilities Demands of other interventions alter rehabilitation options Dexterity limitations influence choice of hearing technologies Mobility issues necessitate evaluation of aural rehab. solutions (e.g., those being pushed in a wheel chair may miss crucial visual cues)
Listening: ***(Using cues for a purpose – i.e. goal directed)***		
Good vision compensates for impoverished cues; especially cues for recognition &/or identification, localisation, & segregation of sound	World knowledge in long term memory is sound ↑ in levels of distractions / information masking Information processing slows ↓ in selective attention (can't inhibit irrelevant stimuli) ↓ in ability to focus, sustain, & switch attention (e.g., from speaker to speaker) Working memory becomes overloaded when input ambiguous Coordination of multiple tasks more challenging	Motivation &/or attitudes reflect fatigue, discomfort, stress, &/or pain Comorbid conditions alter the relevance of listening goals (i.e., whether social support or information is needed) The environment may be acoustically challenging Settings may be under/over stimulating
Comprehending: ***(Creating meaning by mapping cues to stored knowledge)***		
Visual information either compounds or offsets auditory errors Facial, &/or gestural, &/or articulatory cues compensate for impoverished auditory cues	Preserved use of contextual supports Slowing input rate & ↓ in competing tasks alleviates processing demands ↓ in comprehension when input misperceived/incorrectly interpreted Compensatory world knowledge use ↑ working memory load Integration of meaning over time compromised World knowledge may be compromised by neurological damage (e.g., dementia)	Familiar settings may support comprehension Other heath conditions may ↑ exposure to unfamiliar settings Service providers may not speak same language as client Linguistic function may be compromised by neurological damage (e.g., aphasia)
Communicating: ***(Meaningful interaction mediated by cues)***		
Facial &/or gestural cues guide interaction, & support attention to & comprehension of conversational content & affect Eye contact compensates for impoverished auditory cues that determine turn-taking	Longer turns reduce demands of coordinating talker & listener roles Use of contextual cues reduces the need to use conversational repairs for misperceived/incorrectly interpreted details Longer turns reduce the need for conversational repairs	Goals emphasise social interaction rather than information exchange Physical & social environments may induce social isolation or sustain social interaction, depending on the provisions of support - especially from communication partners Disclosure of hearing losses may trigger stereotypical responses that compromise communication

[a] *Adapted from Kiessling et al. (2003), Table 1, pp. 2S94-2S95.*

The subsequent focus on older adults' engagement with ongoing aural rehabilitation summarises salient topics related to hearing health service utilisation, beginning with the need to accommodate the impact of commonly occurring co-morbid conditions. Other topics include drawing on interdisciplinary perspectives that evaluate the benefits of amplification, describing patterns of hearing aid use, and drawing attention to the significance of contributions from communication partners and social support during the ongoing aural rehabilitation process.

3.2 Coping with hearing handicap in late life: The psychosocial implications

Trajectories of late life disability demonstrate heterogeneity that reflects the variable impact of non-physical individual and environmental factors (Deeg, Kardaun, & Fozard, 2001; Guralnik, Lacroix, Abbott, Berkman, Satterfield, Evans, et al., 1993; Verbrugge & Jette, 1994). These factors, in turn, impinge on the viability of behavioural and psychological coping strategies that older adults employ to "master, tolerate, reduce, or minimize stressful events" (Taylor & Seeman, 1999, p. 216).

In their distillation of contextual research that observed coping strategies adopted by individuals living with disabilities, Folkman and Moskowitz (2000) named four convergent features that characterised these strategies. Firstly, they served multiple functions, one of them being the regulation of distress. Secondly, the individual's appraisal of the stressful context affected their choice of coping strategies (Lazarus, 1999b; Lazarus & Folkman, 1984). Thirdly, coping strategies were influenced by personality dispositions such as optimism; and finally, they were moulded by the availability of social resources to the individual.

Researchers have identified two different types of coping strategy: *problem solving strategies* that engage activities to alleviate distress; and *emotion-focused strategies* that regulate the emotional consequences related to exposure to stress (Taylor & Seeman, 1999). The conceptual and empirical links between an individual's exposure to stressful events, their appraisal of the stress, choice of coping strategies, and the subsequent impact of this chain of events on their health and functional status are described in detail in Chapter Five (refer Cohen, 1992). However, it is pertinent to remark that older adults' coping capacities are important contributors to sustaining positive health outcomes (Baltes, 1996; Deeg et al., 2001). In this regard, Andersson and Willebrand's (2003) critical review of the construct of coping in audiology has drawn attention to the mediating role of emotional reactions which filter the on-going adaptive coping processes; and Kampfe and Smith (1998) have highlighted the increased energy demands that accompany these processes in older adults.

3.2.1 Active versus passive coping: The functional implications of disrupted communication

Getty and Hétu (1991; 1994) were among the first researchers to examine the functional implications of coping with hearing losses within the context of their participants' lives. Their account of the insidious impact of progressive hearing losses in noise-exposed workers discussed the differences already noted between lifelong and late-life disability (Verbrugge & Jette, 1994). They observed that whilst diagnostic services focus on identifying deaf people when they are young, to facilitate access to special education programs and resources that enable them to learn to share a common language (sign language), adults who are hard of hearing rarely identify with the specific social group who share their condition. In particular, Getty and Hétu's research demonstrated how these workers sought solutions to their communication problems "strongly modulated by the prevailing culture to which they belonged" (p. 267). Many workers relied on their spouses for support, due to their own reluctance to disclose the extent of their disabilities; and the coping strategies these workers adopted ultimately affected their social activities, work lives and family lives (Hétu, Getty, & Tran Quoc, 1995).

Andersson, Melin, Lindberg, and Scott (1996) stated that perceiving hearing impairment as a barrier for communication and social activities made adjustment and coping more difficult. They defined 'good coping' in terms of "behavioural and environmental adjustments that facilitate communication and are accompanied by a sense of well-being and belonging" (p. 317); added that assertiveness and the concept of perceived control were very relevant to coping with sensory deficits, and concluded that personal control was probably what distinguished good from bad coping. Baltes' (1996) exploration of dependency in old age also drew attention to the need to sustain personal autonomy, by managing 'intrinsic' causative risks such as biological (and sensory) decline; in addition to 'extrinsic' ones, such as ageing stereotypes that were quick to associate communication difficulties within dynamic social interactions as signs of general incompetence.

Garstecki and Erler (1996) highlighted the key differences in communication profiles between a younger group of military personnel (*n* = 433, mean age = 39.5; *SD* = 8.7) with mainly bilateral, noise-induced, high frequency, sensorineural hearing loss, and a group of older adults (*n* = 301, mean age = 75.0; *SD* = 6.2) with mainly bilateral hearing impairment. They found that although retired, older participants reported less demand for communication in the course of their everyday activities, and that their communication environments generally revolved around their homes and focussed on family and friends. The older participants infrequently perceived any negative attitudes, opinions or beliefs in response to their hearing losses, either from their communication partners or from others. They were more likely to use positive communication strategies under their volitional control (such as requesting the repetition of miscommunicated information); but preferred to avoid behaviours that drew attention to their hearing losses. Garstecki and Erler concluded that researchers "need to examine the relationship between self-perceived hearing handicap and measures of psychological control and/or benefit from social support networks" (p. 41).

A British study of 624 participants (aged 57 years or older) from 12 general practices, found that increased age was associated with a more passive attitude toward help seeking for hearing losses (van den Brink, Wit, Kempen, & van Heuvelen, 1996). In particular, non-consulters perceived their hearing losses as relatively inconsequential, saw least benefits of hearing aid use, and experienced little social pressure to seek help; whereas current hearing aid users had the most favourable attitudes towards them. Another review of clinical records of patients from a consortium comprising five audiology clinics (*N* = 1008; mean age = 64.5; 55.8% male), found that those who sought help from audiological services had already acknowledged and accepted their hearing impairment (Erdman and Demorest, 1998a; 1998b). Jerram and Purdy's (2001) New Zealand (NZ) study demonstrated similarly strong empirical links between subjective pre hearing aid fitting expectations and subsequent outcomes. In addition, help-seekers have reported the more frequent use of adaptive strategies (e.g., asking for repetition or watching the speaker's face) as opposed to maladaptive behaviours (e.g., pretending to understand or avoiding difficult communication situations). Whilst gender appeared to yield an inconsistent influence on adjustment to hearing impairment, (Erdman & Demorest, 1998b; van den Brink et al., 1996), those with higher levels of education reported using maladaptive behaviours less frequently, and consequently experienced fewer problems with personal adjustment.

Hallberg and Barrenäs (1993) confirmed the utility of a 'coping with hearing loss model' that comprised controlling and avoiding strategies (originally described in Hallberg & Carlsson, 1991); and explained how the driving force for coping in 53 participants with occupational hearing losses was to avoid being labelled as deviant in social interactions, and to maintain the appearance of normality. Their subsequent qualitative study that described the coping experiences of 17 people (11 women and 6 men) with profound hearing losses (> 70 dB HL), suggested that the personal characteristics of hardiness and self-efficacy provided resources that shielded individuals against stress in everyday life (Hallberg & Carlsson, 1993).

In another qualitative study, Tesch-Romer and Nowak (1998) examined personal and situational characteristics in diarised reports of communication problems written by 79 older adults. These researchers distinguished between invasive (active or intervening) and evasive (passive or avoiding) communication behaviour; and noted that participants reported using autonomous invasive strategies with familiar interaction partners, whilst evasive strategies were more commonly used in unfamiliar social situations, and negatively related to perceived coping efficacy.

Gomez and Madey's (2001) recent review of the coping literature indicated that five factors generally influenced how older adults coped with hearing losses. These included psychosocial factors such as anxiety about ageing (Danhauer, Johnson, Kasten, & Brimacombe, 1985); subjective perceptions of hearing losses (Andersson et al., 1996); personal adjustment to hearing losses (Brooks, 1989a); perceived access to social support (Andersson et al., 1996); and effectiveness of coping strategies (Bentler, Niebuhr, Getta, & Anderson, 1993). Gomez and Madey investigated factors accounting for adaptive versus maladaptive responses to hearing handicap (i.e., strategies that improve communication such as asking others to repeat versus strategies that do not - e.g., pretending to understand a conversation), in a sample of older adults from a local hearing clinic (33 men, 28 women; mean age 75.52, *SD* = 6.95). They reported that those who used maladaptive coping strategies did not necessarily recognise them as such; and that they were associated with both poor adjustment to hearing loss and poor perceived social support. Gomez and Madey also observed that given the salience of psychosocial issues to rehabilitation outcomes, the restricted information obtained from audiological examinations was probably insufficient to help older adults cope appropriately with their hearing problems. More recently, Andersson and Willebrand's (2003) critical review of coping and its application in audiology concluded that researchers in audiology have been slow to adopt the complex terminology of adaptive coping, and recommended that future research should explore 'effective' coping strategies, including person-related factors (such as reports from significant others) that predict the use of these strategies. Such research could explore further the findings regarding both dyadic partners' reports of using controlling and avoiding communication strategies (Hallberg & Barrenas, 1993); and more specifically, examine the interaction between co-dependent dyadic partners' perceived emotional support across a variety of challenging communication situations, and each partner's coping efficacy when using specific communication strategies.

3.2.2 Coping with loss and spoiled identity: The role of communication partners

In a pilot study of 95 patients seen in two audiology centres (London and Cardiff), O Mahoney, Stephens and Cadge (1996) found that a family member generally encouraged older patients to consult a doctor about their hearing losses. Earlier, Hallberg and Carlsson's (1991) in-depth interviews about adjustment to hearing losses revealed that maintaining a normal social identity was the driving force behind the coping process; and that to prevent a hearing disability from turning into a handicap it was necessary to adjust the hard-of-hearing person's environment to accommodate their needs (Hallberg & Carlsson, 1993). Hétu (1996) observed that in social situations where people's status and sense of belonging was precarious, they were more likely to conceal their hearing impairment because they felt stigmatised. More recently, Espmark and Scherman (2003) asserted that only when older adults experienced a lack of sound as a lack of contact with life, did they seek help in the form of hearing technology. They concluded that in older adults, hearing confirms existence *and* identity. Laurel Glass's (2003) personal perspective on hearing loss affirmed this assertion, when she described how she was no longer able "to use sound to interact comfortably and freely with others" (p. 106). She also alluded to her feelings of grief that accompanied such functional losses.

The stigma of spoiled social identity

Hétu (1996) cited Goffman's (1963) definition of stigma as 'a discredited or discreditable attribute' that arose from an asymmetrical power relationship between the stigmatiser and the stigmatised individual, and represented a form of oppression (p. 15). He stated that emotional pride was associated with secure social bonds, whilst shame operated as an exclusion mechanism that reflected threats to an individual's sense of social belonging, and a denial of one of the most basic human needs: that of belonging (Maslow, 1968). If communication partners ignored these feelings of shame, hearing impaired people expressed their contingent emotional responses outwardly as resentment, or inwardly as guilt. In essence, stigmatisation affected the ratification processes that underpin communication, and generally resulted in avoidance of social interactions, as "the fear of shameful communication experiences is stronger than that of self-isolation" (p. 18).

Hétu (1996) has observed that as an average of 5-15 years pass *before* a person seeks professional help, it is important that those involved in the provision of aural rehabilitation remain cognisant of the psychological pain associated with the experience of 'spoiled identity,' as it is more painful than the actual experience of listening and communication difficulties. He drew attention to the short sightedness of interventions that simply resolve listening and communication difficulties, but ignored the feelings central to the experiences of living with hearing losses that ultimately reflect a person's mental health. Later sections, such as *3.3.3 Hearing handicap and depression*, explore the implications of these emotional sequelae. In this regard, Hétu noted that stigmatisation has not been a central issue in audiological research, although it was precisely because of the experience of stigma that hard-of-hearing people were reluctant to join self-help groups. Hétu called for a paradigm shift that accommodated social validation perspectives in the delivery of aural rehabilitation services. Stephen's (1996) psychosocial model provides such a paradigm.

Stephens' (1996) psychosocial framework

Stephens' (1996) overall model for the development of handicap provides a parsimonious descriptive framework of social validation that focuses on crucial interactive processes with the hard-of-hearing person's spouse/partner. During these interactions the respective dyadic partners develop distinctive repertoires of co-dependent coping strategies that often include 'co-acting' (pretending there is no problem), and 'minimising' (downplaying any problems; refer Hallberg & Barrenäs, 1993). In addition, Hallberg and Barrenäs drew attention to the specific roles of the spouse/partner in 'mediating' (advising or steering their partner through any problems), and 'distancing' (separating themselves from their partner).

Stephens' (1996) sociomedical model describes the establishment of hearing handicap within the older adult's sociosphere. Starting with the WHO definitions of disablement and their application to audiology (refer Stephens & Hétu, 1991; and to definitions provided in Chapter One), Stephens extends this conceptual framework to include the role of a significant other, and a range of contingent adaptive experiences that alleviate or enhance the experience of hearing handicap. He states that initially an individual experiences the direct effects of their impairment and disability, which comprise the primary handicap. Adaptive coping strategies may reduce this primary handicap (e.g., relying on visual cues to assist with speech recognition), but can also produce an indirect, secondary handicap (e.g., avoiding large groups due to previous difficulties screening out competing ambient sounds, and the hard-of-hearing person losing confidence in their ability to comprehend and participate competently in interactive conversations).

The hearing-impaired person's spouse/partner experiences a similar process, as the hearing disability invariably affects their inter-personal communication (e.g., the spouse/partner might answer the telephone for their partner, or tolerate excessively loud radio and television volume settings). The evolving constellation of problem-solving coping strategies that comprise the partner/spouse's primary handicap may, however also produce an indirect secondary handicap (e.g., irritation and distancing from their partner, because of the burden of having to assume co-dependent social roles) that ultimately compounds the experience of overall handicap for *each* partner within the dyad.

The final stage in the development of handicap depicted in Stephens' model occurs when positive consequences associated with the disability mitigate the handicap for the person with the hearing losses (e.g., because they may exercise selective listening; avoid unpleasant situations; show empathy for other people living with disabilities; or learn to optimise their communication by concentrating on targeted exchanges). In summary, Stephens' model emphasises the contributions of social exchanges in the development of handicap, which ultimately shape both the hard-of-hearing person and their partner's emotional responses, especially regarding their perceptions of their 'spoiled' social identities.

Coping and family life

Hallberg's (1996) review of coping with occupational hearing losses within the context of family life has drawn attention to the invisible 'communication impediment' borne by hearing impaired people, and shared by their close relatives. Although the studies reviewed did not include those who have aged with occupational hearing losses, they still offer helpful insights about adaptations within family life trajectories. For example, Hallberg found that hearing impairment was clearly a source of annoyance within the couples/families; and that those with occupational hearing losses showed more irritation and aggression at home than at work. During in-depth interviews many men stated "We live as we have always lived … nothing has changed" (p. 29); however, on reflection, they did admit that their social life had become more restricted, and acknowledged that in most cases the same was true for their wives. Interviews with the spouses showed that living with a partner with occupational hearing losses was often demanding and exhausting, due to the men's reluctance to acknowledge the functional implications of their hearing difficulties, which ultimately affected the couple's intimate relationship (Hallberg; Suter, 1999).

Hétu, Getty, and Tran Quoc (1995) have also described the parallel handicaps experienced by workers with occupational hearing losses and their spouses. In particular, they noted three types of likely communication breakdown, viz.: (i) misunderstandings arising from failures to answer, or inappropriate responses, or requests to have things repeated; (ii) diminished frequency of interaction, which affected everyday companionship and intimate communication; and (iii) restricted communication content due to the effort required in communication exchanges.

Partners claimed that coping with these communication difficulties invariably resulted in heightened stress, tension, frustration, and anger.

Hallberg and Carlsson (1993) reported that interactions with energetic and noisy grandchildren were especially demanding for older adults with hearing impairment. Similar difficulties occurred when people with hearing losses communicated with those with weak voices, or foreign accents with unusual cadence modulations.

3.2.3 Social participation versus isolation

Hétu, Getty, and Tran Quoc (1995) reported that most workers with occupational hearing losses experienced a strong negative effect on their self-image, perceived themselves as 'prematurely old', and that to avoid any disparaging comments from co-workers, they typically concealed their hearing losses. In a five-year follow up of these participants, restricted social participation (if not severe isolation) was systematically reported in the workplace. Hétu et al. noted that over time people with hearing losses made significant adjustments to their lifestyle that, in most cases, were characterised by "serious self-imposed restrictions in regard to social participation" (p. 506).

The cost of diminished social participation is reflected in a sense of loneliness, isolation, and ultimately decreased quality of life (Cruickshanks, Tweed, Wiley, Klein, Klein, Chappell, et al., 2003; Espmark, Rosenhall, Erlandsson, & Steen, 2002; Hallberg, 1996; Sherbourne & White, 1999; Wallhagen, Strawbridge, Shema, Kurata, & Kaplan, 2001). Unfortunately, ageing stereotypes that spawn unhelpful social scripts often ignore the special communication needs of older adults (Baltes, 1996; Tolson, 1997; Tolson & Stephens, 1997), and erode their established patterns of social activity; and yet, both social relatedness and autonomy preserve older adults' emotional health, and are central to maintaining their well-being (Heine & Browning, 2002; Rook, 2000).

Data from the New Haven, Connecticut site of Duke University's Establishment of a Population for Epidemiological Studies of the Elderly (EPESE) longitudinal research project have also demonstrated that social disengagement is significantly associated with the incidence of cognitive decline among cognitively intact, community dwelling older adults (Bassuk, Glass, & Berkman, 1999). In addition, a theoretical paper exploring the meaning, theory, and practice of participation for older adults concluded with an appeal to health professionals to avoid being part of the problem that restricted older adults' social participation (Setterlund, Tilse, Worrall, Hickson, & Wilson, 2002). Setterlund et al. encouraged gerontological health workers to embrace the values inherent in social justice, and develop their knowledge and skills to implement empowering practices that enhanced older adults' communication and participation 'on the ground'.

3.3 Accommodating the functional impact of exacerbating co-morbid conditions

Tolson (1997) has drawn attention to the multifaceted nature of age-related confounds in data from cross-sectional studies that focus on single phenomena, and advised that in these instances researchers should be extremely cautious about assuming causality. However, recent longitudinal studies have confirmed the synchrony of change in depression severity and disability level (Ormel & Von Korff, 2000). The salient risk factor domains associated with functional status decline in community-living older adults that emerged from Stuck at al.'s systematic literature review of longitudinal studies, are listed in Table 2.2 (refer Chapter Two; Stuck, Walthert, Nikolaus, Büla, Hohmann, & Beck, 1999). Stuck et al. noted that the equivocal nature of the association between hearing impairment and functional status decline reflected the crude single-item measures used in most epidemiological studies, which failed to take account of the functional consequences of living with hearing handicap. Unfortunately, these methodological limitations have precluded the possibility of exploring potential interactions between risk factors such as the level of hearing handicap and availability of social support on older adults' quality of life.

3.3.1 Hearing handicap and chronic conditions

Verbrugge and Patrick's (1995) analysis of the impact of seven chronic conditions (three nonfatal [arthritis, vision and hearing impairment]; and four potentially fatal [ischemic heart disease, chronic obstructive pulmonary disease, diabetes mellitus, and malignant neoplasms]) documented how readily US adults with particular conditions visited doctors, stayed in hospitals, and sustained regular activity levels. Pooled data from the 1983-1985 Health Interview Surveys, the 1985 National Ambulatory Medical Care Survey, the 1984 National Hospital Discharge Survey, and 1985 vital statistics were analysed to determine overall prevalence rates, probability of occurrence rates, and prominence or ranking of overall rates. The authors found that as age increased, fatal conditions ascended the ranks; and that sensory impairments and chronic conditions became more prominent, with arthritis being the pre-eminent condition among older women. Although sensory impairments ranked higher for limitations at both younger and older ages, they were temporarily displaced in middle age by the rapid ascendancy of chronic diseases. Eye conditions (among both sexes) and arthritis (among women) assumed more prominence on the doctor visit roster as age increased; and despite the high prevalence, arthritis and ear disorders prompted minimal hospitalisation, with tinnitus receiving little medical care at all ages.

Verbrugge and Patrick's (1995) summary noted: "Hearing impairment is also very common, but it causes little limitation and few health services." (p. 177). This statement requires further comment: In their paper, Verbrugge and Patrick defined limitation for those aged 70 and over as dependence on others for activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Activities comprising these measures typically involved physical domains, and completely ignored their communication contexts. An ecological approach to health status assessment of older adults would require additional profiles of communicational competencies, as they form the lifeline for older adults' sustained social and emotional well-being.

An epidemiological study has examined the association of hearing impairment and chronic diseases (diabetes mellitus, lung disease, cardiac disease, stroke, cancer, peripheral artery disease, osteoarthritis, and rheumatoid arthritis) with psychosocial status (depression, self-efficacy, mastery, loneliness, and social network size) in older age (Kramer, Kapteyn, Kuik, & Deeg, 2002). Using data derived from 3,107 participants (48% male; aged from 55 to 85 years) from the Longitudinal Aging Study Amsterdam (LASA), Kramer et al. found that 12% of participants reported hearing impairment; and that of the chronic diseases, osteoarthritis (32.2%) and cardiac (19.6%) diseases were the most prevalent. With the exception of rheumatoid arthritis, the prevalence of all the chronic diseases and hearing impairment increased with age. Men reported hearing impairment significantly more often; and participants with hearing impairment were more likely to report more depressive symptoms and feelings of loneliness, lower feelings of self-efficacy and mastery, and have smaller social networks compared to their normally hearing peers in the sample. Hearing impairment was the only chronic condition that was significantly associated with all five psychosocial measures. Kramer et al. concluded that aural intervention programmes for older adults should accommodate a range of psychosocial factors to enhance the beneficial use of hearing aids; and in particular, involve family and friends.

More recently, data from the Beaver Dam five-year follow-up Epidemiology of Hearing Loss Study has enabled researchers to investigate the impact of hearing losses, hearing handicap, and communication difficulties on the quality of life of participants drawn from a large population of older adults (*N* = 2,688; mean age 69 years; 42% male; Dalton, Cruickshanks, Klein, Klein, Wiley & Nondahl, 2003). Dalton et al. reported findings from an earlier 1990-1991 Heath Interview Survey that the nearly 50% of survey participants who could not hear and understand normal speech also experienced activity limitations linked to comorbid conditions. They found participants in their study underreported their hearing difficulties (identified by the Hearing Handicap Inventory for the Elderly – Screening Version [HHIE-S]; Newman & Weinstein, 1986), but were more likely to report communication difficulties (gauged using six questions that alluded to communication difficulties in different listening contexts). Dalton et al.'s data analysis demonstrated a clear association between increased levels of hearing impairment with increased dependency in both ADLs and IADLs, and reduced quality of life (especially social functioning, measured using Ware's [1997] SF-36). They acknowledged that whilst the cross-sectional nature of their data pointed to possible residual confounding by other factors, it highlighted that those caring for older adults should not simply dismiss hearing losses as an inevitable part of ageing, as it compromised effective communication and functional independence. Dalton et al. also drew attention to the limitation of using an individual approach to impairment in their study, and suggested that in the future researchers should "evaluate the impact of hearing loss on the family as well as the individual" (p. 666). In the current study, a co-dependent social network analysis approach offers a useful way of exploring how co-dependent dyadic partners' networks have accommodated the social constrictions associated with the veterans' hearing losses.

3.3.2 Hearing handicap: Intersections with cognitive ageing and auditory processing

Arlinger's (2003) review of the negative consequences of uncorrected hearing losses noted that whilst several studies point to significant empirical associations between hearing losses and loss of cognitive functions, the causal pathway remains unclear. However, some studies Arlinger reviewed linked uncorrected hearing losses causally with cognitive deterioration (e.g., three reports from the Berlin Ageing Study - Baltes & Lindenberger, 1997; Lindenberger & Baltes, 1994 & 1997). A cross-sectional study that examined the prevalence of hearing impairment in a random sample of older Italians living in Campania (*n* = 1,750; mean age 74.2 years), also found a strong relationship between decreasing hearing function and declines in cognitive status, independent of any effects influenced by age or education (Cacciatore, Napoli, Abete, Marciano, Triassi, & Rengo, 1999). Cacciatore et al. concluded that the use of hearing aids reduced depressive symptoms and may have a protective effect against reduced cognitive functioning. Similar observations have occurred in other studies, although the evidence is by no means conclusive that hearing losses *causes* cognitive decline. For example, Appolonio, Carabellese, Frattola, and Trabucchi's (1996) six-year longitudinal study in northern Italy demonstrated that those with uncorrected visual *and* hearing acuity had poorer cognitive functioning and quality of life; and Naramura, Nakanishi, Tatara, Ishiyama, Shiraishi, and Yamamoto's (1999) Japanese study reported significant correlational links between hearing losses, cognitive functioning and depression. Finally, Uhlmann, Larson, Rees, Koepsell, and Duckert's (1989) research on dementia stated that using hearing aids would not prevent dementia, but could reduce the functional consequences of living with hearing handicap.

Auditory processing

Age-related declines in the complex perceptual and cognitive operations involved in hearing, listening, and comprehending spoken language become most apparent in difficult or complex auditory perception tasks; for example, in noisy or reverberant listening conditions (Fitzgibbons & Gordon-Salant, 1996; Schneider, Daneman & Pichora-Fuller, 2002), or when the speech rate is increased (Hull, 1995e; Wingfield & Tun, 2001). In their review of the effects of ageing on auditory processing, Pichora-Fuller and Souza (2003) referred to changes of available speech cues in the temporal domain, including voice fundamental frequency and harmonic structures, which offer periodicity cues at the sub-phonemic, word, and sentence levels. For example, Gordon-Salant & Fitzgibbons' (2001) examination of time-compressed speech found that declines in older adults' speed of information processing could be attributed primarily to difficulties recognising speech with time-compressed consonants.

Scheuerle (2000) has pointed out that many older adults who do not hear high-frequency phonemes actually receive little of the speaker's meaningful signal. To illustrate the dependence on completeness at the phonemic level of spoken language, Scheuerle removed four consonants (r, n, l, and s) from a textual extract (because of their high incidence in English, and their frequency and loudness characteristics across the speech spectrum). The transformed extract reads as follows:

> Whe- the -u--ight -t-ike- -ai-d-op- i- the ai-, they act -ike a p-i-m a-d fo-m a -ai-bow. The -ai-bow i- a divi-io- of white –ight i-to ma-y beautifu- co-o--. The-e take the -hape of a -o-g -ou-d a-ch, with it- path high above, a-d it- two e-d- appa-e-t-y beyo-d the ho-izo-. The-e i-, acco-di-g to -ege-d, a pot of go-d at the e-d. Peop-e -ook, but -o-o-e ha- fou-d it. Whe- a ma- -ook-fo- -omethi-g beyo-d hi- -each, hi- f-ie-d- -ay he i- -ooki-g fo- the pot of go-d at the e-d of the -ai-bow. (p. 242).

Visual clues in the printed extract indicate where phonemes are missing, which does not occur when the text is presented orally; for, as Scheuerle (2000) reminded readers: "the absence of the acoustic energy is a void that carries no hint of meaning because hearing is a time-tied phenomenon, and the stimulus is brief, rapid and fleeting" (p. 243). She suggested that other quiet phonemes could also be struck out (such as h, th, t, f, and p), which would exacerbate the challenge of hearing something meaningful.

Clearly, auditory disorders in older adults affect the complex integration of peripheral and central auditory systems required to facilitate comprehension of spoken language, and approaches to aural rehabilitation should accommodate these 'compounding problems' (Hull, 1995a; 1995d).

3.3.3 Hearing handicap and depression

Reviews of late life depression (such as those conducted by Alexopoulos, Buckwalter, Olin, Martinez, Wainscott, & Krishnan, 2002; Blazer, 2003; and Gatz, 2000) have overlooked the impact of failing sensory perception on psychosocial functioning. For example, although Blazer's review failed to refer to the functional implications of sensory impairments, he concluded that the erosion of meaningful social ties in late-life increased vulnerability for depressive symptoms. A growing body of research has demonstrated sensory impairment *can* have profound consequences on older adults' well-being, "especially after a lifetime of functioning as a fully sighted and hearing person" (p. 32, Horowitz, 2003). Furthermore, recent studies have suggested that accelerated negative physiological outcomes in late-life could reflect age-related reductions in immune system functioning that have been exacerbated by diminished social interactions, due to the negative impact of depressive symptoms (McGuire, Kiecolt-Glaser, & Glaser, 2002; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Publications linking social support, immune and endocrine regulation, and physical health are examined in greater detail in Chapter Five.

Vision impairment and depression

Epidemiological studies provide clear evidence that community-dwelling older adults with vision impairment demonstrate an increased risk of depression (Bazargan, Baker & Bazargan, 2001; Branch, Horowitz, & Carr, 1989; Carabellese, Appollonio, Rozzini, Bianchetti, Frisoni, Frattola, et al., 1993; and Penninx, Leveille, Ferrucci, van Eijk, & Guralnik, 1999), even after controlling for factors such as age, gender, ethnicity, and other comorbidities (Horowitz, 2003). For example, Wallhagen and colleagues found that in the USA between a quarter and a third of all visually impaired people had reported a significant number of depressive symptoms (refer Wallhagen, et al., 2001), in comparison with the 8-16% prevalence in community-dwelling older adults (Blazer, 2003). Research has shown that the recent onset of vision loss was a trigger for depression, with some resolution occurring over time (Horowitz).

Chapter Two has highlighted the importance of sensory synthesis in older adults' communication; particularly for those who rely increasingly on visual information to compensate for their ARHL (refer Figure 2.3). It is not surprising, therefore, that although vision impairment has demonstrated the stronger independent empirical effect on negative mental health outcomes, older adults with concurrent vision and hearing impairments were most at risk for depression, in comparison to those with a single impairment (Carabellese et al., 1993; Horowitz, 2003).

Hearing losses and depression

Although Arlinger's (2003) review of the negative consequences of uncorrected hearing losses in older adults demonstrated that reduced social activities were associated with poorer quality of life, and an increased prevalence of symptoms of depression, the empirical evidence linking ARHL and depression is not as clear-cut. Stuck et al. (1999) have suggested that this is probably due to the inconsistent and at times crude assessment of hearing losses in epidemiological studies. Despite this, a number of studies have shown that hard-of-hearing older adults were approximately twice as likely to have clinically significant depressive symptoms as their peers who were not similarly impaired (Carabellese et al., 1993; Kramer et al., 2002; Maggi, Minicuci, Martini, Langlois, Siviero, Pavan, et al., 1998; Strawbridge, Wallhagen, Shema, & Kaplan, 2000; and Wallhagen et al., 2001). Bazargan et al. (2001) concluded that hearing mediated the link between functional status and psychological well-being.

Depression and cognition

Geriatric depression is under-recognised in primary care settings; and when diagnosed is under treated (Alexopoulos, et al., 2002). However, a significant number of depressed community-dwelling older adults also have cognitive impairment (Blazer, Burchett, Service, & George, 1991; Maggi et al., 1998); and the prevalence of older adults who have both doubles in frequency for every five-year interval after the age of 70 years (Stuck et al., 1999). In these cases, cognitive dysfunction can frequently be attributed to an underlying dementing disorder (Alexopoulos et al.); although Chartrand (2000) warns of the symptom similarities between unmitigated hearing losses and dementia. Chi and Chou's (2000) prospective three year longitudinal investigation of depressive symptomatology on cognitive performance in Hong Kong Chinese older adults confirmed the predictive power of depression on cognitive decline. They also examined the impact of the provision of tangible and emotional support by two groups of family members (those living with, and those not living with the participants), on depressive symptomatology. Their findings are discussed below.

Depression and social support

Although Alexopoulos et al. (2002) ignored hearing losses in their review of psychosocial factors related to late life depression, they acknowledged the robust contribution of social support (such as having a marital partner) in reducing the impact of functional disabilities on the incidence of depression. The availability of a confidant was identified as the single most protective factor against depression (refer Hays, Landerman, George, Flint, Koenig, Land, et al., 1998). Krause (1991) also found that older adults without supportive social networks reported higher depressed mood; and Pearlman and Uhlmann (1991) have observed that both depression and loneliness affected older adults' quality of life. Finally, Reker (1997) identified that choice/responsibleness, social resources, and physical health predicted depression in community dwelling older adults; whilst de Leon, Glass, and Berkman (2003) have concluded that promotion of social engagement may still be important for the prevention of the disabling impact of depression.

Chou and Chi (2003) found that whilst older Hong Kong Chinese adults who reported more depressive symptoms at baseline also reported receiving more social support in the intervening three years from family members who lived in the same household, support provisions from family not living with their older relatives was stable over this same period. They noted that the reciprocal relationship between social support and distress was clearly dynamic, and changed over time in response to the respondents' needs. Furthermore, they suggested that in the future researchers should pay more attention to the time interval they choose to reveal the dynamic exchange of support provisions.

Blixen and Kippes' (1999) exploration of possible nursing interventions to assist older adults cope with osteoarthritis demonstrated that social support played an important role in moderating the effects of pain, functional limitation, and depression on participants' quality of life. Alexopoulos et al. (2002) concluded their review recommending that interventions focusing on social support needed more attention, especially in the areas of self-help groups for widows and widowers; support groups to decrease feelings of isolation and promote coping; and telehealth interventions for group therapy.

3.4 Older adults and ongoing aural rehabilitation

As early as 1975, Robert Butler (the founding director of the American National Institute of Aging) drew attention to health professionals' attitudes to older patients (cited in Hansson and Carpenter, 1994). In particular, Butler stated that older patients were not only likely to have sensory problems and difficulty in communicating their symptoms, but could "also have different values or health beliefs from physicians, who may be from a different generation and different socioeconomic class" (p. 39). Mulrow and colleagues cited corroborating evidence that health care providers often failed to screen patients for hearing losses (Mulrow, et al., 1990). Their randomised control study of 188 older participants with hearing impairment clearly illustrated the harmful consequences of not diagnosing and treating communication disorders. The researchers randomly selected half the study's participants to be fitted with hearing aids, whilst the other half remained on a waiting list for fittings for four months. Comparisons between these groups of initial assessments, and those taken six weeks and four months later, showed that participants living with untreated hearing losses experienced marked social, emotional, and communicative difficulties. The authors suggested that these difficulties might exacerbate existing stresses in dyadic relationships, by "increasing demands on support networks to alleviate distress, at a time when there are diminished resources for social exchange" (p. 28, Hansson & Carpenter). As increasing dependency challenges the viability of the continuity and stability of important support relationships, there are real possibilities that older adults with untreated hearing impairment (and their partners) are at greater risk of accessing compromised levels of support.

3.4.1 Evaluating the benefits of amplification

In a review of the negative consequences of uncorrected hearing losses in older adults, Arlinger (2003) noted that problems recognising speech in difficult environments comprised the largest number of complaints, and that these gave rise to communicative disabilities that affected both the hearing impaired people *and* those in their environment. He cited a study of 2,304 older hearing-impaired persons and 2,090 'significant others' who participated in a National Council of Aging study in the USA (published by the Seniors Research Group in 1999). Those participants who did not use hearing aids were less likely to participate in social activity, experienced greater emotional turmoil, and reported feeling sad or depressed. Participants who used hearing aids reported improved confidence, and better relationships with others, and at home. Family members reported the beneficial effects of hearing aids more often than those who were hearing-impaired. In addition, empirical links have drawn attention to the need to attend to older adults' hearing health and sustain their communication, in order to preserve their social functioning, and thereby provide a protective buffer against developing depressive symptoms and concomitant cognitive declines.

3.4.2 Patterns of hearing aid use

Although many older adults acknowledge their hearing has changed with the passage of time, they adjust their communication strategies accordingly, and may postpone seeking help or even avoid using hearing aids for a 'very long time' (Erber 2003). Erber attributed the high conversational fluency of older adults with mild hearing losses to their capacities to look and listen when interacting face-to-face, in a quiet environment, with a cooperative partner. He added that most often friends and family members compensate by "routinely speaking louder, nearer, and slower, as well as repeating and clarifying" (p. S22); and that when visual acuity deteriorates so that lip reading is ineffective, there is a much greater need to hear the 'missing' high speech frequencies. (Refer to Figure 2.3 in Chapter Two.)

The sub-optimal diagnosis of hearing losses and exploration of patterns of hearing aid use, especially among older adults, are currently receiving increasing attention from both health professionals and researchers. (See for example Barton, Davis, Mair, Parving, Rosenhall, & Sorri, 2001; Davis, 2003; Gatehouse, 2003; Gates, Murphy, Rees, & Fraher, 2003; Kiessling et al., 2003; Smeeth, Fletcher, Siu-Woon, Stirling, Nunes, Breeze, et al., 2002; and Yueh Shapiro, MacLean, & Shekelle, 2003). Reasons for the under-utilisation or lack of use of hearing aids are varied; they include lack of awareness of professional services, and previous negative experience with hearing aids, especially among older adults (Chen, 1994). Brooks (1989b) suggested that characteristics of the hearing aid user, rather than the characteristics of the device itself or the demands of the communication environment, may explain low or poor usage of these devices. Misguided expectations of the hearing aid, misuse, and/or misunderstanding of instructions have often resulted in non-use (Goffinet, 1992).

A great deal of information can be provided during a hearing aid fitting, especially to novice hearing aid users. Exactly what information older users actually retain and find helpful varies, especially as the details supplied are seldom prioritised, and in some instances even inadequate (Goffinet, 1992). For instance, Kelly (1996) found that the readability of hearing aid brochures required a college-age reading level to understand; while Erdman, Wark, and Montano's (1994) study illustrated that service delivery models in audiology impacted on treatment outcomes, in terms of both patient satisfaction and adherence. Increasingly research attention in the health literature is focussing on health literacy gaps between health professionals and patients, in order to improve communication, adherence, and ultimately health outcomes (see Safeer & Keenan, 2005). Despite this, many older adults may not fully understand or remember spoken and/or printed instructions for hearing aid use, adaptation, and maintenance; and although a large number of older adults typically require help from their communication partners, their partners are seldom encouraged to engage actively in the rehabilitation process (Erber, 2003). Erber also suggested that specialised training courses should cater specifically for family members who provide communicative assistance for the (often long) period prior to the hard-of-hearing person's acknowledgement that they are experiencing communicating difficulties, and need to seek professional assistance.

3.4.3 Beyond the fitting: Communication partners and social support

Pichora-Fuller and Gallagher (1992) endorsed Coyte's statement that "handicap encompasses the direct and indirect impacts on the quality of life of clients with impairments or disabilities, as well as the associated impacts on their family and friends, caused by restrictions on (or burdens of) normal communication activities, whether self or externally imposed" (p. 286).

Carson (1997) also alluded to Coyte's tutorial, when she stated that in an era of diminishing healthcare dollars that prioritised investment returns on delivered programmes, hearing health care advocates should push for nursing training in the area of hearing losses and greater use of audiological services in long-term care facilities.

She concluded that measuring and documenting anticipated and unanticipated outcomes that flow from programmes designed to improve communication and enhance participation would ultimately implicate the community's health network; and that this should also include longer term 'down the road' evaluations that gauged the contextual realm of older adults' quality of life (see also Brooks, Hallam, & Mellor, 2001).

Involving communication partners

Hallberg and Barrenäs (1994) have drawn attention to the short comings of audiological rehabilitation processes that focus on the individual with disability, and ignore barriers in the physical and social milieu that trigger the experience of handicap. Their study evaluated the short- and long-term effects of a group rehabilitation programme offered to middle-aged men with NIHL, who were on a waiting list (December 1992 to April 1993) for consultation at the Department of Occupational Audiology, Göteborg University, Sweden. Conceptually, the programme was similar to one designed by Getty and Hétu (1991), and offered couples psychosocial support, a better understanding of the nature of NIHL, and training in effective coping strategies and hearing tactics. Hallberg and Barrenäs reported that the spouses were appreciative they were included in the group sessions together with their husbands, and that it became apparent through the sessions that hearing disability was an issue of mutual interest for each couple. In particular, the spouses reported that the sessions had made them become more aware of the impact of their partner's hearing handicap on daily family interactions, and that they had become more actively involved in the shared resolution of communication problems within the family. For example, one spouse commented: "Now we can talk about the hearing loss without being irritated with one another" (p. 76). These benefits were reflected in reductions of 'perceived handicap' in both the short- and long-term, for men who participated in the group sessions; however, those who dropped out reported increased 'perceived handicap.'

Hallberg and Barrenäs (1994), who had previously discussed spousal roles as motivating or inhibitory forces in aural rehabilitation (see Hallberg & Barrenäs, 1993), stated that none of the spouses who attended the programme employed co-acting or distancing coping strategies; but were more likely to use mediating, controlling and minimising strategies. They suggested that the relationship between spouses probably determined whether couples attended the group sessions, and that this ultimately influenced the experience of handicap by the males. Hallberg and Barrenäs recommended that the creation of self-help groups could secure long-term benefits for those with NIHL; and that future research should pay special attention to the profiles of couples who chose not to become involved in such opportunities.

Lormore and Stephens' (1994) use of open-ended questionnaires with 121 patients (aged between 43-89 years; 41% men) and their accompanying significant others (40.5% spouses, 43% other relatives, and 16.5% friends) reported that the significant others perceived slightly more unsociable or withdrawal behaviour than the patients. They suggested there were probably many more patients who experienced similar feelings, and significant others who noticed them, but did not openly express them; and warned that the psychosocial problems associated with hearing losses were not resolved simply by fitting a hearing aid. Stephens, France, and Lormore (1995) stated that the spouse/partners of female hard-of-hearing patients typically reported greater levels of frustration; however, Stephens (1996) noted that significant others could provide relevant feedback to professionals regarding modifications to the patients' instrumentation.

Sherbourne and White's (1999) review of the effects of hearing losses on the family and social relationships referred to psychiatrist John Denmark's description of 'courtesy stigma,' which occurs when a "hearing person feels excluded and marginalised because they are associated with the deafened person" (p. 3). Brooks, Hallam and Mellor (2001) noted similar effects when they described emotions such as frustration, irritation, and embarrassment that significant others felt about their spouse/partners' communication difficulties; in addition to the fact that their lives had probably also become increasingly restricted, in tandem with those of their hard-of-hearing spouse/partner. Researchers in Australia have recommended teaching interactional conversational skills to communication partners, to avoid further conversational breakdowns (Heine, Erber, Osborn & Browning, 2002).

Successful conversational exchanges require co-operation from communication partners, however the social stigma associated with hearing losses creates barriers that can discourage participation in social functions (Falvo, 1999). Support groups of adults with late-onset hearing losses strive to increase community understanding, and improve communication accessibility in social environments.

Carson's (1997) description of a unique hearing outreach programme that trained and prepared hard-of-hearing volunteers to go into homes, nursing homes and other long-term care facilities, concluded that a longer term evaluation would demonstrate the extent of lasting change and benefits derived from the role-modelling provided by the hard-of-hearing volunteers. Similarly, Jennings and Head's (1997) 12 month integrated staff and resident education programme in a home for the aged drew attention to the importance of early and ongoing education of both those with hearing losses and their communication partners. More specifically, Hickson and Worrall (2003) have advocated that communication programs should nurture problem-solving strategies to improve communication in everyday life situations, and provide crucial adjuncts to the traditional approach that focuses solely on fitting hearing aids.

3.4.4 A decision-analytic model of aural rehabilitation

In a review of treatment efficacy in older adults, Weinstein (1996) documented the functional and communicative benefits that accrued from hearing aid use. However, research has also shown that the difficulties and frustrations older adults experience adjusting to hearing losses and using hearing aids effectively increased with age (Erber, 2003). Indeed, failure to use hearing aids is a widespread problem (Alpass, Long, Pachana & Blakey, 2003) that has prompted some clinicians to recommend that people with impaired hearing should acquire hearing aids in middle age (Erber), rather than waiting until their communication is severely disrupted, and rehabilitation challenged by attendant memory problems, diminished vision, and poor manual dexterity. Gatehouse (2003), on the other hand, has challenged audiologists to provide a more holistic approach to aural rehabilitation that focuses on 'function, activity and participation' (Kiessling, et al., 2003). Indeed, data from a recent experimental study conducted with 106 veterans affirmed the positive contributions to aural rehabilitation outcomes of a four-week group communication skills programme, which was an adjunct to the hearing aid intervention for the study's 'experimental' as opposed to the 'control' group of participants (Chisolm, Abrams, & McArdle, 2004).

In the final 'consensus' paper that emerged from the Third Eriksholm Workshop, entitled *Candidature for and delivery of audiological services: Special needs of older people*, Kiessling et al. (2003) defined audiological rehabilitation "as a problem-solving process aimed at optimizing the individual's auditory activities and avoiding or minimizing any restrictions to participation" (p. 2S96). Within this conceptual framework, the authors identified five key priorities in relation to older adults' hearing health: (i) The promotion of the benefits of early identification and special interventions that are available to older people. (ii) The need for hearing professionals to work within a model that includes the four key components of evaluation, integrating and decision-making, intervention, and outcome measurement. (iii) The importance of including significant communication partners throughout the rehabilitation process, especially as they may be the main beneficiary of effective treatment. (iv) The urgent need to identify barriers that stop older people from seeking help for hearing impairment. (v) Prioritising researching a broad spectrum of topics that address age-related hearing impairment and aural rehabilitation. These priorities provide an appropriate point to focus on reviewing emerging evidence within NZ's ageing agenda that addresses the topic of hearing health.

3.5 Hearing health: Emerging evidence within New Zealand's ageing agenda

The findings from the preceding international body of research are relevant in NZ, where hearing impairment is the third most prevalent disability for people aged 65 and over, occurring in 221 of 1000 households (Ministry of Health, 2002a). Despite this, publications that address the structural and functional features of social relations in older adults have frequently overlooked the functional implications that face those coping with communication difficulties. For example, the NZ Disability Survey's report *Snapshot 4 People in Residential Care* (refer Ministry of Health, 2002b) failed to include any reference to assistive listening devices in the table of types of special equipment used by adults with disabilities in residential care. This omission ignored the fact that the incidence of hearing impairment almost doubles for those in residential care, to 404 per 1000 (Ministry of Health, 2002a). Even an eminent writer such as Lazarus (1999b) has focused solely on the removal of *physical* barriers that hinder older adults' participation in their environments, and completely ignored the impact of communication difficulties, including societal attitudes that stigmatise those with sensory disabilities and marginalise older adults with them.

The earliest NZ hearing health publications within the Pub Med database were concerned with hazardous noise exposure (refer to Brooks & Allingham's [1976] focus on the boiler making industry; and Roydhouse's [1968] survey of engine room noise in the Royal NZ Navy). Within NZ's adult population who experience a significant degree of occupational hearing losses, research has highlighted sub-groups who are at a higher risk of developing hearing related disorders (for example farmers who have been exposed to intermittent, intense noise; refer McBride, Firth & Herbison, 2003). One group that has been identified are ex-service personnel, particularly those who have been involved in combat (see for example Salmond & Geddes, 1977; Vincent, Long, & Chamberlain, 1994; and Withers, Flett, Long, & Chamberlain, 1997). Current research in United Nations peacekeeping service personnel also reported that six months after deployment 34% have temporary deafness and hearing difficulties (MacDonald, Chamberlain, Long, & Mirfin, 1996). Civilian hearing health promotion programmes currently concentrate on isolating and eliminating hazardous noise, although McBride et al. have observed that rural hearing conservation programmes have room to improve.

Satherley's (1992) Christchurch-based study of hearing aid users noted that whilst sociodemographic variables (such as age, gender, and living circumstances) were unrelated to use, those participants who complained of tinnitus used their aids significantly less. An earlier investigation of 338 New Zealanders recruited from associations for people with tinnitus or hearing impairment, found that half the sample reported being depressed sometimes because of their tinnitus (George & Kemp, 1991). The participants with more severe tinnitus problems consulted more health professionals who, although sympathetic, were unable to provide effective treatment. Saunders (1994) acknowledged the importance of knowledge as a key to overcoming the effects of tinnitus, and the pivotal support role that her own family provided in assisting her cope and learn to live with tinnitus.

Two government-sponsored studies have noted the interdisciplinary characteristics of aural rehabilitation services, and their reports have strongly recommended greater coordination of services for those living with hearing impairment (Kee, 1995; NZ Board of Health Committee on Hearing, 1984). Despite these recommendations, over half the participants in Jerram and Purdy's (1996) study expressed the need to access further information about assistive listening devices, and help in generally managing their hearing aids. Consumer evaluations such as these underscore the need for hearing health professionals to make appropriate provisions for the diverse requirements of NZ's ageing population (Seville, 2001); a population that continues to yield the largest group of hearing aid users (Hill, 1999). Seville's exploration of differences in hearing therapists' and audiologists' knowledge of and attitudes towards older adults found that gaps in their gerontological knowledge, rather than negative and ageist attitudes produced less appropriate treatment recommendations. In addition, one of few studies that have specifically addressed the aural rehabilitation experiences of older NZ adults (*n* = 32; aged between 65-87 years), has highlighted the positive contribution of good cognitive functioning in those participants who accepted the fitting of binaural hearing aids (Hill).

North American research related to speech perception difficulties experienced by older adults (refer Gordon-Salant & Fitzgibbons, 1997; 2001) has illustrated how older adults are reliant on the fidelity of aural information they encode; which is in turn dependent on good sensory perception. Pachana, Alpass, Blakey and Long (2006) have demonstrated how information presented to older adults in a context that is devoid of visual and linguistic cues (i.e., listening to a word list over the telephone), is likely to increase the chance of being incorrectly heard, incorrectly encoded, and therefore, recalled inaccurately. A recent Australian study has also acknowledged the importance of older adults' use of visual cues to enhance speech perception, and advocated that audiologists should encourage their older clients to master lip reading, even if their sight is impaired (Hickson, Hollins, Lind, Worrall, & Lovie-Kitchin, 2004).

Greville's (2005) report updating population numbers and characteristics of hearing impaired people in NZ (using previously unpublished data from the 2001 disability survey), noted hearing disability was more common among certain occupations, notably workers in the trades, elementary occupations, and those who were plant and machine operators and assemblers. The data revealed that people with acquired hearing disabilities were 1.8 times more likely to have left school with no formal qualifications, in comparison with the total NZ population; a ratio that she stated was inflated due to the older mean age of the population with hearing disabilities. Greville also reported that both adults and children with hearing disabilities were the least likely group to receive disability allowances or invalid's benefits; and concluded: "There is need to work on reliable and valid questions to improve the quality of census data relating to hearing loss in the future" (p. 30). There is likewise a clear need to prioritise research within NZ that addresses the contextual effects of ARHL.

3.6 Summary

Chapter Three reviewed the literature describing older adults' ongoing adjustment to hearing handicap in an audible world. Ecological perspectives dominated the introduction, and drew attention to the socially differentiating characteristics of hearing losses and ageing, both of which require novel and different ways of coping. Evolving aural rehabilitation perspectives demonstrated how a number of innovative Canadian audiologists have applied an ecological approach, and provided fresh insights regarding delivery of client-centred services that promote a problem-solving process to alleviate situations of disability and handicap. More recently, researchers have drawn attention to the paucity of interdisciplinary research that endorses ecological perspectives to understand how vision, hearing, cognition, and the presence of other health conditions modulate the experience of hearing handicap in late life.

Glass and Balfour's (2003) EMA provided a conceptual prism to organise the subsequent literature review describing the psychosocial implications of coping with hearing handicap in late life. Active versus passive coping strategies were described, and attention drawn to the important role of communication partners who modulate feelings about the stigma of spoiled social identity for those who are hard-of-hearing; but who become similarly affected by the disablement process. Research was cited that emphasised the importance of social participation in preserving older adults' emotional health, and in particular, the need for researchers interpreting cross-sectional data to take cognisance of the synchrony between changes in depression severity and levels of disability. To this end, research evidence was presented that explored the intersections between cognitive ageing and auditory processing that affect older hearing impaired adults' capacities to hear, listen, and comprehend spoken language; and mention was made of the growing body of research that has demonstrated sensory impairment can have a profound effect on older adults' social and emotional well-being. The focus on geriatric depression led to a brief consideration of the importance of the perceived availability of social resources in reducing the impact of functional disabilities on the incidence of depression. (This aspect is explored in greater depth, in Chapter Five.)

The research evidence showed that older adults' engagement in ongoing aural rehabilitation provides opportunities to preserve social functioning, and thereby minimise depressive symptoms and concomitant decreases in cognitive functioning. An increasing number of studies have reported the benefits of using amplification to sustain communication; however, the barriers that stop older adults from seeking help and optimising these benefits need to be identified. In particular, Scandinavian audiologists have highlighted the importance of locating physical and social triggers that initiate or exacerbate the experience of handicap; and indicated that the relationships between spouses determined the dyads' level of engagement with group rehabilitation sessions. The literature reviewed reiterates the need to involve communication partners in the ongoing aural rehabilitation process.

Finally, the focus on hearing health in NZ's emerging ageing agenda has shown that there needs to be a greater level of awareness in government agencies that report on older adults' well-being; especially regarding the impact of sensory losses and the use of assistive listening devices to promote communication. While most of the research evidence focussed on occupational hearing losses, and some on tinnitus and the use of hearing aids, only a few studies have addressed the specific aural rehabilitation needs of older adults in NZ. No published studies have examined the empirical links between hearing health, social well-being and quality of life in older New Zealanders.

Given the significant salutogenic contribution of sustaining social participation to 'age well' and maintain older adults' quality of life, the following chapter examines the theoretical underpinnings of the concept of social support, whilst Chapter Five explores the empirical links between three specific social support constructs salient to the current research context, and health-related quality of life.

CHAPTER FOUR: SOCIAL SUPPORT CONSTRUCTS

4.1 Evolving concepts

4.2 Intersecting theoretical and empirical paradigms
  4.2.1 The sociological tradition
  4.2.2 The cognitive tradition
  4.2.3 The interpersonal process tradition
  4.2.4 The intervention tradition

4.3 Distilling conceptual definitions
  4.3.1 A conceptual taxonomy
  4.3.2 Support functions
  4.3.3 Support functions and coping

4.4 Measuring social support constructs
  4.4.1 Psychometric challenges
  4.4.2 Social networks
  4.4.3 Perceived social support
  4.4.4 Support behaviours

4.5 Summary

Chapter Four traces the evolution of the concept of social support, initially examining four intersecting theoretical and empirical paradigms, and then presenting Lareiter and Baumann's (1992) conceptual taxonomy comprising five social support constructs, as a distilled theoretical framework salient to the current research context. In addition, five specific support functions known to enhance coping capacity in stressful situations are described (Wills & Shinar, 2000). Finally, a range of generic psychometric challenges that are likely to confront researchers who assess Cohen's (1992) recommended three-component model of social support are addressed, prior to focusing on the defining features of each construct (viz., social networks, perceived social support, and support behaviours). This theoretical exposition underpins the Chapter Five literature review of explanatory models and empirical evidence that link social support and health-related quality of life (H-QoL).

Epidemiological evidence rather than theory has shown that the maintenance of strong social networks and relationships throughout life are associated with a range of health outcomes. Accordingly, a review of earlier empirical applications of social support provides a synopsis of the conceptual variations of the term ‘social support’.

4.1 Evolving concepts

Prior to 1970 social support was rarely used in a research context, and until the mid-1970s the term was primarily used in a concrete sense, to denote a person, relationship, or transaction (Veiel & Baumann, 1992b). Later authors used the generic plural ‘social supports’ to refer to functionally comparable, concrete social interchanges of resources (Dohrenwend, Dodson, Dohrenwend, & Shrout, 1984).

During the late 1970s and early 1980s, the term was transposed into an abstract construct: social support referred to an *inferred* characteristic or function of social relationships or transactions, rather than the observable relationships or transactions themselves. Distinctly different conceptual constructions have produced diverging empirical research strands, with increasing diversity in the formulation of conceptual definitions, measures, and ultimately research agendas. More recently, social support has been conceptualised as a metaconcept (Vaux, Phillips, Holly, Thomson, Williams, & Stewart, 1986) with multi-dimensional qualities that lack specificity, and commonly imply an abstract characteristic of persons, behaviours, relationships, or social systems. Veiel and Baumann’s (1992b) description of social support as “a general and directly beneficial, perhaps intrinsic, quality of social relationships” (p. 1) provides an example of this approach.

The task of extracting a commonly accepted notion of what researchers mean by social support is challenging. Nevertheless, there is a pressing need to synthesise the disparate findings, instruments, and concepts into a coherent theoretical structure. Before attempting to accomplish this, it is helpful to know what theoretical approaches have informed the evolving conceptual perspectives and research traditions within the field of social support.

4.2 Intersecting theoretical and empirical paradigms

Expositions of basic human requirements inform the philosophic bedrock of the concept of social support, with the earliest theory first articulated in 1897, by French sociologist Émile Durkheim. Durkheim aimed to explain individual pathology as a function of social dynamics, and paved the way for several theories that subsequently shaped empirical explorations of social relationships, and their influence on health (Berkman & Glass, 2000; Berkman, Glass, Brissette, & Seeman, 2000).

In the mid 1900s psychoanalysts such as John Bowlby (the architect of Attachment Theory), formulated new theoretical insights that explored social cohesion from the perspective of the individual. Bowlby saw the importance of loss and separation as key issues for psychotherapists, and proposed that there is a universal human need to form close affectional bonds (Bowlby, 1980).

At the same time that Bowlby was formulating his theoretical framework, a number of British anthropologists developed the concept of 'social networks' as a new way of looking at social structure and community. Post World War II sociologists in the United States adapted and extended the concept of social network analysis to include quantitative empirical applications. They developed an egocentric network approach to social network analysis, which assessed the structure and function of networks from the perspective of the individual (see Burt & Minor, 1983; Wellman's [1993] reflective commentary; and more recently Marsden, 1993).

The sheer volume of publications devoted to social support since the 1970s provides evidence of evolving research agendas, with the focus moving to explorations of the *social* aetiology of mental and physical disorders (Veiel & Baumann, 1992b). Intersecting research paradigms in psychology, sociology, and psychiatry that focus on examining the social determinants of health and well-being have spawned a proliferation of global scores of social support and health status. In order to distil the conceptual components of social support within this burgeoning literature, the following sections describe four significant traditions that have provided empirical evidence linking social support and health (Cohen, Gottlieb & Underwood, 2000).

4.2.1 The sociological tradition

Émile Durkheim was the first to articulate the sociological tradition, when he postulated that disintegrating social ties of migrant workers to industrial areas had a detrimental effect on their psychological well-being. Interest in this link was rekindled in the 1970s and 1980s, when researchers found that those who participated in their communities enjoyed better mental health (see for example Cohen & Wills' [1985] review). Researchers subsequently developed social integration measures that reflected the number of reported social relationships in diverse areas to gauge social network participation. At the same time, a seminal study by social epidemiologists (Berkman & Syme, 1979) examined the association between social integration and mortality in a 9-year follow up study of residents of Almeda County, California (see also Wingard, Berkman, & Brand, 1982). The study found those participants who were more socially integrated lived longer. Similar links between social integration and increased longevity were subsequently observed in several large prospective epidemiologic studies in the United States (see for example Blazer, 1982; Cerhan & Wallace, 1997; House, Robbins, & Metzner, 1982; Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986; Vogt, Mullooly, Ernst, Pope, & Hollis, 1992).

Researchers have yet to agree exactly which characteristics of social networks are essential to health (Blazer, 2005). Evidence to date has shown that the number of network members is less important than either involvement in a range of social relationships (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; Thoits, 1983), or a range of social activities (House, Robbins, & Metzner, 1982). In addition, the stability of social integration measures over time facilitates the assessment of their impact on health, in contrast to fluctuating subjective perceptions of social support (Brisette, Cohen, & Seeman, 2000).

4.2.2 The cognitive tradition

In 1976, John Cassel (a physician and epidemiologist) and Sidney Cobb (a psychiatrist) argued that strong social ties provided a buffering effect against the potentially pathogenic impact of stressful events. Cassel (1990; although this article was originally published in 1976, in the *American Journal of Epidemiology*) found that confused or absent feedback from the social environment placed persons at risk for disease, in comparison with those who received consistent feedback, together with support and assistance that encouraged the development of coping capacities. Similarly, Cobb (1976) stated that those who were cared for and loved within networks of mutual obligation developed perceptions of support that, in turn, nurtured adaptive coping mechanisms.

Cohen and Wills (1985) reviewed 40 correlational studies designed to test the 'stress-buffering hypothesis' that social support protected persons from negative psychological consequences. They concluded that there was consistent evidence of buffering of the impact of stress where the cognitive appraisal of the availability of social support matched the needs elicited by the stressor. Cohen and McKay (1984), and subsequently Cutrona and her colleagues (Cutrona & Russell, 1990) elaborated which parameters were important when matching stressful events with support resources; they concluded that emotional and esteem support provide protection against a wide range of stressful events (Cohen & Wills). Perceptions of the availability of support proved to be a crucial conceptual element within this body of research.

4.2.3 The interpersonal process tradition

The past quarter century has seen research directions focus on the expression and receipt of social support. In essence, this tradition has emerged directly from empirical applications (Cohen, Gottlieb, & Underwood, 2000).

Initially the earliest research attempted to develop classification schemes to depict support exchanged in dyadic and group contexts (Cohen, Gottlieb, & Underwood, 2000). For example, Gottlieb (1978; cited in Cohen et al.) identified 26 categories, organised into four classes: emotionally sustaining behaviours, problem-solving behaviours, indirect personal influence, and environmental action. Another researcher, Levy (1979), who studied support groups in several U.S. towns, identified 28 categories; nine of which he found occurred most frequently during helping exchanges and included empathy, mutual affirmation, explanation, sharing, morale building, self-disclosure, positive reinforcement, personal goal-setting and catharsis. Other classification categories of support-intended behaviours have listed belonging, esteem, informational, and tangible support (Cohen & McKay, 1984). Although House and Kahn (1985) replaced belonging and esteem with the term emotional support, and more recently Cutrona, Suhr, and MacFarlane (1990) used the term network companionship instead of belonging.

4.2.4 The intervention tradition

Earlier writers in the social support and health research community encouraged practitioners to intervene and augment the support exchanges between people. For example, John Cassel (1990) stressed the need to strengthen individual's social support, rather than reduce their exposure to stressors; and Sydney Cobb (1976) enthusiastically suggested that patients should be taught how to give *and* receive social support. The intervention tradition, by definition, employs an applied perspective (Rubinstein, Lubben, & Mintzer, 1994).

At first network-centred interventions aimed to develop *targeted outreach programmes* that increased the helping skills of informal communities of caregivers such as teachers, police, clergy, and family physicians (Cohen, Gottlieb, & Underwood, 2000). However, initially no evaluations determined the effects of training on the intended beneficiaries (Cohen et al.). Another approach that began during the late 1970s involved the creation of *support groups,* for people who had experienced a range of acute life events and crises such as natural disasters, marital separation, transition to parenthood and bereavement. For example, Tudiver, Hilditch, Permaul, and McKendree's (1992) mutual–help group intervention for new widowers revealed a significant improvement over time on health, psychological and social measures, thereby highlighting the interdependence of maintaining social supports and physical health in bereaved older men (see also Fitzpatrick, 1998).

Finally, *one-to-one mentoring and coaching programmes* traditionally either draw mentors from the beneficiary's existing social network, or graft them onto it (Cohen, Gottlieb, & Underwood, 2000). For example, an experimental study conducted over a 3-year period in Leicestershire, England, offered individual packages of support to older people who lived alone, to enhance their social contacts (Clarke, Clarke, & Jagger, 1992). The experimental group participants in the study offered support recorded significant improvements in their self-perceived health status.

The associations between social relationships and health are complex, and are not always positive (Cohen & Wills, 1985). In fact, some interventions have met with mixed success. For example, when caring for Alzheimer patients, primary caregivers who were assisted by relatively pessimistic secondary caregivers experienced relatively less psychosocial distress, than those assisted by more optimistic helpers; especially in female-female care-giving dyads (Bourgeois, Beach, Schulz, & Burgio, 1996; see also Helgeson & Cohen, 1996; Helgeson, Cohen, Schulz, & Yasko, 2001; Lavoie, 1995). Despite this, Cohen, Gottlieb, and Underwood (2000) encourage the use of interventions as quasi-experimental techniques, to test theories about the impact of the social environment on health; theories that require clearly articulated definitions of social support and health constructs.

4.3 Distilling conceptual definitions

Veiel and Baumann (1992b) state that behaviour that is regarded as supportive, because of its obvious helping or comforting nature to the recipient, may be denoted as social support (as in those behaviours targeted by some assessment instruments, e.g. Vaux, Riedel, & Stewart, 1987). Similarly, behaviours that lead to subjective states of being unconditionally accepted, esteemed, and so on, may also be defined as supportive (cf. Hobfoll, 1998). In addition, social support may refer to a particular attitude or behaviour of members of a social network, expressed through specific observable behaviours, non-verbal clues, or other actions. The support value of particular behaviours "often depends on real or perceived attitudes of the provider" (p.5, Veiel & Baumann); for example, if attitudes or intentions are perceived as insincere, the support behaviours may well be invalidated. Thus, the combination of a particular person, and a particular behaviour, makes for support.

Lareiter and Baumann (1992) state that the terms 'social network' and 'social support' describe "a complex system of social phenomena, which represents part of (the) 'sozialen Lebensraum' (social world, Lewin) of a person and its functions" (p. 37). They maintain that the theoretical and empirical relations between social networks and social support are not clear, and offer a multidimensional taxonomy of social support that distinguishes six distinct concepts. Only five of these concepts are used as a research framework in the present study, with *Received/enacted support* omitted.

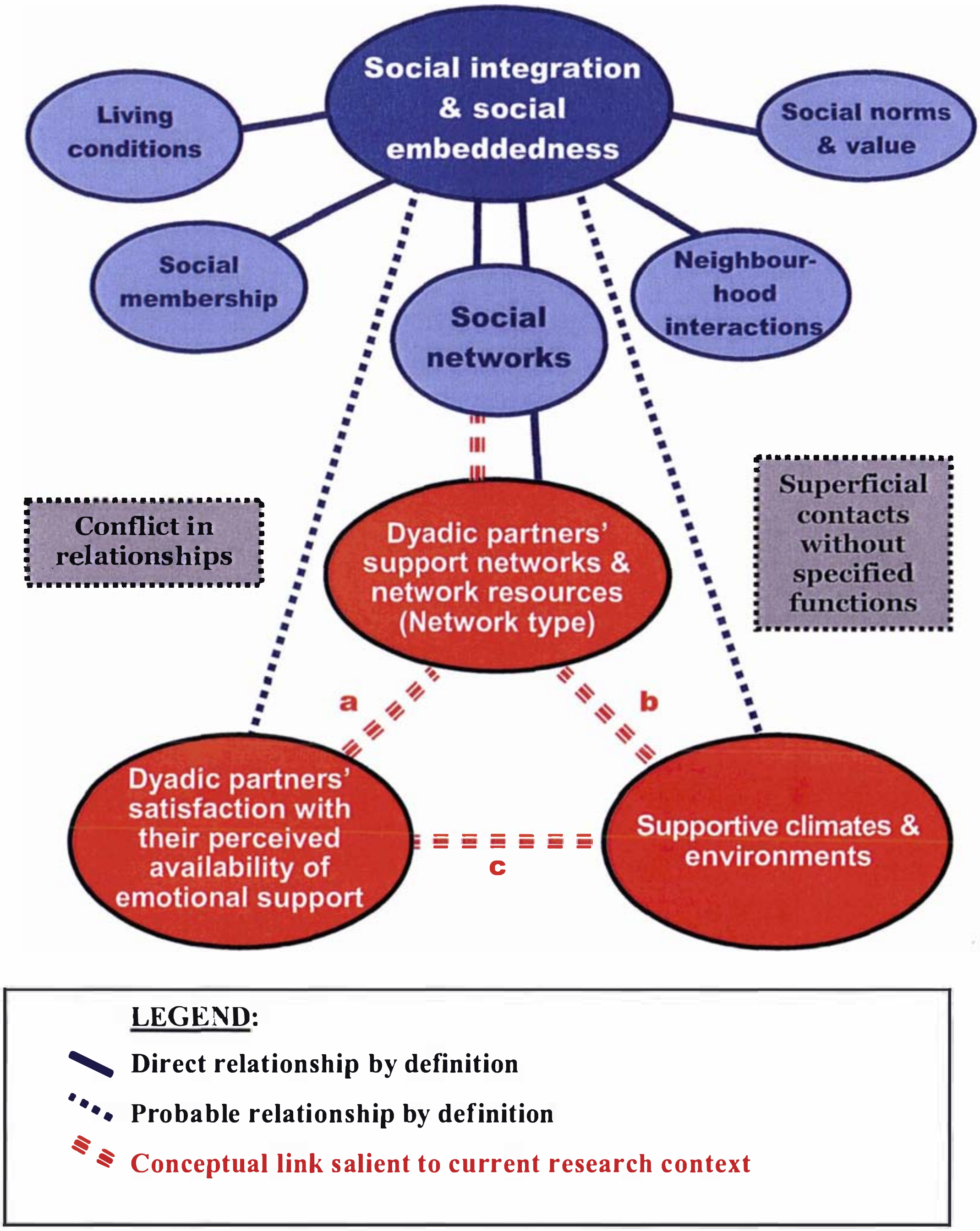

Figure 4.1. Diagrammatic hierarchy of the social networks and social support terminology. (Adapted from Lareiter & Baumann [1992], Figure. 1, p. 38.)

Note: ***Received support*** (for the recipient) ***and enacted support*** (from the provider) typically show very low concordance (Antonucci & Jackson, 1990). They are also generally independent of the other concepts depicted in this diagram (Lareiter & Baumann); consequently, these two concepts have been omitted.

4.3.1 A conceptual taxonomy

Lareiter and Baumann's (1992) taxonomy (refer Figure 4.1 for a diagrammatic summary of these concepts) includes the following five concepts:

i) *Social integration and social embeddedness* refer to the participation or involvement of a person in their social life, community and society, and includes access to resources and support systems. Possibly the most complex construct, social embeddedness, could cause all of the remaining constructs to overlap, and is therefore depicted as a super ordinate construct in Lareiter and Baumann's (1992) hierarchical diagram (refer Figure 4.1). Whether social integration is defined as a diverse range of relationships (see for example Cohen, Doyle, et al., 1997; and Thoits, 1983), or as involvement in a range of social activities (House, Robbins, & Metzner, 1982), it has received the most support in research studies that have investigated the links between social support and health (Cohen, Gottlieb, & Underwood, 2000).

ii) *Social network* is a term "used as a metaphor to describe points and their mutual ties" (p. 34, Lareiter & Baumann, 1992). 'Social network' describes the structure of social relationships, as opposed to 'social support', which refers to specific functions of a social network. Social networks comprise all those people with whom we have ongoing relationships, who may or may not provide social support. Conceptually, support networks are embedded in larger social networks (Wenger, 1994). Figure 4.1 (below) depicts this conceptual link.

iii) *Support network and network resources* are defined as potential and actual supporters who are those to whom the person turns, or would turn to, for support and help. Wenger (1994) stresses that support networks emphasise relationships between people, rather than groups or institutions. She asserts that the core of most people's support network is their family; and that there is clear research evidence that the *type of support network* people have affects their search for support; but more specifically, that access to resources and "the capacity to cope with problems is affected by the structure and the membership of the network" (p. 1). The structural and functional aspects of support network and network resources concepts may intersect, as Wenger, Davies, Shahtahmasebi, and Scott (1996) illustrated when they reviewed the empirical literature on social isolation and loneliness. Using data from a longitudinal study of older adults conducted in North Wales, Wenger et al's statistical models indicated that the critical factors for *isolation*, and hence difficulties accessing network resources included: network type, marital status, and social class; whilst the critical factors for *loneliness* included: network type, household composition, and health. The conceptual links within the current research context between network type, and both supportive climates and perceived support, are depicted in the adaptation of Lareiter and Baumann's diagram (see Figure 4.1). It is readily apparent from this conceptual diagram that network type holds a pivotal position within this conceptual formulation.

iv) *Perceived support* is the *individual's* perception (a cognition) of being supported, and includes an evaluation of the number of supporters, and satisfaction with their support provisions. Lareiter and Baumann state there is little overlap reported between an individual's perceived support and the other constructs, *except* where perceived support from the family relates to supportive environments (refer to v). The current research will initially examine the characteristic features of independent dyadic partner's perceptions of emotional support (i.e. independent of their co-dependent or associated dyadic partner), and then explore to what extent their perceptions of emotional support vary across different types of support networks (see below, in addition to Figure 4.1). It is instructive to note that whilst perceived emotional support focuses on *one individual's cognitions*, supportive climates focus on *appraisals of support transactions of two or more individuals*.

v) *Supportive climates and environments* is a term that has been used by Procidano & Heller (1983), who defined supportive *family* climates as those having a high degree of perceived support from the family; and Holahan and Moos (1985), who examined stress and coping within a socioecological perspective. This term also encompasses elements of what Cohen, Gottlieb and Underwood (2000) refer to as 'the interpersonal tradition,' which has focused on identifying different categories of support functions (see for example those authors cited in section 4.2.3 above; in addition to the five support functions described in 4.3.2, below; and the range of alternative typologies in Cutrona & Russell's [1990] review). Given the ecological approach to aural rehabilitation within the current research context, supportive social climates will both encourage participants to access appropriate support functions that facilitate the development and use of compensatory communication strategies, and monitor features of the built environment (such as levels of ambient sound and lighting), in order to facilitate reciprocal participative communication. Examples of two different types of supportive social climates in the current research context include: (a) Dyadic partnerships, where *both* partners report high levels of satisfaction with perceived emotional support, and are therefore more likely to be mutually supportive when adapting communication coping strategies that manage living with hearing handicap, and sustain social participation. (b) Self-help groups operating within organisations such as the Hearing Association New Zealand Te Kāhui Rongo o Aotearoa (HANZ) that offer a range of support functions for people who are hard of hearing (refer to the evidence related to contemporary self-help groups cited in *Supportive social environments,* in Chapter Five). Orientations to self-help and reciprocal exchange of support functions vary within different social networks (Wenger, 1993).

The suggested conceptual links depicted in Figure 4.1, between the two *individual constructs* of egocentric support network types and perceived (emotional) support, and the *pluralistic construct* of co-dependent dyadic partners' supportive climates and environments, will guide the exploratory data analysis within the current study.

Given the importance of support functions in the development of supportive climates and environments that enhance capacities to influence rehabilitation outcomes in older adults, the following section elaborates further on this dimension, with particular reference to the experiences of people who are living with hearing handicap.

4.3.2 Support functions

Empirical evidence has shown that each of the support functions listed below may be differentially effective for a variety of problems or stressors (Wills & Shinar, 2000):

i) *Emotional support*, which is "the availability of one or more persons who can listen sympathetically when an individual is having problems and can provide indications of caring and acceptance" (p. 88, Wills & Shinar, 2000), has been shown to alter threat appraisals of life events, reduce anxiety and depression, and enhance self esteem and coping strategies (Wills & Shinar).

ii) *Instrumental support* is targeted practical help to enhance coping strategies. A range of examples salient to the current research context include lending money or providing for the subsidised purchase of medical services (including equipment); installing assistive listening technologies, such as magnetic induction loops to facilitate inclusive listening and participative communication in homes and public places; removing moisture or wax from malfunctioning hearing aids; and changing hearing aid batteries.

iii) *Informational support* includes providing knowledge that is useful for solving problems, including information about community resources and services (such as contacting a local branch of the HANZ, in order to learn more about assistive listening technologies and alternative communication strategies - e.g., lip-reading - to enhance coping.

iv) *Companionship support* involves companions who can share social and leisure in a range of sporting, recreational and cultural domains, so that positive distractions can replace rumination about problems. For example, attending computer skills classes designed for people with hearing handicap that avoid giving instructions when standing behind or beside the computer users, and encourage sharing communication experiences with others who are similarly hard of hearing.

v) *Social comparison or feedback validation* provides information about normative behaviour, thereby decreasing perceived deviancy, providing favourable comparisons, and allowing for acceptance of feelings. Active membership in a community group such as a local branch of the HANZ provides opportunities of feedback validation amongst peers who face similar experiences.

Empirical studies vary in the attention that researchers accord each of these categories (cf. Dykstra, 1993; Bailis & Chipperfield, 2002).

4.3.3 Support functions and coping

In theory, support functions that enhance coping should be most relevant for persons experiencing high levels of stress (Wills & Shinar, 2000). However, without understanding how social support works (Chapter 5 reviews explanatory empirical models), practitioners cannot begin to design effective interventions. In their review of the literature, Swann and Brown (1990) state that positive feedback (or emotional support) from relationship partners mediates the link between stress and health. They acknowledge that this hypothesis presumes a high level of motivation to verify self-conceptions, through processes that build individuals' capacities to predict and control their social worlds, so that "others see one as one sees oneself" (p.152). Furthermore, Swann and Brown theorise that in order to accomplish a positive social identity, relationship partners play significant roles as 'accomplices' in stabilising their partners' self-conceptions (through feedback validation), and that each partner pursues a variety of strategies in their efforts to construct self-verifying social environments.

Heckhausen (1997) elucidates further on these strategies, stating that primary control strategies (comprising behavioural activities) characterise individual's efforts to shape their social and physical environments to suit their needs and wants, thereby providing opportunities for support transactions to affirm social identities (Swann & Brown, 1990). Complementary secondary control strategies (comprising cognitive processes) accommodate individuals' changing perceptions of their social reality (Bailis & Chipperfield, 2002; Heckenhausen & Schulz, 1998), and thus elicit self-confirmatory responses (Swann & Brown).

Despite the importance of feedback validation, Veiel and Baumann (1992a) maintain that the term 'social' in 'social support' is possibly misleading, as it is the *individual* who influences the size and composition of the network, and hence its capacity to deliver support. The *individual* seeks or does not seek help; and does, or does not accept it. Finally, the *individual* evaluates the support received; and then integrates the evaluation into a relatively enduring and encompassing cognitive-emotional representation of their social world (cf. Gottlieb, 1985). Thus, support is a relatively stable personal feature of the recipient, either as an enduring individual trait, or as several traits; and social support is therefore denoted as a transient *individual* state of mind; a perception of being cared for or loved (Cobb, 1976). Sarason and Sarason's (1982) focus on perceived social support as an individual difference variable articulates this approach, which is different from the actual social structures and transactions.

Within the current research context, 'supportive social climates and environments' are defined in terms of their capacities to achieve appropriate aural rehabilitation goals that enhance adaptive communication activities, and maintain participants' social functioning. Moreover, supportive dyadic partnerships should facilitate seeking help from professional audiologists, assistance (where appropriate) from self-help groups such as the HANZ, and encourage the development of appropriate adaptive communication strategies that sustain participation in a range of activities, including the appropriate use of assistive listening technologies. Research has shown that the exchange of support functions within dyadic partnerships, particularly emotional support, affects the development of appropriate adaptive coping capacities (Wills & Shinar, 2000).

4.4 Measuring social support constructs

Apart from Cohen (1992), several other authors have recommended using "a three component model as the most practical and heuristic" approach to the assessment of social support (p. 68, Oxman & Berkman, 1990). Indeed, Oxman and Berkman's three major dimensions of social network structure and composition, the type and amount of social support function, and the perceived adequacy of the social support provided, are very similar to Cohen's three constructs of social networks, perceived social support, and support behaviours.

As a prelude to a presentation of Cohen's (1992) three social support constructs, the next section will first identify a range of psychometric challenges that researchers have identified in relation to measuring social support constructs.

4.4.1 Psychometric challenges

Challenges confronting those intending to construct and use social support assessment instruments remain intricately linked to the conceptual complexities that abound within this research area. For example, Veiel and Baumann (1992b) stress the need to assess network structures and interaction patterns unbiased by subjective conditions, and suggest that direct observation, or using network members themselves, provides reliable sources of data (as advocated by Kessler, 1992).

In contrast to the empirical imperative for unbiased assessments of supportive network structures, is the need for researchers to collect subjective evaluations of perceived support (Veiel & Baumann, 1992b). Vaux (1992) notes that perceived support scores are in fact 'hybrid measures', as factual items are paired with subjective-evaluative ones. This characteristic, which also occurs in life event questionnaires, distinguishes these psychometric instruments from traditional psychological assessments (Veiel & Baumann, 1992b).

Vaux's (1992) review of the status of social support assessment noted that whilst the assessment of social support had progressed, the complexity of the social processes demand an arsenal of measures. He recommends that there is a great need for "measures that can serve general purposes, but can be adapted to particular research foci" (p.207).

Whilst Vaux (1992) proposes several recommendations for the selection of instruments, the following three are salient to the current research focus on supportive rehabilitative environments: (i) Research questions that concern a particular support mode (e.g. emotional support) or source (e.g. the immediate family) should select measures that target this focus. (ii) Where measurement is restricted, the focus should be on support appraisals and emotional support. (iii) Where clinical assessment features, priority should generally be given to network orientation, then support appraisals, and finally to support resources. Vaux states that in terms of instrument development, researchers should evaluate discriminant validity for current and new measures; and, wherever possible, use multiple measures to facilitate secondary psychometric analyses.

These psychometric challenges provide a backdrop for the final three sections, which focus on measuring each of Cohen's (1992) three support constructs.

4.4.2 Social networks

Oxman and Berkman (1990) define social network as "the pattern of ties linking people together" (p.68); adding that an analysis of social networks does not map what resources flow through these ties, nor establish whether they are even supportive. Social network analyses do focus on the characteristics of the patterns of ties between actors in a social system, rather than on the characteristics of individual actors themselves. "Analysts search for regular structures of ties underlying often incoherent surface appearances and use their descriptions to study how these social structures constrain network members' behaviour" (p.26, Hall & Wellman, 1985). Egocentric networks are networks surrounding an individual; however, network analysis methodologies can also be used with aggregated networks (Berkman, Glass, Brisette, & Seeman, 2000).

From the outset, formal theory organised in mathematical terms, and grounded in the systematic analysis of empirical data, has guided network analysis (Freeman, 2004). Whilst sophisticated computer packages are available to analyse and manage network data, simple measures of network structure and size are relatively easy to estimate (Berkman, Glass, Brisette, & Seeman, 2000). Social network data can be depicted graphically, in the form of sociograms or matrices (Brisette, Cohen, & Seeman, 2000). One social network measure that employs graphical representation is Wenger's (1994) Network Assessment Instrument (NAI). (Refer to Figure 7.1 in Chapter 7, for an example of this type of representation.) This instrument evolved from a longitudinal study of ageing in North Wales (starting in 1978), that concentrated on support networks. Wenger's NAI "identifies five distinct types of support networks reflecting different adaptations of older people and those to whom they relate living in the community" (p.2, Wenger, 1994; the Methodology chapter provides further details of this measure). Each distinct network type can be located along a socially integrated to isolated continuum, which provides helpful insights regarding older adults' access to functional support to sustain their health and well-being.

In a review of network measurement, Wenger (1995) criticises the use of proxy measures, stating that most gerontological research is primarily interested in the availability of emotional and instrumental support of adult children for their ageing parents. She notes that the existence and proximity of adult children does not necessarily equate with the provision of support; that data on friends and neighbours receives less attention; and that network assessment methodologies frequently fail to give any idea of the extent, or potential, of the network regarding the provision of resources.

Wenger (1995) differentiates between measuring 'total networks' (an approach that highlights the affective or elective nature of network ties), and 'partial or purposive networks' (which fulfil a specific purpose, such as the care networks of older people). Focus on purposive networks has proved valuable in the context of social support and social policy, with research demonstrating links between network characteristics, help seeking behaviours, the levels and types of informal help, and support received (refer Wenger, 1995; and Wenger, Davies, & Shahtahmasebi, 1995).

4.4.3 Perceived social support

Measures of perceived social support tap perceptions of the availability of social relationships providing functional support, which help those facing acute or chronic stressors cope. Measuring perceptions of the availability of supportive functions provides multidimensional options (Wills & Shinar, 2000), as functional support can be delineated in a number of ways (see, for example, the taxonomy of five types of support functions listed earlier). Delineating support components in this way allows for the matching between particular supportive functions and life stressors (Cutrona & Russell, 1990). For example, informational and instrumental support may be important to derive the maximum benefits from an assistive listening device; however, a supportive emotional climate may also be a key ingredient, to encourage perseverance during the initial phase of the on-going aural rehabilitation process.

Emotional support is one function with a proven research pedigree that demonstrates a 'surprisingly broad usefulness' (Wills & Shinar, 2000). Despite this, Vaux (1992) warns of the need to be vigilant, as general support measures are unlikely to capture all the contextual nuances of stress-support relationships. Wills and Shinar's review of measures of perceived support also stress the importance of examining the relevance of the measure to the researcher's hypotheses and population. In addition, they advise that as reliability is a prerequisite for validity, researchers should investigate the internal consistency and test-retest reliability indexes of potential measures, recommending optimal values of above .80. Wills and Shinar's selective table of 22 perceived support measures only included those with "a clear theoretical background and supporting psychometric information" (p. 97); Sarason, Levine, Basham, & Sarason's (1983) Social Support Questionnaire (SSQ) is one of the chosen measures. The methodology chapter provides further details of the SSQ, which gauges perceived emotional support in the doctoral study's data collection.

4.4.4 Support behaviours

The doctoral research study endorses Noble and Hétu's (1994) ecological approach to disability and handicap, and follows a similar line of inquiry to that cited by Wills and Shinar (2000), which suggested that supportive dyadic partnerships were more likely to nurture the development of appropriate and effective control strategies (Heckhausen, 1997). Accordingly, the doctoral study determines the nature of the structural and functional components comprising dyadic partner 'sociospheres', and explores their downstream links with aural rehabilitation outcomes. This ecological approach also indexes dyadic partners' appraisals of their own health-related quality of life (H-QoL), to discover whether any potentially invisible, 'collateral health effects' affect the veterans' partners (Christakis, 2004).

A range of support behaviours also occurs *within* the provision of audiological rehabilitation services, and yet there is a paucity of evidence-based research evaluating the relative effectiveness of the increasingly diverse range of aural rehabilitation interventions available for older adults. Two NZ government-sponsored studies have strongly recommended improved co-ordination of services for those with hearing losses (Kee, 1995; Newell, 1984). These recommendations foreshadow the dual imperatives of intersectoral collaboration and participation that inform current primary health care initiatives (MacDonald, 1992; cited in Hannay, Sunners, & Platts, 1997), and stress the importance of coordinating collaborative service provisions to enhance adherence (Glasgow, Funnell, Bonomi, Davis, Beckham, & Wagner, 2002; Wagner, Austin, Davis, Hindmarsh, Schaefer, & Bonomi, 2001).

Patient satisfaction with services provided by their audiologists and the performance of hearing aid technologies, provide useful indicators of older adults' experiences of on-going aural rehabilitation (Hampton, 2003). In addition, an audit of aural rehabilitation support services provided by branches of HANZ and associated hearing therapists within New Zealand will provide a useful database of support functions provided by this voluntary organisation.

4.5 Summary

Chapter Four delineated the evolution of social support concepts, identifying four traditions that characterise the intersections between empirical paradigms and diverse theoretical perspectives (provided by Bowlby, Cassel, Cobb, and Durkheim). Lareiter and Baumann's (1992b) taxonomy of five social support concepts clarified the meaning of this multidimensional construct, and suggested potential links between the structural (e.g. social network) and functional (e.g. purposive support networks and perceived support) dimensions. Given the importance of supportive environments that nurture coping capacity in older adults, five salient support functions were also defined (Wills & Shinar, 2000). The psychometric challenges confronting researchers measuring social support constructs were described, and Cohen's (1992) three-component model (social networks, perceived social support and support behaviours) presented as a practical means of assessing social support in the current research context. Chapter Five reviews the theoretical explanatory models and empirical evidence linking these social support constructs with older adults' health-related quality of life.

CHAPTER FIVE: SOCIAL SUPPORT AND HEALTH-RELATED QUALITY OF LIFE

5.1 Health perceptions and quality of life in older adults
  5.1.1 Defining quality of life
  5.1.2 Health status
  5.1.3 Functional status
  5.1.4 Health-related quality of life in older adults

5.2 Social relationships and health-related quality of life
  5.2.1 Social epidemiological perspectives
  5.2.2 Stress and health
  5.2.3 Stress, emotion, coping and health status: Lazarus' synthesis
  5.2.4 The main effects model
  5.2.5 The stress-buffering model

5.3 Cohen's overview
  5.3.1 Cohen's Transactional Model of Stress

5.4 Social support and health in older adults
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  5.4.5 Support behaviours
  5.4.6 Hearing health, social well-being and adherence

5.5 Chapter summary

5.6 Review and pilot study preview
  5.6.1 Theoretical and empirical links between hearing handicap, cognition and depression

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Chapter Five explores the theoretical and empirical links between social support, stress, and health-related quality of life (H-QoL), within the context of older adults' lives. A brief exposition of the conceptual relationships between quality of life, health status, and functional status in older adults provides a theoretical lens through which to review the subsequent explanatory models and mechanisms that link social factors with *self-rated health. Cohen's (1992) Transactional Model of Stress (TMS) provides a theoretical overview that integrates Lazarus and Folkman's (1984) dynamic appraisal of stress and coping with the three social support constructs defined in Chapter Four. This framework suggests a number of explanatory pathways between social support constructs and adaptive coping processes salient to older adults' adjustments to hearing handicap in late life. A selection of empirical evidence subsequently illustrates the nature of the links between each of the three social support constructs and H-QoL in older people, and concludes by focusing on adherence, hearing health and social and emotional well-being. Following the chapter summary, a synopsis of the theoretical and empirical evidence from the literature reviewed in the introductory chapters (predominantly the first three) presents the rationale for the pilot study's exploration of potential empirical links between hearing handicap, cognitive status and depression. At the conclusion of the following chapter, the pilot study's findings influence the literature selected to preview the doctoral study hypotheses.*

Given that the ultimate aim of health care is to promote health, and that the 1948 internationally accepted World Health Organisation (WHO) definition of health is **not** an operational concept (van Weel, 1993), it is useful to begin this chapter by clarifying what is meant when referring to 'health' within the current research context, which focuses on older adults. This process will provide an appropriate conceptual lens through which to review the empirical links between social support and health-related quality of life (H-QoL) in older adults.

5.1 Health perceptions and quality of life in older adults

van Weel's (1993) figurative depiction of the conceptual relationships between quality of life, health status, and functional status reflects a generic, patient-specific perspective: Functional status is embedded in subjective health status; which is in turn embedded in quality of life (refer Figure 5.1, below). The ensuing three sub-sections refine the explicit definitions of each of these key conceptual components, to qualify the meaning of H-QoL within a gerontological context.

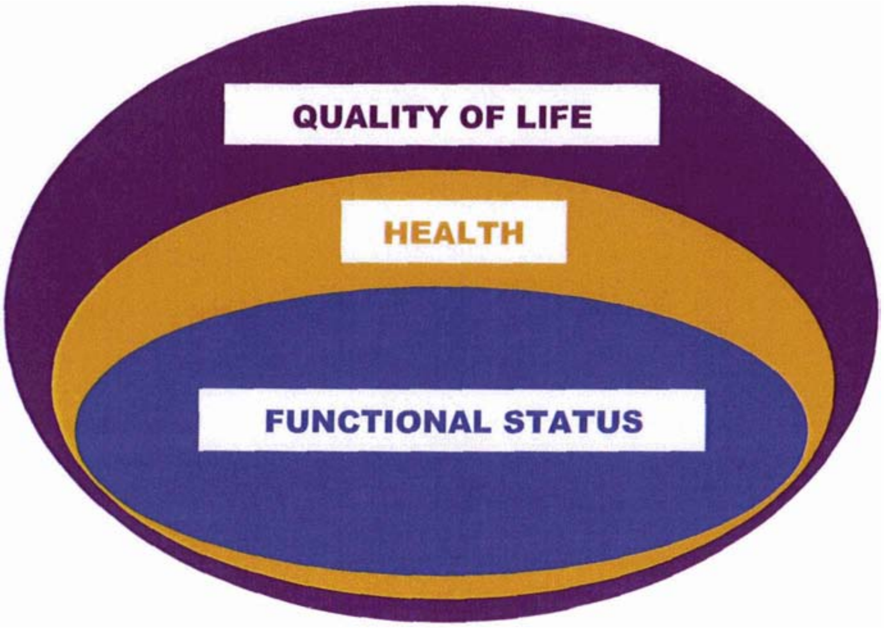

Figure 5.1. Conceptual links between quality of life, health status and functional status. (Adapted from van Weel 1993, Figure 1, p. 97.)

5.1.1 Defining quality of life

Despite the post-war popularisation of the term 'quality of life' within both lay and academic discourses, it remains an elusive concept to define with any precision (Rapley, 2003), especially within a gerontological context. Linked to the 'social indicators movement' in the 1960s, initially quality of life measures indexed social progress (Rapley). During the 1960s and 1970s Scandinavian conceptions of quality of life generally focussed exclusively on *objective* indicators of levels of living, of society as a whole; on the other hand, North American conceptions have focussed on *subjective* well-being, at the level of individual citizens (Noll, 2000). Although many publications do not define quality of life (Meeberg, 1993; Taillefer, Dupuis, Roberge, & Le May, 2003), the construct has emerged as an important outcome paradigm in clinical practice, epidemiological research, health care policy formulation, and assessments and evaluations of the effectiveness of technological interventions (Ormel, Lindenberg, Steverink, & Vonkorff, 1997).

Rehabilitation perspectives

Most early uses of the term 'quality of life' referred to well-being, conceptualised either in terms of an individual's objective conditions of living, or in terms of their experience of life, or both (Ormel et al., 1997). During the 1980s, evolving conceptualisations of quality of life within rehabilitation included references to "physical, emotional, cognitive, and social aspects of functioning within the major areas of life (e.g., mobility, communication, activities of daily living, vocational activities, social relationships, and leisure and recreation) across the lifespan" (p. 27, Renwick & Friefeld, 1996). Over time rehabilitation goals have moved from simply providing compensatory programmes, to integrating people with disabilities into adaptive social and physical environments that enhance their quality of life (refer Day & Janke, 1996; Renwick & Friefeld; Schalock, Brown, Cummins, Mattkka, Felce, & Brown, 2000). The most recent contemporary rehabilitation perspectives also include attention to health promotion, as well as primary and secondary prevention of disability. (For example, the Australian Government's [2005] "Ageing Well, Ageing Productively" policy framework encourages innovative, collaborative, cross-disciplinary research themes, such as "investigating modifiable factors to delay the onset of disorders and associated disabilities which limit economic and social participation and contribute to co-morbidities and reduced quality of life as people age"; p. 5.) Unfortunately, some researchers within the rehabilitation field have paid scant attention to definitions and conceptualisations of quality of life, in comparison to the number of scales they have derived to measure the construct (Woodill, Renwick, Brown, & Raphael, 1994).

Gerontological perspectives

Over the past two decades, the rehabilitation approach has encountered challenges associated with the marked increase in both the number and proportion of citizens who are aged 65 years and older (United Nations, 2003). In 1980 James Fries was one of the first researchers to draw attention to the public health implications arising from the increase in the average life expectancy of American citizens over the past century. The emerging 'longevity revolution' in Western industrialised nations has refocused public health agendas on maintaining well-being in older populations, where increasing morbidity occurs between the ages of 55 and 75 years (see also Fries, 2002a). In 1980, Fries' seminal article challenged the prevailing dominant rehabilitation paradigms of ageing with his 'compression of morbidity' thesis (Maddox, 2000). The thesis optimistically predicted that, for older adults, the risk of developing chronic illnesses and their associated functional disabilities could be postponed by changes in lifestyle that improved physical activity, social integration, and cognitive performance. A growing body of research evidence supporting Fries' thesis has encouraged the development of health promotion programmes and policies to postpone the age of onset of morbidity, prolong the period of adult vigour, and thereby improve older adults' quality of life. (For example, note how Fries [1992, 1996, 2002a, 2002b, 2003] and Hubert, Bloch, Oehlert, & Fries [2002] shape the United Nations' [2005] paper *Mainstreaming the concerns of older persons into the social development agenda*). These policy initiatives have contributed to a worldwide ageing policy discourse that includes auspicious terms such as active ageing, healthy ageing, positive ageing, successful ageing, or ageing well; all of which emphasise the importance of sustaining participation in society for older people (Setterlund, Tilse, Worrall, Hickson, & Wilson, 2002).

A closer inspection of the conceptual complexities of the term 'health' itself is an essential prologue to a consideration of the determinants of quality of life, as this will establish the perimeter of the sphere of influence that health occupies within the quality of life construct.

5.1.2 Health status

Bowling (1997) stresses that health status is embedded in a conceptual definition of health, which in turn shapes the way this concept is measured. In the past, health status indices in the Western world have typically been linked to negative definitions of health as the absence of disease, and therefore focused mainly on objective measures of the negative features of disease and illness. However, reliance on a negative definition of health can potentially exclude about 80 percent of a society's population (Bowling). Despite this, the research literature indicates that it appears easier for researchers to measure ill health, rather than agree on an acceptable operational definition of health, or wellness.

Positive health status

Bowling (1997) states that whilst there is no accepted definition of the concept of positive health, there is now broad general agreement that it encompasses:

> more than the mere absence of disease or disability and implies 'completeness' and 'full functioning' or 'efficiency' of mind and body and social adjustment. ... Positive health could be described as the ability to cope with stressful situations, the maintenance of a strong social support system, integration in the community, high morale and life satisfaction, psychological well-being, and even levels of physical fitness as well as physical health. (p.5)

This multi-faceted construction of positive health, which includes participation within a community context, is conceptually very appealing. However, the immediate challenge for health researchers is the selection of salient contextual constructs, from such a dynamic, multi-level, pluralistic structure. One construct relevant to the current research context is functional status.

5.1.3 Functional status

The concept of functional status is one of the most common methods of assessing one component of health status within a broader conceptual model of health in older adults (Bowling, 1997). Functional health status differs from general health status, in that the former relates directly to a person's ability to perform social roles, and is a component of health that measures the effects of disease (especially the handicap), rather than the disease itself. Operational definitions of functional health status generally concentrate on a variety of activities of daily living (ADLs), and are therefore able to gauge the effects of both illness/impairments/disabilities and wellness. The social roles that become so readily apparent in the pursuance of these activities emphasise that daily activities occur in a social context, and that individuals interact with others in order to attain and sustain their well-being (Bach & Rioux, 1996). The renascent emergence of an ecological perspective, which attempts "to arrive at a naturalistic understanding of the world in which we live" (p. 391, Inui, 2003) and die, is particularly relevant to the 'successful ageing' research agenda; and offers perspectives that researchers ignored when they focussed solely on ageing (Lazarus, 1999b).

The recent Word Health Organisation (WHO) report entitled *International Classification of Functioning, Disability and Health Final Draft* (2001), refers to the consequences of an impairment or disability in terms of activity limitations (which impact the execution of tasks or actions by an individual), or participation restrictions (which impact the degree of involvement of an individual in life situations). The concept of participation is receiving increasing attention from those who are interested in transforming enabling policies on participation into "liberating social change practices" (p. 44, Setterlund et al., 2002). In particular, the identification and removal of barriers to participation, in conjunction with the promotion of social engagement, have become major themes in the psychosocial research agenda on ageing well (Maddox, 2000), themes that challenge the often socially marginal position of older people, in Western industrial societies (Minkler, 1981).

5.1.4 Health-related quality of life in older adults

Researchers use the term 'quality of life' interchangeably with a variety of others such as health status, health perceptions, functional disability, psychiatric disturbance, subjective well-being, and life satisfaction (Murrell, 1999). This multi-dimensional usage highlights the conceptual complexities of the term 'health-related quality of life.'

The health-related focus features prominently within recent gerontological perspectives of quality of life. For example, data from the Berlin Aging Study (BAS; Baltes & Mayer, 1999) has explored the links between individual differences in both health status and functional capacities in old age, and subjective well-being (Smith, Borchelt, Maier, & Jopp, 2002). In addition, Bowling's (1995) analysis of responses from 2000 randomly selected adults in great Britain found that adults aged 75+ were more likely than younger people to mention their own health as the first most important area of their life, and less likely to mention their relationships with family and relatives. Bowling also found that for participants with long-standing illness, being able to get 'out and about' became increasingly more important as age increased. Subjective well-being is commonly used as a general indicator of psychological adaptation and successful ageing (see Baltes & Baltes, 1990; Baltes & Carstensen, 1996a, 1996b; Lawton, 1997; Raphael, 1996; and Rowe & Kahn, 1987; in addition to those authors already mentioned in relation to the 'compression of morbidity' thesis in older adults, particularly Fries, 2002a, 2002b; and Maddox, 2000).

The phrase 'well-being' is included in the WHO's well-known definition of health, a definition that has influenced many of the earlier conceptualisations of quality of life (WHO, 1948). This definition of health as "a state of physical, mental and social well-being, and not merely the absence of disease" has successfully linked health domains with happiness and life satisfaction (Power, 2003). A half a century later, the WHO's definition of quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHOQOL Group, 1995, p. 1404) stresses the importance of subjective perceptions, without referring explicitly to health. This conceptualisation anticipates that quality of life assessment scales encapsulate the dynamic interplay between an individual's subjective perceptions of their 'position in life,' and their relationships with their social, physical, and cultural environments.

5.2 Social relationships and health-related quality of life

In general, researchers consider that social support affects both physical and mental health, through its influence on emotions, cognitions, and behaviours (S. Cohen, 1988). Although abundant empirical evidence demonstrates an association exists between social relationships and health, explaining the causal mechanisms that link the dynamic interplay between biological, psychological, and social processes continues to challenge researchers. Social epidemiologists such as Lisa Berkman and colleagues have proposed an integrated model that attempts to accommodate "classical theoretical work in sociology, anthropology and psychiatry with the empirical research currently underway on social networks, social integration and social support" (p. 853, Berkman, Glass, Brissette, & Seeman, 2000). The ensuing section briefly outlines this significant conceptual model, which also underpins Glass and Balfour's (2003) Ecological Model of Ageing (EMA) referred to earlier (see Figure 2.1).

5.2.1 Social epidemiological perspectives

Berkman and Glass's (2000) comprehensive model includes both upstream macro- and mezzo-level structural social support factors, and downstream micro level pathways that encapsulate the functions of social networks. (Refer Figure 5.2 [below], which incorporates examples from the current research.) The upstream constructs are closer to Durkheim's sociological orientation and focus on the larger macro-social context that includes a consideration of culture, social change, socio-economic position, and political participation. In comparison, downstream constructs attempt to explain how social network structures influence functional support provisions and interpersonal behaviours through four psychosocial mechanisms, namely: (i) the provision of social support; (ii) social influence, social engagement and attachment; (iii) person-to-person contact; and (iv) access to resources and material goods.

These four micro-level mechanisms, in turn, influence biological and psychological factors, which are the most proximate to health outcomes. Berkman, Glass, et al. (2000) outline three possible proximate pathways within this complex lattice: Firstly, the health behaviour pathways that reflect social influence and shape health-promoting or health-damaging behaviours, such as adherence to medical treatments or help-seeking behaviour, in addition to smoking, alcohol consumption, diet, and exercise. Empirically, social connectedness has shown an inverse relation to risk-related health behaviours; a feature Pescosolido (1992) illustrated when she described how social networks influence people's decision-making about seeking help for health problems, and how that ultimately affected the trajectories of their illness episodes (see also Pescosolido, Wright, Alegria, & Vera [1998]). Secondly, the psychological pathways that influence cognitive and emotional states, including sense of well-being or depression, and coping effectiveness. Studies of psychological health show that perceived adequacy of social support, rather than availability, appears to be the most important construct (Henderson, 1981; and Swindle, Heller, Pescosolido, & Kikuzawa, 2000). Finally, the physiologic pathways ultimately encapsulate the cascading macro to micro influences across the life course, a connection best illustrated by the empirical link between social integration and all-cause mortality.

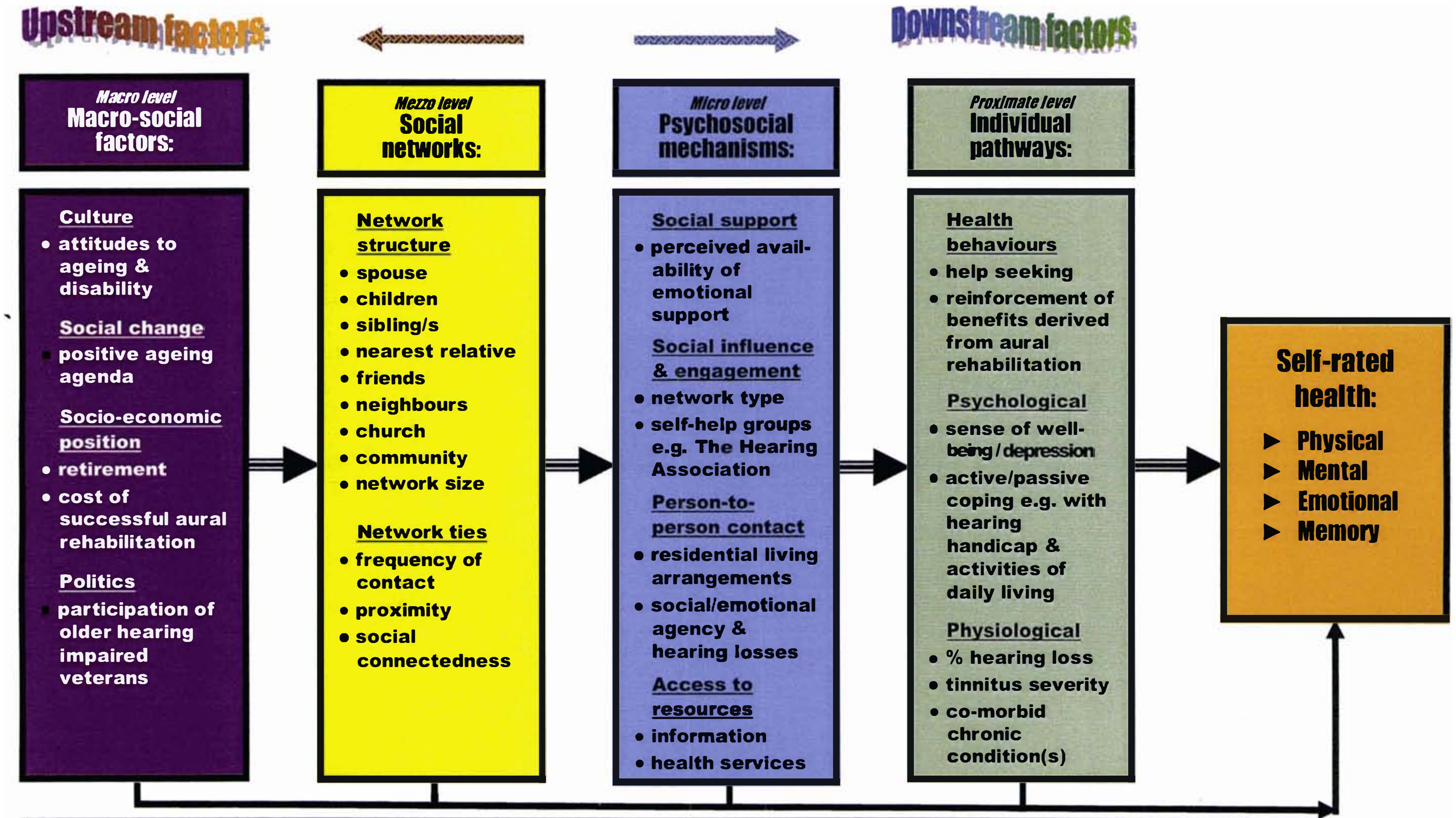

Figure 5.2. Conceptual model of how social networks impact self-rated health. Adapted from Berkman and Glass (2000) Fig. 7-1. (p. 143); and Zunzunegui, Kone, Johri, Beland, Wolfson, and Bergman (2004) Fig. 1. (p. 2070).
Note. Paths are drawn in one direction for simplicity, but feedback loops are possible.

Berkman, Glass, et al. (2000) draw attention to recent life-course perspectives in humans and animals that suggest long-term neurobiological experiences which unfold in old age may well be shaped during earlier, critical periods (Suomi, 1997). For example, Meaney and colleagues have shown that in rodents, chronic social isolation throughout the life course can produce persistent hypothalamic-pituitary-adrenal axis responses that induce faster ageing (Meaney, Aitken, Bodnoff, Iny, & Sapolsky, 1985; Meaney, Aitken, Vanberkel, Bhatnagar, & Sapolsky, 1988; Meaney, Mitchell, Aitken, Bhatnagar, Bodnoff, Iny, & Sarrieau, 1991). In addition, a growing body of evidence has linked social relationships with immune system functioning. (See for example Cohen, Doyle, Skoner, Rabin, & Gwaltney's [1997] research in relation to susceptibility to the common cold; and Cohen & Herbert's [1996] review of how psychological factors might influence immunity and immune system-mediated disease, especially less serious infectious diseases). Cohen and Herbert caution, however, that this literature has yet to establish unequivocally that the associations between psychological factors and disease are attributable to immune changes.

Two further conceptual models articulate explanatory mechanisms of how empirical observations of social support affect health and well-being. Identified by Cohen and Syme (1985), each model accommodates up- and/or downstream factors in Berkman, Glass, et al.'s (2000) inclusive model, in addition to another significant construct, namely stress. In the so-called 'main-effects' model (generally observed in upstream factors), social relationships influence health outcomes, with stress being only one of several factors that influence health; hence, irrespective of stress levels, people experience beneficial effects. On the other hand, the 'stress-buffering' model (usually associated with downstream factors) assumes that stress leads to poor health outcomes, and that social relationships buffer the impact of stress, when stress levels are associated with problematic access to emotional support (Kaplan, Sallis, & Patterson, 1993). Given the importance of the construct of stress within both these models, it is instructive to consider briefly the links between stress and health, prior to presenting further explanatory details of each model.

5.2.2 Stress and health

The potential link between stress and health has become increasingly important, because in Western industrial societies people are living much longer and chronic illnesses such as cancer, heart disease, and acute infectious illnesses have begun to feature more prominently in mortality rates (Lazarus, 1999b). A large body of research evidence has linked stress to various detrimental effects that impinge on biological, psychological and social functioning. For example, researchers have traced the impact of stress on the immune and cardiovascular systems, on mortality and morbidity rates, and on the prevalence of suicide and various emotional disorders (Fitzpatrick, 1998). It appears that older men are more vulnerable than women and younger age groups, to the adverse effects of disruptions to their social networks (Bowling & Windsor, 1995; Fitzpatrick). Data from a sample of 1,210 US ex-service personnel who participated in a normative ageing study is of particular relevance to the current research context (Spiro, Schnurr, & Aldwin, 1994): Spiro, et al, reported that World War II veterans exposed to moderate or heavy combat had 13.3 times greater risk of suffering from post-traumatic-stress-disorder symptoms 45 years later. They cautioned that combat exposure could remain a 'hidden variable' in the study of ageing men. In New Zealand, Alpass, Long, Blakey and Pachana (2004) have also found evidence of a negative relationship between combat exposure and cognitive status in a sub-sample of 232 older veterans in the NZ Hearing Aid Research Project (HARP) who also agreed to participate in face-to-face interviews. In addition, among the 166 'combat veterans' in the HARP sub-sample, satisfaction with the perceived availability of social support was significantly related to PTSD severity, but unrelated to general mental health (Redwood, Alpass, Long, Pachana, and Blakey, 2004).

A brief overview of Lazarus' (1999a) 'new conceptual synthesis' of four inter-related constructs, namely stress, emotion, coping, and health status, provides relevant insights into the rehabilitation contexts of older veterans.

5.2.3 Stress, emotion, coping and health status: Lazarus' synthesis

Lazarus (1999a) acknowledges that the most important modern theorist of physiological stress was Hans Selye (1950, 1957). However, Selye's three-stage general adaptive syndrome failed to explain what makes a psychological event noxious. Lazarus and his colleagues accomplished this, through their exploration of the personal meaning of stress, or appraisal. Appraisal affects the interaction between person variables, and their reactions to environmental variables, which influences the experience of stress and emotion.

Lazarus (1999a) conceived of two kinds of appraisal: primary appraisal, which focused on goal relevance, goal congruence and type of ego involvement; and secondary appraisal, which focused on future expectations and coping potential. He suggested that coping serves two major functions: firstly, a problem-focused function involving information gathering to mobilise action; and secondly, an emotion-focused function, which aims to regulate the emotions tied to the stress situation. Thus, stress, emotion and coping are conceptualised as "existing in a part-whole relationship" (p. 37, Lazarus, 1999a), with emotion providing a super ordinate function that includes stress and coping.

Lazarus (1999a) endorses new theoretical and empirical directions that present perspectives on positive mental health, which emphasise states of mind and actions that transcend life's challenges (see for example Ryff & Singer's evolving conceptual approach in a series of chronologically ordered publications: 1996, 1998a, 1998b, 2000a, 2000b, 2002, & 2003). Despite these optimistic developments, Lazarus remains cautious about whether social scientists have successfully demonstrated if, and how, stress and emotion influence health.

In their review of the literature examining the links between social support and health, Cohen, Underwood and Gottlieb (2000) note that in correlation studies, social integration measures generally fail to interact with stress levels (see reviews by Cohen & Wills [1985]; and Schwarzer & Leppin, [1989]). On the other hand, more sensitively calibrated functional measures that gauge stress levels (e.g. the perceived availability of support), are more likely to show evidence of stress buffering. The following two sections examine these two different explanatory models.

5.2.4 The main effects model

In the additive or main effects model the social environment is a key element that enhances health and well-being independently of stress. Social control shapes health-promoting behaviours, and thus promotes desirable health outcomes. Another interpretation is that social involvement provides identity and sources of positive self-evaluation (Kaplan, Sallis & Patterson, 1993), which reduces psychological despair (Cohen, Gottlieb, & Underwood, 2000). Increased perceptions of control and mastery are invariably associated with reductions in anxiety, helplessness and despair, and this ultimately enhances positive health outcomes (Thoits, 1986; 1995).

In contrast, isolation that increases negative affect, creates a sense of alienation, decreases feelings of control and self-esteem, and is more likely to be associated with suppressed immune function and increased neuroendocrine responses (Cassel, 1990; Cohen, et al., 2000; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Cohen et al. speculate that the main effects model may in fact camouflage the buffering effect of social support, especially if researchers either ignore daily stresses, or assess them poorly. The stress-buffering mechanisms, generally linked to explanations of perceived support, are described in the ensuing section.

5.2.5 The stress-buffering model

The stress-buffering model illustrates how the perceived availability of social support can potentially shape individual responses at different points along the causal chain that links stressors to illness (Cohen, et al., 2000). The model has been modified by researchers to accommodate adaptive coping responses (Lazarus, 1999a), and consequently provides diverse pathways that include potential positive *and* negative health outcomes.

The first interaction point with social support occurs when an individual is able to redefine a potential threat, as they believe that they can call on others to assist them cope (Thoits, 1986). Support beliefs nurtured in this way may reduce or eliminate emotional reactions to stressful events, actively promote problem-solving coping strategies, and consequently minimise associated physiological responses, in addition to preventing or altering potentially maladaptive behavioural responses (Cohen, Gottlieb,

& Underwood, 2000). Cohen, et al. state that the receipt of support may alleviate the impact of stress appraisal, and facilitate a repertoire of adaptive coping behaviours such as exercise, proper nutrition, and adequate rest (cf. Cohen & Wills, 1985; House, Robbins, & Metzner, 1982), which in turn promotes positive physical and mental health outcomes.

Given the demonstrated importance of social relationships in people's everyday lives (Uchino, Uno, & Holt-Lunstad, 1999), it is timely to present Cohen's (1992) organizational overview, which accommodates the three selected social support constructs defined in the previous chapter, within a dynamic transactional model of stress that depicts a variety of adaptive pathways, and integrates both the main effects and stress-buffering explanatory models.

5.3 Cohen's overview

In an overview of the interrelations between stress and social support that impact on health, Cohen (1992) states that *social networks* refer to the structure of social relationships (including the quantity and type of relationships), whilst *perceived social support* refers to their function (including their capacity to provide resources such as emotional support and information). He adds that the dynamic interplay between structure and function mobilises *support behaviours* intended to aid persons facing stressful events (see also Uchino, 2004b). Cohen's Transactional Model of Stress (TMS) encapsulates these three key social support constructs (refer to sections 4.4.2 – 4.4.4 in Chapter 4 for more details).

5.3.1 Cohen's Transactional Model of Stress

Cohen (1992) states it is easier to criticise the apparent lack of an integrated theoretical perspective, than to derive one. He developed a conceptual framework as an organisational tool to assist with the integration of conceptual links between social support, stress, and health, rather than as a formal explanatory model (refer Figure 5.3, below). At the heart of Cohen's diagram are the core constructs of Lazarus and Folkman's (1984) transactional model of stress and disorder (clearly identified in the diagram by the discontinuous borders), which interact with Cohen's three interrelated social support constructs of social networks, perceived support, and support behaviours (identified here by the continuous borders; refer Figure 4.1 in the previous chapter).

In essence, the transactional exchanges begin when an individual appraises the severity, context, duration, and timing of stressful events as either stressful or benign, in the context of their own values, beliefs, experiences, and coping resources. Events perceived as stressful can result in a range of psychological (e.g. negative affect, lowered self-esteem, and lowered feelings of control) and physiological (e.g. cardiovascular, hormonal, and immune response) changes that may ultimately put a person at risk for disorder or ill health.

Thus the appraisal of the meaning of stressful events, by assessing whether an individual's abilities to cope exceed the demands of the situation, occurs in a dynamic social context. Cohen (1992) states that the accumulation of multiple stressful events within, or across categories, increases the risk of a negative outcome; and that psychological changes are presumed to mediate the physiological effects of stress such as increased heart rate and blood pressure, hormonal secretions (including catecholamines, CRF, ACTH, cortisol, and growth hormone), and changes in immune function.

Figure 5.3 (below) identifies nine potential pathways that depict the connections between the three key social support constructs, embedded within Cohen's (1992) Transactional Model of Stress (TMS):

(1) Social norms and information provide a social context for the appraisal of events (an aspect reported by a variety of researchers, including Allen, Sorensen, Stoddard, Peterson, & Colditz, 1999; Lazarus, 1991; Lazarus & Folkman, 1984; and Shaw, 1999).

(2) Social networks directly influence perceptions of support through support norms, and expectations of reciprocity (illustrated by Ikkink, & van Tilburg, 1998; and Peek, Coward, Peek, & Lee, 1998).

(3) The stress-buffering hypothesis suggests that perceptions of social support moderate the impact of stress (see for example Carr, House, Kessler, Nesse,

Sonnega, & Wortman, 2000; Clutton, Pakenham, & Buckley, 1999; Cohen & Wills, 1985; and Veiel, 1992).

(4) In the additive model (Wheaton, 1985) stressors result in the mobilisation of support behaviours, thereby ameliorating the stressor's impact (for example, Kubzansky, Berkman, & Seeman, 2000).

The five remaining pathways focus on support behaviours that are central to problem- and emotion-focused adaptive processes.

(5) Emotion-focused coping centres on the regulation of self-esteem maintenance and/or affect (as reported by Brown, Andrews, Harris, Adler, & Bridge, 1986; Burns, Eichenberger, Eich, Ajdacic-Gross, Angst, & Rossler, 2003; Cotten, Burton, & Rushing, 2003; Krause & Shaw, 2000; and Wills & Cleary, 1996).

(6) A feedback loop linking support behaviours with stress appraisal allows for the expression of feelings of specific control over a stressor, as well as generalised expectancies of control (described by a number of writers such as Cohen, 1988; Heaney, Israel, Schurman, Baker, House, & Hugentobler, 1993; and Michie & Williams, 2003).

(7) The feedback loop between support behaviours and perceived social support takes account of the influence of previous experiences with support in terms of an individual's expectations regarding their future support (refer Litwin, 1994; and Pinquart & Sorensen, 2002)

(8) 'Inappropriate support' occurs when either the aid supplied is in a domain where the person already feels competent, or the aid threatens perceptions of competence. This pathway also reflects the failure of networks to respond when a person is in need.

(9) This feedback loop connects support behaviours to the social network, and depicts network deterioration because of the support processes (see Beckett, Goldman, Weinstein, Lin, & Chuang, 2002; Gagnon, Hersen, Kabacoff, & Van Hasselt, 1999; and Silverstein, Chen, & Heller, 1996). Cohen (1992) suggests that deterioration might occur due to prolonged demands on support that exceed the expectancies and/or norms of a network.

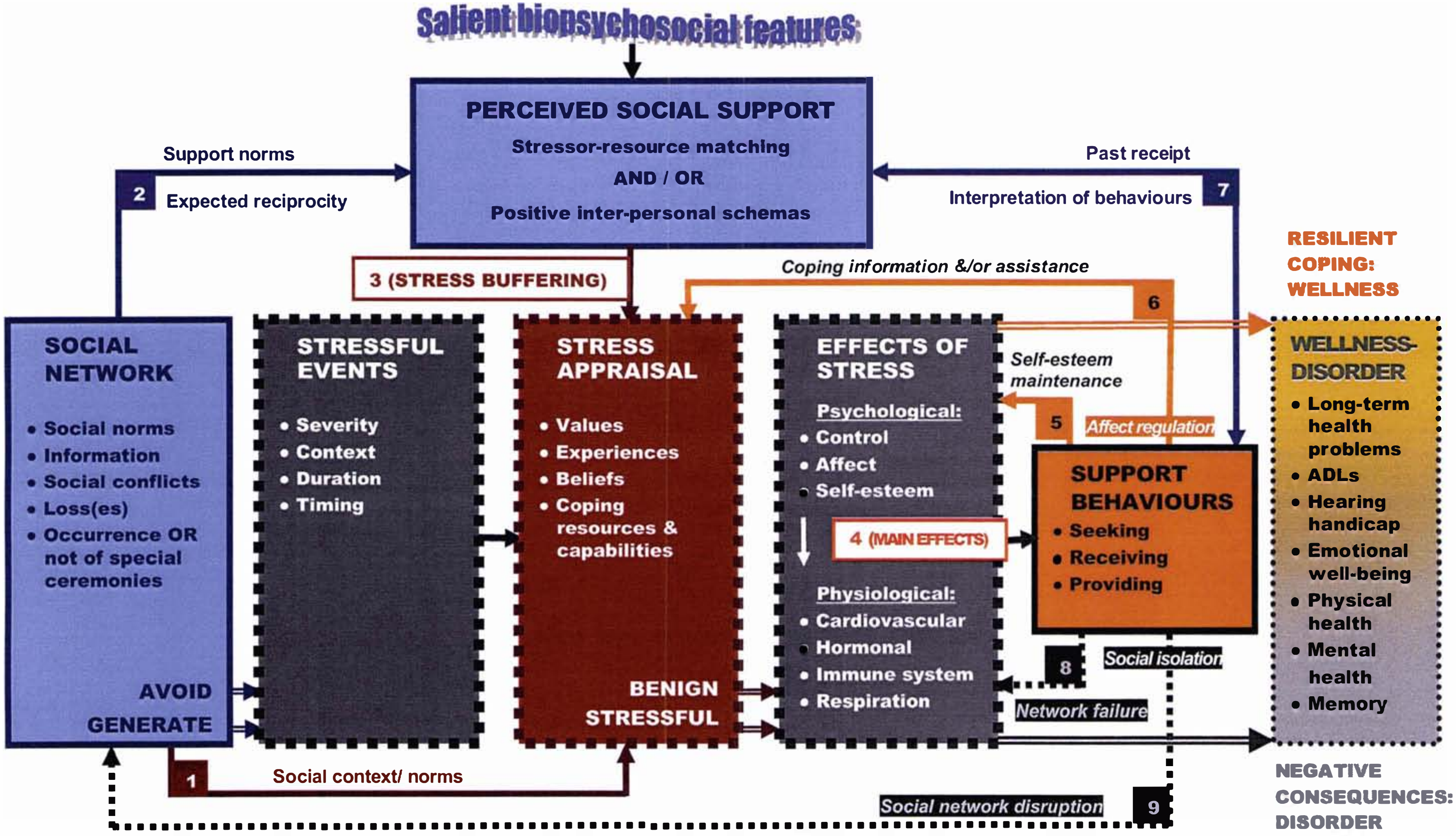

Figure 5.3. Major concepts and mechanisms depicting relations between stress, social support and the wellness-disorder continuum. (Adapted from Cohen's *Transactional Model of Stress* [1992] Figure. 1, p. 110.)

> For example, Riemsma, Taal, and Rasker (2000) found that both over- and underestimations of patient's functional disabilities by their spouse were associated with poorer mental health status for the patient. They suggest that misperception of a patient's condition by their spouse can lead to ineffective and inappropriate support being given. In addition, Freedland and Carney (2000) state that although anxiety and social isolation are clinically significant problems in many older patients with heart failure, these problems are in fact deserving of more clinical attention than they typically receive.

Delineating the specific health-related functions of social relationships within such a dynamic model is challenging, and may in fact vary across the developmental course of social relationships (Rook & Underwood, 2000). Despite this, a number of authors in the field have suggested that the helpfulness of different support behaviours varies across stressors (refer Cohen & McKay, 1984; Cutrona & Russel, 1990; Wills, 1985). This hypothesised specificity, in turn, forms the cornerstone of 'the matching hypothesis' (Rook & Underwood), which predicts that the support most closely matched with needs that are aroused by particular stressors, will provide the greatest health benefits. For example, widowed individuals' support needs change over time, as they move through the initial acute phases of grief, to longer-term adaptation (Stylianos & Vachon, 1993). Rook and Underwood maintain that researchers should focus on evaluating what different kinds of social support are required at the onset, versus the maintenance phases of clinical disorders; and probe the meaning of shifts in psychological functioning over time. Further attention is paid to these pathways, when discussing the results.

5.4 Social support and health in older adults

Within the gerontological literature, theories of normal adult development offer a variety of explanations of the changes associated with ageing, both at the individual and at the group level (Schaie & Willis, 1996). For example, some life-span approaches to social ageing stress that adaptation and growth of function can occur at any point during the life-span, and that old age need not be experienced as a time of social isolation or loneliness (refer Baltes & Baltes, 1990; Hansson & Carpenter, 1994). On the other hand, Carstensen (1992) suggests that individuals begin narrowing their range of social partners long before old age; and Hansson and Carpenter acknowledge that certain age-related circumstances (such as retirement, reduced income, and poor health) can begin to restrict opportunities for social interaction (see also Baltes & Carstensen, 1996a, 1996b). A variety of factors constraining the functional roles of older adults can further restrict meaningful social participation (for example, the loss of friends and family members through death, and the contraction of social roles in later years). In particular, parenting demands usually decrease with age; although there are increasing numbers of 'grandparents parenting grandchildren' (refer Glass & Huneycutt, 2002; and Thompson, 1999). There may also be additional demands placed on family relationships, due to increasing dependency needs linked to frailty, disabilities, sensory losses, and diminishing cognitive competencies.

Prior to focusing on research evidence that links social support to the health and well-being of older adults, it is appropriate to begin with a preview of the gerontological research agenda that includes terms such as 'successful ageing,' 'robust ageing,' 'productive ageing,' or 'ageing well' (Garfein & Herzog, 1995).

5.4.1 The social dynamics of ageing well

Although researchers have yet to agree on the precise definitions of terms such as 'successful / robust ageing,' and 'ageing well' (T Glass, 2003), they accept that these terms imply *more* than mere longevity (Inui, 2003). In fact, belated recognition of the heterogeneity in the health of older adults (Friedrich, 2001b; Rowe & Kahn, 1987), coupled with a new discourse espousing the theory and practice of health promotion (Robertson & Minkler, 1994), has focussed the gerontological research agenda increasingly on factors that are extrinsic to the ageing process (e.g. life style, diet, and exercise; refer Rowe & Kahn, 1997). Implicit in these health promotion goals for community-dwelling older adults is an acknowledgement of the contextual realities of later life (including the possible presence of disease or disability), and a need to prioritise the development of resilient adaptive capacities that sustain health and functional independence, to facilitate 'ageing in place' (Elnitsky & Alexy, 1998). The attendant implications for both health promotion (Syme, 2003) and the provision of appropriate clinical care within environments that value 'successful ageing' include learning what older adults expect and value, and developing interventions that endorse their dignity, autonomy, needs for social engagement, and the absence of suffering (T. Glass).

Lazarus (1999b) draws attention to the dearth of in-depth studies which explore patterns of coping that sustain productive social engagement in later life. Despite this, he commends the significant contributions of Baltes and Baltes (1990), whose three process model of 'selection, optimization and compensation' describes strategies that older people use to "age well even in the face of loss", by selecting valued goals for concentrated effort, and releasing less important ones (p.172, Lazarus, 1999b). This model, which accommodates Carstensen's (1992) theory of socioemotional selectivity (describing the evolution of social and emotional development through adulthood), recognises the unique significance of individual values and goals for older adults, as they shape the expression and personal meaning of their adaptive functional competencies across biological, psychological, and social domains (Baltes & Carstensen, 1996a).

In their analysis of cross-sectional data from the 1986 University of Michigan's Survey Research Centre, Garfein and Hertzog (1995) delineated four independent dimensions of 'robust ageing' (namely functional, affective, and cognitive status, and productive involvement). Of these four dimensions, productive involvement (which measured the number of hours during the year a participant was involved in both compensated and uncompensated work and other helping activities) was the highest ranking contributor to robust ageing. Closely aligned to older adults' productive engagement in activities are their feelings of autonomy and control.

Autonomy and control

The extent of choice available to older people over aspects such as the timing, pace, method and manner of their engagement in activities, are potentially useful indicators of the degree of control or autonomy they exercise (Rowe & Kahn, 1987). Rowe and Kahn's review of experimental field studies reaffirms previous non-experimental findings suggesting the importance of control for the well-being of older people. Their conclusion that autonomy and control may be major discriminating determinants of successful versus usual ageing was reiterated by Margaret Baltes (1996), who argued that adaptation in the developmental struggle for dependency versus autonomy is an integral part of successful ageing.

Rowe and Kahn (1987) highlight the nexus between social support and control, noting that autonomy-enhancing supportive behaviours (e.g. teaching, encouraging, and enabling) should enhance effective coping; whereas constraining behaviours (e.g. 'doing for,' and warning), whilst conveying caring, reinforce helplessness. Kubzansky, Berkman and Seeman (2000) state that control both enhances health-related behaviours, and modulates physiological mechanisms triggered by demoralizing experiences in situations where the individual is unable to exercise control. A number of studies have also linked a greater sense of control to more positive health outcomes (e.g. Burton, Newsom, Schulz, Hirsch, & German, 1997; Jette, Rooks, Lachman, Lin, Levenson, Heislein, et al., 1998; Searle, Mahon, & Isoahola, 1995; and Wolinsky & Stump, 1996).

5.4.2 Empirical evidence: Methodological caveats

Determination of the quality of evidence in studies linking social support constructs with health requires careful scrutiny of research design and data analysis methodologies. A significant amount of ageing research is cross-sectional, with attendant cohort effects (shaped by distinctive childhood-family experiences) confounding the results. Despite this, cross-sectional comparisons of chronological age groups do identify variables that impact the ageing process (Lazarus, 1999b); although longitudinal research designs provide a sure way of examining changes over time. However, as exemplary research designs require costly prospective, intra-individual, longitudinal data collection procedures, they are relatively uncommon (Lazarus, 2000).

The following studies have been selected on the basis of their methodological rigour, to offer insights into emerging themes that have demonstrated links between Cohen's (1992) three social support constructs and health status in the older people.

5.4.3 Social networks

Social network perspectives dominate the international research investigating the links between social support and older people's health (e.g. Bowling & Browne [1991] and Wenger [1997] in the UK; Litwin [1998] in Israel; and Oxman & Berkman [1990] in the

USA). Within this literature, sociodemographic characteristics (such as age, ethnicity, gender, income, and education) have consistently predicted the availability of late life social resources (see for example Bowling's [1994] review; and Martire, Schulz, Mittelmark, & Newsom's [1999] findings based on a large population-based study of older adults).

Gender: Implications for longevity

Differential gender effects reported in four longitudinal studies provide valuable insights relevant to the current research context. Firstly, Avlund, Damsgaard, and Holstein's (1998) study of 734 70 year-old Danish men and women, recruited in 1984, found that over an 11-year follow-up period, those men who did not help others with repairs and who lived alone, and women with no support, had increased risks of dying. Similarly, Avlund, Lund, Holstein, Due, Sakari-Rantala, and Heikkinen's (2004) baseline and 5-year follow-up study of 651 non-disabled 75-year old participants from Finland and Denmark, explored the structure and function of their social networks in the prevention of functional decline. These authors reported a link between the absence of weekly telephone contact and both functional decline and mortality in men; whereas less than weekly telephone contact, no membership in a retirement club, and not sewing for others were all significant predictors of the same dependent variables in women. Fuhrer, Dufouil, Antonucci, Shipley, Helmer, and Dartigues' (1999) 5-year study of 3,777 randomly selected persons, aged 65 years and over, who resided in southwest France, reported that socially isolated, depressed older men were at increased risk of dying earlier. Finally, Shye, Mullooly, Freeborn, and Pope's (1995) 15-year follow-up of older research participants in Almeda County, California, found that network size had a protective effect on mortality for both men and women, with men deriving protection from smaller networks than women; and that network size only affected men's mortality indirectly, through their health status. Zunzunegui and colleagues have suggested that where buffering of gender-related health vulnerabilities occurs (including self-perceived health and depressive symptoms), this is probably due to less sharply defined gender roles within specific cultural contexts (Zunzunegui, Koné, Johri, Béland, Wolfson, & Bergman, 2004). Variable gender differences permeate the evidence throughout this section.

Diverse sociodemographic variables

In addition to gender, a variety of studies have highlighted the links between marital status (e.g. Wister & Dykstra, 2000), higher socio-economic status (e.g. Grundy & Sloggett, 2003; Strawbridge, Cohen, Shema & Kaplan, 1996), educational attainment (e.g. Kubzansky, Berkman, Glass, & Seeman, 1998, Strawbridge, Cohen, et al.), ethnicity (Strawbridge, Cohen, et al.), and successful ageing measures.

Litwin (1998) explored the relation between social support network types and five health measures (viz. basic and instrumental activities of daily living [IADLs], incontinence, vision, and self-rated health), in a sample of 4,214 Israelis, aged 60 and over. Despite controlling for the respondents' age, sex, and education in the data analysis, the results demonstrated that those with consistently better health scores lived in networks with typically diverse social resources. Felton and Berry's (1992) examination of data on 82 older adults' social relationships found that although most social provisions were valuable regardless of their source, reassurance of worth was distinctly more beneficial when provided by non-kin, but instrumental assistance provided by kin related more strongly to well-being. The availability of duplicate providers of support was also uniquely important in offsetting negative affect.

Physical health and functioning

The evidence related to physical health and functioning is consistent: those who enjoy adequate social support are more likely to flourish. Two longitudinal studies of successful ageing provide indicative insights. Firstly, in the 6-year prospective Alameda County Study of 356 older adults aged 65-95 years in 1984, a cluster of three psychosocial and behavioural factors predicted positive health outcomes, namely having close personal contacts, walking often for exercise, and the absence of depression (Stawbridge, Cohen, et al., 1996; see also Strawbridge, Deleger, Roberts, & Kaplan, 2002). Secondly, in the 7-year MacArthur Study of a cohort of 1,313 relatively high functioning 70-79 year old men and women from New Haven, East Boston, and Durham (baseline data collected between May 1988 and December 1989), respondents with more social ties showed minimal declines in physical functioning (Unger, McAvay, Bruce, Berkman, & Seeman, 1999). These salutogenic effects were stronger for male respondents, or those with lower levels of baseline physical functioning performance. Another longitudinal study of 1,396 older non-disabled adults demonstrated that 75-year-old men and women who enjoyed a large diversity in social relations and high social participation maintained their functional abilities (Avlund, Lund, Holstein, & Due, 2004). On the other hand, 80-year-old men with diminished instrumental social support were more likely to experience a decline in their functional abilities.

Although the current research focuses mainly on psychosocial mechanisms that determine psychological well-being, it is worth noting the differential impact of social functioning on patterns of change in physical functioning, for individuals coping with different chronic conditions. In a two and a half year follow-up of 1,313 MacArthur Study cohort participants, greater emotional support was a protective factor for those with cardiovascular disease, whilst social conflict was a risk factor for those with hypertension or diabetes (Seeman & Chen, 2002). Two further studies have explored potential biological pathways using the new concept of biological risk, 'allostatic load', a cumulative measure of biological dysregulation across multiple regulatory systems. Firstly, Seeman, Singer, Ryff, Love, and Levy-Storms' (2002) comparison of younger and older participant cohorts demonstrated an association between lower allostatic load scores and cumulative positive relationship experiences in the younger cohort's data (*n* = 106 respondents, aged 58-59 years). In comparison, in the older cohort (a sub-group of *n* = 765 respondents from the larger MacArthur Study cohort referred to earlier), men who were both more socially integrated and reported more frequent emotional support, recorded lower allostatic load scores. Women within the older cohort demonstrated similar results as the men's, but theirs were non-significant. In the second study, Seeman, Crimmins, Huang, Singer, Bucur, Gruenewald, et al., (2004) demonstrated that the allostatic load measures of the MacArthur Study cohort sub-sample explained 35.4% of the difference in mortality risk between those with higher versus lower socio-economic status (SES). The authors caution that as their sub-sample represented the top third with respect to physical and cognitive functioning, this would have restricted the range of variability in terms of biological risk profiles, and consequently may have underestimated the capacity of allostatic load to mediate the link between SES and mortality.

Adaptive coping abilities and adherence

Stansfeld (1999) pointed out that apart from the protective effects of social support that limit or decrease health risks, it may also be beneficial for those who have to adjust to, or cope with, the effects of a chronic condition. Much of the research in this area focuses on emotional support (see also perceived social support, below), although Gallant's (2003) review of the influence of social support on chronic illness self-management reported 'a modest positive' influence of social network members on self-management (especially regarding dietary behaviours, a topic that is reviewed by Silverman, Hecht, & McMillin, 2002). Gallant also acknowledged the potentially negative impact of network members on self-management, but concluded that summarising the range of results is impossible, due to variations across studies in conceptualising both the support and dependent variables. She referred to the 'global effects' of social support on health, which include the "overall influence on quality of life, and general well-being, regardless of their effect on self-management behaviours" (p. 191).

Penninx and colleagues explored the effects of depressive symptoms on participants' physical abilities over six years (Penninx, Leveille, Ferrucci, van Eijk, & Guralnik, 1999). They found that relatives of depressed persons in the study sample of 6,247 community-dwelling older adults (average age 72.8 years; 41.3% males at baseline in 1982/1983), from communities in East Boston, Iowa and New Haven, provided emotional and instrumental support; including encouragement to seek medical care, comply with treatment regimes, and participate in physical activities.

Re-hospitalisation of older adults is one potential index of inappropriate management of chronic diseases (Mistry, Rosansky, McGuire, McDermott, & Jarvik, 2001). In their study of 123 older male veterans (average age 70 years) enrolled in a psycho-geriatric care-coordination project, Mistry and colleagues found that a group of socially isolated veterans were 4-5 times more likely than their low-isolation risk peers to be re-hospitalised within one year of enrolment in the programme. In keeping with earlier observations that described the direct or mediating characteristics of structural measures, this dataset showed the absence of any buffering effects against either psychological or physical health needs for veterans in the low social isolation risk group. Two characteristics distinguished the socially marginalised, re-hospitalised veteran group: Firstly, "the number of relatives the veteran '[felt] close to, at ease with, [could] discuss private matters with, or [could] call on for help' mattered" (p. 957); and secondly, the ready availability of a confidant to discuss important decisions. Clearly, both of these structural characteristics indirectly assessed the functional provisions of emotional support; a construct that if assessed directly, might have demonstrated evidence of the buffering effects of social support. The additional finding within this study that the veterans' subjective physical health and functioning perspectives predicted their re-hospitalisation, whereas the physician-assessed illness ratings did not, provides a useful signpost for researchers who face the dilemma of choosing between 'subjective patient' vs. 'objective clinical' measures.

Mental and emotional health

Loneliness and social isolation are frequently associated with old age, and yet a minority (5%-10%) of community dwelling older adults report *frequent* loneliness (Pinquart & Sorensen, 2001). Studies of participants aged 65+ and 85+ have reported less powerful and consistent associations between network support and psychiatric morbidity, than those with physical health (Bowling & Browne, 1991; Bowling & Farquhar, 1991; Bowling, Farquhar, Grundy, & Formby, 1992). Bowling's (1994) review also referred to researchers who suggested that changes in support act as stressors, and that this has a direct effect on mental health (e.g. Thoits, 1991).

In a one-year, prospective study of 87 new patients hospitalised for geriatric psychiatric services in Quebec, Canada, loss of autonomy was identified as a key factor for admission, in addition to relatives' strain and not living with a spouse (Lesage, Charron, Punti, Murphy, Dorvil, Charbonneau, & Carpentier, 1994). Autonomy also featured, albeit indirectly, in Penninx and colleague's exploration of the effects of depressive symptoms on participants' physical abilities referred to earlier (Penninx et al., 1999). Penninx and colleagues found that depressed persons were slightly older, more likely to be female, less educated, and have less income (Penninx et al.). In addition, stroke, cognitive impairment and hearing problems were more commonly associated with depression; and those with depressive symptoms were more likely to develop subsequent disabilities with mobility (73% increased risk) and activities of daily life (67% increased risk). Depressed participants with fewer close contacts with relatives experienced significantly increased risks of physical disability over time, due to deficits in instrumental support, and economic and tangible assistance.

Cognitive health and memory

Bassuk, Glass and Berkman (1999) were among the first social epidemiologists to examine the influence of a global measure of social engagement on cognitive health. Their study sample of 2,812 non-institutionalised participants, aged 65 years or older, comprised the 1982 New Haven, Connecticut, cohort of the Established Populations for Epidemiological Studies of the Elderly (EPESE) project. They reported that in the study's sample, the odds of experiencing cognitive decline were approximately twice as great in socially disengaged respondents; an association that endured, even after adjusting for many sociodemographic and health factors. Bassuk et al. concluded that active, reciprocal connections between persons and communities foster the maintenance of self-esteem, which improves self-care practices.

Results from the Swedish Kungsholmen project, which explored the influence of social network on the occurrence of dementia over a 3-year period, in a community-based cohort of 1203 people (aged 75 or over, with good cognition at baseline in October 1987), found a limited social network increased the risk of dementia by 60% (Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000). Although unknown confounders in the data may yet be identified (Fratiglioni et al.), the finding that despite the small numbers, a decreasing gradient in the richness of social networks accompanied a statistically significant increase in the risk of developing dementia, has highlighted the need for social policies that enhance the social functioning and well-being of older people. Lisa Berkman's (2000) comments in the same issue of the Lancet suggested that participation in complex interpersonal exchanges mobilises cognitive processes, thereby endorsing the 'use it or lose it' phenomenon of successful ageing. Berkman concluded that social networks' capacity to predict health outcomes was probably attributable to life-long cumulative patterns of functioning, which endorsed Bowling's (1994) earlier observations.

In sum, it is clear from the evidence cited that researchers have identified key sociodemographic factors which influence the relative strength of the links between social network measures and a variety of health outcomes, including a range of attendant adaptive coping capacities (such as adherence, among others) that ensure older adults 'age well'. Empirical associations between social networks and physical health are more robust than similar associations with mental or emotional health. Finally, recent epidemiological findings highlight the protective features of social engagement on cognitive functioning.

5.4.4 Perceived social support

Sarason, Sarason and Pierce (1990) stated that the "most active ingredient of social support may be individuals' beliefs that they have people who value and care about them and who are willing to try to help them if they need assistance or other support" (p. 137). The perceived availability of support is more consistently related to a range of outcome measures (Cohen & Wills, 1985), as the construct probably also captures the impact of received support on support perceptions (Sarason et al.).

Mental health and psychological well-being

In her review of the literature focusing on emotional well-being and psychiatric morbidity in older adults, Bowling (1994) noted that perceived social support is 'measured less often' than objective network indicators. This trend has changed, as evidenced by a June 2007 search of the Web of Science multidisciplinary citation database, using the terms 'older adult', 'health' and 'social support,' which retrieved 170 publications. Proportionately more of these publications (*n* = 41) referred to 'perceived support' in the text as opposed to 'network' (*n* = 33); and only three publications referred to both these terms (see Pinquart & Sorensen, 2000; Wong, Yoo & Stewart, 2007; Yeh & Lo, 2004). Most of the 170 publications reported cross-sectional datasets focusing on participants' mental health, including psychological distress. For example, Villeneuve, Lebel, and Lambert's (1992) cross-sectional study of a representative sample of 361 community-dwelling older adults, living in Montréal, confirmed the buffering effects of perceived social support on psychological well-being, in addition to affirming previously reported links between physical health and functional status that predominately affected women participants' well-being. In another study of 57 residents (average age 83.7 years; 78.6% female; 80.4% not married), who had resided in an assistive living facility for an average of six months, Cummings (2002) found the predictive value of gender, functional status and self-reported health diminished when perceived social support was introduced. She concluded that these results clearly illustrated the key role social support played in bolstering residents' psychological well-being.

Martin, Grünendahl and Martin (2001) have also examined the relative contributions of stress (in the health domain), perceived availability of social contact, and satisfaction with social activities, to research participants' well-being, in cross-sectional data from two age cohorts (449 older [61-63 years] and 489 middle aged [41-43 years] adults), randomly selected from a stratified (by age and gender) pool of German residents. The dataset indicated the presence of stable structural relations as people age; that both health stress and environmental stress levels increased with age; and that in the health domain, stress levels mediated the link between perceived availability of social support and well-being.

More recently, Löckenhoff and Carstensen (2004) used socioemotional selectivity theory to consider possible ways of tailoring treatment contexts, so that older adults avoid limiting their health-related information-seeking and decision-making.

Depression

Newsom and Schulz's (1996) investigation of the relation between physical impairment, social support, and quality of life in a national sample of 4,734 American adults (aged 65 years and older), found that lower reported social support was associated with decreases in life satisfaction and increases in depressive symptoms. Moreover, they concluded that subjective perceptions of support mitigated both the level of depressive symptoms and life satisfaction. Structural modelling results also indicated that a gradient of increasing tangible support provisions was more predictive of fewer depressive symptoms, drawing attention to the sense of security and primary control over the environment (Heckhausen & Schulz, 1995) provided by this type of support. In contrast to this, informational and emotional support targeting cognitive processes exhibited secondary control attempts to fit in with the world (Heckhausen & Schulz), whilst adaptive processes yielded muted effects in this dataset (Newsom & Schulz). Newsom and Schulz concluded that over time decreases in functional autonomy associated with ageing might deplete the available positive sources of support, and thereby trigger an increase in negative support transactions.

Lynch, Mendelson, Robins, Krishnan, George, Johnson, et al.'s (1999) cross-sectional and longitudinal (1 year later) analysis investigated factors shaping perceptions of social support in different age cohorts (*n* = 167 older participants, average age 70.4 years; and *n* = 108 middle-aged, average age 42.2 years) of participants enrolled in the Duke University Clinical Research Center's study of depression in late life. Lynch and colleagues state that although cohort differences may well reflect the heterogeneous nature of depression in older people (including structural brain changes associated with ageing; citing Krishnan, Hays, Blazer, 1997), disruptions in close relationships commonly precede depressive episodes; and that the type of loss may influence the degree of support received from others, or how this support is perceived. They report that in the cohort of older adults, multivariate analyses of cross-sectional data reveal lowered perceived social support was associated with less social interaction, lower instrumental support, being divorced, as well as greater pessimism (self-reproaching) and slowed thinking. Lynch et al. warn that these symptoms require further clinical exploration, to detect the possible influence of factors such as dementia, vascular depression, adverse medication response, etc. In the longitudinal analyses only Time 1 perceived levels of social support predicted depression one year later, at Time 2.

Kahn, Hessling, and Russell (2003) analysed responses from 100 older participants attending a day community centre (average age 76 years, 47% married; 66% women). They found that 'dispositional negative affectivity', a disposition to experience negative emotions influencing cognition and self-concept (cited in Watson & Clark, 1984), spuriously explained the relationship between perceived social support and their single-item, self-report, measure of physical health over the past 30 days (rated on a scale from poor = 1 to excellent = 10). However, this apparent bias was not strong enough to contaminate the significant relationship between perceived social support and psychological well-being in their sample. Kahn et al. stress the need to be mindful of this dispositional variable, when considering social support interventions to improve older adults' health (see also Landau & Litwin, 2001).

Links with health promotion

Increased longevity in ageing populations creates serious societal challenges, due to the associated increases in the prevalence of chronic diseases. Health promotion policies aimed at improving older people's physical and mental health should be guided by population-wide information of demographic and psychosocial correlates (Kaplan, Newsom, McFarland, & Lu, 2001). For example, Kaplan and colleagues' cross-sectional analysis of a comprehensive Canadian population health survey comprising 12,611 respondents (1996-1997 – Cycle 2), found that inactivity is associated with psychological distress for both men and women; that perceived social support is associated with increased physical activity for women, but not men; and that married women were notably less active than their 'not-currently-married' counterparts.

In comparison to physical health promotion, mental health promotion requires more aetiological research and programme evaluation (Herrman, 2001). Kocken and Voorham's (1998) evaluation of a peer-led senior health education course comprising four two-hour meetings on 'Successful Ageing' in Ridderkerk (an urban area of Rotterdam, Holland), is one example of a programme designed to encourage older people to engage in new health promotion activities. The authors recruited 138 participants (aged 55-79 years) in the experimental group, and 182 in the control group (which also participated in the course on completion of the research). Participation in the course influenced experimental group participants' perceptions of daily social support available from the environment, and at the three-month follow-up assessments, their subjective health evaluations were also more positive. (See also Kocken, 2001.)

Although perceived social support is beginning to receive more attention from researchers, the evidence is more likely to be from cross-sectional research, and features more prominently in studies focusing on mental health and psychological well-being. There is a notable scarcity of research examining the intersections between social network measures and perceived social support in older people; although social networks provide an indirect means of access to functional support (Uchino, 2004a).

5.4.5 Support behaviours

Adherence

Although DiMatteo's (2004) meta-analyses of 122 studies (published between 1948 and 2001) that correlated structural or functional social support with patient adherence do not focus specifically on older adult populations, the findings are particularly salient to the current research context. DiMatteo found that functional dimensions of social support (such as practical support, emotional support, and family cohesiveness) were more strongly associated with adherence than the structural element of marital status. In particular, she highlighted the need for the provision of practical support to improve health, as her analyses demonstrated that among every 100 patients who were not receiving practical help with treatment regimens, at least 65 were not likely to follow treatment guidelines. DiMatteo advocated that clinicians should routinely assess the type and quality of patient relationships when they prescribed treatments, to facilitate the provision of support to attain their treatment goals, and thereby maximise the potential benefits. She suggested that more attention should be devoted to designing interventions that provide appropriate "practical help in the context of an emotionally supportive and cohesive network" (p. 213; see also Glasgow et al., 2002).

Reciprocity

Reciprocity or 'supportive exchanges' that involve the giving *and* seeking of advice and other forms of assistance bears an important relationship to perceived health status in older adults (Minkler, Satariano, & Langhauser, 1983). Analysing survey response data gauging supportive exchanges in 678 older residents of Alameda County, California, Minkler and colleagues suggested that advice seeking may in fact be as strongly associated with health status as social ties, and noted in a subsequent publication that the best predictor of the survey respondents' health was their spouses' health (Satariano, Minkler, & Langhauser, 1984). A decade later, Field, Minkler, Falk, and Leino (1993) published a 14-year longitudinal analysis of the potential influence of health, age, gender, and socioeconomic status on family contacts and feelings, in a sample of 62 Berkeley Older Generation Study participants. Health and socio-economic status accounted for the largest observed variance in this sample, and those in good health enjoyed both greater contact with family, and more feelings of closeness to them.

Supportive social environments

Supportive social environments promote and enhance coping capacity, including the readiness of individuals to initiate or sustain positive health behaviour change (Haber, 1996). Despite this, Haber stated that many health professionals focus primarily on their roles as medical technicians, and by neglecting their health educator roles, frequently failed to provide appropriate health information, including offering community referrals to harness enabling social support provisions that facilitate health behaviour change.

Within the sphere of health service utilisation, it is worth noting the supportive social environments that characterise contemporary self-help groups, which have developed since the 1935 founding of Alcoholics Anonymous (Borkman, 1997). Influenced by the civil rights and women's movements in and after the 1970s, these groups provide information and referral, in addition to a variety of other services, which consolidates their important co-ordinating function within communities (Borkman). Levy's (1979) review of self-help groups' help-giving activities concluded that group members provide what most in the population at large want: emotional empathy, mutual affirmation, behavioural prescriptions and positive reinforcement.

Penning's (1995) investigation of the role of social support in relation to health status and health service utilization in 1,284 community-dwelling older adults (aged 60+ years), living in Manitoba, Canada, illustrated the importance of matching appropriate support provisions (informational, instrumental, emotional) with specific health-related needs, in different health services (primary, secondary, and home care). In another study of 3,240 older (mean age 72.8 years at baseline), community-dwelling residents of north-central North Carolina, a prospective cohort design was used to explore potential predictors of declines in three physical functioning measures (ADLs, strength/range of motion, and stamina/mobility), over a year (Hays, Saunders, Flint, Kaplan, & Blazer, 1997). *Receiving* instrumental support was a risk factor for increased deficits across all three functional domains; however, *giving* instrumental support was protective of both functional ability, and satisfaction with the amount of social support interaction. The availability of a confidant was protective against both ADLs and stamina/mobility functions, whilst perceived adequacy of social support was protective of strength/range of motion deficits. Males were at greater risk of developing ADL deficits; and females, deficits in strength/range of motion. Satisfaction with the amount of social interaction buffered the effect of depressive symptoms on functional declines across all domains.

Links with support networks

Litwin's (1999) examination of help giving and receiving patterns among older adults (*N* = 2,646 aged 60+), within different types of support networks, highlighted the need to include this information when planning community-based social care. For example, traditional extended family networks were characterised by mutual exchange patterns; narrow family focus networks by disjointed exchanges; and attenuated networks by marginalised exchanges. This evidence mirrored similar findings by Wenger (1994), whose network typology reflects differing capacities to cope with the frailties of old age. For example, generalised serial reciprocity characterised the Locally Integrated support networks whose members tended to be younger and in better health; in addition, offers of help in crises often resulted in collaborative action between family, friends and neighbours. Wenger noted that such generalised support sustained older adults' independence performing activities of daily life longer than their counterparts who lived in Family Dependent support networks.

To summarise, DiMatteo's (2004) review has shown that practical (tangible) support behaviours form a crucial component of successful adherence; in addition, Minkler (1983) and colleagues (Minkler, Driver, Roe, & Bedeian, 1993) have observed that reciprocal exchanges and giving support provided protective salutogenic effects. Self-help groups promote and enhance coping by offering a range of crucial support behaviours (such as empathy, affirmation, positive reinforcement, and behavioural prescriptions). In addition, appropriate support provisions (instrumental, informational, and emotional) should target and match specific health-related needs; and both Wenger (1994) and Litwin (1999) have demonstrated that different types of family networks have variable capacities to provide appropriate support.

5.4.6 Hearing health, social well-being and adherence

Chapter Three engaged an ecological perspective to describe the functional implications of coping with hearing handicap in late life. Arlinger's (2003) review described the negative implications of untreated hearing impairment from the perspective of the person with hearing losses, whilst Stephens' (1996) model of the development of hearing handicap included the contributions of frequently unrecognised 'collateral health effects' (Christakis, 2004) that arise from communication difficulties that ultimately affect dyadic partners. A number of researchers have drawn attention to the urgent need for gerontological workers to collaborate, and promote the early identification of communication difficulties. They advocate that ecological perspectives that develop appropriate adaptive coping strategies in both those who are hard of hearing and their communication partners will minimise the handicapping effects or hearing impairment (e.g., Kiessling, Pichora-Fuller, Gatehouse, Stephens, Arlinger, Chisolm, et al., 2003; Pichora-Fuller & Carson, 2001). Despite the reluctance of many older adults to acknowledge they need to seek help for communication difficulties, health professionals are beginning to focus on catering for their special needs (Kiessling, 2003; Pichora-Fuller & Cheesman, 1997; Setterlund, et al., 2002).

There is clear empirical evidence that aural rehabilitation that includes complementary psychosocial support programmes enhances the potential benefits available from technological interventions such as hearing aids and other assistive listening devices (ALDs). Moreover, the literature recommends that programmes should involve not only those with hearing losses, but also their communication partners; and any others willing to modify older adults' physical and social environments, so that they enhance the acoustic features and promote interactive communication (Setterlund, et al., 2002). Effective and appropriate aural rehabilitation interventions should be priorities within the NZ government's successful ageing agenda, as the evidence clearly demonstrates that sustained social participation produces optimal benefits across older adult's social, emotional, and cognitive well-being.

5.5 Chapter summary

Chapter Five clarified the nested conceptual relationships between the terms 'quality of life,' 'health,' and 'functional status' in older adults; and noted that the term 'health-related quality of life' (H-QoL) has featured prominently in recent gerontological literature. Social epidemiological perspectives illustrated the nature of the dynamic interplay between an individual's subjective perceptions and their relationships with their social, physical, and cultural environments. In particular, Berkman and Glass' (2000) integrated social epidemiological model suggested that upstream macro- and mezzo-level social factors influence downstream micro-level pathways that ultimately affect self-rated health. Furthermore, Cohen and Syme's (1985) two explanatory models demonstrated how empirical observations of the mezzo-level structural elements of social networks ('main effects') and/or micro-level functional elements of the perceived availability of social support ('stress-buffering') affected health and well-being. In the additive or main effects model, social involvement enhanced health and well-being independently of stress, due mainly to increased perceptions of control and mastery, which neutralise the potential impact of stress. By contrast, coping with stress is central to the stress-buffering model, as the perceived availability of social support can reduce or eliminate emotional reactions to stressful events, and promote problem-solving coping strategies. Cohen (1992) acknowledged the apparent lack of integrated theoretical perspectives in the literature linking social support to health outcomes, and formulated the Transactional Model of Stress (TMS) as an organisational tool. The model identified nine potential pathways that depict the dynamic interplay between Lazarus' (1999a) core concepts of stress appraisal and coping, and Cohen's three social support constructs (viz.: social networks, perceived availability of social support, and support behaviours).

The final section described the social dynamics of ageing well, prior to reviewing a selection of methodologically robust evidence that illustrated the empirical links between Cohen's (1992) three social support constructs (defined in Chapter Four), and self-reported health in older adults. Social network perspectives dominated the international literature linking social support and older adults' health, with mainly longitudinal studies identifying predisposing social demographic predictors of adherent behaviours associated with positive physical health outcomes; although sustained social engagement also predicted robust cognitive functioning, whilst cognitive impairment and hearing problems were more commonly associated with depression. Older adults' subjective perceptions of social support have received less attention, with mostly cross-sectional datasets exploring links with mental health and psychological well-being. Whilst Canadian studies have confirmed the buffering effects of perceived social support on psychological well-being, German researchers have concluded that stress levels mediated the links between the perceived availability of social support and well-being in older adults. Very little research has focused on the intersections between the structural and functional aspects of social support in older adults, and yet supportive social environments that enhance adherence to positive health behaviours and encourage reciprocity in social interactions vary across different types of social networks (refer Litwin, 1999; and Wenger, 1994).

The chapter concluded by integrating insights from the hearing health, social well-being and adherence literatures, and suggested that sustained social participation was essential to maintain older adult's social, emotional, and cognitive well-being.

5.6 Review and pilot study preview

Chapter One noted that the PRECEDE phase of Kaplan et al.'s (1993) flexible research framework accommodated anthropological perspectives of gerontological concepts such as coping with normal, pathological and successful ageing trajectories. Evidence from the Berlin Aging Study (cited in Chapter Two) illustrated how older adults use life-long adaptive strategies such as socioemotional selectivity (Baltes & Carstensen, 1996a & 1996b) to navigate the transitional demands of ageing (Baltes, Staudinger, & Lindenberger, 1999). Similarly, Glass and Balfour's (2003) Ecological Model of Ageing (EMA) suggested potential constructs and causal pathways that explore how older adults' adaptive responses reflect personal coping competencies elicited by the environment, which ultimately affect their health and functioning. The EMA readily accommodates the reality that chronic conditions, cognitive deterioration and/or depression may well exacerbate older adults' coping efficacy and their social agency. Chapter Two also described how the increasing prevalence of normative age-related sensory losses in vision and hearing affect communication in older adults, and can similarly exacerbate the functional implications of ageing with noise-induced hearing losses and tinnitus.

5.6.1 Theoretical and empirical links between hearing handicap, cognition and depression

Gerontological researchers studying normal ageing trajectories have suggested two alternative theoretical models that explain the complex interactions between perceptual and cognitive factors that underpin older listeners' language comprehension capabilities (Schneider, Daneman, & Pichora-Fuller, 2002). Current evidence, which includes findings from a number of epidemiological studies, strongly supports the *common-cause hypothesis* that age-related neuronal deterioration underpins *both* sensory *and* cognitive losses (Wahl & Heyl, 2003). (Refer also to Anstey, Luszcz, & Sanchez's [2001b] Australian Longitudinal Study of Ageing; Lee, Smith, & Kington's [1999] Assets and Health Dynamics of the Oldest-Old survey data in the United States; and Appollonio, Carabellese, Frattola, & Trabucchi's [1996] study of older community-dwelling residents of Brescia, Northern Italy.)

Although 15%-20% of older adults experience the potentially additive effects of dual sensory losses (Fozard & Gordon-Salant, 2001), Verbrugge and Patrick (1995) stated that health services, nourished by a biomedical ethos, generally fail to provide appropriate care and support for older adults with conditions that progressively disable them over many years. Other researchers have highlighted the crucial aspect of the timing of interventions in old age, especially as these interventions aim to improve older adults' quality of life (Wahl & Heyl, 2003).

Chapter Three's focus on hearing handicap in late life summarised recent aural rehabilitation perspectives that facilitate the active development of older adults' compensatory coping strategies to accommodate the functional implications of hearing handicap in an audible world, and concurrently promote successful ageing (Hummert & Nussbaum, 2001). These perspectives demonstrated the utility of adopting applied ecological approaches that provide more information about potential and actual limitations in older people's communication activities, and the consequential restrictions to social participation for both those living with hearing impairment and their communication partners. For example, Kiessling et al. (2003) illustrated how the functional impact of age-related changes in vision, cognition and the presence of other health conditions modulate the experience of hearing handicap in late life (refer Table 3.3). The adjustment phase of Glass and Balfour's (2003) EMA structured the subsequent literature review. Scandinavian authors who examined active coping within the audiological context reported a dearth of multidisciplinary research perspectives; especially in relation to designing potential studies to identify how a range of complementary aural rehabilitation interventions might enhance older adults' diverse adaptive coping capabilities (Andersson & Willebrand, 2003).

A number of studies also demonstrated that social relatedness and autonomy were crucial for older adults' well-being; and that social disengagement had been significantly associated with cognitive deterioration (Bassuk, Glass, & Berkman, 1999). On the other hand, cross-sectional data in an Italian study illustrated that the use of hearing aids not only reduced the participants' depressive symptoms, but also appeared to protect them from further declines in their cognitive functioning (Cacciatore et al., 1999). Furthermore, a Japanese study reported significant correlational links between hearing losses, cognitive functioning and depression (Naramura et al., 1999); and Bazargan et al. (2001) concluded that hearing mediated the links between hearing losses, cognitive functioning and depression.

Arlinger's (2003) review of the negative consequences of ageing with uncorrected hearing losses highlighted that health professionals urgently need to address the health literacy gap if they wish to improve older adults' communication, adherence, and well-being. A number of researchers also drew attention to the lack of crucial problem-solving adjuncts that support ongoing aural rehabilitation processes promoting communication (see Hickson & Worrall, 2003). Accordingly, the pilot study explores potential methodological issues related to gauging the cognitive status of a sample of older ex-service personnel with hearing impairment, prior to exploring the subsequent empirical links within the dataset between the participants' cognitive status, and their self-reported levels of hearing handicap and depression. Chapter Six addresses the specific aims and objectives of the pilot study.

CHAPTER SIX: PILOT STUDY AND DOCTORAL STUDY HYPOTHESES

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Chapter Six anchors the preceding literature review within a New Zealand (NZ) research context, by focusing on a pilot study's convenience sample of 46 older NZ veterans. Descriptions of the pilot study's rationale, aims, objectives, and research *methodology examine the appropriate data collection procedures for the larger, NZ War Pensions (NZWP) Medical Research Trust Board supported study that examined the correlates of hearing aid use, in a randomly selected, cross sectional sample of older NZ veterans with hearing losses. Following the presentation of the pilot study results the discussion highlights what methodological adjustments were made to the doctoral study's measures and data collection processes.*

A synopsis of the theoretical and empirical evidence reviewed in the preceding chapters draws attention to Hétu (1996) and Stephens' (1996) inclusion of family members when describing the functional implications of living with hearing handicap. Accordingly, preliminary doctoral hypotheses linked to the first three research aims focus on different aspects of the dyadic partners' coping trajectories, including their social and emotional well-being. A composite analytical framework subsequently informs the selection of clusters of independent variables (IVs) to examine their bivariate associations with the three key outcome variables of interest, namely the veterans' self-reported hearing handicap (HH), and their physical and mental health-related quality of life (PH-QoL and MH-QoL). Finally, hypotheses linked to the fourth and final research aim explore the explanatory capacity of generic IV clusters and selected IVs in regression equations that focus on three dependent variables (DVs) of interest, namely: the veterans' HH, PH-QoL & MH-QoL.

6.1 Introduction

The preceding chapters have drawn attention to the fact that both the incidence and prevalence of hearing losses increase with age (Willot, 1991). These facts reverberate in the profile of New Zealand's (NZ's) ageing population, where hearing disability is the second most commonly reported disability, after mobility and agility disabilities (Ministry of Health, 1999a).

In 1998, Margaret Faulkner (former Interim Director Secretary for New Zealand War Pensions - NZWP) highlighted the lack of evidence within NZ of the uptake and use of hearing aids by ex-service personnel. A team of researchers within Massey University's School of Psychology, led by Professor Nigel Long, subsequently submitted a research proposal to the NZWP Medical Research Trust Board that aimed to explore patterns of hearing aid use in NZ ex-service personnel. Funding was secured for this research project, entitled: *Development of screening and follow-up procedures to optimise use of hearing aid devices in older service personnel with and without cognitive deterioration.* The pilot study of this project forms the central focus of this chapter.

6.1.1 Rationale

The varied reasons why hearing aids are under-utilised or not worn at all have been discussed in Chapters Two and Three. It is instructive to note that although a comprehensive study on 330 US military retirees' use of amplification has found strong evidence that those who used their hearing aid devices consistently reported very high satisfaction and benefit (Sinclair & Goldstein, 1991), researchers have yet to specifically examine the empirical links between hearing aid use and cognitive status in older ex-service personnel. The pilot study aimed to increase understanding of this relationship, so that the quality and appropriateness of aural rehabilitation services engage more readily in accommodating older ex-service personnel's rehabilitation needs.

6.1.2 Aims and objectives

The overall goal of the NZWP's Medical Research Trust Board funded Hearing Aid Research Project (HARP) was to develop a screening project to identify service personnel who may be at-risk for non-usage or incorrect usage of hearing aids. The pilot study focussed on whether or not cognitive deterioration associated with ageing affected hearing aid use, but also provided an opportunity to resolve any methodological concerns, prior to conducting the doctoral study. Given this focus on methodological rigour, predictive hypotheses were not formulated.

6.1.3 Assessing cognitive status in older adults

Following a review of the literature, the researchers decided that the most effective way of screening for cognitive functioning in the pilot study would be through a telephone screening procedure, namely the Telephone Interview for Cognitive Status (the TICS;

refer to Brandt, Spencer, & Folstein, 1988). Brandt et al. derived the TICS from the Mini Mental State Examination (MMSE; see Folstein, Folstein, & McHugh, 1975), adapting the questions for administration over the telephone. (Refer to *6.3.3 Third contact*, below, for more details of the MMSE.) Welsh, Breitner, and Magruder-Habib (1993) subsequently modified the original version of this telephone screening instrument, and this version (designated as the TICS-m) was used.

Initially, telephone surveys appeared to provide a practical way of collecting the participants' cognitive status profiles, as face-to-face assessments would have required time consuming and costly travel to centres throughout NZ. The TICS-m thus offered an appealing, cost-effective mode of reaching a nation-wide group of ex-service personnel; especially as older New Zealanders' telephone ownership rates were comparable to those of the general population (Social Monitoring Group, 1989), and the pilot study participants would therefore be easily accessible, using this mode of communication.

Although it may appear less than desirable to use the telephone to communicate with older participants who are living with hearing losses, there were no caveats within the published literature that alerted researchers or clinicians to any potential difficulties, especially regarding the administration. Pachana, Alpass, Blakey, and Long (2006) point out that as all the pilot study participants were fitted with hearing aid(s), those who had compatible telephone receivers could activate a telecoil switch within their aid, and thereby facilitate the magnetic transfer of sound directly to their hearing aid during the telephone interview. In addition, holding the telephone receiver next to the mastoid bone is known to enhance the recipient's reception of sound, as the mastoid bone itself also conducts telephonically transmitted sound waves (Aneshensel, Frerichs, Clark, & Yokopenic, 1982).

Given the absence of any indications to the contrary in the gerontological literature, the research team decided to proceed with a research protocol that included assessing the cognitive status of participants over the phone, using the TICS-m.

6.1.4 Overview of the research design

A geographically restricted convenience sample of 100 older NZ ex-service personnel, selected from the NZWP' database of recipients of hearing aid battery benefits in mid-1999, were invited to join the pilot study. The 51 respondents who chose to participate assisted the HARP research team validate the research protocol for the subsequent main study, conducted in the following year. The validation process required three points of contact with the participants, namely through mail out surveys, telephone interviews, and finally, face-to-face interviews.

6.2 Procedure

The following four sub-sections describe the implementation of the pilot study procedure.

6.2.1 Consultation

In 1999 the research officer consulted with a number of leading professionals engaged in the aural rehabilitation context throughout NZ. These professionals included: a local audiologist in private practice in Palmerston North, two hearing therapists at The Hearing Association (Manawatu Branch), the chairperson of the Audiology Association (in Christchurch), senior lecturers and researchers at the Auckland Medical School (where audiologists are currently trained in NZ), and the clinical director at the National Audiology Centre (NAC) in Auckland. Advice and resources gathered during this consultation process were used to guide and inform the pilot study's research protocol, especially the compilation of the questionnaires.

6.2.2 Ethical approval

Ethical approval was obtained from Massey University's Human Ethics Committee.

6.2.3 Recruitment of the pilot study sample

To protect the privacy of potential participants, the initial mail out inviting ex-service personnel to join the study was compiled by staff working at the NZWP Processing Unit in Hamilton, under the auspices of the NZ government agency of Work and Income. Respondents returned their completed consent forms to the research officer at Massey

University's School of Psychology, Palmerston North, which facilitated the creation of a participant database.

Initially, a convenience sample of 100 veterans was selected. These veterans received NZWP disability benefits for their hearing losses, were 55 years or older and resided within a one-and-a half hours drive from Massey University's Turitea campus, in Palmerston North. The significance of residential proximity to the university campus reflected the research protocol requirement that a face-to-face interview be conducted with each pilot study participant.

6.2.4 Response rates

The first mail out to 100 potential pilot study participants, via NZWP' Hamilton office, were posted on the week ending 13 August, 1999. Between 17 and 27 August, 1999, 37 respondents replied to the research officer at Massey University; 33 indicating that they wished to join the study, while 4 indicated that the potential participant could not, mainly due to poor health. Thus the *first mail out* secured a 37% overall response rate, of which 33% were positive.

At the beginning of September, 1999, a follow up letter prepared by the research officer was posted from the Hamilton office to the 63 potential participants who had not yet responded to the initial letter. The *follow up contact* yielded 18 positive responses (a 28% positive response rate), and nine negative responses (a 14.3% negative response rate). Five of the nine negative respondents cited frail health as the reason for their inability to participate.

As a result of these two points of contact, a total of 51 participants with an average age of 77.8 years agreed to join the pilot study.

6.3 Method

The pilot study participants were asked to respond to a series of questions on three different occasions.

6.3.1 First contact

The five distinct parts comprising the pilot study mail out survey, each of which gathered responses to a different range of questions, are briefly described in the following section.

The Pilot Study Mail Out Survey

PART 1 questions included: the participant's sociodemographic details, service record, health-related quality of life (H-QoL - using the SF-36; Ware, 1997), and a range of aural rehabilitation variables (refer Brooks, 1989a).

PART 2 questions covered the extent to which the hearing aid/s help the participant in their daily life (using the Shortened Hearing Aid Performance Inventory – the SHAPI; Schum, 1992).

PART 3 questions gathered information on the characteristics of the participant's hearing aid/s, their assessment of the service provision by the audiologist who fitted their hearing aid(s), and awareness of the functions of the Hearing Association (adapted from Satherley, 1992).

PART 4 identified the social and emotional problems that the participant's hearing losses may be causing them, using the Hearing Handicap Inventory for Adults (HHIA) or for the Elderly (HHIE) (Ventry & Weinstein, 1982).

PART 5 focussed on the emotional status of the participant over the week prior to completing the survey (using the Geriatric Depression Scale – the GDS-15; Sheikh & Yesavage, 1986).

The SHAPI was the only questionnaire excluded from the mail out survey protocol when compiling the doctoral study's mail out survey. Descriptions of this questionnaire, and the three retained in the doctoral study follow (i.e. the HHI, the GDS-15, and the SF-36).

The Shortened Hearing Aid Performance Inventory (SHAPI)

The 38-item SHAPI (Schum, 1992) is a shortened version of Walden, Demorest, & Hepler's (1984) original 64-item Hearing Aid Performance Inventory (HAPI).

Respondents are asked to read each SHAPI question depicting various listening situations in their daily life, and respond by recording the number of a phrase from a response key, to indicate the helpfulness of their hearing aid(s) is in that situation. These responses ranged from (1) Hinders performance to (5) Very helpful, with 'Does not apply' coded as a zero. Question 1 ("You are sitting alone at home watching the news on TV") is an example of 'speech in quiet' question; Question 10 ("You are in a crowded grocery store checkout line and are talking with the cashier") provides an example of a 'speech in noise' question; and Question 15 ("You are in the kitchen in conversation with your spouse/partner during the preparation of the evening meal"), an example of speech with reduced cues.

Schum (1993) reported a test-retest correlation (one month later) of 0.80 for the overall scale, in a sample of 64 older hearing aid users; however, in the current pilot study, only 12 participants answered all 38 SHAPI questions. These responses yielded a Cronbach alpha (α) coefficient of 0.89, reflecting acceptable internal consistency for those who completed all 38 items.

The Hearing Handicap Inventory (HHI)

The Hearing Handicap Inventory (HHI) is one of the most well-researched inventories for hearing handicap in existence (Punch & Weinstein, n.d.). Both the HHI for the Elderly (HHIE; Ventry & Weinstein, 1982) and HHI for Adults (HHIA; Newman, Weinstein, Jacobson, & Hug, 1990) were designed to assess the effects of hearing impairment as well as hearing aid benefit, on the respondent's social and emotional adjustment. The HHIA was derived from the HHIE, but designed for those under 65 years of age, and includes questions relating to occupational contexts. For either instrument, the total scores range from 0-100, and comprise two different subscales: the social and situational subscale (from items such as "Does your hearing problem cause you to avoid groups of people?"); and the emotional subscale, which measures the emotional consequences of coping with hearing impairment (from items such as "Does your hearing problem cause you to feel embarrassed when meeting new people?"). Respondents were asked please to tick one circle alongside each question, to indicate whether the word 'Yes', "Sometimes', or 'No' best describes their reaction to the given listening situation.

Newman et al. (1990) cited three publications supporting the popularity of the HHIE, which they acknowledged may be "attributed to its brevity, ease of administration/interpretation, excellent internal consistency reliability, and high test-retest reliability" p. 430 (refer to Newman & Weinstein, 1989; Ventry & Weinstein, 1982; and Weinstein, Spitzer, & Ventry, 1986). Similarly, the HHIA has demonstrated robust internal consistency (Newman et al., [1990] reported a Cronbach α coefficient of 0.93), and high test-retest reliability (Newman, Weinstein, Jacobson, & Hug [1991] reported figures of 0.93 to 0.97). The pilot study's data produced an identical measure of internal consistency for the HHIE (Cronbach α coefficient = 0.93).

The Geriatric Depression Scale (GDS-15)

The 15 item short form Geriatric Depression Scale (the GDS-15; Shiekh & Yesavage, 1986) is a measure of mild to moderate depressive symptoms specifically developed for use with older adults (Joiner, 2000). The scale's easy-to-administer format provides binary yes/no responses for items such as "Do you feel full of energy?" and "Do you feel you have more problems with your memory than most?" Responses to five items are reversed before summating the final total score (i.e. Questions 1, 5, 7, 11, & 13). Total GDS-15 scores range from 0-15, with higher scores indicative of more depressive symptomology, but not symptom severity; scores below 5 suggest the absence of clinically significant depressive symptoms (Almeida & Almeida, 1999) The self-rating format allows for economy of time, and is recommended for use as a screening device for depression in geriatric populations, as questions are "not heavily weighted toward health concerns", and seem "to be especially sensitive to the aspects of depression experienced by older adults" (p. 168, Sheikh & Yesavage).

Almeida and Almeida (1999) cited three studies reporting acceptable test-retest reliability indexes for the GDS-15, and noted that those who have evaluated the scale's internal consistency reported Cronbach α coefficients around 0.80. Their own investigative study sample of 64 Brazilian participants (mean age 67.5 years), recruited from an outpatient clinic for the elderly attached to the Santa Casa Medical School of Sao Paulo, reported a Cronbach α coefficient of 0.81. In the pilot study the GDS-15 responses demonstrated poor homogeneity of items, as reflected in the Cronbach α coefficient of 0.30. Potential reasons for this lack of internal consistency are explored in the results section that focuses on the GDS-15 responses.

Health-related quality of life (H-QoL - i.e. the SF-36)

The SF-36 Health Status Questionnaire (Ware, 1997) comprises 36 questions which assess a respondent's functional status and well-being in relation to eight health attributes, derived from multi-item scales (viz.: Physical Functioning [PF]; Role limitations due to Physical health [RP]; Bodily Pain [BP]; General Health perceptions [GH]; Vitality [VT]; Social Functioning [SF]; Role limitations due to Emotional health [RE]; and Mental Health and well being [MH]). These scales contain between two and ten items each (refer to Table 6.1 for specific details), and are scored using Likert's method of summated ratings (Ware). Ware's scoring instructions ensure that the processes regulating data entry and the treatment of missing data are standardised, in addition to providing algorithms for item aggregation and transformation of the scale scores. Higher transformed scores (to a maximum of 100) represent better self-reported health status.

Five of the subscales are 'unipolar' (PF, RP, BP, SF and RE), defining respondents' health status in terms of the absence of disability, so that a maximum score of 100 indicates no reported disability (Ministry of Health, 1999a). The other three subscales (GH, VT and MH) are 'bipolar' and cover both positive and negative health states. In addition, two summary measures can be calculated following Ware, Kosinski, and Keller's (1994) scoring algorithm (refer p. 4:3): the Physical Component Score (PCS) and Mental Component Score (MCS). NZ sample means and standard deviations are used to standardise the eight subscales' scores; however, in the absence of any NZ SF-36 factor loadings available from the NZ Ministry of Health, the formula for estimating the aggregate mental and physical health component scores use those published by Ware et al. that reflect the USA's normative data. The final step transforms the component scores to norm-based (50, 10) scoring, with a maximum possible score of 100. These two component scores were not calculated in the pilot study sample, but were in the doctoral study.

Table 6.1

SF-36 item composition, scoring algorithm[a], raw score range[a], and Cronbach α coefficients for each of the eight health attributes in the Pilot Study sample (*n*=46)

Health attribute scales	Final item values	Lowest & highest possible raw scores	Possible raw score range	Alpha coeff. in pilot study[b]
1. Physical Functioning	3a+3b+3c+ 3d+3e+3f+ 3g+3h+3i+3j	10, 30	20	.92
2. Role-Physical	4a+4b+4c+4d	4, 8	4	.86
3. Bodily Pain	7+8	2, 12	10	.88
4. General Health	1+11a+11b+ 11c+11d	5, 25	20	.80
5. Vitality	9a+9e+9g+9i	4, 24	20	.88
6. Social Functioning	6+10	2, 10	8	.76
7. Role-Emotional	5a+5b+5c	3, 6	3	.86
8. Mental Health	9b+9c+9d+ 9f+9h	5, 30	25	.84

[a] Adapted from Table 6.11, p. 6:18 (Ware, 1997)
[b] Cronbach alpha (α) coefficient

Following a review of 14 studies, most of which used the Cronbach *α* coefficient to examine the internal consistency of the SF-36 sub-scales, Ware (1997) concluded that in most cases the estimates "exceeded accepted standards for measures used in group comparisons" (p. 7:4). Ware noted that with the exception of the two-item Social Functioning scale, where the median of the reliability coefficients across studies was 0.76, the remaining scales were equal to or exceeded 0.80. These results affirmed the reliability of the SF-36 scales to investigate the health status of groups. The SF-36 Mental Health scale (also known as the MHI-5) was widely used prior to inclusion in the SF-36 (Jette, Davies, Cleary, Calkins, Rubenstein, Fink, et al., 1986; Ware). Although no comparable Cronbach *α* coefficients for older adults with hearing impairment were reported, those obtained in this pilot study (which ranged from 0.76 to 0.92) were within the expected range of values (refer to the final column of Table 6.1).

Chronological account of the first contact

Of the 51 participants in the study sample, 47 completed and returned their survey between 7 September and 18 October, 1999. The oldest participant, who was 90 years old and lived alone, requested that a researcher assist him to complete his survey. This was accomplished during the face-to-face interviews with other participants who lived in the same area. The research officer coded the returned surveys prior to making any further contact with each participant. This process offered valuable background information about the participants, and allowed for further opportunities to clarify any incomplete, ambiguous, or conflicting responses during the second and third contacts. As a result, there were no missing responses within the dataset, other than where participants could not remember dates (such as when did you receive your current hearing aids?).

6.3.2 Second contact

Of the original 51 participants, two agreed to participate only in the first contact phase, leaving 49 participants. Two further participants were unable to complete telephone interviews, due to hospitalisation and ill health. Thus 47 of the original 51 participants were interviewed over the telephone between 22 September and 29 October, 1999.

At the start of each telephone interview data were collected from each participant about the ear they were holding the telephone to, whether they were wearing their hearing aid/s at the time of the interview, and if the aid was switched on. The interviewer also checked that the participant could hear her voice clearly, and that there were no competing noises or distractions within the participant's own environment before proceeding with the cognitive status questions.

The Modified Telephone Interview of Cognitive Status (TICS-m)

The Telephone Interview of Cognitive Status (TICS - Brandt, Spencer, & Folstein, 1988) consists of 11 items and covers similar domains as the MMSE (viz. orientation, concentration, short-term memory, language, mathematical skills and praxis), but includes a more comprehensive assessment of memory (Lines, McCarroll, Lipton, & Block, 2003). Total scores range from 0-41. The instrument has good test-retest reliability, and has demonstrated high sensitivity and specificity to the diagnosis of mild dementia (Brandt, Spencer, & Folstein, 1988; Gallo & Breitner, 1995; Plassman, Newman, & Welsh, 1994), in addition to dementia within samples of stroke patients (Barber & Stott, 2004; Desmond, Tatemichi, & Hanzawa, 1994).

The TICS-m (Welsh et al., 1993) includes a 10 point delayed recall item to increase sensitivity, particularly to various forms of dementia. In addition, Welsh et al. removed the item related to residential address (which would be difficult to verify in large epidemiological studies), and added two more easily verifiable items (age and phone number) to the personal information questions. Two additional points were also allocated for recollecting the first names of the current president and vice-president of the USA. In the pilot study these Americocentric questions were altered to recollecting the names of the current NZ prime minister and deputy prime minister. The modified instrument comprised 12 items, with a maximum score of 50 points. A cut-off score on the TICS-m of 30/31 achieved 85% sensitivity and 83% specificity in the identification of normal as opposed to cognitively impaired older adults (Welsh et al.); this increased to 99% sensitivity and 86% specificity when the slightly lower cut-off of 27 was used (Gallo & Breitner, 1995).

The TICS-m was administered in a standard fashion, except when the interviewer read the ten TICS-m recall items. For this item, the participant was informed that the interviewer would be unable to repeat any words in the word list they were about to read to them; but that the participant would be asked to repeat what they had just heard, after each word in the list had been articulated. This change in administration procedures minimised the chances of conversational interactions to clarify what was said, and aimed to minimise the participant's frustration should the task prove to be too demanding for those who experienced difficulties hearing over the telephone.

The standardised administration procedure of denying participants any opportunity to request that a word be repeated flies in the face of older hearing impaired participants' everyday-listening coping strategies. Indeed, requesting repetition of oral information is a modus vivendi for many older adults whose capacity to hear has been compromised by noise-induced hearing loss (NIHL), and exacerbated by presbycusis. The registration of the 10-word list (pipe, whip, pillow, chest, silk, cabin, elephant, theatre, watch and giant) thus required the participant to repeat every word they heard over the telephone, one at a time, without receiving any additional linguistic or environmental listening cues to support or guide their correct phonic registration. These participant responses were recorded by the interviewer, and their subsequent delayed recall of the word list was scored against this recorded list. Thus, if the word 'pipe' was misheard as 'pike' and later recalled as such, the item was deemed to have been misheard, but correctly recalled. This alteration ensured that when scoring the responses, it was possible to gauge the accuracy of recall, and analyse the types of phonic registration errors made by participants. This process has drawn attention to the need to compile phonically robust word lists that avoid beginning and/or ending with high frequency consonants (e.g. pipe, whip, pillow, chest, and silk), which present acoustic challenges for older adults with compromised hearing. Apart from the word list registration item, other questions were repeated on request.

Although few studies have reported on the internal reliability of the TICS-m, Desmond, Tatemichi, and Hanzawa (1994) referred to the robust test-retest reliability for the original TICS in a sample of 36 stroke patients (mean age 72.3 years *SD* = 8.9). Barber and Stott's (2004) subsequent investigation of the validity of the TICS and TICS-m in 64 post-stroke patients (mean age 72.0 years) specifically excluded those patients with impaired hearing. Apart from this reference, no other studies have considered the potential impact of hearing losses on the participants' scores. In the pilot study, the TICS-m responses yielded a Cronbach α coefficient of 0.63.

6.3.3 Third contact

Of the 49 participants, 47 participated in the third contact's face-to-face interviews, which took place within a two week time frame on average, after the administration of the TICS-m. Each face-to-face interview initially explored difficulties that the participant experienced managing their hearing aid, then focused on thinking processes and memory, using the MMSE (Burns, Lawlor, & Craig, 1999), and finally resolved any missing data in the participant's survey.

Of the 47 participants interviewed face-to-face between 27 September and 3 November, 1999, 30 interviews were conducted in the participants' homes, 14 at the Hearing Association NZ's Manawatu Branch office, two at work, and one while the participant was in Palmerston North hospital, awaiting specialist medical assessment results.

The Mini-Mental State Examination (MMSE)

The MMSE is probably the most widely used brief measure of gross cognitive functioning, and consequently the instrument's psychometric properties and its utility in various research settings have been discussed in a number of publications (refer to Tombaugh & McIntyre's [1992] comprehensive review; and Jones, Schinka, Vanderploeg, Small, Graves, & Mortimer's [2002] more recent comments). The MMSE assesses orientation in time and place, registration of three words (in this instance: ball, flag, and tree), immediate and delayed recall of these three words, attention and calculation, language, praxis, and visual construction.

The highest possible total score for the MMSE is 30 points. By general consensus, MMSE scores less than 24 are suggestive of cognitive deficits, while those above 27 are indicative of normal cognitive abilities (Hopp, Dixon, Grut, & Bäckman, 1997). During the administration of the MMSE the interviewer recorded details of all the participants' responses, in order to analyse the types of errors made during their face-to-face interviews, in comparison with those made using the TICS-m.

Hopp, et al.'s (1997) longitudinal investigation of the psychometric properties of the MMSE in a sample of 44 adults over the age of 75 years reported low Cronbach α coefficients (0.31 to 0.52); but stronger test-retest correlations ($r = 0.79$ over two years). In the pilot study sample the Cronbach α coefficient was 0.67.

6.4 Results

The data were analysed using SPSS Version 10.1.3. Of the 51 veterans who originally enlisted in the pilot study, 46 completed all three points of contact. The results depict the responses of these 46 participants. Given the small sample size and the multiplicity of variables of interest in this research, no multivariate analyses were performed on the pilot study data set. The significant empirical relationships that are highlighted in these results all emerge in two-tailed bivariate correlational analysis using Pearson's correlational coefficient.

6.4.1 Sociodemographic information

All 46 participants resided in NZ's central North Island, mostly (93.5%) in urban- or peri-urban settings. All participants identified as being New Zealanders of European descent; 43 were male, three female; and all but two were retired. Twenty nine participants (63.0%) lived with their spouse/partner and no one else, while 13 lived alone (28.3%). Participant ages ranged from 55 to 90 years, with a mean age of 77.67 years (*SD* = 6.31). Twenty-seven of the participant sample (58.7%) had completed high school level education; and six (13%) had acquired a university degree, diploma, or certificate. A third of the sample had previously worked (and two currently work) in management, professional, or technical occupations; of the remaining occupational categories, the largest groups represented were service and sales workers, and the trades (eight participants in each category).

Thirty four (73.9%) participants had served in the army, eight (17.4%) in the air force, and four in the navy (8.7%). The over representation of ex-army personnel may be partially attributable to the geographical restrictions placed on the selection of this convenience sample, and the preference for ex-service personnel from particular services to live in specific geographic locations, when they retire.

Of the 31 respondents (67.39%) who had been on active service, most had travelled to the Pacific (9) and North Africa (9) on their first tour. Others reported going to Europe (5), the Mediterranean (2), Korea (2), the UK (1), and Vietnam (1); and two participants remained in NZ for their first active service. Similar destinations featured for respondents who completed second and third tours of duty. The sole participant who reported going on a fourth tour stated that he had served in Vietnam.

6.4.2 Aural rehabilitation, depression and health-related quality of life

These results are structured to reflect the dominant conceptual themes in the preceding literature reviews, drawing attention to relevant psychometric issues that emerge.

Objective audiological measure of hearing losses

An algorithm which incorporates audiometric test results, and includes an age adjustment when computing a person's bi-lateral hearing loss, was developed by the Australian Department of Health's National Acoustic Laboratories (Macrae, 1976). NZWP use this measure, which is referred to as the NAL% HL, to assess veterans' hearing health. Consent was secured from the participants to obtain their most recent report of their NAL% HL (which is adjusted for age), from their medical records held in NZWP Hamilton office. Two participants' files did not hold any information on their NAL% HL, but the remaining 44 participants' scores ranged from 9.10% to 91.30%, with a sample mean of 41.83% (*SD* = 21.38).

Empirical links between the veterans' age, HHI and SHAPI scores, and self-reported hearing aid use

The two participants who were under 65 years of age completed the Hearing Handicap Inventory for adults (HHIA); the remainder completed the equivalent questionnaire for those aged 65 and older, the HHIE (refer to the earlier descriptions in this chapter of these two instruments). The HHI total scores for the sample were in the mild to moderately handicapped range (26 to 66), with a sample mean of 44.24 (*SD* = 10.53). The HHI total scores were normally distributed.

Unlike the response format of the HHI, the SHAPI's format provided the opportunity for respondents to select 'Does not apply' (n/a) for the listed listening situations; consequentially a variable number of SHAPI items were completed. In particular, nearly a third of the respondents selected n/a for questions 18 and 21 (which describe situations listening to a sermon in a church). One first time user who had acquired binaural aids in the previous month did not respond to any SHAPI questions; whilst 17 participants who similarly identified that they were first time hearing aid users selected n/a for an average of 8.3 items, whereas the remaining 28 more experienced users responded n/a for an average of only 3.5 items. Despite these response characteristics affecting the participants' total scores, no specific adjustments were made to accommodate those who had selected the n/a option on multiple occasions. As a result the total SHAPI scores for the 45 respondents who responded ranged from 50 to 174. Further discussions related to the usefulness of this instrument in the current research context are addressed in section *6.5.1 Aural rehabilitation, emotional well-being and health-related quality of life measures*.

In the survey hearing aid use was measured in three different ways, each of which had an associated five point Likert scale that was reversed prior to analysis (refer Brooks, 1989a). These measures included: General Use (GU), with a scale that ranged from not at all (1) through some days (3), to every day (5); Daily Use (DU), where the scale ranged from only short periods (1), through about half the day (3), to all day long (5); and finally Hourly Use (HU), which ranged from less than 2 hours (1), through between 4 & 6 hours (3), to more than 8 hours (5).

A series of 17 statements in the survey that focused on the participants' positive and negative feelings about their hearing aids were adapted from Brooks (1989a) to include a Likert scale frequency of occurrence response key, which ranged from 'all the time' (1) to 'now and then' (4); 'does not apply' (n/a) was designated as a 5. Although participants responded on average to twice as many 'positive' feeling statements as negative ones (36.4 to 18.9), the high occurrence of those who selected n/a meant that this dataset could not be used to provide reliable summary indexes of participants' 'positive' and 'negative' feelings.

The Table 6.2 correlation matrix highlights the absence of any significant empirical links between the respondents' HHI total scores and any hearing aid use measures, in comparison with their SHAPI total scores. Hearing aid use measures reflected variable sensitivity to other salient aural rehabilitation variables (e.g. HU reflected first time users' sporadic patterns of use more accurately, whilst GU was more closely aligned to more experienced users' predictable patterns built up over longer periods).

Empirical links between the aural rehabilitation variables

Respondents indicated their level of satisfaction with their current aid(s), by ticking one of five numbers which ranged from 'Totally Dissatisfied' (1) to 'Totally Satisfied' (5). Those with higher HHI scores reported less satisfaction with their aids ($r = -0.548$, $p<0.01$); while higher SHAPI scores were associated with greater levels of satisfaction ($r = 0.589$, $p<0.01$), and more frequent GU of aid/s ($r = 0.483$, $p<0.01$).

Table 6.2

Statistically significant inter-correlations between the respondents' demographic, aural rehabilitation, depressive symptoms and cognitive status variables (*n*=46)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	1.00													
2 NAL% HL	.341*	1.00												
3 HHI			1.00											
4 SHAPI			-.385**	1.00										
5 GU		.509**		.546**	1.00									
6 DU		.414**		.330*	.579**	1.00								
7 HU		.506**		.557**	.706**	.880**	1.00							
8 Help/support adapting					.338*		.411**	1.00						
9 Satisfaction with aid(s)			-.548**	.589**	.483**				1.00					
10 Overall satisfaction with audiologist		-.380*		-.299*	-.360*	-.443**	-.488**			1.00				
11 GDS-15			.373**	-.451**	-.343*		-.337*	-.343*			1.00			
12 TICS-m		-.403**						.315*				1.00		
13 TICS-m (without recall)		-.374*										.756**	1.00	
14 MMSE	-.409**	-.397**	.320*									.390**	.529**	1.00
15 MMSE (without recall)	-.382**	-.392**	.316*									.496**	.522**	.873**

* $p < 0.05$ ** $p < 0.01$ (both 2-tailed)

NOTE: Only statistically significant correlations are displayed in this matrix.

Respondents' overall satisfaction with the provision of audiological services was significantly associated with all three hearing aid use measures (refer Table 6.2). The frequency of provisions of help from family, friends, and close associates, to assist respondents 'get used to' their hearing aid(s) (Brooks, 1989a) was significantly associated with both HU ($r = 0.411$, $p<0.01$), and GU ($r = 0.338$, $p<0.05$). Those with more supportive family, friends, and close associates also reported significantly less depressive symptoms ($r = -0.343$, $p<0.05$), and higher TICS-m scores ($r = 0.315$, $p<0.05$). Clearly, a fuller understanding of' the availability of appropriate help and support could be useful for hearing impaired clients and their families, as they embark on what inevitably becomes a life-long involvement with aural rehabilitation professionals.

Empirical links between the respondents' HHI, GDS-15, and SF-36 subscale scores

The preceding literature reviews have drawn attention to the theoretical and empirical links between hearing handicap and social isolation on the one hand; and social isolation and depression on the other. This section provides evidence from the pilot study respondents of these intersecting empirical relationships, whilst also inspecting the psychometric properties of the chosen measures.

Respondents reported the presence of an average of 2.3 (*SD* = 2.49) GDS-15 symptoms, which correlated significantly with their total scores on both the HHI ($r = 0.373$, $p<0.05$) and the SHAPI ($r = -0.451$, $p<0.01$). The inter-item correlations with the GDS-15 total provided a focused snapshot of the emotional burden borne by older adults who age with hearing losses. The four most highly correlated items encapsulated associations with the stigma of hearing impairment by referring to social comparisons (question 15; $r = 0.683$, $p<0.001$, n=46); compromised self esteem and a sense of worthlessness (question 12; $r = 0.647$, $p<0.001$, n=46); boredom (question 4; $r = 0.623$, $p<0.001$, n=46); and consequential diminished life satisfaction (question 1; $r = 0.616$, $p<0.001$, n=46). These questions differed from Almeida and Almeida's (1999) findings that ranked dropping activities (question 2), boredom (question 4), feelings that life is empty (question 3), and preferring to stay home (question 9) as the four most likely to be linked with a major depressive episode in their sample of community-dwelling older adults (refer Table 2, p. 861). Clearly the emotional burden of coping with hearing losses within this dataset resonated more strongly with a slightly different cluster of GDS-15 questions.

Another cluster of four GDS-15 items correlated significantly with the respondents' HHI total scores. This cluster provided additional insights regarding the emotional impact of living in constricting social environments because of the participants' HH, and included: (i) Feeling afraid that something bad is going to happen (question 6; $r = 0.616$, $p<0.01$); (ii) Becoming aware of having more problems with memory than most others (question 10; $r = 0.400$, $p<0.01$); (iii) Dropping activities and interests (question 2; $r = 0.373$, $p<0.05$); and (iv) Staying at home rather than going out and doing things (question 9; $r = 0.338$, $p<0.05$).

A closer examination of individual GDS-15 items revealed that the total of 25 negative responses to the question "Do you feel full of energy?" (question 13) was double the response frequency for the next two questions which gauged the incidence of depressive symptoms in this sample (i.e. question 9 – which referred to preferring "to stay at home rather than going out and doing things"; and question 10 – which referred to having "more problems with memory than most"). Once question 13 was removed from the 15 item GDS, the Cronbach α coefficient improved from 0.30 to 0.77.

The GDS-15 Question 13 responses highlight the pervasiveness of depleted energy levels reported by the older adults in this sample, and foreshadow potential links with the SF-36 Vitality subscale. Links with measures such as the SF-36 subscales inform hearing health professionals about the heterogeneity of functional health status in older adults who present for audiological rehabilitation, as many of these factors ultimately impact on achieving positive aural rehabilitation outcomes (Hill, 1999).

Table 6.3 lists the SF-36 subscales' normative mean scores (with 95% confidence intervals) for NZ males aged 75 years and older. The adjacent column displays the pilot study's SF-36 subscale mean scores (with their standard deviations), and the range of these scores (with the number of participants who scored the minimum score of 0 or the maximum score of 100). In the pilot study dataset the SF-36 Physical Role (RP) and Emotional Role (RE) subscales provided evidence of measurement constraints at both extremities of these scales; whilst the Social Functioning (SF) and Bodily Pain (BP) scores exhibited only 'ceiling' constraints.

Table 6.3

SF-36 subscale means for: (a) NZ Males 75+ years (with 95% confidence intervals); and (b) The Pilot Study sample means (*SDs*), range of scores and number of participants with the minimum and maximum scores[a]

SF-36 Subscale:	(a) Norms for NZ Males 75+ years[b] Mean *(CI)*[c]	(b) Pilot Study sample (n=46) Mean *(SD)* & Range of scores (participants with min. 0 & max. 100)
1. Physical Functioning (PF)	61.5 *(55.9-67.1)*	63.04 *(26.93)* 5.00-100.00 (0 & 1)
2. Role-Physical (RP)	50.7 *(42.7-58.7)*	54.89 *(42.04)* 0.00-100.00 (13 &16)
3. Bodily Pain (BP)	68.4 *(63.2-73.6)*	62.35 *(26.80)* 12.00-100.00 (0 & 11)
4. General Health (GH)	63.2 *(59.4-66.9)*	64.22 *(20.49)* 20.00-97.00 (0 & 0)
5. Vitality (VT)	63.2 *(59.6-66.9)*	60.33 *(21.30)* 20.00-90.00 (0 & 0)
6. Social Functioning (SF)	80.9 *(76.9-84.9)*	73.10 *(26.61)* 25.00-100.00 (0 & 18)
7. Role- Emotional (RE)	74.8 *(68.6-81.1)*	68.12 *(40.95)* 0.00-100.00 (10 & 25)
8. Mental Health (MH)	83.0 *(81.0-85.0)*	78.87 *(17.80)* 28.0-100.00 (0 & 6)

[a] As the pilot study included 3 women and 43 men, only the SF-36 norms for NZ males aged 75+ years are displayed for comparison purposes.

[b] Extracted from Table 56: SF-36 mean scores, by age and sex, p. 146, *Taking the Pulse* (Ministry of Health, 1999.)

[c] CI = 95% Confidence Intervals

It is readily apparent that all four subscales that gauged emotional wellbeing in the pilot study sample were lower than their equivalent NZ age-group norms; whereas only the BP subscale was lower in the physical health dimension. This comparison highlights the emotional impact of HH on the participants' H-QoL; an association that is amplified by the negative correlations between all eight SF-36 subscales and the GDS-15 scores (refer Table 6.4). In particular, the strength of the SF-36 VT subscale's association with the GDS-15 (r = -0.617, p<0.01) was similarly reflected, although more modestly, in a correlation with the HHI (r = -0.380, p<0.01). Empirical links with the Mental Health (MH) subscale were also evident through significant correlations with the participants' HHI (r = -0.348, p<0.05), their HU (r = 0.362, p<0.05), and help/support with aural rehabilitation (r = 0.332, p<0.05).

Table 6.4

Veterans' SF-36 subscale correlations with their self-reported use of their hearing aid/s (HU), perceived need for help/support with aural rehabilitation, hearing handicap total scores (HHI) and depression scores (GDS-15) for *n*=46 respondents

SF-36 Subscale:	HU	Help/support with aural rehabilitation	HHI	GDS-15
1. PF	-.038	.127	-.160	**-.323***
2. RP	.207	.248	**-.313***	**-.450****
3. BP	.126	.135	**-.355***	**-.477****
4. GH	**.312***	**.339***	-.227	**-.491****
5. VT	.273	.273	**-.380****	**-.617****
6. SF	.114	.133	-.234	**-.296***
7. RE	.203	**.432****	-.207	**-.345***
8. MH	**.362***	**.332***	**-.348***	**-.602****

* p<0.05 ** p<0.01 (both 2-tailed)

6.4.3 Cognitive status: TICS-m and MMSE scores

The range of scores on both the TICS-m (M = 32.4, SD = 5.43; range = 17-44) and the MMSE (M = 25.5, SD = 2.16; range = 20-30) were indicative of normal to mildly impaired cognitive functioning. In the TICS-m range, sixteen participants (34.8%) scored below the recommended cut-off of < 31; whilst in the MMSE, six participants

(13%) scored below the equivalent recommended cut-off of < 24. When the registration and recall of words was removed from participants' total scores (i.e. a maximum of 20 points in the case of the TICS-m, and 6 for the MMSE), and the equivalent transformed cut-offs applied (<19 in both cases), only two participants' scores fell below these new cut-offs for each test; and only one of these two participants was common to both groups.

Table 6.2 shows that age was significantly correlated with the MMSE scores ($r = -0.41$, $p<.01$), such that increasing age was associated with lower MMSE scores. Although similar for the TICS-m, this correlation was not significant ($r = -0.23$, n.s.). The NAL% HL was significantly correlated with both the TICS-m ($r = -0.40$, $p<.01$) and the MMSE ($r = -0.39$, $p<.01$), such that higher cognitive status scores were associated with lower bi-lateral hearing loss. For 19 participants lower MMSE scores were significantly correlated with greater frequency of acknowledging "My hearing aid is difficult to insert" ($r = 0.595$, $p<.01$); a result supported by Julie Hill's (1999) study that examined predictors of binaural hearing aid success in a sample of 32 older adults (mean age 76 years, *SD* = 5.7) residing in North Shore, Auckland, and found that good cognitive functioning was predictive of hearing aid acceptance.

The bivariate correlation between the TICS-m and the MMSE scores ($r = -0.39$, $p<.01$) was much lower than reported elsewhere in the literature (Brandt, Spencer, & Folstein, 1988; Jarvenpaa, Rinne, Raiha, Koskenvuo, Lopponen, Hinkka, et al., 2002; Plassman et al., 1994). Reasons for this apparent anomaly are undoubtedly linked to the frequently ignored impact of hearing losses on cognitive assessment, particularly in older adults. This point is clearly illustrated in the Table 6.2 correlation matrix which depicts how an improved correlation between these scores was attained by removing the word registration and recall lists ($r = -0.522$, $p<.01$); tasks that are particularly sensitive to auditory capabilities. Research evidence illustrating the complementary synergistic effect of amplification on speechreading in adults with acquired sensorineural hearing losses has demonstrated good audibility for low-to-mid frequency consonants (Walden, Grant, & Cord, 2001). Clearly older hearing impaired listeners who are deprived of crucial visual place-of-articulation information when assessed telephonically, are disadvantaged. In addition, all memory assessment tasks in older adult populations should examine the phonic characteristics of the consonants comprising the word lists, and avoid those with either high frequency or soft, sibilant sounds, to minimise the inevitable impact of hearing losses confounding the memory assessment outcomes.

6.5 Discussion and methodological recommendations for the main study

Despite the small sample size and possibility of restrictions in the variability of responses, most of the instruments selected to gauge the variables of interest in the survey proved to be psychometrically robust, and appropriate to use in a self-report format with hearing impaired older adults.

6.5.1 Aural rehabilitation, emotional well-being and health-related quality of life measures

The excellent completion rates of the survey (100%) indicated the willingness of these older veteran respondents to contribute to the research process; many acknowledging at the face-to-face interviews that they hoped their responses "would help others cope more effectively." The empirical links that emerged between variables derived from the survey provided sound evidence of the face validity of instruments such as the HHI and the GDS-15; both of which were developed for use within gerontological research contexts. In addition, the convergent construct validity of these two scales described the emotional burden of living with hearing losses. Despite the restrictions in the range of scores for some SF-36 subscales, they also provided potentially useful complementary profiles of the participants' H-QoL, by reflecting the implications of this emotional burden on the participants' mental health. A cross-sectional study of 1332 older Italians (mean age 74.2, *SD* = 6.4) has reported similar links for those with hearing losses (Cacciatore, Napoli, Abete, Marciano, Triassi, & Rengo, 1999).

Clearly the variable number of responses to the different listening situations depicted in the SHAPI questions proved problematic. It was therefore decided to omit this questionnaire from the main study protocol, to enhance the possibility of securing complete response sets to self-report questionnaires during the data collection process.

6.5.2 Cognitive status measures

The TICS-m was abandoned as the sole cognitive status check in the main study as the poor correlation between the MMSE and the TICS-m raised questions about the reliability and validity of using this mode of assessment with older, hearing impaired participants. As a result, the telephone interview was dropped from the main study protocol, and cognitive data collected using Crook and Larrabee's (1990) self report scale for evaluating memory in everyday life, which was included in the main study mail out survey. Details of this scale are provided in the methodology chapter of the main doctoral study.

The dearth of any significant correlations between either the TICS-m or the MMSE and the eight SF-36 subscales replicates a similar finding in a study of 128 nursing home residents (Andresen, Gravitt, Aydelotte, & Podgorski, 1999).

6.5.3 The need for social support measures

Studies illustrating how the negative impact of hearing impairment affects not only those living with HH, but also their partners, report that the effective use of hearing aids improves the quality of life of *both* parties (Brooks, Hallam, & Mellor, 2001; Donaldson, Worrall, & Hickson, 2004; Stark & Hickson, 2004). The ensuing doctoral study broadens the scope of the HARP by recruiting veterans *and* their dyadic partners in order to provide alternative perspectives from *both* partners of the veterans' experiences of ageing with HH. The cross-sectional research design gathers information about independent dyadic partners' social support, emotional wellbeing and H-QoL, in addition to appraisals of the veterans' HH, and the veterans' reports of their engagement in aural rehabilitation, and memory in everyday life. The subsequent data analyses determine the characteristic profiles of structural and functional support within the independent dyadic partner samples, prior to exploring their empirical links with the veterans' self-reported HH, engagement with aural rehabilitation, and ultimately the H-QoL profiles of both partners. Clearly, the inclusion of Wenger's (1994) Network Assessment Instrument (NAI) within the doctoral research protocol, to gauge the structural aspects of social support networks within older veteran dyads, will complement other questions that focus on the functional features of social support.

6.6 Summary and doctoral study hypotheses

The pilot study findings distil the theoretical and empirical insights derived from the literature reviewed in the preceding chapters, especially those related to HH, aural rehabilitation, and the potential downstream effects on the participants' social support, emotional wellbeing and H-QoL. Accordingly, this final section highlights relevant evidence that informs the articulation of 16 preliminary hypotheses linked to the first three research aims; and two major with seven subsidiary hypotheses linked to the fourth and final research aim, which explore possible significant multivariate links associated with the veterans' HH, social support and H-QoL.

6.6.1 Synopsis and preliminary hypotheses

Whilst Verbrugge and Patrick's (1995) analysis of pooled 1980s US population health data revealed that the prevalence of both sensory impairments and chronic conditions increased with age, they failed to consider the functional implications of sensory limitations on the communication contexts of older adults who were dependent on others to perform activities of daily living (ADLs). Epidemiological data from the 'Longitudinal Aging Study Amsterdam' similarly reported that the prevalence of chronic diseases and hearing impairment increased with age, and that men were significantly more likely to report they had hearing losses (Kramer, Kapteyn, Kuik, & Deeg, 2002). However, Kramer et al. also noted that hearing impairment was the only condition that was significantly associated with all five psychosocial measures in their respondent database, and concluded that aural intervention programmes for older adults should accommodate a range of psychosocial features that involve family and friends. More recently, findings from the five-year follow-up 'Epidemiology of Hearing Loss Study' with Beaver Dam residents reported a clear association between the prevalence of comorbid conditions, compromised communication, and functional independence in the older adult group; and suggested that future researchers should evaluate the impact of hearing losses on the family, as well as the individual (Dalton, Cruickshanks, Klein, Klein, Wiley, & Nondahl, 2003). However, no interdisciplinary research has explored aural rehabilitation outcomes for older adults within an ecological context that includes perspectives of coping with hearing losses, and ageing with spoiled social identities that potentially impact on older adults' cognitive, social and emotional functioning, and ultimately their H-QoL.

First research aim: Veterans' aural rehabilitation coping trajectories

Chapter Three summarised recent aural rehabilitation perspectives that facilitate the active development of older adults' compensatory coping strategies, to accommodate the functional implications of living with HH in an audible world. These perspectives demonstrated the utility of adopting applied ecological approaches that provide more information about potential and actual limitations in communication activities, and the consequential restrictions to social participation, for both those living with hearing impairment and their communication partners. For example, Hétu (1996) described how workers with NIHL disguised the stigmatising impact of their spoiled social identities, waiting an average of 5-15 years before seeking professional help; and how they frequently relied on their spouses for support or even avoided social interactions, due to their reluctance to disclose the extent of their disabilities. Hétu also called for a paradigm shift that accommodated social validation perspectives in the delivery of aural rehabilitation services. Stephens' (1996) sociomedical model of the evolution of HH within older adults' sociospheres drew similar attention to the invisible communication impediment borne by people with hearing losses, and shared by their close relatives (Hallberg, 1996).

As a prelude to exploring the female spouses' appraisals of the legacy of their partners' hearing losses, the hypotheses initially focus on the first research aim, encapsulating aspects of the veterans' active engagement in their on-going aural rehabilitation. Accordingly, the first three hypotheses compare the self-identified first-time hearing aid users with those who were more experienced within the veteran sample, in terms of the recency of their access of audiological services, and both their satisfaction with, and daily use of their hearing aids:

Hypothesis 1: Significantly more experienced hearing aid users in comparison with self-identified first time users will have had their hearing tested more recently.

Hypothesis 2: The first time hearing aid users will be significantly less satisfied than the more experienced users with the overall performance of their aids.

Hypothesis 3: First time hearing aid users will report significantly less frequent daily use (DU) of their hearing aids than the more experienced users.

Whilst these three hypotheses depict key aspects of the veterans' coping trajectories as they accommodate ageing with hearing losses, the following hypotheses focus on the female partners' appraisals of the veterans' coping capabilities.

Second research aim: Comparing dyadic partner appraisals of the legacies of the veterans living with hearing handicap (HH)

Informed by Hétu (1996), Stephens (1996), and Dalton et al.'s (2003) perspectives of the spoiled social identities associated with acquired hearing losses, four hypotheses compare spousal appraisals of the impact of living with HH on different facets of the veterans' lives, and thereby address the second research aim:

Hypothesis 4: A significantly greater proportion of female partners in comparison with veterans will report that the veterans' hearing losses affect the veterans' family, social and recreational lives.

Hypothesis 5: More specifically, a significantly greater proportion of women in comparison with veterans will report that the veterans' actual roles in their families are affected by their hearing losses.

Hypothesis 6: In addition, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses affect their interpersonal relationships.

Hypothesis 7: Finally, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses have made their partners feel depressed.

These contrasting spousal appraisals of the veterans' social and ultimately their emotional agency are refocused in the third research aim, which explores the intersecting structural and functional features of the independent dyadic partners' support networks.

Third research aim (i): Describing the intersecting structural and functional features of dyadic partners' social support

Garstecki and Erler's (1996) research comparing the communication profiles of younger and older adults living with hearing losses concluded that future research should investigate the relationship between social support and HH. The following seven hypotheses address both this suggestion and the third research aim, by focussing on the intersections between the independent dyadic partners' Wenger (1994) support network characteristics and their associated perceptions of emotional support. Whilst Wenger's network typology is described in detail in the following chapter, it is instructive to know that Wenger's NAI identifies five distinct types of social support networks, which can be arranged along a support network continuum that ranges from socially integrated (i.e. Wider Community and Locally Integrated networks) to socially isolated (i.e. Local Self Contained, Family Dependent and Private Restricted networks):

Hypothesis 8: The socially isolating impact of living with hearing losses will ensure that a significantly greater proportion of veterans in comparison with their partners will live in socially isolated Wenger support networks; on the other hand, significantly more women will live in socially integrated support networks.

Hypothesis 9a: In addition, the impact of living with hearing losses will accentuate the expected gender differences between the partners in relation to the number of people they identify available to provide emotional support, so that the veterans will list significantly fewer people in comparison with their partners.

Hypothesis 9b: Despite listing fewer people available to provide emotional support, the published literature indicates that male respondents will be significantly more satisfied with their perceived availability of emotional support than the females.

Hypothesis 10: In keeping with Wenger's description of the support network typology, respondents in the Locally Integrated networks will list the greatest number of people available to provide emotional support, while those in Private Restricted networks will list the least.

Hypothesis 11: Accordingly, respondents in Wenger's Locally Integrated networks will report the highest levels of satisfaction with their perceived availability of emotional support, whilst those in the Private Restricted networks will report the least satisfaction.

Investigating these five hypotheses will provide insights in relation to the subsequent explorations of the bivariate and multivariate relationships between the structural and functional features of the partners' social support, and the veterans' HH. However before addressing these, it is necessary to consider further functional implications that are likely to be exacerbated by constricting social participation.

Third research aim (ii): Determining the functional consequences of constricted social participation on the veterans' memory in everyday life and both partners' emotional well-being

Both Bowling (1994) and Lisa Berkman (2000) noted that the predictive links between social networks and health outcomes (including memory and emotional well-being) are probably attributable to life-long, cumulative patterns of functioning; whilst Glass and Balfour's (2003) Ecological Model of Ageing (EMA - refer Figure 2.1) highlighted the potentially exacerbating impact of these functional limitations on older adults' H-QoL. The following four hypotheses explore the functional implications of constricting social participation within the doctoral dataset:

Hypothesis 12: Veterans in socially integrated networks will report significantly less frequent occurrence of forgetting than those veterans in socially isolated networks.

Hypothesis 13a: Given the increased risk of clinical depression in older adults with hearing losses, the veterans will report significantly more depressive symptoms than their partners.

Hypothesis 13b: In addition, respondents in the socially integrated networks will report significantly fewer depressive symptoms than those respondents in the socially isolated networks.

Hypothesis 13c: Finally, those respondents in Wenger Private Restricted networks, which are the most socially restricted and therefore least likely to be emotionally supportive of all the types of support networks, will report the most depressive symptoms.

The ensuing section integrates the theoretical underpinnings that informed the preliminary hypotheses into a composite theoretical model that addresses the fourth and final research aim.

6.6.2 Theoretical rationale guiding the multivariate analyses and hypotheses

Figure 6.1 depicts a generic composite model of Ageing with Hearing Handicap that integrates conceptual elements extracted from Kaplan, Sallis and Patterson's (1993) PRECEDE model (refer Figure 1.2), Glass and Balfour's (2003) Ecological Model of Ageing (EMA - refer Figure 2.1); and Lareiter and Baumann's (1992) figurative depiction of social support constructs (refer Figure 4.1). This analytical framework informs the selection of salient ecological variables for three multivariate regression analyses, which initially explore the explanatory power of generic variable blocks to account for variance in the veterans' self-reported HH. Subsequently the significant results in relation to the veterans' hearing health are included to explore further links with their physical and mental health-related quality of life (i.e. PH-QoL and MH-QoL). These generic variable blocks comprise clusters of constructs that encapsulate the dyadic partner perspectives of ageing with stigmatising hearing losses, and include:

i) Predisposing sociodemographic variables;
ii) Reinforcing structural support network variables;

iii) Dis/enabling functional support variables (that may also encompass perceptions of on-going aural rehabilitation);

iv) Potentially exacerbating cognitive, physical, mental and emotional health-related variables.

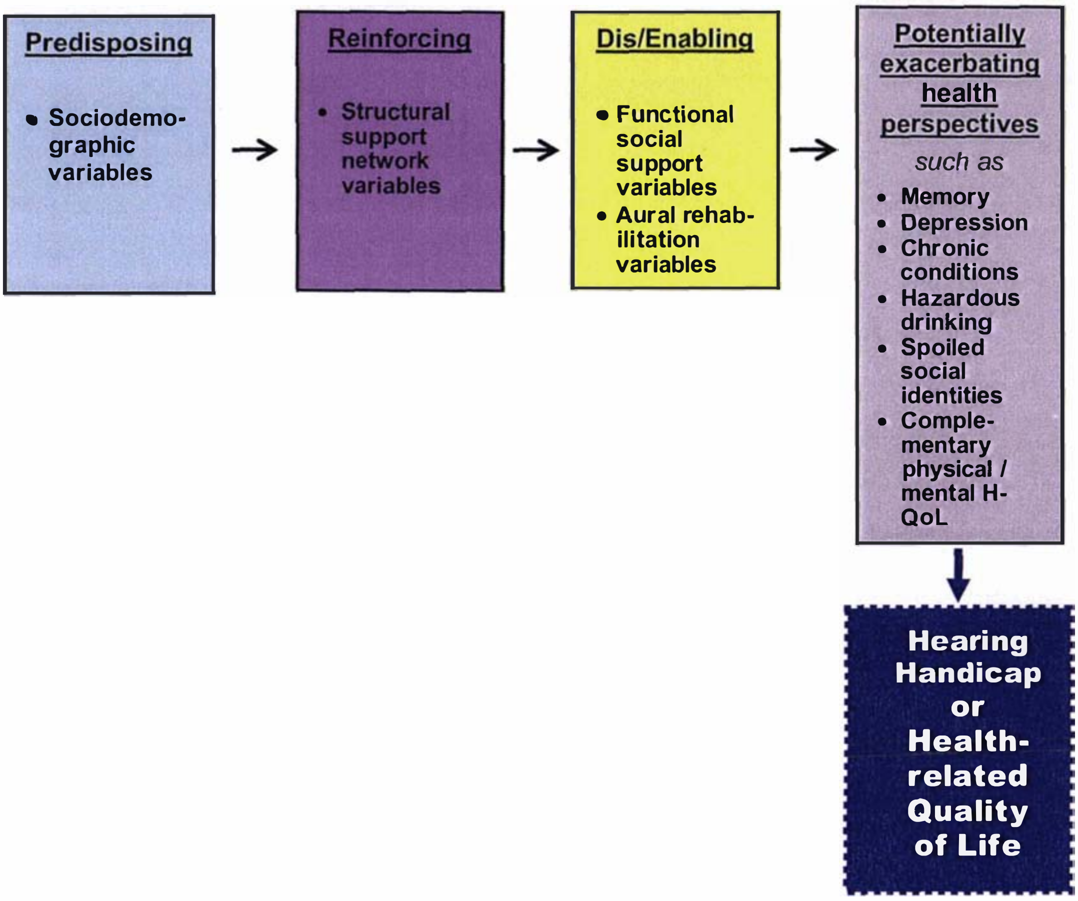

Figure 6.1. Ageing with Hearing Handicap: A conceptual framework to guide exploring the potential empirical links between social support, hearing handicap (HH), potentially exacerbating health conditions and health-related quality of life (H-QoL), within the independent dyadic partner samples.

Guided by the literature reviewed in the preceding chapters, overarching hypotheses initially predict that the composite model of Ageing with Hearing Handicap will explain a significant amount of the variance in each of the three regression analyses that are central to the study's exploration of the fourth and final research aim. Specific hypotheses subsequently examine the explanatory power of selected IVs in relation to the veterans' hearing handicap (HH) or health-related quality of life (H-QoL).

Fourth research aim: Exploring potential empirical links in the dataset with the veterans' self-reported hearing handicap (HH) and health-related quality of life (H-QoL)

The overarching hypothesis that focuses on the explanatory power of the composite conceptual model in terms of the HH regression states that:

Hypothesis 14: The predisposing, reinforcing, dis/enabling and exacerbating variable blocks comprising the composite model of Ageing with Hearing Handicap will explain significant proportions of the variance in the veterans' self-reported Hearing Handicap Inventory (HHIE) total scores.

Moreover, the following four hypotheses focus on the comparative explanatory power of specific IVs / blocks of IVs in relation to the veterans' HHIE total scores:

Hypothesis 14a: The partners' functional support measures will account for comparatively more variance than their structural measures of support.

Hypothesis 14b: The aural rehabilitation variables will explain more variance than their sociodemographic variables, even though the latter block includes the objective measures of the veterans' actual bi-lateral hearing losses (i.e. their NAL% HL).

Hypothesis 14c: In the final model, the veterans' self-reported memory in everyday life will significantly exacerbate their self-reported experience of HH.

Hypothesis 14d: Finally, the veterans' perceptions of their spoiled social identities (explored in the second research aim) will account for the most explained variance of all the variable blocks in the composite conceptual model.

The H-QoL hypotheses are informed by the literature reviewed in Chapter Five linking social support and health. In this case the overarching hypothesis predicts that:

Hypothesis 15: The predisposing, reinforcing, dis/enabling and exacerbating variable blocks that comprise the composite conceptual model of Ageing with Hearing Handicap will explain a significant proportion of the variance in both the veterans' self-reported mental and their physical H-QoL (i.e. their SF-36 PCS and MCS scores).

More specifically, in relation to the veterans' PCS and MCS scores:

Hypothesis 15a: As suggested by the international epidemiological literature reviewed in chapter five, the reinforcing structural support measures will account for more variance in the veterans' PH-QoL than the dis/enabling functional support measures.

Hypothesis 15b: Conversely, dis/enabling functional support measures will account for relatively more variance in the veterans' MH-QoL than the reinforcing structural support measures.

Hypothesis 15c: Given the strong empirical links between hearing losses, social isolation and depression, the potentially exacerbating impact of ageing with stigmatising hearing losses will account for proportionately more variance in the veterans' mental than their physical H-QoL.

Table 6.5 displays a summary list of these four research aims with their associated hypotheses; whilst the following chapter previews the dyadic datasets collected to examine these hypotheses.

Table 6.5
Summary list of the four research aims and their associated hypotheses

AIM I:	**Comparisons between the self-identified first time & more experienced veterans' aural rehabilitation coping trajectories**
Hyp. 1	Significantly more experienced hearing aid users in comparison with first time users will have had their hearing tested more recently.
Hyp. 2	The first time hearing aid users will be significantly less satisfied than the more experienced users with the overall performance of their aids.
Hyp. 3	The first time hearing aid users will report significantly less frequent daily use (DU) of their hearing aids than the more experienced users.

Table 6.5 (continued)

AIM II:	Comparing partners' perceptions of the stigmatising impact of hearing losses on the veterans' social & emotional agency
Hyp. 4	A significantly greater proportion of female partners in comparison with veterans will report that the veterans' hearing losses affect the veterans' family, social and recreational lives.
Hyp. 5	More specifically, a significantly greater proportion of women in comparison with veterans will report that the veterans' actual roles in their families are affected by their hearing losses.
Hyp. 6	In addition, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses affect their interpersonal relationships.
Hyp. 7	Finally, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses (HL) have made their partners feel depressed.
AIM III:	**(i) Intersecting structural and functional features of social support**
Hyp. 8	The socially isolating impact of living with hearing losses will ensure that a significantly greater proportion of veterans in comparison with their partners will live in socially isolated Wenger support networks; on the other hand, significantly more women will live in socially integrated support networks.
Hyp. 9a	In addition, the impact of living with hearing losses will accentuate the expected gender differences between the partners in relation to the number of people they identify available to provide emotional support, so that the veterans will list significantly fewer people in comparison with their partners.
Hyp. 9b	Despite listing fewer people available to provide emotional support, the published literature indicates that male respondents will be significantly more satisfied with their perceived availability of emotional support than the females.
Hyp. 10	In keeping with Wenger's description of the support network typology, respondents in the Locally Integrated (LI) networks will list the greatest number of people available to provide emotional support, while those in Private Restricted (PR) networks will list the least.
Hyp. 11	Accordingly, respondents in Wenger's Locally Integrated (LI) networks will report the highest levels of satisfaction with their perceived availability of emotional support, whilst those in the Private Restricted (PR) networks will report the least satisfaction.
AIM III:	**(ii) Functional implications across Wenger's support network continuum**
Hyp. 12	Veterans in socially integrated networks will report significantly less frequent occurrence of forgetting than those veterans in socially isolated networks.
Hyp. 13a	Given the increased risk of clinical depression in older adults with hearing losses, the veterans will report significantly more depressive symptoms than their partners.
Hyp. 13b	In addition, respondents in the socially integrated networks will report significantly fewer depressive symptoms than those respondents in the socially isolated networks.
Hyp. 13c	Finally, those respondents in Wenger Private Restricted (PR) networks, which are the most socially restricted and therefore least likely to be emotionally supportive of all the types of support networks, will report the most depressive symptoms.
AIM IV:	**Empirical links with the veterans' self-reported hearing handicap & H-QoL**
Hyp. 14	**The predisposing, reinforcing, dis/enabling and exacerbating variable blocks comprising the composite model of Ageing with Hearing Handicap will explain significant proportions of the variance in the veterans' self-reported Hearing Handicap Inventory (HHIE) total scores.**
Hyp. 14a	The partners' functional support measures will account for comparatively more variance than their structural measures of support.
Hyp. 14b	The aural rehabilitation variables will explain more variance than their sociodemographic variables, even though the latter block includes the objective measures of the veterans' actual bi-lateral hearing losses (i.e. their NAL% HL).
Hyp. 14c	In the final model, the veterans' self-reported memory in everyday life will significantly exacerbate their self-reported experience of HH.
Hyp. 14d	The veterans' perceptions of their spoiled social identities (explored in the second research aim) will account for the most explained variance of all the variable blocks in the composite conceptual model.
Hyp. 15	**The predisposing, reinforcing, dis/enabling and exacerbating variable blocks that comprise the composite conceptual model of Ageing with Hearing Handicap will explain a significant proportion of the variance in both the veterans' self-reported physical and mental H-QoL (i.e. their SF-36 PCS and MCS scores).**
Hyp. 15a	As suggested by the international epidemiological literature reviewed in chapter five, the reinforcing structural support measures will account for more variance in the veterans' PH-QoL than the dis/enabling functional support measures.
Hyp. 15b	Conversely, dis/enabling functional support measures will account for relatively more variance in the veterans' MH-QoL than the reinforcing structural support measures.
Hyp. 15c	Given the strong empirical links between hearing losses, social isolation and depression, the potentially exacerbating impact of ageing with stigmatising hearing losses will account for proportionately more variance in the veterans' mental than their physical H-QoL.

CHAPTER SEVEN: METHOD

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7.6 Measures: The spouse/partner survey
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7.7 Coding and data entry

Chapter Seven

Chapter Seven describes the research methodology employed to assemble the doctoral study respondent dataset, including objective measures of the veterans' bi-lateral hearing losses. The chapter begins by providing details of the research design, participant recruitment procedures, and dyadic sample composition. It concludes with descriptions of the structure and selection of questions and questionnaires that comprise the mail out survey (MOS) booklets for both the main respondents (MRs) and their respective spouse/partner (S/P). Salient psychometric details are provided, including the Cronbach alpha (α) coefficients for all the scales.

The doctoral study research method evolved from procedures that were trialled in the pilot study described in Chapter Six. Refinements made to that data collection process accommodated the methodological constraints noted and included appropriate tools to gauge the structural and functional components of social support within the respondent dyads. The descriptions of the psychometric properties of instruments used in the pilot study and retained in the doctoral study surveys are not repeated; however, the measures of internal consistency for these scales within the doctoral study sample are reported. (In particular, the questions related to general, daily, and hourly hearing aid use [i.e. GU, DU, HU; Brooks, 1989a]; the Hearing Handicap Inventory [HHI; Ventry & Weinstein, 1982]; the Geriatric Depression Scale [GDS-15; Sheikh & Yesavage, 1986]; and the eight SF-36 subscales [Ware, 1997]).

7.1 Introduction

As noted in Chapter Six, in 1999 research funding provided by the New Zealand War Pensions (NZWP) Medical Research Trust Board enabled a Massey University School of Psychology research team to undertake research that examined the predictors of hearing aid use in a sample of older New Zealand (NZ) ex-service personnel (refer to the Hearing Aid Research Project [HARP] official report - Alpass, Long, Pachana, & Blakey, 2003). This doctoral study has reconfigured the original aims of the HARP, in order to explore the structural and functional features of social support and their links with selected outcome variables, within the context of older hearing impaired veterans' lives and those of their dyadic partners'. This reconfiguration includes perspectives from both the veteran main respondents (MRs) in addition to those of their spouse/partner (S/P), and thereby ensures that respondent dyads are a central feature of the research. To avoid ambiguity in the text when referring to particular dyadic partners, the author has chosen to use the term 'veteran' wherever possible, but also uses the acronym 'MR' (i.e. main respondent); whereas the veteran's female dyadic partner is more readily identified by the acronym 'S/P' (i.e. spouse/partner). The doctoral study hypotheses articulated in the concluding section of Chapter Six complement but differ from the HARP's dual foci on cognitive deterioration associated with ageing, and developing appropriate informational material to assist ex-service personnel achieve optimal outcomes during their on-going aural rehabilitation.

7.2 Research design

The doctoral study's veteran respondents were a subset of the HARP veteran sample; however, the mail out survey responses of these veterans' co-dependent dyadic partners (i.e. partners/spouses who resided in the same household) complemented the veterans' perspectives encapsulated in their survey responses. The dyadic partners' survey responses were collected over a period of eleven months, using stratified random sampling methodology and at least two points of contact with the veterans. The management of this data collection process was organised into three phases, each of which is described below (refer to Table D.1's summary of this process in Appendix D).

7.2.1 Phase 1: Potential participant pool

Phase 1 involved the random selection and compilation of the HARP mailing list by NZWP's Central Processing Unit (CPU) staff in Hamilton, who also mailed out the first contact letters along with the information sheets, consent forms, and addressed, FREEPOST return envelopes (refer Appendix A). Respondents (i.e. both the veterans and their partner/spouse) were directed to return their completed consent forms to the project research officer at Massey University's School of Psychology.

7.2.2 Phase 2: Dyadic partner mailing lists

Phase 2 involved the creation of a respondent mail out list by the project research officer at Massey University's School of Psychology, on receipt of signed consent forms. Each veteran on the list received a self report mail out survey (MOS) booklet; and, if another person also returned a signed consent form indicating that they wished to participate, a self report ‘Other Person’ survey was also posted out to that respondent. A second, follow-up letter was posted to those veterans who did not respond within two months of NZWP CPU posting the first contact letter.

7.2.3 Phase 3: Database of veterans’ hearing losses

Phase 3 involved accessing the most recent audiological assessment of the veterans’ hearing losses from their medical records stored at NZWP CPU in Hamilton. All the veterans in the HARP sample consented to this process.

7.3 Procedure

The following five sub-sections describe the implementation of the doctoral study procedures, which were managed alongside those of the HARP data collection processes.

7.3.1 Phase 1

Phase 1 activities were managed by staff at NZWP CPU Hamilton, to ensure the privacy of information related to war pensioners held on NZWP databases. The NZWP January 2000 database of veterans who had previously served in the NZ Armed Forces, and received hearing aid battery benefits from NZWP, formed the pool of potential research participants.

A random sample of 3000 veterans was chosen by computer generated random number software (as detailed below) from the potential participant pool of 8957 veterans, who were in receipt of hearing aid battery benefits in January 2000. NZWP CPU staff subsequently removed the names of deceased veterans, and those whose current addresses were ‘not known’, and created a mailing list that comprised 2921 veteran names. These veterans, who were invited to join the study comprised two groups; the Lower North Island Group (LNI) and the Rest of New Zealand Group (RONZ).

As the HARP researchers wished to interview veterans who lived in the Lower North Island region face-to-face, the sample selection procedures ensured that this group was over represented in the final pool of randomly selected potential respondents. Thus, respondents from the Lower North Island comprised half of the final randomly selected pool of potential respondents. In order to achieve this 1463 (53.43%) veterans were randomly selected from the 2738 who resided in the Lower North Island.

Once the names of the 2738 LNI veterans were removed from the total pool of 8957 veterans available to contact 6219 (69.43%) remained. This larger group comprised those who resided in the "rest of the North Island" (4094 - 45.71% of the total 8975) and those who resided in the South Island (2125 - 23.72% of the total 8957). A further 1458 (23.44%) veterans were randomly selected from the 6219 available. The pool of potential respondents thus comprised 1463 (50.09%) veterans who lived in the LNI, and 1458 (49.91%) veterans who lived in the RONZ.

In late April 2000 NZWP CPU staff mailed the first contact letter (FCL), authored by the Secretary for War Pensions, to the 2921 veterans, inviting them to participate in the study. Veterans also received a Main Study Information Sheet that provided details about the research team; the research project and their involvement in it. This sheet detailed the possibility of another person in the same household joining the study, assurances regarding maintaining the respondents' confidentiality at all times, and an outline of their rights as research participants. A Veteran's Declaration consent form was enclosed, with an accompanying addressed FREEPOST reply envelope. A 'Declaration of Other Person' consent form was also included, with an accompanying plain brown envelope, for confidential inclusion within the veteran's reply envelope, should a dyadic partner also wish to join the study. (Refer Appendix A.)

Potential participants were invited to respond to the research officer at the School of Psychology, Massey University, Palmerston North, if they wished to join the study.

7.3.2 Phase 2

From late April 2000 each veteran who wished to join the study was mailed a copy of the MOS booklet, together with an addressed, FREEPOST envelope (to return their completed MOS). From the total pool of 2921 first contact letters posted, 947 (32.42%) veterans responded positively and chose to join the research project during late April, May and June 2000. Two months after the first contact letters were posted by NZWP CPU staff, 1897 follow-up letters were mailed out, early in July 2000 (refer Appendix A). This represented 64.94% of the veterans from the original NZWP mailing list who had not yet responded to their first contact letters.

From the total pool of 1897 second letters posted, 435 (22.93%) veterans responded positively and chose to join the research project during July and August 2000. By the end of August 2000, 1379 veterans had been entered on the research study database, and had received a survey booklet to complete. A further three veterans joined the study after that date; the last MOS booklet was posted out on 16 October 2000. Overall there was a combined positive response rate of 47.31% to the 2921 original first contact letters mailed out by NZWP CPU staff.

7.3.3 Phase 3

Phase 3 of the data collection involved accessing veterans' files held at NZWP's CPU in Hamilton, to extract information related to each respondent's clinically defined percentage bi-lateral hearing losses. A database was created by the project research officer to capture information including: (i) the date of the respondent's most recent hearing assessment by a medical specialist on file; and (ii) their National Acoustics Laboratory bi-lateral percentage (NAL%) hearing losses (calculated as per the algorithm articulated by Macrae [1976] that takes into account auditory acuity in both ears, and the person's age).

The amount and quality of information in the database was contingent on the respondents' files being available to access, and the hearing assessment records being located within each veteran's file.

7.3.4 Response rates and sample composition

The HARP response rates are reflected in the numbers of participants who completed and returned their MOS booklets. Table 7.1 (below) provides details of the numbers of MOS booklets that were posted to veterans and another person (who had enlisted in the study by returning a signed consent form), and subsequently either withdrawn, or coded and submitted for data entry.

Table 7.2 indicates the final numbers of veterans who responded to the invitation to join the study, either alone or together with a communication partner. Forty-five of the 444 veterans who responded alone initially joined the study together with another person; however, their partners subsequently withdrew after they had received their surveys. In most instances, the reasons given by the 'other persons' for their withdrawal/non-completion included poor health, or difficulties understanding what the range of questions in their survey had to do with a research project focussed on the veterans' hearing losses. The doctoral study dataset examined only those veterans who had responded with another person, both of whom had completed and returned their survey booklets.

Table 7.1

Numbers of mail out survey (MOS) booklets: (a) posted to respondents; and later either (b) withdrawn or (c) returned and coded for data entry

Recipients	(a) Total MOS booklets posted	(b) Total MOS booklets withdrawn	(c) Total MOS booklets coded
Veterans (% of posted)	1382	133 (9.6%)	1249 (90.4%)
'Other person' (% of posted)	930	125 (13.4%)	805 (86.6%)

Table 7.2

Composition of the nested HARP and doctoral samples: Numbers (and %) of veterans' surveys returned with / without linked dyadic partner surveys

Veterans with / without linked 'Other person' MOS	Total actual numbers (%)	FCL[a] actual numbers (%)	SCL[b] actual numbers (%)
Veterans + linked surveys	805 (64.4%)	608 (69.6%)	197 (52.4%)
Veterans only	444 (35.6%)	265 (30.4%)	179 (47.6%)
TOTAL MRs	1249	873	376

[a] FCL = First Contact Letter respondents

[b] SCL = Second Contact Letter respondents

The following section elucidates on the inclusion criteria applied to the HARP sample, in order to derive the final doctoral study dyadic sample.

7.3.5 Dyadic partners' sample selection criteria

Of the 805 veterans who responded with another person, 788 lived in the same household. A homogenous dyadic cohort was subsequently selected by applying the following five inclusion criteria: (i) male MRs; (ii) aged 65 years or older; (iii) who responded with a female spouse/partner (S/P) living in the same household; where (iv) both partners in these respondent dyads lived independently in the community and (v) had completed and returned their MOS booklets. Seven hundred and three respondent dyads met these selection criteria. Of the 101 dyads excluded by applying these five criteria 61 veterans were aged under 65 years; 16 veterans lived in another household from the 'other person' who had responded; 13 veterans had a relationship other than spouse/partner with the 'other person' who had responded; six of the 'other persons' were male, three veterans were female, and two further dyads met all the other inclusion criteria but the veterans resided in dependent aged care facilities. The dyadic responses were then examined, to identify those dyads where either partner's missing data would affect the reliability of the measures to be included in the planned multivariate analyses. Consequently, a further 32 dyads were excluded from the analysis, due to missing responses in five key questionnaires (i.e. the HHI, GDS-15, SF-36, and two social support measures - Wenger's [1994] network assessment questionnaire and Sarason, Sarason, Shearin, & Pierce's [1987] perceptions of the availability of emotional support). The final doctoral study sample ultimately comprised 671 respondent dyads.

7.4 Measures: The main respondent survey

The 42-page veteran mail out survey (MOS) comprised six different parts; changes in paper colour marked the transition from one part of the survey booklet to the next, and, with the exception of the outside cover pages, only the right hand facing pages in the booklet had printed text. An accompanying letter asked the veteran to answer all the questions, and advised that completion of the survey would probably take longer than an hour. (Refer Appendix B.)

7.4.1 Structure and content

A brief catalogue of the range of questions comprising each part of the six part survey follows, with detailed psychometric descriptions of the published measures salient to the doctoral study data analyses addressed in separate sections thereafter.

PART 1 - Socio-demographic and service information: Questions sought information about the participant's age, gender, ethnicity, location of their residential household and who else occupied their household, their retirement status, current or previous occupational status in the work force (later classified according to the NZ Standard Classification of Occupations - Statistics NZ Te Tari Tatou, 1995), educational qualifications and pre-tax income (including benefits) of the veteran and every other member of their household. Questions were modelled on the 1996 NZ Census of Population and Dwellings (Statistics NZ Te Tari Tatou, 1997). Respondents were asked about their service record (branch, service numbers, location(s) of active service and/or United Nations duty); and how their hearing became impaired during their period(s) of service.

PART 2 Section I – Questions profiling the aural rehabilitation process and tinnitus: This section gauged a number of the discrete features that encapsulated individual aural rehabilitation profiles, including: the veteran's use of and their satisfaction with the performance of their hearing aid(s) (refer Brooks, 1989a); identified 'first ever' aid users and the length of time the veterans had been using their aid(s); gauged their feelings in relation to their hearing aid(s) (adapted from Brooks), the situations where they were likely to use their aid(s), the overall performance of their aid(s) in those situations, and their overall satisfaction with their aid(s) (on a five point scale); the veterans' experiences of tinnitus (adapted from The South Australian Hearing Study survey; Wilson, Walsh, Sanchez, & Read, 1998); their familial history of hearing losses, the types of problems that affected their aid(s) functioning properly, and the prescription and use of a single (monaural), or two aids (binaural).

PART 2 Section II – Questions profiling the aural rehabilitation service provision and utilisation: Questions asked when the veteran had first noticed they had difficulty hearing, when their current aid(s) was/were fitted; the identifying characteristics of their current aid(s); and how many years had passed since their hearing was last tested. Respondents provided feedback regarding their overall satisfaction with audiological service provisions since engaging in aural rehabilitation, in addition to the explanation the audiologist provided before and during the fitting for their current aid(s). A final series of questions probed the veterans' awareness of the main functions of the Hearing Association, whether they had personally contacted the association, and if so, the purpose for this contact, and how helpful this had been (questions adapted from Satherley, 1992).

PART 3 - Hearing Handicap: The 25-item Hearing Handicap Inventory for the elderly (HHIE; Ventry & Weinstein, 1982) was included in the MOS for all those respondents aged

65 years and older. The final question in PART 3 listing six areas of the veteran's life that may have been in the past, or are currently affected by their hearing losses were adapted from question 15 of the South Australia Hearing Study Questionnaire (Wilson et al., 1998). More details are provided about this question in the upcoming section on the dyadic partner's survey.

PART 4 – Health-related quality of life and emotional well-being: This part comprised four distinct elements, the first of which focused on the emotional well-being of the veterans over the week prior to completing the survey, encapsulated in their 15-item Geriatric Depression Scale (GDS-15) scores (Sheikh & Yesavage, 1986). The second element examined the veteran's current patterns of alcohol consumption; the third on the presence or absence of 16 long-term health problems; and the final element gathered information to profile the veterans' self-reported, health-related quality of life (H-QoL; depicted in eight SF-36 subscales and their associated mental and physical health composite scores; Ware, 1997).

PART 5 Social Support: This also comprised four different elements. Firstly, Wenger's (1994) eight question Network Assessment Instrument (NAI) classified patterns of responses into one of five different types of social networks (detailed descriptions of these different networks are provided later, in the section on the structural aspects of social support). Secondly, six questions measured the respondents' perceptions of the size and functional status of their emotional support network (Sarason et al., 1987). Thirdly, three questions adapted from the Assessment of Quality of Life (AQoL) instrument (refer Hawthorne, Richardson, Day, & McNeil, 2000) examined the links between social support, hearing losses, family roles and emotional engagement in relationships. Finally, three further questions extracted from the AQoL determined how functionally independent the veteran was, when performing three different types of activities of daily living (ADLs).

PART 6 - Memory in everyday life: These questions focussed on self-reported memory in everyday life (Crook & Larrabee, 1990), which comprised 18 'ability-to-remember' and 20 'frequency of forgetting' questions.

7.4.2 Similarities between the pilot and doctoral studies' survey booklets

Due to the considerable overlap between the content of the pilot study survey and that developed for the doctoral study, descriptive psychometric information already provided in the pilot study will not be repeated for the HHIE, frequency of hearing aid use, GDS-15 and SF-36 questionnaires; however, measures of internal consistency (summarised in the Cronbach alpha [α] coefficient) are reported for these scales, to reflect their psychometric properties within the context of the doctoral study's sample of 671 veterans and their dyadic partners.

The Hearing Handicap Inventory (HHI) and frequency of hearing aid use

Chapter Six has already reported that the HHI has demonstrated excellent internal consistency reliability, and high test-retest reliability (refer to Newman & Weinstein, 1988, 1989; Ventry & Weinstein, 1982, 1983; and Weinstein, Spitzer, & Ventry, 1986), in addition to validly indexing the benefits associated with hearing aid use (Newman & Weinstein, 1988). The doctoral study Cronbach α coefficient of 0.94 (n = 634) for the veterans' HHIE responses matched that of the pilot study sample (0.93, n = 46).

In order to calculate the veterans' equivalent HHIE 10 item screening version scores for comparison purposes with their partners' scores, the veterans' responses to questions 8, 10, 11, 20 and 21 were used to compute the equivalent HHIE-S social scale; and their responses to questions 2, 5, 9, 14 and 15 were used to compute the equivalent HHIE-S emotional scale).

A Cronbach α coefficient of 0.91 (N = 671 veterans) demonstrated strong internal consistency between Brooks' (1989a) three measures that gauged the frequency of the veterans' self-reported hearing aid use, which included their General Use (GU), Daily Use (DU), and Hourly Use (HU).

The Geriatric Depression Scale (GDS-15)

Almeida and Almeida's (1999) review of research applications that use the GDS-15 found acceptable test-retest reliability indexes, and noted Cronbach α coefficients around 0.80

where the scale's internal consistency had been evaluated. The pilot study's GDS-15 responses initially demonstrated poor homogeneity of items, as reflected in the Cronbach α coefficient of 0.30, but this improved considerably to 0.77 once question 13 ("Do you feel full of energy?") was removed from the list of items. On account of the small pilot study sample the researchers decided to retain this scale in the HARP main study. In the doctoral study veteran sample the Cronbach α coefficient for all 15 items was 0.72 (n = 671). As over half the veterans (n = 376, or 56%) also responded negatively to question 13, this question was temporarily dropped from the items, to discover if a similar improvement in the Cronbach α coefficient could be effected. However, in this instance the impact was minimal, with the 14 items yielding a coefficient of 0.71, and so all the items were retained.

Health-related quality of life (the SF-36)

Ware (1997) provides guidelines for administrators of the SF-36 which could not be adhered to in either the pilot or the doctoral studies, due to the self-report completion format of a comprehensive survey, structured to meet the specific research needs and priorities of both the HARP and the doctoral study hypotheses.

Table 7.3 (below) shows that veterans in the doctoral study sample yielded a comparable range of Cronbach α coefficients for seven of the eight SF-36 subscales reported in the pilot study; only the Mental Health (MH) subscale was markedly lower than the pilot study equivalent (α=.69 versus α=.84). Potential reasons for this are considered in the SF-36 results section in the next chapter. The S/P sample Cronbach α coefficients included in Table 7.3 yielded a very similar range of measures, with the differences between the Social Functioning subscales being the most pronounced.

7.4.3 Alcohol consumption and the presence of chronic health problems

Four questions modelled on a NZ Ministry of Health survey which profiled the health of the NZ population addressed the veteran's drinking patterns, including whether they drank alcohol; the daily frequency of their alcohol consumption in the past seven days; the amount of alcohol they consumed on a typical day when drinking; and the frequency they drank six or more drinks on one occasion. These questions were adapted from the alcohol consumption questions in the NZ Health Survey 1996-97 General Health Questionnaire (refer p. 284, Ministry of Health, 1999a). The seven day time frame was specifically chosen to provide continuity with the preceding GDS-15 questions' focus on 'the past week.'

Table 7.3

Eight SF-36 health attribute subscales, with corresponding Cronbach alpha (α) coefficients for the doctoral study's veteran and spouse/partner (S/P) samples

SF-36 health attribute subscales	Veteran alpha coeff.[a] (α)	Veteran sample size (n)	S/P alpha coeff.[a] (α)	S/P sample size (n)
1. Physical Functioning	0.90	666	0.92	662
2. Role-Physical	0.88	662	0.90	664
3. Bodily Pain	0.91	663	0.89	664
4. General Health	0.82	664	0.84	660
5. Vitality	0.83	658	0.83	657
6. Social Functioning	0.81	666	0.85	668
7. Role-Emotional	0.84	655	0.84	661
8. Mental Health	0.69	662	0.72	658

[a] Cronbach's alpha (α) coefficient

Long-term health problems

The incidence of chronic health problems was assessed using a checklist of 16 common conditions (refer Flett, Millar, Long, & MacDonald, 1998). This question was framed so that veterans could indicate whether "a doctor, nurse or health care worker" had told them they had any of the 16 listed chronic conditions; conditions which they had, or would be likely to have, "for six months or more." Flett et al. developed this list from an existing checklist of serious medical conditions compiled by Belloc, Breslow, and Hochstim (1971), which they subsequently amended to include health problems mentioned in the NZ 1992-93 Household Health Survey.

7.4.4 Structural support: Wenger's support network typology

Wenger's (1994) measurement instrument for practitioner identification of network type evolved from a longitudinal study of ageing in North Wales, which concentrated on the role of social support networks. Wenger defines the support network "as all those people involved with an elderly person in a significant way: as a member of the household, in providing companionship, emotional support, instrumental help, advice or personal care or receiving any of these from the old person" (Wenger, 1994, p. 2). She notes research has demonstrated that older adults' searches for help or support to build their coping capacities as they age are shaped by the kinds of social networks they have. Furthermore, Wenger (1994) states: "Because the idea of a network emphasises relationships between people rather than groups or institutions, it is a particularly suitable tool in the search for understanding of the social ageing process where relationships are central" (p. 1).

The development of Wenger's Network Assessment Instrument (NAI)

Wenger's longitudinal study initially began using techniques based on McCallister and Fischer's (1978) survey methodology (cited in Wenger, 1995); an approach that focused on actual behaviour of network members (by referring to events that had already occurred), or the 'present inclinations' of the respondent (by asking who they *would* expect to act, or to whom they would turn for particular reasons). An analysis of respondent data elicited in this way identified structural characteristics of personal networks (such as size, membership, and geographic radius), and their correlates (Wenger, 1995).

Wenger's network typology emerged following a four-year intensive qualitative study of 30 people, aged over 80 years who lived in North Wales (Wenger, 1994). The eight questions comprising the NAI gauge three network characteristics viz.: boundedness of membership, frequency of contact, and geographic dispersion, which in turn establish three distinguishing features of five different types of network (Wenger, 1994) including (i) the availability of local close kin; (ii) the level of involvement of family, friends and neighbours; and (iii) the level of interaction with the community and voluntary groups. A scoring algorithm allocates points to one or more of the five network categories for each question (refer Wenger, 1994). Once all eight questions have been processed in this way, the scores for each of the five categories are summated, and the resulting profile examined to establish which network category has the highest total score. Wenger states that in 70% of cases there will be an obvious result; whilst in 25% the result will be borderline as the highest total will occur in two categories; and in approximately 5% of cases the results will be inconclusive. The name of each of the five distinct network types in Wenger's network typology encapsulates the relationship the older person has with their network. These five network types are described below, and depicted graphically in Figure 7.1.

A summary of Wenger's Support Network Types

Wenger's (1994) support network typology identifies the following five categories of support networks, each of which reflects differing adaptations of older adults and those to whom they relate who live in the community. For convenience, these networks are ranked using the same order as that in Figure 7.1:

1 ***Family Dependent (FD)*** support networks tend to be small, mainly focused on close family ties, with few peripheral friends and neighbours and minimal community involvement; nearly all the support needs for those in these networks, who are more likely to be both older and less healthy, are met by close family (usually an adult daughter).

2 ***Locally Integrated (LI)*** support networks are usually larger on average than the others, and typically enjoy close relationships with local family, friends, and neighbours, with many neighbours also being friends; they are generally based on long-term residence in a geographic location, and active involvement in community organisations in the present or recent past.

3 ***Local Self-Contained (LSC)*** support networks are smaller on average, and typically aloof, sustaining infrequent contact with at least one relative who resides in the same or neighbouring community (usually a sibling, niece/nephew as childlessness is common); community involvement tends to be low key, with reliance for help principally resting with neighbours, who may be approached with reluctance.

4 ***Wider Community focused (WC)*** support networks are larger than average, typified by absence of local kin, and active relationships with distant relatives (usually children); contact is made with friends and neighbours, but the distinction maintained; frequently associated with retirement migration, this network type is more commonly found amongst older adults who are either middle-class or skilled working class.

5 ***Private Restricted (PR)*** support networks are smaller than average, with an absence of local kin, minimal contact with neighbours, a low level of contact with the community, and in many cases may represent a lifelong adaptation of low social contact. Wenger notes that this network actually subsumes two subtypes: independent married couples and dependent older adults "who have withdrawn or become isolated from local involvement" (p. 4).

As Wenger's NAI was developed for use by practitioners conducting face-to-face interviews in clinical settings, there have been no published studies in the gerontological research literature that have examined the psychometric properties of this instrument used in a self-report, pencil and paper format. Adapting the NAI questions for use in NZ required transforming the first three questions' Imperial distances (expressed in miles) in the response format into kilometres, and including an additional option of living 'Outside New Zealand'. Thus respondents were offered a choice of the following seven-item response format for the first three questions which focus on distance from the source of support (e.g. question 1 asks "How far away, in distance, does your nearest child or other relative live?"): (A) No relatives; (B) Same house OR less than 2 kilometres (Km) away; (C) From 2 Km to less than 10 Km away; (D) From 10 Km to less than 30 Km away; (E) From 30 Km to less than 100 Km away; (F) 100 Km or more away within New Zealand; (G) Outside New Zealand.

The scoring algorithms used in SPSS, which followed Wenger' (1994) specifications, were modified to accommodate these adjustments.

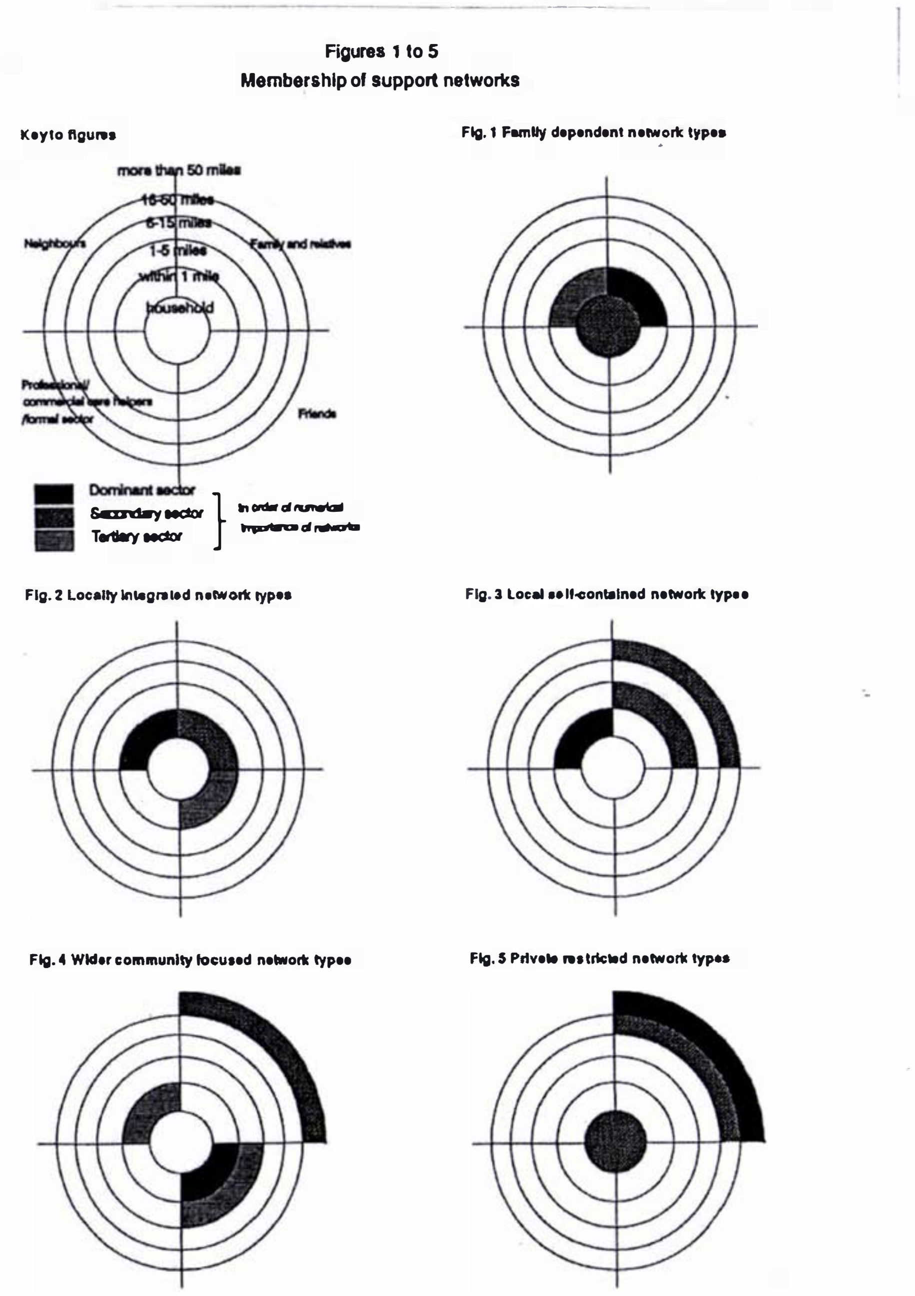
Litwin (1995) warns that whilst researchers frequently equate social networks with functional support networks, they can at times operate in a way that can be most unhelpful. For example, there is more opportunity for interpersonal conflict amongst those with more close friends and family members, than those who are more isolated (Cohen, Gottlieb and Underwood, 2000). Conflict linked with the veterans' perceptions of living with hearing handicap was assessed indirectly, through questions adapted from the AQoL that focused on their relationships in general, and in particular, disruptions to their family role (refer Hawthorne et al., 2000). As these questions were also included in the S/P MOS, more detailed descriptions are provided in the section focused on the impact of hearing handicap on the veteran's life.

7.4.5 Functional support: Sarason et al.'s perceived availability of emotional support

The brief form of the Social Support Questionnaire (SSQ - Sarason et al., 1987) was used to measure the veterans' perceptions of the size of their social support networks, and their perceived satisfaction with the availability of emotional support provided by their networks. The six item SSQ is a shortened version of the longer scale developed by Sarason, Levine, Basham, and Sarason (1983).

Each of the six items required a two-part response: Firstly, the respondent listed the initials of all the people (ranging from no-one to a maximum of nine) whom they could count on for support in a specific situation; and secondly, they rated their perceived level of satisfaction with the support those listed would provide, using a Likert scale that ranged from 1 (very satisfied) to 6 (very dissatisfied). This process yielded two scores, viz.: the size of the respondents' emotional support networks (SSQn) linked to those situations, calculated by averaging the total number of persons they listed for each item; and their perceived satisfaction with the availability of support those listed would provide (SSQs). The satisfaction scores were reversed before the average score was calculated, so that higher scores indicated greater satisfaction with the perceived availability of emotional support.

Between three and fifteen female respondents used generic statements in response to various SSQn questions (e.g. "everyone/everybody/several/dozens/many", "all my family", "friends", "church members", "faith/power of prayer", and "just get on with it").



Note: The following equivalent metric distances were substituted:

Same house OR < 2 KM away (within 1 mile); from 2 Km to < 10 Km away (1-5 miles); from 10 Km to < 30 Km away (5-15 miles); from 30 Km to < 100 Km away (15-50 miles); 100 Km or more away within New Zealand (more than 50 miles).

In addition "Outside New Zealand" was specified as the final option.

Figure 7.1. Wenger's support network typology – copied from Wenger, 1994, p. 6.

These statements and any missing responses were replaced with the modal value within each case where only two or three SSQ items were affected; however, for 55 veterans (8.2%) and 18 women (2.7%) where > 3 SSQ questions were affected, the independent dyadic partner sample item mean replacements were used. As a result, no missing data are reported in the SSQ results.

Sarason et al. (1987) reported robust internal reliability coefficients for both the SSQ6n and SSQ6s that ranged from 0.90 to 0.93, in their sample of college students. In the doctoral study, the veteran SSQ6n Cronbach α coefficient was 0.94 (n = 671); whereas the SSQ6s scale demonstrated less item homogeneity, with a Cronbach α coefficient of 0.77 (n = 671).

7.4.6 Functional independence performing activities of daily life

Three questions extracted from the AQoL gauged the levels of independence the veterans enjoyed in activities of daily life (Hawthorne et al., 2000). The first of these three questions focused on tasks related to personal care; the second on domestic tasks "such as preparing food, gardening, housework or cleaning the car"; and the final question on the veteran's mobility around their home and community. The Likert scale response format ranged from "I need no help at all" (1) to "I need daily help" (4). These scores were reversed prior to analysis in the SPSS dataset, so that the higher scores reflected greater levels of independence.

7.4.7 Self-reported memory in everyday life

Crook and Larrabee's (1990) Memory Assessment Clinic Self-Report Scale or MAC-S was designed and validated to assess memory complaints in relation to everyday memory performance (Larrabee, West, & Crook, 1991). The MAC-S consists of two subscales, the first being the 18-item 'ability to remember' subscale, which includes statements related to specific information (such as "My ability to remember the name of a person just introduced to me is ...."). Responses ranged from 1 (very poor) to 5 (very good). The second subscale includes 20 items that assess the 'frequency of forgetting' (with items such as "Have difficulty recalling a word I wish to use"). These responses ranged from 1 (very often) to 5 (very rarely).

Larrabee et al. (1991) state that overall the MAC-S avoided confounding depression with memory self-evaluation. In the doctoral study sample both subscales demonstrated excellent internal consistency (Cronbach α coefficients of 0.92; $n = 579$ for the 'ability to remember' subscale and $n = 330$ for the 'frequency of forgetting' subscale); however, there were an average of three times the number of responses missing in the 'frequency of forgetting' subscale items.

The HARP protocol required that a sub-sample of the main study participants who resided in the Lower North Island were interviewed, to assess their cognition and memory face-to-face, using Teng and Chui's (1987) 'Modified Mini-Mental State (3MS)' questionnaire (Blakey, Alpass, Pachana, & Long, 2002a). Subsequently, a correlational matrix explored the empirical links of these 240 veterans' 3MS item responses with their self-reported memory in everyday life responses (Blakey, Alpass, Pachana, & Long, 2002b). Although there were fewer significant correlations between the 3MS and five frequency of forgetting factors, the 'General Forgetfulness' factor recorded the two highest correlations in the array. As a result, it was decided to focus only on the Section II frequency of forgetting questions in the doctoral study analysis, and subject these 20 questions to a principal components analysis.

7.5 Veterans' hearing impairment

As in the pilot study, signed consent from the veterans enabled the researcher to secure their most recent bilateral hearing assessment details, from their medical records held in NZWP's Hamilton office (referred to as their NAL% HL; Macrae, 1976). The NAL% HL data indexed the veterans' actual bi-lateral hearing impairment.

7.6 Measures: The spouse/partner survey

The 19-page spouse/partner (S/P) mail out survey comprised four different parts. An accompanying letter asked the respondent to answer all the questions, and advised that completion of the survey would probably take about 15 minutes. (Refer Appendix C.)

7.6.1 Structure and content

A brief catalogue of the range of questions in each of the four part S/P MOS follows:

PART 1 - Socio-demographic details and perceptions of the veteran's hearing handicap: A range of questions modelled on the veteran's survey asked about the participant's age, gender, ethnicity, retirement status, current or previous occupational status in the work force, educational qualifications. Respondents were also asked if they had a hearing problem; whilst five further questions gauged their perceptions of the impact of hearing impairment on the veteran's life. (Details of these questions are provided below.)

PART 2 – Spouse screening version of the Hearing Handicap Inventory for the Elderly (HHIE-S SP): Spousal perceptions of the social and emotional consequences of living with hearing handicap were gauged using the 10-item HHIE-S SP (Newman & Weinstein, 1986, 1988).

PART 3 - Social support: As in the veteran's survey, questions included: Wenger's (1994) NAI; and Sarason et al.'s (1987) perceptions of the size and functional status of the S/P's emotional support network.

PART 4 - S/P's health-related quality of life and emotional well-being: Questions gauged the S/P's self-reported H-QoL over the past four weeks encapsulated in the eight SF-36 subscales and their associated mental and physical health composite scores (Ware, 1997); and their emotional well-being over the week prior to completing the survey, encapsulated in their GDS-15 responses (Sheikh & Yesavage, 1986). The final question asked the respondent to indicate their relationship to the veteran by circling the appropriate word from a list of 13; 'spouse' was the first word in this list, and 'partner' the second.

7.6.2 Perceptions of the impact of hearing losses on the veteran's life

Four questions at the end of PART 1 in the S/P MOS related to the S/P's perceptions of the impact of hearing impairment on the veteran's life and social relationships; the final question in PART 1 focused on the S/P's perceptions of the relative importance of five different situations where the veterans were likely to use their hearing aid(s). All five questions were also included in the MOS, in order to secure comparable responses to these questions from each partner in the respondent dyads.

Perceptions of the impact of hearing handicap on the veteran's life and social relationships

Respondents were asked to indicate how often six specific areas of the veteran's life had been affected in the past, or may be currently affected, as a result of the veteran's hearing losses (adapted from question of the South Australian Hearing Study Questionnaire; Wilson et al., 1998). Responses were chosen from a five point Likert response key, which ranged from never (=1) to all the time (=5). The six areas mentioned included the veteran's working life, social life, family life, and recreational life; how often their hearing losses made the veteran feel depressed, and how often it had created physical pain and suffering for the veteran.

A further three questions that were adapted from the AQoL (Hawthorne et al., 2000), gauged the relationships the veteran has with other people in general; but in particular, the specific impact of hearing losses on the veteran's relationship with their family and their emotional relationships with others. A four point Likert response key for these three questions ranged from plenty of friends and never lonely / family role unaffected / very close and warm relationships (=1), to socially isolated and feels lonely / cannot carry out any part of family role / not close and warm relationships (=4). Scores for the first two questions were reversed prior to analysis in the SPSS dataset, so that the higher scores reflected greater social connectedness / the least disruption to family roles. The question that focused on emotional relationships was reversed and recalibrated to include the 'unchanged' response option as the midpoint within a five point Likert scale: 'not close and warm' (=1), seldom close and warm (=2), 'unchanged' (=3), 'sometimes close and warm' (= 4), and 'very close and warm' (=5).

Perceptions of the relative importance of situations where the veterans use their hearing aid(s)

The final question asked the S/P to rank five different listening situations where the veteran was likely to use their aids, in the order that the veteran considered to be important, from most important (=1) to least important (=5). (This question was adapted from Brooks [1989a], to secure the S/P's perspectives.) The five situations included (i) in person to person conversation; (ii) in a group of family or friends at home; (iii) listening to music; (i) listening to TV (or radio) news; and (iv) with a group of people in noisy conditions (i.e.

club, bus, pub, etc.). These responses were also reversed within the SPSS dataset, prior to analysis, so that the least important situation was ranked as one, and the most important as five.

Perceptions of the veteran's hearing handicap: The 'significant other' HHIE screening tool

Noble (2002) states that the HHIE (Ventry & Weinstein, 1982) and its adaptation for spouses (the HHIE-S [SP]; Newman & Weinstein, 1986) have previously been used in the appraisal of hearing aid benefit. For example, Newman and Weinstein (1988) have suggested that unchanged or more pronounced discrepancies in perceptions of hearing handicap between hearing aid users and their spouses, one year after being fitted with hearing aids, could identify those couples who might benefit from aural rehabilitation counselling sessions. They also stress that whilst the construct validity of the HHIE is sound, it is less than desirable to wait a year before gathering pre- and post-hearing aid fitting responses to the HHIE; especially where older adults are facing other age-related losses and disabilities. Although the doctoral study research design did not collect pre- and post-fitting responses as referred to by Newman and Weinstein, the cross-sectional responses to the survey booklets provided an opportunity to examine the differences in the perceptions of the veterans' hearing handicap by including the full 25-item HHIE in the survey, and the 10-item screening version for their spouse/partner (HHIE-S [SP]) in the S/P survey (as recommended by the American Speech-Language-Hearing Association, 1997).

Instructions at the start of the HHIE-S (SP) requested that respondents identify problems they might have observed in relation to the veteran's hearing losses, by ticking the words 'Yes', 'Sometimes' or 'No' in response to the 10 questions in the scale. In each question the word 'your spouse' was replaced with the phrase 'the main respondent,' to allow for significant others who were not spouses (e.g. partners, siblings, and adult children). Apart from this adaptation, the 10 items mimicked the original HHIE-S (Sever, Harry, & Rittenhouse, 1989), which was composed of five questions that focused on problematic social situations (e.g. "Do you feel that any difficulty with hearing limits or hampers the main respondent's personal or social life?"); and five questions that focused on emotional difficulties (e.g. "Does a hearing problem cause the main respondent to feel frustrated when talking to members of your family?"). 'No' responses scored 0; 'Sometimes' scored 2; and 'Yes' scored 4. All 10 items were selected from the 25 items in the original scale; scores were summated to provide totals ranging from 0 to 40, with the higher scores indicating evidence of more pronounced handicap.

Lichtenstein, Bess, and Logan (1988) indicate that a HHIE-S raw score range between 0-8 is indicative of no handicap; 10-24 shows mild-moderate handicap; and 26-40 severe handicap. It is instructive to note that there was no directive in either the veteran's or their S/P's survey that they should respond to the HHIE questions considering how the veteran hears with or without their aid(s). Thus in both instances, the perceptions of the veterans' hearing handicap may or may not have included the potentially ameliorating benefits of hearing aid use.

Wark and Boheme (1999) report that the published literature indicates paper-and-pencil self-report formats of the HHIE yield higher handicap scores and lower reliability coefficients. The Cronbach α coefficients for their sample of 134 older adults (average age 71 years) for the 25 item HHIE was 0.93; and for the 10 item HHIE-S this dropped to 0.82. The doctoral study α coefficients replicated these observations: The veterans' HHIE α coefficient was 0.94 (n = 634), while their partners' HHIE-S (SP) α coefficient was 0.86 (n = 667).

No published studies have specifically examined the validity of the HHIE-S SP as a screening tool; however, between 1997 and 1999, the Australian Blue Mountains Hearing Study validated the use of HHIE-S scores against the gold standard of pure-tone audiometry, in a sample of 2015 older adults (aged 55-99 years). The authors reported the HHIE-S performed slightly better in younger than older subjects, and for those with moderate hearing impairment (Sindhusake, Mitchell, Smith, Golding, Newall, Hartley, et al., 2001).

7.6.3 Assessing the structural and functional features of social support networks

The S/P survey included the same instruments to assess their social support, namely: Wenger's (1994) NAI to identify the structural dimensions of their support networks; and Sarason et al.'s (1987) SSQ6, to gauge the perceived availability of emotional support that characterise the different types of Wenger support networks. The Cronbach α coefficient for the SSQ6n was 0.95 (n = 629), and the associated SSQ6s scale 0.96 (n = 652).

7.6.4 Health-related quality of life and emotional well-being

The eight SF-36 (Ware, 1997) subscales provided profiles of the S/Ps' H-QoL. Table 7.3 (above) reflects that the S/Ps' range of Cronbach α coefficients for these eight subscales (0.72 to 0.92) were comparable to those obtained for the veteran responses. Clearly the Mental Health subscales were the least internally consistent for both the veterans and their dyadic partners.

The GDS-15 (Sheikh & Yesavage, 1986) gauged the S/Ps' emotional well-being by establishing the presence of depressive symptoms. The Cronbach α coefficient for all 15 items in this scale was 0.77 ($n = 644$).

7.7 Coding and data entry

Two final year undergraduate students coded the booklets; responses were then entered into separate text files by an experienced, competent stenographer. These text files were imported into previously defined SPSS files, and then merged into one dataset.

CHAPTER EIGHT: RESULTS

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Chapter Eight addresses each of the four research aims (articulated in Chapter One) with their associated hypotheses (presented in Chapter Six), and begins by setting out the respondent inclusion criteria, data screening and subsequent four stage data analysis. Statistical summaries describe the main respondent (MR) veteran and spouse/partner (S/P) samples, and a range of associated psychosocial variables. Factor analyses summarise the Wenger support network and self-report frequency of forgetting memory responses, and analyses of variance examine sociodemographic differences across Wenger's support networks to determine the relationships of sex and type of support networks to the respondents' perceived emotional support and their reported frequency of depressive symptoms. The generic conceptual model of Ageing with Hearing Handicap (refer Figure 6.1) guides the selection of clusters of independent variables (IVs) to include in correlational matrices. These matrices explore significant bivariate associations between six blocks of biopsychosocial variables and three dependent variables (DVs) of interest, namely the veterans' self-reported: (i) Hearing Handicap (HH); (ii) Physical health-related quality of life (PH-QoL); and (iii) Mental health-related quality of life (MH-QoL). The first three IV blocks comprise predisposing sociodemographic, reinforcing structural support, and *dis/enabling functional support variables; however, the composition and sequencing of the remaining IV blocks differ, depending on whether the analysis focuses on the veterans' HH, as opposed to their PH-QoL or MH-QoL. The correlation matrices for these three DVs guide the selection of appropriate IVs within each of the six blocks, for subsequent entry into three hierarchical regression analyses that explore their multivariate links with the veterans' self-reported HH, PH-QoL, and MH-QoL.*

8.1 Data screening and analyses

Prior to the computer-based data screening, a small, random selection of main respondent (MR) and spouse/partner (S/P) survey booklets were inspected by the author. This inspection examined the accuracy and consistency of two independent coders, who followed complementary coding protocols for questions common to both dyadic partners' mail out survey (MOS) booklets. No coding irregularities or discrepancies were detected.

8.1.1 Respondent inclusion criteria

Two independent SPSS data files were created (using SPSS version 10.1.3): one file comprised the 804 veteran responses; and the other file the responses of the veterans' dyadic partners. The study inclusion criteria selected male veterans aged 65 years and older who had responded with a female dyadic partner living in the same household. Applying these criteria yielded a cohort of 703 respondent dyads (veterans' mean age = 79.26 years, *SD* = 4.47; S/Ps' mean age 74.44 years, *SD* = 6.09). These two files were then merged to form one SPSS data file comprising 703 dyadic cases. Following further inspection for missing data, 32 dyads (4.6%) were identified with substantial missing social support variable responses. Once these cases were withdrawn, 671 co-dependent dyadic partners (i.e. residing in the same household) remained in the dataset (i.e. 48.7% of the HARP sample, which had secured a 47.3% positive response rate). In order to undertake principal components analysis of all the participants' responses to Wenger's network assessment instrument, and the subsequent analyses of variance of salient variables common to both dyadic partners, a file comprising 1342 independent dyadic partners was also compiled.

8.1.2 Missing data and variable transformations

Initially all the salient veteran and S/P variables were screened for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analyses, using recommended SPSS analytical tools (refer Tabachnick & Fidell, 2001a). In most cases, missing data are included in the initial descriptive statistical summaries; however, where the proportion of missing values was very small, the data were imputed. This was achieved either by using the respective variable's mean value (as recommended by Tabachnick & Fidell), or by following relevant scoring algorithm instructions for specific scales (such as Ware's [1997] SF-36). Sample sizes fluctuate accordingly, as the missing data varied across the respondents.

The specific instances where the scoring was reversed or the total scores were inverted during transformation are noted in the text. All positively or negatively skewed variables were transformed using the appropriate statistical formulae (specified by Tabachnick & Fidell, 2001a). Within the respondent dataset the following independent variables (IVs) were transformed because they were positively skewed: the veterans' percentage bi-lateral hearing losses, the total number of people that veterans listed available to provide emotional support to them, and the total number of both long-term conditions and depressive symptoms that veterans reported; the self-reported gauge of the veterans' independence performing three different activities of daily living, and the total number of female dyadic partners' self-reported depressive symptoms; the veterans' appraisals of the performance of their hearing aids in noise, the frequency that veterans reported their hearing losses had made them depressed, and had also affected their social, family, and recreational lives.

Similarly, the following negatively skewed variables were transformed for both dyadic partners: Their Wenger Community Focus (WCF) and Family Focus (WFF) component scores, satisfaction with the perceived availability of emotional support, and SF-36 Mental Component Summary (MCS) scores. In addition, the following veteran variables were also transformed: The veterans' relationships with others and associated feelings of loneliness, the impact of their hearing losses on the veterans' perceived social agency within their family roles, their reported daily use of their hearing aids, their overall level of satisfaction with their audiological services, and finally their SF-36 Physical Functioning (PF), General Health (GH), Vitality (VT), Social Functioning (SF), Emotional Role (RE) and Mental Health (MH) subscale scores.

8.1.3 Data analyses

The data analyses were undertaken in four stages (refer to Appendix D's Table D.2 which provides a descriptive summary of the statistical procedures used; and Table D.3 which lists the research aims, their associated hypotheses and statistical outcomes):

First, descriptive statistics summarised the following variables: Demographic features of the male veteran and female dyadic partner samples; veteran perspectives of their hearing handicap and aural rehabilitation; female dyadic partner perspectives of their husband/partner's hearing handicap; both dyadic partners' structural and functional features of social support; and the independent health-related profiles of both dyadic partners. In all cases untransformed means and standard deviations are reported for ease of interpretation, and the incidence of missing data noted.

Second, factor analyses were used to aggregate the independent dyadic partners' social network support features (Wenger, 1994) into two components for each dyadic partner; and to reduce the number of 'memory in everyday life' items (Crook & Larrabee, 1990) to three components. These results are reported alongside the descriptive frequencies of the respective variables.

Third, tests of significant differences between groups were undertaken, including proportional difference tests (*z* scores), chi-square (χ^2) tests, *t* tests, and analyses of variance (ANOVAs) to locate significant differences on key variable means between the dyadic partner samples, or between/across the group means of specific variables of interest within the dyadic sample (such as gender and different types of Wenger [1994] social support networks). All post-hoc comparisons report the exact *p* values of the results without adjusting the alpha levels (as recommended by Rothman, 1986). Where the Levene's test detected unequal error variance between variables, post-hoc pairwise comparisons were made using the conservative Tamhane's T2 procedure.

Finally, bivariate correlational matrices illustrated the empirical associations within the transformed dataset, prior to conducting regression analyses which explored the relative impact of selected predisposing, reinforcing, dis/enabling, exacerbating and stigmatising IVs on the three health-related quality of life (H-QoL) dependent variables (DVs) of interest, namely the veterans' self-reported: (i) Hearing Handicap (i.e. HHIE total scores); (ii) Physical H-QoL (i.e. SF-36 Physical Component Summary – PCS scores); and (iii) Mental H-QoL (SF-36 Mental Component Summary - MCS scores).

Checks for multivariate outliers within the dataset revealed that three veteran cases met the χ^2 $p<.001$ criterion for Mahalanobis distances when a regression analysis examined the empirical links between the veterans' IVs and their self-reported hearing handicap (HH). Similarly, two dyadic partner cases were identified in relation to empirical links between the dyadic partner dataset and the veterans' physical H-QoL (PH-QoL); and 12 dyadic partner cases were identified as outliers when empirical links were explored between the dyadic partner dataset and the veterans' mental H-QoL (MH-QoL). For each regression analysis the respective outlying case(s) were subsequently excluded from the models that are reported.

Effect sizes are reported using the eta squared ($\acute{\eta}^2$) estimation, together with the probability values that establish the relative practical significance of each result. The effect size gauges the magnitude of the difference between means (Tabachnick & Fidell, 2001a). Cohen's (1988) guidelines recommend interpreting the magnitude of the $\acute{\eta}^2$ statistic as follows: .01 is a small effect; .06 is a moderate effect; and .14 is a large effect.

8.2 The main respondent veteran sample

Details of the main respondents' (MRs') social demographic characteristics, their military service, attributions regarding how they lost their hearing and their current hearing impairment levels are summarised in the tables, and discussed in the text of the following three sections. The terms 'veteran' and 'MR' are used interchangeably throughout this chapter.

8.2.1 Social demographic profiles

Table 8.1 presents details of the veteran sample's demographic variables. The veterans' ages ranged from 65.60 to 96.02 years. Most veterans (*n*=523 or 77.9%) were in the 75-84 year old age range cohort. The majority of veterans identified as New Zealanders of European descent (96.6%).

Four in every five dyads lived in the North Island (NI), with just under half of these respondents residing in the lower NI. Just over half the veterans (51.6%) reported that they lived in main urban areas; over a third (36.6%) indicated they lived in minor or secondary urban areas; whilst the smallest group (11.8%) lived in rural areas/centres. Nearly all the veterans in the sample (95.2%) lived with their spouse/partner (S/P) only; while the remainder lived with their spouse and family (4.8%), or in other circumstances. Just over a quarter of the veterans (27.4%) indicated their highest educational qualification was the equivalent of a school certificate pass; another quarter (25.6%) reported they had a trade and/or professional qualification; and just under a quarter (24.6%) had no school qualifications. Of the remaining group, 10.7% indicated they had a university qualification; slightly less (9.7%) had University Entrance and above; whilst 13 veterans (1.9%) did not complete the question on education.

Table 8.2 summarises socio-economic status information. Most veterans reported that they were retired (97%). Only 17 veterans indicated they were not retired (2.5%), whilst three did not specify their retirement status. Occupational categories were coded according to the specifications of the New Zealand (NZ) Standard Classification of Occupations (Department of Statistics, 1999), used in the NZ census. The largest group (*n*=115 or 17.1%) identified having a 'Professional' occupational category. More than half the veteran sample identified occupational categories that are traditionally *not* associated with hazardous noise exposure (58.7% in the first five categories); whilst just over a third of the total sample (35.6%) were involved in occupational categories with higher risks of occupational noise exposure (including 29.5% associated with agricultural, fisheries, and trades workers and 6.1% with machine operators and assemblers, and elementary occupations; refer to Hinchcliffe's [2002a, 2002b, 2002c] publications regarding exposure to hazardous occupational noise levels in Nigeria and the UK, and those related to the debate regarding estimating occupational noise exposure risks in the US which include: Prince, Stayner, Smith, & Gilbert [1997 & 1998]).

Table 8.1
Summary of the veteran main respondents' demographic information (*N*=671)

Variables	Number of respondents	Percentage of respondents
1. Age:		
(Mean = 79.23 years; *SD* = 4.50; Range = 30.42 years)		
65-74 years old	87	13.0
75-84 years old	523	77.9
85+ years old	61	9.1
2. Ethnicity:		
New Zealander of European descent	648	96.6
New Zealander of European & Mäori descent	8	1.2
New Zealander of Mäori descent	5	.8
Not specified	10	1.5
3. Residential location:		
Main urban area (pop. of 30,000 or more)	346	51.6
Minor/Secondary urban area (pop. 1-30,000)	246	36.6
Rural area/centre (pop. < 1000)	79	11.8
4. Household composition[a]:		
Live with spouse/partner only	639	95.2
Live with spouse & family	32	4.8
Live with other adults	3	.5
Live in a rest home	4	.6
Other living arrangements (with 1 relative/in a retirement village)	2	.3
5. Education:		
No school qualification	165	24.6
School certificate passes	184	27.4
University Entrance +	65	9.7
Trade & /or professional qualification	172	25.6
University degree/diploma/certificate	72	10.7
Not specified	13	1.9

[a] *Respondent numbers exceed 671 as some respondents selected more than one response.*

The average gross annual income of veterans who completed the income question was \$20,597 (*SD*=\$15,780); whilst the average gross annual contributions from others in their households was somewhat less (*M*=\$15,394; *SD*=\$11,345). In both cases, the income range \$10,000-\$20,000 yielded the highest frequency of responses. Ninety-seven veterans (14.5%) failed to specify *any* details regarding their gross total annual income; and double that number (196 or 29.2%) left the question related to financial contributions from other members of their household blank.

Table 8.2
Summary of the veterans' occupational status and annual income (*N*=671)

Variables	Number of respondents	Percentage of respondents
1. Retirement status:		
Retired	651	97.0
Not retired	17	2.5
Not specified	3	.4
2. Occupational categories (before retirement/current):		
i Legislators, administrators & managers	79	11.8
ii Professionals	115	17.1
iii Technicians & associated professionals	72	10.7
iv Clerks	51	7.6
v Service & sales workers	77	11.5
vi Agriculture & fisheries workers	100	14.9
vii Trades workers	98	14.6
viii Plant & machinery operators & assemblers	30	4.5
ix Elementary occupations	11	1.6
Not specified	38	5.7
3. Veteran's total pre-tax annual income: (Mean = $20,597; *SD* = $15,780; Range = $179,000)		
≤$10,000	69	10.3
>$10,000 - $20,000	318	47.4
>$20,000 - $30,000	118	17.6
>$30,000 - $40,000	41	6.1
>$40,000 - $50,000	11	1.6
>$50,000	17	2.5
Not specified	97	14.5
4. Others' total pre-tax annual income contributions to the household: (Mean = $15,394; *SD* = $11,345; Range = $109,000)		
≤$10,000	176	26.2
>$10,000 - $20,000	220	32.8
>$20,000 - $30,000	51	7.6
>$30,000 - $40,000	12	1.8
>$40,000 - $50,000	6	.9
>$50,000	10	1.5
Not specified	196	29.2

8.2.2 Military service profiles

Military service details are presented in Table 8.3. Almost 80% of the veterans (*n*=526) served in only one of four service branches (i.e. NZ Army, RNZ Air Force, RNZ Navy, or 'Other branch'). Of the 145 remaining veterans, 130 indicated they had served in two branches, 10 in three branches, and one in four branches. Four veterans did not specify in which branch they had served. Two thirds of the sample reported that they had served in the NZ Army (*n*=454); over one third reported they had served in the RNZ Air Force (*n*=245); whilst only 66 (9.8%) veterans had served in the RNZ Navy, and 55 (8.2%) had served in one of the 'Other' branches. Appendix E presents summary social demographic profiles of veterans within each branch of service.

Table 8.3
Summary of the veterans' military service details (*N*=671)

Variables	Number of respondents	Percentage of respondents
1. Branch of service[a]:		
NZ Army	454	67.7
RNZ Air Force	245	36.5
RNZ Navy	66	9.8
Other branches[b]	55	8.2
2. Combinations of service branches:		
NZ Army & RNZ Air Force	89	13.3
NZ Army & RNZ Navy	16	2.4
NZ Army & Other branches	16	2.4
RNZ Air Force & RNZ Navy	2	.3
RNZ Air Force & Other branches	34	5.1
RNZ Navy & Other branches	9	1.3

[a] *145 MRs (21.6%) served in two or more branches, so the total exceeds N=671.*

[b] ***These included:** British Army, Fleet Air Arm, Merchant Navy, NZ Police Force, NZ Post Office, Royal Air Force, Royal Canadian Air force, Royal Marines, & Royal Navy.*

8.2.3 Hearing losses

Information about how the veterans' hearing *first* became impaired and their current levels of hearing impairment is summarised in Table 8.4. Of the 645 (96.1%) veterans who indicated how their hearing was first impaired, the majority (420) cited 'ammunition explosion'; however, a quarter of respondents also referred to 'engine noise'. The remaining five reasons only accounted for 7.7% (*n*=52) of respondents' descriptions of how their hearing *first* became impaired.

Table 8.4

Summary of veterans' attributions of their hearing losses and current NAL% HL scores (*N*=671)

Variables		Number of respondents	Percentage of respondents
1. How veterans' hearing first became impaired:			
i	Ammunition explosion	420	62.6
ii	Engine noise	173	25.8
iii	Miscellaneous work noises	20	3.0
iv	Flying (non-engine noise)	12	1.8
v	Biological/chemical	10	1.5
vi	Accident	7	1.0
vii	Machinery noise	3	0.4
Not specified		26	3.9
2. NAL% HL (categorized into quintile groups): (Mean = 40.07%; *SD* = 19.43; Range = 94.70)			
0% to 20%		84	12.5
>20% to 40%		261	38.9
>40% to 60%		178	26.5
>60% to 80%		63	9.4
>80% to 100%		27	4.0
Not specified		58	8.6

The veterans' pure-tone audiometric test data were converted into percentage bi-lateral hearing losses scores, using an algorithm developed in Australia's National Acoustic Laboratories (NAL) that also takes into account normative age-related hearing losses (see Macrae, 1976). These scores are subsequently referred to as NAL% HL scores. Fifty eight (8.6%) veterans' NAL% HL scores could not be secured, due to their NZ War Pensions' records either being unavailable from the archives; or available, but with recent audiological reports missing. The average NAL% HL for the 613 veterans whose scores were present was 40.06 (*SD*=19.43) and ranged from 5.3% to 100.0%. Nearly two thirds of veterans' NAL% HL scores (65.4%) were within the >20% to 60% range, which is indicative of moderate to moderately severe hearing impairment. Eighty four veterans (12.5%) with an average age of 76.72 years (*SD*=4.56) showed evidence of mild hearing impairment (≤ 20%); and 90 veterans (13.4%) with an average age of

80.44 years (*SD*=4.79) exhibited severe or profound hearing impairment (>60% NAL% HL).

8.3 The dyadic spouse/partner respondent sample

Details of the 671 female spouse/partners' (S/Ps') social demographic characteristics are summarised in two tables, and discussed in the text of this section.

8.3.1 Social demographic profiles

Table 8.5 presents details of the S/P sample's demographic variables. Respondents' ages ranged from 50 to 89 years ($M = 74.43$ years; $SD = 6.16$), which was on average 4.8 years younger than the veterans; a difference that was statistically significant (t [1228.67] = 16.28, $p<.001$). A similar number of women identified as New Zealanders of European descent ($n = 642$); 16 women identified as New Zealanders of Mäori descent, and nine as New Zealanders of European *and* Mäori descent. In addition, 23 women selected 'Other ethnicity,' which included English/British (9), Australian (7), Scottish (2), and European (1).

On the whole, the women reported lower levels of educational attainment than the veterans. One third (33.7%) of women indicated they had no school qualifications; nearly a third (31.1%) reported that they had the equivalent of school certificate passes; whilst those in the remaining third were most likely to have a trade or professional qualification (17.1%). Forty-three women (6.4%) indicated they had university qualifications; and eight (1.2%) did not complete the question on education. When the educational attainment variable was collapsed into three levels (viz.: no school qualifications; only school qualifications; and post school qualifications), a chi-square (χ^2) test revealed a statistically significant difference in the educational attainment levels between the veterans and their dyadic partners (χ^2 [2, $N = 1342$] = 29.68, $p<.001$). As respondent dyads resided in the same household, details related to their residential location and household composition were presented previously, in Table 8.1. In addition, the 22.2% (n=149) of women who indicated they had hearing problems were significantly older (t [643] = 2.57, p=.01) than those who reported that they did not.

Table 8.6 summarises the women's retirement status, and their past (if retired) or current occupational categories. Most of the women reported that they were retired (93.9%). Unlike the veterans, whose occupational categories were reasonably evenly distributed across six of the categories, the women clustered in two occupational categories: 'service and sales workers' (39.2%), and 'clerks' (23.2%).

Table 8.5

Summary of spouse/partner respondents' demographic information (*N*=671)

Variables		Number of respondents	Percentage of respondents
1. Age:			
(Mean = 74.43 years; *SD* = 6.16; Range = 39.00 years)			
50-64 years old		54	8.1
65-74 years old		234	34.9
75-84 years old		368	54.8
85+ years old		15	2.2
2. Relationship of spouse/partner:			
Spouse	(*M* age = 74.57; *SD* = 6.11)	651	97.0
Partner	(*M* age = 69.80; *SD* = 6.38)	20	3.0
3. Ethnicity[a]:			
New Zealander of European descent		642	95.7
New Zealander of Mäori descent		16	2.4
New Zealander of European & Mäori descent		9	1.3
Other ethnicity		23	3.4
4. Education:			
No school qualification		226	33.7
School certificate passes		209	31.1
University Entrance +		70	10.4
Trade & /or professional qualification		115	17.1
University degree/diploma/certificate		43	6.4
Not specified		8	1.2
5. Does the spouse/partner currently have a hearing problem?			
No	(*M* age = 74.02; *SD* = 6.33)	496	73.9
Yes	(*M* age = 75.50; *SD* = 5.54)	149	22.2
Not specified	(*M* age = 76.12; *SD* = 5.34)	26	3.9

[a] *Respondent numbers exceed 671 as some respondents selected more than one response.*

There were no questions related to the women's gross annual income; however, as veterans reported gross annual contributions from others in their households was on average \$15,394 (*SD* = \$11,345), this figure offers a potential proxy index of the dyadic partners' gross annual income; although 29.2% of veterans failed to respond to this question (refer Table 8.2).

Table 8.6
Summary of spouse/partners' occupational status categories (*N*=671)

Variables		Number of respondents	Percentage of respondents
1. Retirement status:			
Retired		630	93.9
Not retired		41	6.1
2. Occupational categories (before retirement/current):			
i	Legislators, administrators & managers	37	5.5
ii	Professionals	95	14.2
iii	Technicians & associated professionals	46	6.9
iv	Clerks	156	23.2
v	Service & sales workers	263	39.2
vi	Agriculture & fisheries workers	22	3.3
vii	Trades workers	19	2.8
viii	Plant & machinery operators & assemblers	15	2.2
ix	Elementary occupations	4	0.6
Not specified		14	2.1

8.4 Veterans' perspectives of their hearing handicap and aural rehabilitation experiences

The preceding sections provide contextual details for those that follow, which describe the veterans' perceptions of ageing with noise-induced hearing losses (NIHL) and tinnitus, and thereby address the first research aim.

8.4.1 Case history notes

Of the 389 veterans (58.0%) who reported the year they first noticed difficulty hearing, more than half indicated this had occurred within the past 40 years; nearly a quarter (23.3%) recorded this had occurred between 40 and 55 years ago; and a further 21.3% stated it had occurred during WWII, which was between 55 and 60 years ago.

It was possible to calculate the duration between the date when veterans remembered first becoming aware they had difficulty hearing, and subsequently became engaged in aural rehabilitation for 380 respondents (56.6%). These veterans waited 20 years on average (*SD* = 17.27; range 57 years) before seeking help for their communication difficulties. The 162 veterans who had waited up to 10 years were at least 15 years younger on average when they sought help (*M* age when first engaged in aural rehabilitation = 64.13 years; *SD*=13.90), than the 68 respondents who had waited over 40 years (*M* age = 79.90 years; *SD* = 4.01). These 68 veterans were not only significantly older (*t* [220.007] = -7.134, *p*<.001) when they acquired their first hearing aids, but also reported more pronounced hearing handicap (Hearing Handicap Inventory [HHIE] total *M* = 43.59; *SD* = 20.66), despite the fact that their levels of hearing impairment (NAL% HL *M*= 36.23; *SD* = 16.47) were significantly lower (*t* [228] = 2.03, *p*=.044) than the 162 veterans who only waited 10 years or less (NAL% HL *M* = 41.95; *SD* = 20.73).

8.4.2 Living with the legacy of hearing handicap

The veterans' Hearing Handicap Inventory (HHIE) scores are depicted in Table 8.7. The sample mean for the HHIE social subscale (HHIEs) was higher and displayed less variance (*M* = 22.36; *SD* = 10.72) than that of the emotional subscale (HHIEe) total (*M* = 20.61; *SD* = 12.66). In all cases the actual range of scores reflected the full range available.

Table 8.7

Summary of veterans' HHIE scores following substitution of missing data (*N*=671)

Scale	Mean	*SD*	Range (of actual scores)
HHIEs (Range 0 to 48)	22.36	10.72	48
HHIEe (Range 0 to 52)	20.61	12.66	52
HHIE total (Range 0 to 100)	42.97	22.43	100

Veterans were asked to indicate how much of the time their hearing losses had affected six different areas of their life (ranging from 'never' = 1 to 'all the time' = 5). Eighty three percent of respondents reported that their hearing losses had affected their social life to some extent. Similarly, 72.6% reported that their family life had been affected; 62.6% their recreational life; and 56% their working life. Only 6.9% reported that their hearing losses had made them depressed; and 4% that it had caused them pain and suffering.

A further survey question asked specifically about the impact of the veteran's hearing losses on their ability to carry out their role in their family. Forty-two percent of respondents acknowledged that their hearing losses had at some stage restricted the roles they fulfilled in their family.

Over half the veterans indicated that they enjoyed very close and warm relationships in general (with their spouse/partner, relatives, and/or friends) in spite of their hearing losses; and just over a quarter that their relationships were unchanged by their hearing losses. Of the remaining veterans, 128 (19.1%) indicated that their relationships were only sometimes close and warm, and 18 (2.7%) that they were seldom close and warm, due to their hearing losses. Finally, three veterans reported that their relationships were never close and warm, due to their hearing losses.

8.4.3 Tinnitus

Three quarters of the veteran sample ($n = 496$) reported they had experienced tinnitus at some stage; slightly fewer indicated that they *still* heard tinnitus noises ($n = 478$ or 71.2%), with just over half stating that the noises lasted longer than five minutes ($n = 343$ or 51.1%), and nearly one third ($n = 221$) that they heard these noises most or all of the time.

Nearly forty percent of respondents ($n = 264$) reported that when their tinnitus noises were at their worst, they were moderately or severely annoying, while 169 veterans (25.2%) indicated that they were slightly annoying. Only 39 respondents (5.8%) stated that tinnitus noises were not at all annoying. Whilst over half of the 472 veterans ($n = 275$ or 58.3%) who responded to the question in relation to tinnitus preventing them from sleeping indicated this was never a problem; for 27 veterans (5.7% of $n = 472$) tinnitus prevented them from sleeping at least half or more of the time; and a further 170 veterans (36% of $n = 472$) reported that sometimes their tinnitus prevented them from sleeping.

The next two sections depict aspects of the veterans' aural rehabilitation coping trajectories.

8.4.4 Aural rehabilitation services

Over half the veteran sample ($n = 344$ or 51.3%) reported their hearing had been tested within the past two years; 24.9% within the past three or four years; while for 114 veterans (17%) their hearing had been tested over four years ago. Forty six veterans (6.9%) either could not remember when their hearing had last been tested, or did not complete this question.

Audiological services

Respondents were asked to rate their satisfaction with the overall services provided by their audiologist, using a scale where totally dissatisfied was 1 and totally satisfied 5. Only 58 veterans (9.7%) indicated that they were slightly or extremely dissatisfied with the overall services provided by their audiologist. The general level of satisfaction with audiological service provisions ($M = 3.76$; $SD = 0.97$; range = 4.0) was reflected in the veterans' recommendations for service improvement, as 10% of veterans indicated that no further improvement was needed. However, 55 veterans (8.2%) suggested that audiologists needed to improve their communication/service delivery.

The Hearing Association New Zealand Te Kähui Rongo o Aotearoa (HANZ)

Eighty percent of veterans ($n = 541$) indicated that they had heard of the 'Hearing Association' (i.e. the Hearing Association New Zealand Te Kähui Rongo o Aotearoa, which will subsequently be referred to as HANZ). The five most frequently cited sources of this information included: NZ War Pensions (NZWP - 21.3%); the Royal NZ Returned and Services' Association (RSA - 21.3%); their audiologist (18.7%); a friend (11.2%) and the newspaper (10.6%).

Just over half the veteran sample (344 or 51.3%) reported that they had contacted the HANZ; however, 12.5% of veterans did not answer this question. The main reasons for contacting the HANZ are listed in Table 8.8, and account for more than three quarters of the 439 reasons cited.

Finally, nearly all those who had contacted the HANZ rated the association as helpful; almost a quarter (163 veterans) stated the organisation was very helpful, and 15.2% (102 veterans) that it was extremely helpful.

Table 8.8

Rank ordered list of reasons for contacting a branch of the Hearing Association New Zealand Te Kähui Rongo o Aotearoa (cited by 328 veterans)

	Reasons	1st reason: MR numbers *(% of n=328)*	2nd reason: MR numbers *(% of n=96)*	3rd reason: MR numbers *(% of n=15)*
1	To secure batteries	97 *(29.6)*	12 *(12.5)*	1 *(6.7)*
2	For a hearing test	38 *(11.6)*	3 *(3.1)*	
3	For advice / information	36 *(11.0)*	16 *(16.7)*	4 *(26.7)*
4	For hearing aid repairs / servicing	31 *(9.5)*	21 *(21.9)*	1 *(6.7)*
5	Due to referral from elsewhere	26 *(7.9)*	6 *(6.3)*	
6	To get help for hearing difficulties	23 *(7.0)*	1 *(1.0)*	
7	To apply for (unspecified) help	17 *(5.2)*	6 *(6.3)*	

8.4.5 Hearing aids: Use and performance

The median and modal number of months that veterans reported they had been using hearing aids (120 months or 10 years) was less than the mean (M = 148 months; SD = 123.23; range 6 to 648 months). One third of the veteran sample (n = 231 or 34.4%) self-identified they were 'first time' hearing aid users, three quarters of whom reported using their aids for 72 months (six years) or less. Whilst most veterans stated their hearing aids were fully funded by NZWP, 126 respondents (18.8%) indicated that they had paid more for higher technology aids.

Table 8.9

Self-reported frequencies of veterans' daily hearing aid use (DU for N=671)

Frequency of use	Number of respondents	Percentage of N=671	Cumulative percentage
Never	22	3.3	3.3
Only short periods	63	9.4	12.7
Less than half the day	84	12.5	25.2
About half the day	99	14.8	40.0
Most of the day	155	23.1	63.1
All day long	242	36.1	99.2
Not specified	6	.9	100

Although three survey questions focused on different aspects of hearing aid use (i.e. *general* hearing aid use; *daily* hearing aid use; and *hourly* hearing aid use), these results focus specifically on the patterns of *daily* use [DU], as they reflect the differences in adherence across the full spectrum of less (i.e. first time) to more experienced users. The veteran sample's mean DU indicated that on average veterans used their aids between half to most of the day (M = 3.55, SD = 1.48). Table 8.9 shows that nearly 60% of all veterans wore their aids most or all day long, while only 22 veterans (3.3%) reported that they never used their aids and six veterans (0.9%) did not respond to this question.

Veterans ranked five different situations where they were likely to use their aids, in order of their importance to them. 'Person to person conversation' emerged as the most important situation for 401 veterans (59.8%). This was followed by 'listening to TV (or radio) news', 'in a group of family or friends at home', 'listening to music', and 'with a group of people in noisy conditions'. After ranking these situations, respondents were asked to rate the overall performance of their aid(s) in each of the situations, from useless (1) to very good (5). Figure 8.1 compares the ratings of the three situations that involve interactions with other people across five NAL% HL quintile levels (0-20%, 20-40%, etc.). The data demonstrate succinctly the limitations of assistive listening technologies' capacities to compensate for the losses of normal hearing, listening and comprehending capacities in these older veterans, especially in noisy places and group situations.

Finally, veterans were asked to assess their overall satisfaction with their hearing aids on a five point scale from 'Totally Dissatisfied' (1) to 'Totally Satisfied' (5). The mean satisfaction rating for the entire sample was 3.47 (SD = 0.94).

Three hypotheses addressed the different aural rehabilitation coping trajectories and hearing health profiles of the 233 (34.7%) veterans who identified that they were first time users of hearing aid technology, in comparison with the remaining two thirds of the veteran sample (n=438) who were more experienced users. Although the veterans in these two groups were generally the same age (M = 79 years), the experienced users had been more than 10 years younger on average when fitted with their first hearing aids (i.e. 63.2 years versus 73.8 years), and reported having used the technology for three times longer on average than the first time users (i.e. 16 years versus 5.5 years). These two groups also differed significantly in terms of both the veterans' actual hearing losses (experienced users *M* NAL% HL of 44.07% versus 32.55% for first-time users; *t* [583.323] = -8.65, *p*<.001) and their self-reported hearing handicap (experienced users *M* HHIE of 46.11 versus 37.07; *t* [669] = 5.06, *p*<.001).

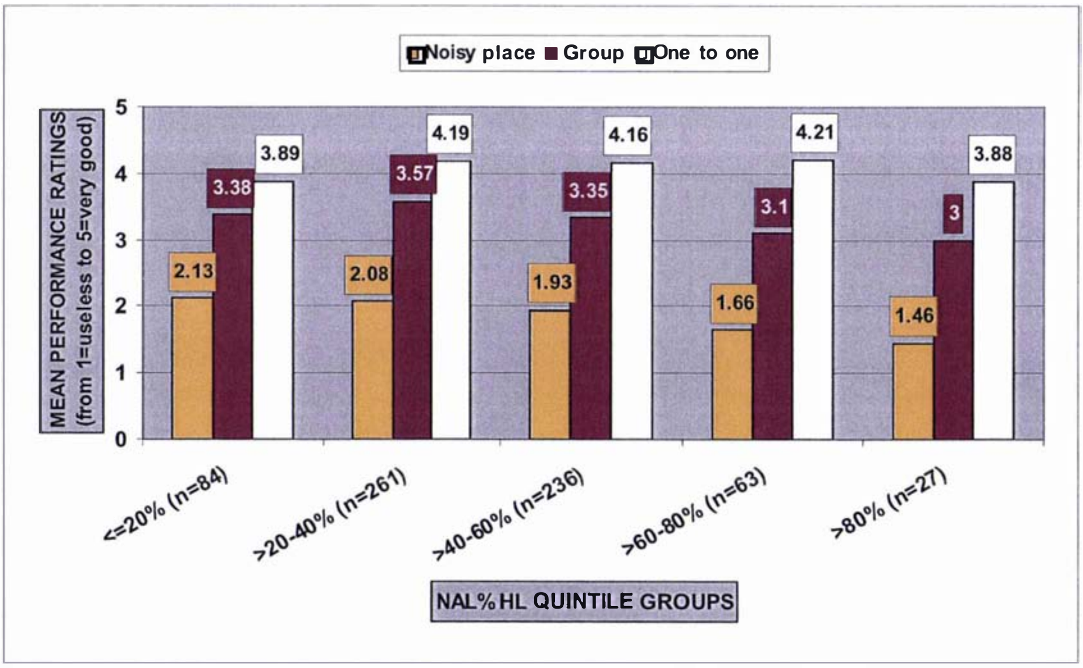


Figure 8.1. Mean ratings of hearing aid performance in three different situations (viz. noise, in a group, and one-to-one), across five NAL% HL quintile levels (*N*=671).

Given these differences, **Hypothesis 1** predicted that significantly more experienced hearing aid users will have had their hearing tested more recently (i.e. within the past two years). The results confirmed this prediction, as only 38.6% (*n* = 90) of the first time users indicated that they had visited an audiologist within the past two years to have their hearing tested, in comparison with 58% (*n* = 254) of the more experienced users (*z* = -4.78, *p*<.0001). In addition, an independent samples t-test between the veterans' appraisals of satisfaction with their hearing aids revealed that experienced users were significantly more satisfied with the performance of their hearing aids (experienced users' *M* overall satisfaction = 3.53 versus 3.36; *t* [410.54] = 2.13, *p*=.034). Those results confirmed **Hypothesis 2**, which predicted that first time users would be significantly less satisfied with the overall performance of their aids. Furthermore, **Hypothesis 3**, which predicted that significantly more first time users would be likely to wear their aids for only half a day or less, was also confirmed. In fact the proportion of first time users who only wore their aids for half a day or less (*n*=136 or 58.4%) was nearly double that of the experienced users (*n* = 132 or 30.1%), who were more likely to report that they used their aids for longer than half a day (*z* = 7.11, *p*<.0001).

8.5 Spouse/partners' perspectives of the veterans' hearing handicap

Describing and comparing dyadic partner perspectives of the veterans' hearing handicap addresses the second research aim.

8.5.1 Appraisals of the veterans' hearing handicap

The 10-question spouse screening version of the Hearing Handicap Inventory (HHIE-S [SP]) gauged spousal appraisals of the social and emotional consequences of their partners' hearing handicap (refer Newman & Weinstein, 1986; 1988). Three further questions (identical to those asked of the veterans) focused on spousal perceptions of the legacy of living with hearing handicap on their husbands' lives.

The women's HHIE-S (SP) scores are depicted in Table 8.10, alongside the equivalent veteran scores. The final column presents significance levels of the *t* tests conducted to determine if the dyadic partner appraisals of the veterans' hearing handicap were significantly different. Female spouses' ratings of the social implications of their partner's hearing handicap were significantly higher than their partners (*t* [1334] = -7.28, *p*<.001). Although the partners' appraisals of the emotional impact of hearing losses were similar, the difference between their total scores was statistically significant (*t* [1331] = -4.75, *p*<.001).

Table 8.10
Comparisons between the S/P and veteran samples' mean HHIE-S scores (*N*=671)

Scale	S/Ps' Mean *(SD)*	Veterans' Mean *(SD)*	*t* test significance
HHIE-S (social subscale)	13.23 *(4.86)*	11.29 *(4.81)*	*p*<.001
HHIE-S (emotional subscale)	10.61 *(5.12)*	10.13 *(4.96)*	not significant
HHIE-S (total)	23.84 *(9.35)*	21.43 *(9.11)*	*p*<.001

8.5.2 Appraisals of the legacy of living with hearing handicap on the veterans' lives

Female respondents indicated how much of the time six different areas of their partner's life "may have been affected in the past, or may currently be affected by their hearing loss" (ranging from 'never' = 1 to 'all the time' = 5). The three most highly significant proportional differences between the independent dyadic partners' appraisals are depicted in Table 8.11's first three entries, which illustrate that between 14.6% and 22.1% more women reported that hearing losses had affected a particular aspect of their partners' lives from half to all the time. The most pronounced differences occurred in relation to the impact on the veterans' family lives (22.1% more women reported this; refer to item 1) and their social lives (reported by 20.4% more women; refer to item 2); however, 14.6% more women also noted the impact of hearing losses on the veterans' recreational lives (item 3). These results confirm **Hypothesis 4**, which stated that a significantly greater proportion of women in comparison with their dyadic partners will report that hearing losses affect their partners' family, social and recreational lives.

Table 8.11

Comparisons between the independent dyadic partners' perceptions of the impact of hearing losses (HL) on the veterans' lives and roles within their families (respondent numbers relative to *N*=671 dyads)

Areas of veterans' lives affected by their HL:	**Number (%) of *N*=671**		***z* scores with significance tests**	
	Veterans	**S/Ps**	***z***	***p***
1) Family lives (affected ≥ half the time)	127 *(18.9%)*	275 *(41.0%)*	-9.66	<.0001
Total respondent pool	664 *(99.0%)*	624 *(93.0%)*		
2) Social lives (affected ≥ half the time)	191 *(28.5%)*	328 *(48.9%)*	-8.55	<.0001
Total respondent pool	664 *(99.0%)*	630 *(93.9%)*		
3) Recreational lives (affected ≥ half the time)	129 *(19.2%)*	227 *(33.8%)*	-7.42	<.0001
Total respondent pool	661 *(98.5%)*	590 *(87.9%)*		
4) Veterans' family roles affected	280 *(41.7%)*	364 *(54.3%)*	-4.56	<.0001
Total respondent pool	663 *(98.8%)*	665 *(99.1%)*		

Given these significant differences, it is unsurprising that 12.6% more women also reported their partners' actual roles in their families were currently affected by their hearing losses. This statistically significant proportional difference between the dyadic partners' appraisals of the veterans' social agency within their families confirms **Hypothesis 5,** which predicted that a significantly greater proportion of women would report that their partners' roles in their families are affected by their hearing losses (refer item 4 in Table 8.11).

Table 8.12

Comparisons between the independent dyadic partners' appraisals of the impact of hearing losses (HL) on the veterans' relationships in general and the veterans' emotional well-being (respondent numbers relative to *N*=671 dyads)

Veterans' relationships and their HL:	**Number (%) of *N*=671**		**z scores with significance tests**	
	Veterans	**S/Ps**	***z***	***p***
1) Veterans' relationships remain warm despite their HL	468 *(69.8%)*	387 *(57.7%)*	4.74	<.0001
Total respondent pool	664 *(99.0%)*	667 *(99.4%)*		
2) Veterans' relationships unchanged by their HL	175 *(26.1%)*	242 *(36.1%)*	-3.90	<.0001
Total respondent pool	664 *(99.0%)*	667 *(99.4%)*		
3) Veterans' relationships less warm due to HL	21 *(3.1%)*	38 *(5.7%)*	-2.25	=.0124
Total respondent pool	664 *(99.0%)*	667 *(99.4%)*		
HL & depression:				
4) Veterans depressed by their HL (affected ≥ half the time)	46 *(6.9%)*	70 *(10.4%)*	-3.09	<.001
Total respondent pool	662 *(98.7%)*	580 *(86.4%)*		
5) Veterans never depressed by their HL	431 *(64.2%)*	255 *(38.0%)*	7.48	<.0001

Although significantly more veterans (12.1% more) reported that their relationships (with their spouse/partner, relatives, and/or friends) were in general 'very close and warm' despite their hearing losses, 10% more women perceived that they were unchanged (refer to items 1 & 2 in Table 8.12). However, a significantly larger proportion of the 59 respondents who indicated that relationships *had* been affected at least half the time by hearing losses were women (refer item 3, Table 8.12). Of these 38 women, 31 reported that their husbands/partners' relationships were 'seldom close and warm' (versus 18 veterans); whilst seven women stated their husbands' relationships were 'never close and warm' because of their hearing losses (versus 3 veterans). These results confirm **Hypothesis 6**, which predicted that a significantly greater proportion of women in comparison with their dyadic partners would report that the veterans' hearing losses affect their interpersonal relationships.

Table 8.12 also shows that female dyadic partners were one and a half times more likely to report that hearing losses had made their partners depressed at least half the time (refer item 4); whereas the veterans were significantly more likely to state that their hearing losses had never made them depressed (refer item 5). These results confirm **Hypothesis 7**, which predicted that a significantly greater proportion of women in comparison with veterans would report that hearing losses made the veterans depressed.

In summary, disruptions to the hearing impaired veterans' social agency were particularly noticeable in the dyadic partner appraisals of the veterans' reduced efficacy fulfilling their family roles, and in the associated emotional constraints on their partners' relationships and emotional well-being. These perceptual differences highlight the importance of gauging *both* dyadic partners' perspectives in aural rehabilitation interventions.

8.6 Structural support: Dyadic partners' support networks

The following three sections focus on the third research aim, beginning with a description of the structural features of the dyadic partners' social support networks as a prelude to reviewing their associated functional implications. These results begin by comparing the composition of the independent dyadic partners' support networks. A principal components analysis (PCA) aggregates Wenger's (1994) Network Assessment Instrument (NAI) responses into two factors across both dyadic partner samples (i.e. for $N = 1342$). Finally, sociodemographic and hearing loss profiles that characterise the typical features within each independent respondent sample are depicted across the five 'pure' Wenger support network types.

8.6.1 Applying Wenger's support network typology

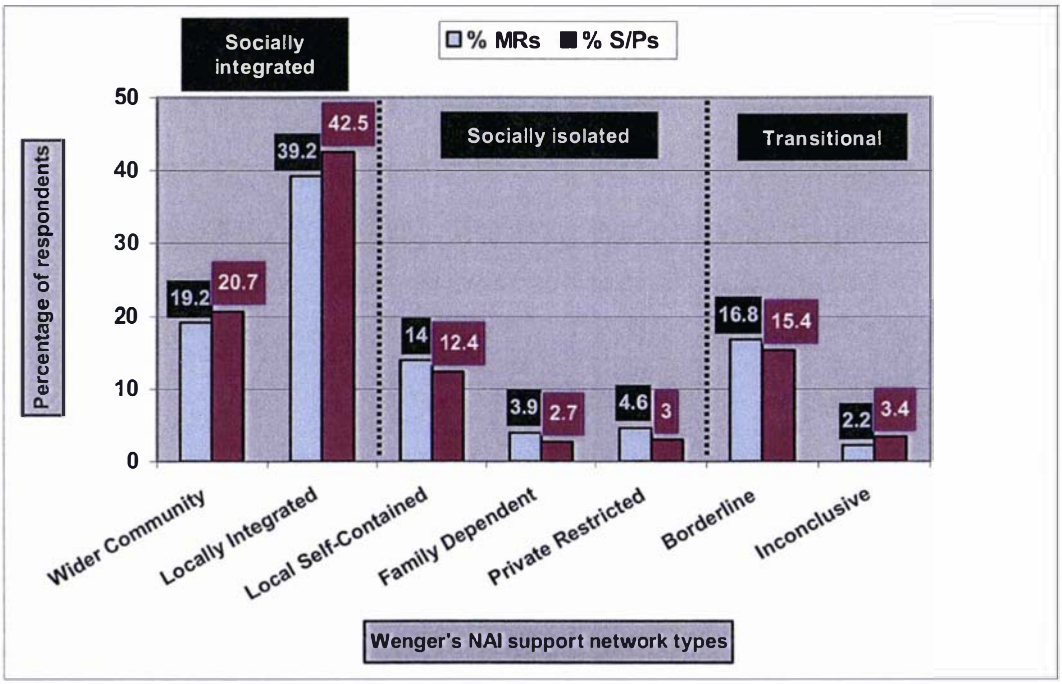
The results reported in this section reflect the prevalence of different types of support networks in the independent (i.e. male and female) dyadic partner samples.

Independent veteran and S/P samples' support networks

In the veteran sample, just over 80% (*n* = 543) of respondents' support networks were classified as 'pure' Wenger support network types; 113 (16.8%) as borderline (BL), and 15 (2.2%) as inconclusive (IN) network types. Similarly, 545 (81.2%) spousal dyadic partners' support networks were classified as one of the five pure Wenger support network types; a further 103 (15.4%) were classified as BL, and 23 (3.4%) as IN network types.

Figure 8.2 compares the distribution of Wenger's support network types for the independent veteran and S/P samples along a continuum that places the two socially integrated pure support networks that are characterised by more frequent contact with their communities on the extreme left of the graph (i.e. Wider Community [WC] and Locally Integrated [LI] networks), and the three pure support network types that are more socially isolated and characterised by diminishing community contact (occasional to no contact) to their right (i.e. Local Self-Contained [LSC], Family Dependent [FD], and Private Restricted [PR] support networks). As this support network continuum is referred to frequently within these results, the network legend below Figure 8.2 provides a useful point of reference for the reader.

Four hundred and twenty four women (63.2%) as opposed to 392 (58.4%) veterans lived in socially integrated support networks; conversely, 151 (22.3%) veterans lived in socially isolated support networks, in comparison with 121 (18%) female dyadic partners. The proportion of socially integrated to socially isolated Wenger support networks between the independent dyadic partner samples was significantly different, as 4.8% more female dyadic partners resided in the socially integrated WC and LI support networks ($z = 3.02, p=.0013$). This result confirmed **Hypothesis 8**, which predicted that a significantly larger proportion of women in comparison with their partners would reside in socially integrated Wenger support networks; and conversely, that a significantly larger proportion of veterans would reside in socially isolated Wenger support networks, because of their socially isolating hearing losses.



LEGEND: WENGER'S SOCIALLY INTEGRATED TO SOCIALLY ISOLATED SUPPORT NETWORK CONTINUUM		
Socially integrated pure support networks	**Socially isolated pure support networks**	**Transitional networks**
Wider Community (WC)	Local Self-Contained (LSC)	Borderline (BL)
Locally Integrated (LI)	Family Dependent (FD)	Inconclusive (IN)
	Private Restricted (PR)	

Figure 8.2. Comparison of independent dyadic partners' distributions of Wenger's Network Assessment Instrument (NAI) support network types, across the socially integrated to isolated support network continuum (for N=671 dyadic partners).

Apart from this significantly different proportional distribution across Wenger's network continuum, Figure 8.2 illustrates the similarities between the independent dyadic partner samples in terms of their numbers of pure, borderline, and inconclusive support networks.

8.6.2 Principal components analysis of Wenger's Network Assessment Instrument responses

A principal components analysis (PCA) was conducted on Wenger's (1994) Network Assessment Instrument (NAI) item responses, to reduce them to a smaller set of underlying factors for later use in the multivariate analyses. In order to achieve this, a new SPSS file was created, comprising the eight Wenger NAI item responses for 1342 cases (i.e. both 671 dyadic partners). These data were scrutinised before conducting the PCA.

The correlation matrix revealed the presence of many coefficients of .3 and above; the Kaiser-Meyer-Oklin value was 0.68, which exceeded the recommended value of 0.6 (Coakes & Steed, 2001); and the Bartlett's Test of Sphericity (Bartlett, 1954; cited in Tabachnick & Fidell, 2001c) reached statistical significance. These three statistical characteristics in addition to the adequacy of the sample size supported the factorability of the Wenger NAI correlation matrix.

Principal components analysis revealed the presence of three components with eigenvalues exceeding 1 that explained 31.05%, 52.16%, and 65.26% of the accumulative total variance. An inspection of the screeplot revealed a clear break after the second component (refer to Appendix F), and consequently, it was decided to retain two components for further investigation. To aid in the interpretation of these two components, Varimax rotation was performed.

The rotated solution (presented in Table 8.13 below), which accounted for 52.16% of the total variance in the dataset, revealed that each component showed loadings in excess of .5 on three different Wenger NAI items. The Component 1 loadings were stronger and accounted for 31.04% of the explained variance, while the Component 2 loadings contributed 21.12% to the explained variance.

Table 8.13

Varimax rotation of two factor solution for 8 Wenger NAI items (N=1342 dyadic partners)[a]

Wenger NAI Questions		Wenger NAI Family Focus Factor	Wenger NAI Community Focus Factor	Total Variance %
Wenger Family Focus (WFF) Factor: (α=.86)				
Q1	Distance from nearest Child / other relative?	.917		
Q2	Distance from nearest child?	.906		
Q4	How often sees children or relatives to speak to?	.872		
Wenger Community Focus (WCF) Factor: (α=.49)				
Q5	How often chat/do something with friends?		.820	
Q6	How often chat/do something with neighbours?		.772	
Q8	How often attend meetings in the community?		.502	
Percentage variance		31.04	21.12	52.16

[a] *NOTE: Only loadings above .5 are displayed.*

Component 1 was named the Wenger Family Focus (WFF) factor, as it included two questions relating to the residential proximity of relatives and children, and one about the frequency of face-to-face contact with them. Component 2 was named the Wenger Community Focus (WCF) factor, as it included three questions that considered the frequency of meeting or doing something with friends, with neighbours, and attending meetings or social gatherings in the community. Question 3 (related to the residential proximity of siblings) and question 7 (which focussed on the frequency of attending religious meetings) were omitted, due to their weak factor loadings.

The Wenger factor scores were inverted by subtracting each score from a constant of seven, so that higher WFF scores represented more frequent contact with family members associated with closer residential proximity; and similarly, higher WCF scores reflected more frequent contact with community members. Neither the veterans' WFF scores (M = 3.99, SD = 0.99), nor their WCF scores (M = 3.96, SD = 1.03) were significantly different from those of their independent dyadic partners' scores (S/P WFF

M = 4.01, *SD* = 1.00; S/P WCF *M* = 4.04, *SD* = 0.97). The dyadic partners' WFF scores were more similar than their WCF scores, with the veterans' scores reflecting less community contact on the whole.

Table 8.14

Distribution of Wenger Family Focus (WFF) and Community Focus (WCF) mean factor scores for independent veteran and female dyadic partner samples across five 'pure' Wenger Support Network Types (total *n*=1088)

Variables:	**Five 'pure' Wenger Support Network Types (SNTs):**					
	Wider Com. (WC)	**Locally Integrated (LI)**	**Lcl. Self Contained (LSC)**	**Family Depndnt. (FD)**	**Private Restrctd. (PR)**	**TOTAL of 5 'pure' SNTs**
Number of MRs	129	263	94	26	31	543
(% of n=671)	*(19.2%)*	*(39.2%)*	*(14.0%)*	*(3.9%)*	*(4.6%)*	*(80.9%)*
Number of S/Ps	139	285	83	18	20	545
(% of n=671)	*(20.7%)*	*(42.5%)*	*(12.4%)*	*(2.7%)*	*(3.0%)*	*(81.2%)*
TOTAL *n*	268	548	177	44	51	1088
(% of N=1342)	*(20.0%)*	*(40.8%)*	*(13.2%)*	*(3.3%)*	*(3.8%)*	*(81.1%)*
Wenger Family Focus (WFF) Factor scores:						
MR Mean	2.76	4.65	3.78	5.15	2.81	3.97
(SD)	*(0.43)*	*(0.47)*	*(0.53)*	*(0.42)*	*(0.80)*	*(0.98)*
S/P Mean	2.73	4.70	3.71	5.21	2.98	4.00
(SD)	*(0.50)*	*(0.49)*	*(0.60)*	*(0.41)*	*(1.18)*	*(1.03)*
Wenger Community Focus (WCF) Factor scores:						
MR Mean	4.42	4.43	3.28	2.66	2.57	4.04
(SD)	*(0.79)*	*(0.73)*	*(0.87)*	*(1.10)*	*(1.19)*	*(1.05)*
S/P Mean	4.33	4.44	3.31	2.81	2.49	4.12
(SD)	*(0.79)*	*(0.73)*	*(0.87)*	*(1.10)*	*(1.19)*	*(0.96)*

Whilst Wenger (1994) developed the NAI as a clinical tool to identify five different types of support networks, the PCA successfully condensed the dyadic partners' responses for subsequent use in regression analyses. Table 8.14 displays the dyadic partners' mean WFF and WCF factor scores across the five Wenger support networks. It is noticeable that the Wider Community (WC) and Private Restricted (PR) networks had the lowest mean WFF factor scores, whereas the highest mean WFF factor scores were associated with the Locally Integrated (LI) and Family Dependent (FD) networks. By contrast, the mean WCF factor scores appeared similar within the socially integrated

WC and LI networks, but declined steadily across the socially isolated network continuum. (Refer to Appendix G's typical network characteristics of pure and borderline Wenger support networks.)

8.6.3 Social demographic profiles across Wenger's support network continuum

The following section describes each respondent sample's typical sociodemographic profiles across Wenger's five pure support networks, in terms of five specific variables, namely: age, the veterans' percentage bi-lateral hearing losses and hearing handicap, their residential location and highest educational attainment.

Veterans' support networks' sociodemographic profiles

Table 8.15 presents the mean values with *SD*s that include sample mean substitutions for any missing values) for age, hearing losses (NAL% HL) and hearing handicap (HHIE total scores), across the veteran sample's five pure Wenger support network types ($n = 543$). These network types are purposely listed from left to right to depict those that are more socially integrated (as per the Figure 8.2 legend), in order to highlight any potential links between increasing age, levels of hearing impairment and handicap, and increasingly constricted social support networks.

Veterans in the Local Self-Contained (LSC) networks were the oldest on average; and those in the Family Dependent (FD) networks the youngest. In addition, the mean differences between veterans in the Wider Community (WC) and Private Restricted (PR) networks, in terms of both their hearing losses and their hearing handicap, were significant: NAL% HL $t\,(37.38) = -2.49, p{=}.017$; HHIE total $t\,(37.25) = -2.35, p{=}.024$.

Table 8.15

Veterans' typical sociodemographic profiles across five 'pure' Wenger support networks depicted along the socially integrated to isolated continuum (*n* = 543)

Variables:	Socially Integrated:		Socially Isolated Networks:		
	Wider Community (WC)	Locally Integrated (LI)	Local Self Contained (LSC)	Family Dependent (FD)	Private Restricted (PR)
Number of veterans	129	263	94	26	31
(% of n=543)	*(28.5)*	*(48.4)*	*(17.3)*	*(4.8)*	*(6.8)*
Mean age (yrs)	78.82	79.45	79.93	77.51	79.34
(SD)	*(4.64)*	*(4.13)*	*(4.98)*	*(5.29)*	*(5.19)*
Mean NAL% HL	37.42	39. 55	40.86	42.89	48.77
(SD)	*(16.83)*	*(18.18)*	*(17.12)*	*(22.43)*	*(24.01)*
Mean HHIE total	38.91	43.06	43.64	51.62	52.26
(SD)	*(20.60)*	*(21.51)*	*(22.86)*	*(25.25)*	*(28.83)*
Numbers of veterans who resided in peri-urban/rural locations:					
1. Peri-urban	108	242	79	19	27
(% of 543)	*(83.7)*	*(92.0)*	*(84.0)*	*(73.1)*	*(87.1)*
2. Rural	21	21	15	7	4
(% of 543)	*(16.3)*	*(8.0)*	*(16.0)*	*(26.9)*	*(12.9)*
Numbers of veterans' who reported their highest educational attainment as:					
1. Post school quals.	58	91	32	8	10
(% of 543)	*(45.0)*	*(34.6)*	*(34.0)*	*(30.8)*	*(32.3)*
2. Only school quals.	49	118	33	5	13
(% of 543)	*(38.0)*	*(44.9)*	*(35.1)*	*(19.2)*	*(41.9)*
3. No school quals.	22	54	29	13	8
(% of 543)	*(17.1)*	*(20.5)*	*(30.9)*	*(50.0)*	*(25.8)*

Table 8.15 also displays the relative frequencies across Wenger's five support networks of veterans residing in peri-urban (87.5%) and rural (12.5%) locations, and their highest level of educational attainment (36.6% reported they had post school qualifications; 40.1% had only school qualifications, and 23.2% no school qualifications). The veterans' highest educational attainment levels varied significantly across the support network types (χ^2 [8, *n* = 543] = 21.79, *p*=.005); as did their residential location (χ^2 [4, *n* = 543] = 12.54, *p*=.014). Veterans in Wider Community (WC) and Locally Integrated (LI) networks reported higher educational attainment levels, and those in LI networks were most likely to reside in peri-urban locations. By contrast, the veterans in

Family Dependent (FD) networks were younger on average, reported lower educational attainment levels, and a relatively higher proportion resided in rural areas.

Female dyadic partners' support networks' sociodemographic profiles

For comparison purposes, the presentation of the women's typical sociodemographic profiles across each of the five pure Wenger support network types (*n* = 545) replicates that of the veterans', as far as possible. In Table 8.16 the 10-item HHIE-S (SP) mean scores provide spousal perspectives that complement the veterans' self-reported experiences of hearing handicap, encapsulated in their 25-item HHIE scores.

Women in the Family Dependent (FD) networks were also the youngest respondents on average, while those in the Private Restricted (PR) networks were the oldest; and only the veteran partners' actual hearing losses were significantly different for women in Wider Community (WC) as opposed to those in Private Restricted (PR) networks (NAL% HL t [157] = -2.53, p=.012).

Table 8.16 also includes the percentage frequency of women who reported that they had a hearing problem at the time they completed their survey, alongside the relative frequencies of respondents' residential locations (89.2% resided in peri-urban areas) and their highest educational attainment levels (21.8% reported post school qualifications; 43.1% had only school qualifications; and 35.0% had no school qualifications). The younger women in the Family Dependent (FD) support networks reported the highest relative incidence of both hearing problems (*n* = 6 or 35%) and an absence of school qualifications (*n* = 10 or 55.6%). As in the veteran sample, spouses in the Wider Community (WC) networks were the most likely to have reported post-school education.

Table 8.16

Female spouse/partners' typical sociodemographic profiles across the five 'pure' Wenger support network types ($n = 545$)

Variables:	Socially Integrated:		Socially Isolated Networks:		
	Wider Community (WC)	Locally Integrated (LI)	Local Self Contained (LSC)	Family Dependent (FD)	Private Restricted (PR)
Number of S/Ps	139	285	83	18	20
(% of n=545)	*(25.5)*	*(52.3)*	*(15.2)*	*(3.3)*	*(3.7)*
Mean age (yrs)	74.52	74.64	74.65	73.44	75.10
(SD)	*(5.56)*	*(5.79)*	*(5.56)*	*(9.95)*	*(8.78)*
MRs' Mean NAL%	37.32	40.23	41.12	38.30	48.58
(SD)	*(17.57)*	*(18.45)*	*(18.47)*	*(20.03)*	*(22.51)*
MRs' Mean HHIE total	39.76	43. 63	43.69	43.22	48.70
(SD)	*(22.59)*	*(22.25)*	*(22.01)*	*(20.54)*	*(26.11)*
S/Ps' Mean HHIE-S	23.50	23.35	23.33	25.11	27.10
(SD)	*(9.30)*	*(9.38)*	*(9.73)*	*(8.84)*	*(10.00)*
Numbers of spouse/partners who reported hearing loss problems (HL):					
S/P with HL	28	67	19	6	5
(% of 545)	*(20.1)*	*(23.5)*	*(22.9)*	*(33.3)*	*(25.0)*
Numbers of spouse/partners who resided in peri-urban/rural locations:					
1. Peri-urban	124	258	70	16	18
(% of 545)	*(89.2)*	*(90.5)*	*(84.3)*	*(88.9)*	*(90.0)*
2. Rural	15	27	13	2	2
(% of 545)	*(10.8)*	*(9.5)*	*(15.7)*	*(11.1)*	*(10.0)*
Numbers of spouse/partners who reported their highest educational attainment as:					
1. Post school quals.	46	52	14	3	4
(% of 545)	*(33.1)*	*(18.2)*	*(16.9)*	*(16.7)*	*(20.0)*
2. Only school quals.	55	127	40	5	8
(% of 545)	*(39.6)*	*(44.6)*	*(48.2)*	*(27.8)*	*(40.0)*
3. No school quals.	38	106	29	10	8
(% of 545)	*(27.3)*	*(37.2)*	*(34.9)*	*(55.6)*	*(40.0)*

8.7 Functional support: Dyadic partners' perceptions of the availability of emotional support

This section continues to focus on the third research aim, describing the respondents' perceptions of the availability of emotional support, and their satisfaction with it (gauged by Sarason, Sarason, Shearin, & Pierce's [1987] Social Support Questionnaire [SSQ]). The section begins by depicting the perceptions of emotional support within each independent dyadic partner sample; and then focuses on the profiles of perceived emotional support across Wenger's support networks. Finally, analyses of variance explore if there are any significant differences in perceptions of emotional support between the male and female respondents, across the five pure Wenger support networks. Differences between the dyadic partners' perceptions of the veterans' feelings of loneliness across these support networks groups are also reported.

8.7.1 The veteran sample

The veterans listed an average of 3.4 people (*SD* = 2.24) who would be able to provide emotional support and help in six different situations; and reported that they were on the whole 'fairly satisfied' with the perceived support these people could provide (*M* = 5.66; *SD* = 0.57).

In addition, over two thirds of veterans (*n* = 453) indicated that they 'have plenty of friends' and were 'never lonely.' A quarter of veteran respondents (173) reported they were 'occasionally lonely'; 29 veterans (4.3%) reported they were 'often lonely for company,' and eight veterans stated they were 'socially isolated and feel lonely.' Eight veterans did not respond to this question.

8.7.2 The spouse/partner sample

Although in comparison with the veterans, the female dyadic partners listed significantly larger numbers of people available to provide them emotional support and help (*M* = 3.6; *SD* = 2.21; *t* [1340] = -1.96, *p*=.050), they were less satisfied than the veterans with the perceived availability of this support (*M* = 5.58; *SD* = 0.72); a difference that was also statistically significant (*t* [1328.958] = -2.29, *p*=.022). Although significant, these differences were comparatively small and confirmed **Hypotheses 9a** and **9b**, which predicted that although the veterans would list a smaller number of people available to provide emotional support (**9a**), they would be more satisfied than their dyadic partners with the perceived availability of emotional support within their networks (**9b**).

Eighty-six more female dyadic partners reported that their husbands were lonely. Of the 296 respondents (44.1%) who perceived this to be the case, 194 women (28.9%) indicated that their husbands were 'occasionally lonely'; 66 (4.3%) reported their husbands were 'often lonely for company'; and 36 indicated that their husbands were 'socially isolated' *and* lonely. Sixteen women (2.4%) did not respond to this question.

8.7.3 Perceived emotional support across Wenger's support network continuum

The ensuing analysis explores the respondents' perceptions of the availability of emotional support, focusing initially on the size of the respondents' emotional support networks and then on their perceived satisfaction with the availability of emotional support provided by those specific networks. In each case, a two-way analysis of variance examined the relative impact of the respondents' gender and the five different types of pure support networks on their self-reported perceptions of the availability of emotional support. Wenger's five pure support network types were ranked as before, from socially integrated to socially isolated support networks.

Variations in the perceived numbers of people available to provide emotional support across Wenger's five pure support networks

A two-way between groups analysis of variance (ANOVA) explored the impact of the respondents' gender and the five different support network types on the number of people respondents listed who could provide them with emotional support (denoted as SSQn; refer Figure 8.3). The SSQn mean distribution was normal; and the Levene's statistic revealed homogeneity of variance between the sample's groups. The output showed a highly significant main effect for the support network types ($F\,[4, 1087] = 11.85$, $p<.001$); but neither gender ($F\,[1, 1087] = 1.13$, $p=.288$), nor the interaction between the respondents' gender and their support networks ($F\,[4, 1087] = 1.07$, $p=.370$) achieved significance. The support network types' effect size was moderately small (partial $\eta^2 = .042$).

Multiple post-hoc pairwise comparisons were conducted using the conservative Tamhane's T2 Test (due to heterogeneity of variance). The results revealed that the number of people perceived available to provide emotional support by the 51 respondents in the Private Restricted (PR) support networks (*M* = 1.88, *SD* = 1.36) was significantly less (at $p<.001$) than those listed by respondents in the two socially integrated (Wide Community [WC] and Locally Integrated [LI]) and the Local Self-Contained (LSC) networks, but not significantly less than the numbers reported by respondents in the Family Dependent (FD) support networks (*M* = 2.9, *SD* = 2.19). The most pronounced pairwise difference with the respondents in the socially isolated PR networks occurred between the 548 respondents in the Locally Integrated (LI) support networks (*M* = 3.9, *SD* = 2.25; mean difference = -2.02, $p<.001$).

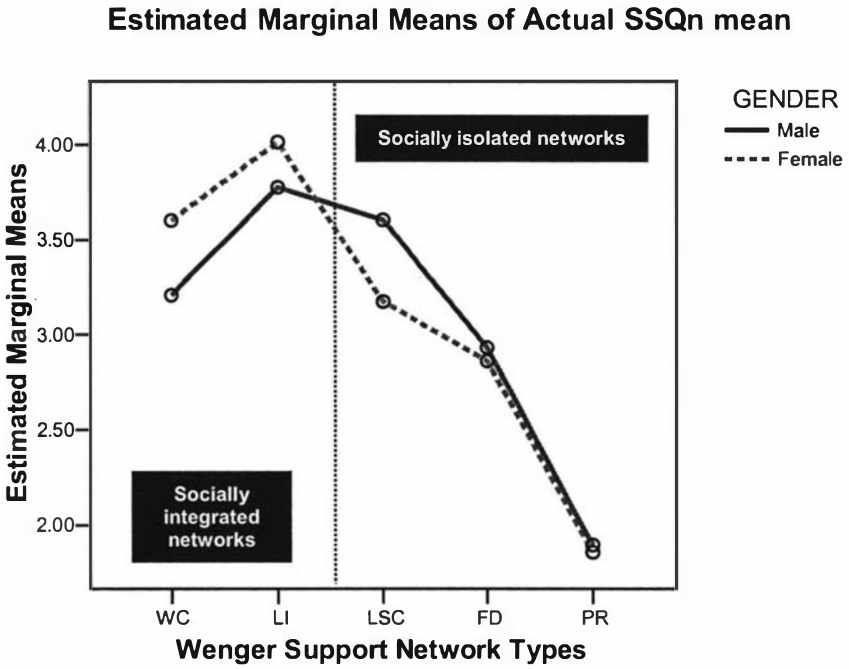


Figure 8.3 Comparisons between independent dyadic partners' mean total number of people they perceived were available to provide them emotional support, across five pure Wenger support networks, depicted along the socially integrated to isolated support network continuum (i.e. actual SSQn mean, for n=543 veterans and n=545 female partners).

These results confirmed **Hypothesis 10**, which predicted that respondents in Locally Integrated (LI) networks would furnish the largest perceived network of people available to provide emotional support in the six situations named in Sarason et al.'s (1987) SSQ, whilst those in Private Restricted (PR) support networks would list the least. In addition, the fact that the 51 respondents in the socially isolated PR support networks listed significantly fewer people than three of the four other pure network types gauges the extent of the social isolation experienced by respondents in these PR networks.

Figure 8.3 also illustrates that the small but nevertheless significant bivariate gender differences noted at the beginning of this section disappear when respondents in transitional networks are excluded from the analysis.

Variations in perceived satisfaction with the availability of emotional support across Wenger's support networks

A similar process of investigation was pursued when exploring the impact of the respondents' gender and their support network membership on their perceived satisfaction with the availability of emotional support (denoted as SSQs; refer Figure 8.4). The SSQs mean distribution was severely negatively skewed and transformed using a recommended logarithmic procedure (Tabachnik & Fidell, 2001a); these transformed scores were subsequently inverted, so that higher scores represented higher levels of perceived satisfaction. This procedure was only partially successful in reducing the skewness. The Levene's statistic revealed heterogeneity of variance in the dataset; thus the significant main effects for both the support network types (F [4, 1087] = 10.71, $p<.001$) and gender (F [1, 1087] = 4.97, $p=.026$) should be viewed with caution, as the distortion of the F-distribution could in fact render the results significant at an alpha level of only .10 (Coakes & Steed, 2001). A significant interaction also occurred between the respondents' network groups and gender (F [4, 1087] = 3.50, $p=.008$), which is clearly visible in Figure 8.4. The main effect size for the support network groups was moderately small (partial $\acute{\eta}^2 = .038$), but more pronounced than that of either the main effect of gender (partial $\acute{\eta}^2 = .005$), or the interaction effect of gender and support network types (partial $\acute{\eta}^2 = .013$), which were both small.

Multiple post-hoc pairwise comparisons using the Tamhane's T2 test (due to the heterogeneity of variance), identified a significant difference in perceived satisfaction with the availability of support between respondents in the pure Locally Integrated (LI) support network and those in both the Private Restricted (PR; mean difference = .12, $p=.009$) and Local Self-Contained support networks (LSC; mean difference = .05, $p<.001$). These results confirmed **Hypothesis 11,** which predicted that respondents in the Locally Integrated (LI) networks would be the most satisfied with the perceived availability of emotional support, while those in Private Restricted (PR) networks would be the least satisfied.

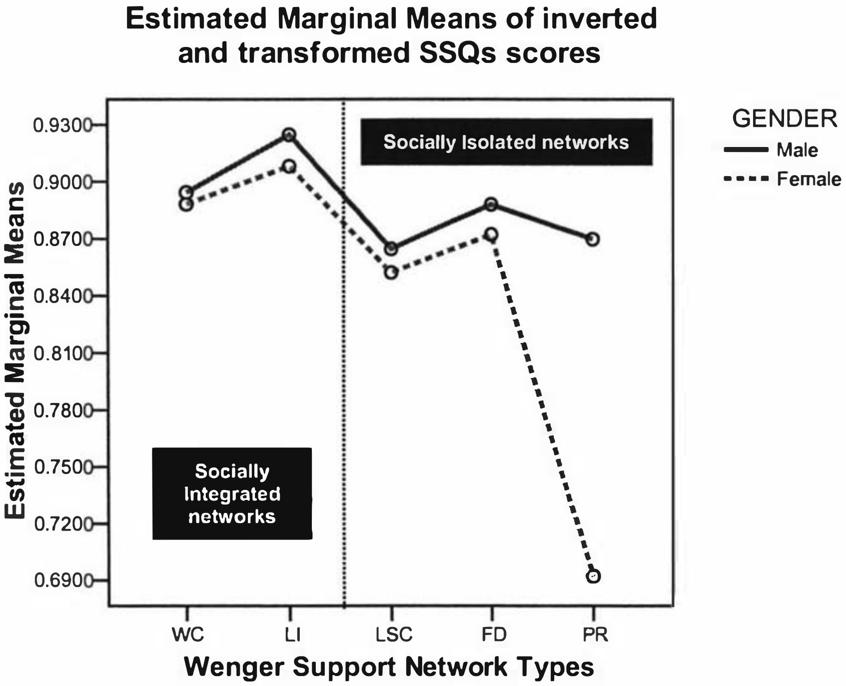


Figure 8.4. Comparisons between independent dyadic partners' satisfaction with the perceived availability of emotional support provisions across five pure Wenger support networks, depicted along the socially integrated to isolated support network continuum (for *n*=543 veterans and *n*=545 female partners).

Figure 8.4 illustrates how the independent veteran sample respondents expressed higher levels of satisfaction with the availability of emotional support than their female counterparts, across all five pure support networks. The most pronounced gender difference occurred between the 20 women (*M* = .69, *SD* = .26) and 31 veterans (*M* = .87, *SD* = .18; refer to Figure 8.4) in the Private Restricted (PR) networks; a difference that contributed to the significant interaction effect in this ANOVA. It is worthwhile noting that Table 8.16 showed that women in the PR support networks were on average the oldest of all the women in the five pure support networks. These characteristics are explored further in the ensuing chapter.

Feelings of loneliness in socially isolated networks

The evidence was unequivocal regarding the emotionally supportive features of Locally Integrated (LI) networks for both the veterans and their dyadic partners. The respondent profiles in the Private Restricted (PR) networks also demonstrated clearly the paucity of perceived emotional support available for those who live in this most socially isolated type of support network. For example, the greatest proportion of respondents (58.1%) in PR networks reported that they felt lonely, and a similar proportion (54.8%) indicated that their hearing losses affected the veterans' capacities to fulfil their family role. Although emotional support provisions in the Family Dependent (FD) networks appeared more robust, nearly a third of these veterans also reported feeling lonely. The fact that over a third of veterans (37.2%) in Local Self-Contained (LSC) networks also indicated they felt lonely supports the finding that these veterans were significantly less satisfied with the perceived availability of emotional support than those in the socially integrated LI support networks.

Appendix H provides a descriptive summary of respondents' emotional profiles across Wenger's five pure support networks (refer Table H.1), in addition to the four transitional and inconclusive networks (refer Table H.2).

8.8 Dyadic partners' health-related quality of life

Descriptions of the dyadic partners' health-related quality of life (H-QoL) initially focus on the veterans' physical health (reflected in the absence/presence of co-morbid conditions) and their self-reported alcohol consumption, and then their functional status (including their memory in everyday life and independence performing activities of daily living). These veteran perspectives are subsequently complemented by descriptions of both partners' emotional well being (reflected in the absence/presence of depressive symptomatology), and their actual H-QoL (reflected in their SF-36 physical and mental health component scores).

8.8.1 Prevalence of chronic conditions and alcohol consumption in the veteran sample

The veterans indicated which of 16 long-term health problems they had "had for six months or more, or something which *was* likely to last for six months."

Prevalence and range of chronic conditions

Table 8.17

List of long term health problems reported by at least ten percent of veterans

Long term Health Conditions	Number of veterans	Percentage of *N*=671 veterans	Number of missing responses (% of *N*=671)
1 Sight impairment	426	63.5	16 (2.4%)
2 Arthritis	322	48.0	18 (2.7%)
3 Heart trouble	257	38.3	16 (2.4%)
4 High blood pressure	236	35.2	18 (2.7%)
5 Hernia	134	20.0	19 (2.8%)
6 Bowel disorders	103	15.4	22 (3.3%)
7 Respiratory conditions	101	15.1	19 (2.8%)
8 Skin conditions	95	14.2	20 (3.0%)
9 Cancer	89	13.3	19 (2.8%)
10 Kidney conditions	87	13.0	20 (3.0%)

On average, veterans reported having a total of 3.12 (*SD* = 1.88; Range = 12) long term health conditions. Thirty four veterans (5.1%) reported they had no long term health problems; over half the sample (52.6%) indicated they had between one and three conditions; almost one third of veterans (30.8%) reported they had between four and six conditions; 29 (4.3%) between seven and nine conditions, and one respondent reported having 12 chronic conditions. Table 8.17 illustrates the range of conditions typically reported by at least ten percent of these older veterans.

Veterans' self-reported alcohol consumption

Four survey questions on page 24 of the mail out booklet focused on the veterans' self-reported patterns of alcohol consumption. Over three quarters of the veterans (518 or 77.2%) reported that they drank alcohol; 142 (21.2%) indicated they did not, and 11 veterans (1.6%) failed to respond to question 16.

Of the 655 veterans (97.6%) who responded to question 17, which focussed on how many days in the past week the veteran had consumed alcohol: a quarter (170 or 26.%) stated they had not had any drinks; a quarter (176 or 26.9%) indicated they had consumed alcohol daily, a quarter (170 or 26%) reported drinking on between three to six days; and 134 (20.5%) veterans indicated they had consumed alcohol on only one or two days in the past week. Responses to question 18 reflected the quantity of drinks consumed on a typical day. Of the 563 (83.9%) veterans who responded to this question 438 (77.8%) reported drinking one or two drinks; 102 (18.1%) reported drinking three or four drinks; while 23 (4.1%) reported drinking 5-10 drinks. Question 19 gauged the frequency of hazardous drinking (i.e. drinking six or more drinks on one occasion) that was likely to increase the veteran's risk for adverse health events (Reid, Fiellin, & O'Connor, 1999). Of the 630 veterans (93.9%) who responded to this question, 480 (76.2%) reported never having six or more drinks, whilst a total of 150 veterans (23.8%) did. Of these veterans 95 (15.1%) veterans indicated they did so less than monthly, 30 (4.8%) reported doing so monthly, and 25 (4%) reported consuming those quantities daily or weekly.

8.8.2 Veterans' functional status

This section focuses on the third research aim, describing the veterans' self-reported memory in everyday life and their functional independence performing activities of daily living.

Memory in everyday life

As stated in the previous chapter, a decision was made to focus only on the 20 questions comprising the Section II Frequency of Forgetting section from Crook and Larrabee's (1990) self-reported memory in everyday life questionnaire (i.e. the MAC-S). A principal components analysis (PCA) was conducted on the veterans' responses to these questions to condense the dataset for later use in the exploratory regression analyses. Prior to performing the PCA, the responses were reversed, and the data was assessed to check its suitability for factor analysis: The 20-item correlation matrix revealed that many coefficients were greater than 0.3; the Kaiser-Meyer-Oklin value was 0.94, which exceeded the recommended value of 0.6 (Coakes & Steed, 2001); and the Bartlett's Test of Sphericity (Bartlett, 1954; cited in Tabachnick & Fidell, 2001c) reached statistical significance. As all the required statistical assumptions were met, a PCA of the data was undertaken

Table 8.18

Varimax rotation of three factor solution for 20 MAC-S Memory in Everyday Life 'Frequency of Forgetting' items (*N*=671 MRs)[a]

	GR Factor	GF Factor	ASP Factor	Total Variance
General Retrieval (GR): (α=.85)				
Q16 ... fail to remember a name or word	.752			
Q15 ... can't remember where met people	.712			
Q18 ... store item in safe place & forget where	.677			
Q19 ... take long time to recall a well-known fact	.664			
Q6 ... have word on tip of tongue but can't recall it	.661			
Q3 ... go to room to get something & forget what	.588			
Q10 ... fail to recognise people who recognise me	.512			
General Forgetfulness (GF): (α=.78)				
Q9 ... dial number & forget whom I was calling		.725		
Q4 ... stop to think when distinguishing right & left		.724		
Q13 ... arrive at grocery/pharmacy & forget what to buy		.674		
Q14 ... forget appointment/other event important to me		.665		
Q5 ... forget which waiter took my order in restaurant		.577		
Attending during Semantic Processing (ASP): (α=.76)				
Q2... miss point someone else is making during a conversation			.752	
Q7... have difficulty following conversation with environmental distractions			.679	
Q8... forget to bring up important point in conversation			.565	
Q1... have difficulty recalling word I wish to use			.564	
Q20... confuse one word with another when they sound the same			.555	
Percentage variance	75.9	14.1	10.0	52.35

[a] *NOTE: As loadings above .5 are displayed, Questions 11, 12, & 17 are not included.*

The PCA of the 20 'Frequency of Forgetting' MAC-S items revealed the presence of three components whose eigenvalue exceeded 1, and explained 39.73%, 7.37%, and 5.26% respectively of the total variance. A visual inspection of the screeplot also revealed a clear break after the third component (refer Appendix I), and consequently three components were retained for further investigation. Varimax rotation was performed to aid in the interpretation of these three components. The rotated solution (presented in Table 8.18, with values <0.5 not shown) revealed that all three components showed a number of strong loadings, and three items were excluded (viz., questions 11, 12, & 17), as they did not meet the specified 0.5 loading.

This three component solution explained 52.35% of the total variance: Component 1 accounted for 75.9% of the explained variance, included seven items, and was named the 'General Retrieval' (GR) factor; Component 2 accounted for 14.1% of the explained variance, included five items, and was named the 'General Forgetfulness' (GF) factor; and finally Component 3 accounted for 10% of the variance, also included five items, and was named the 'Attending during Semantic Processing' (ASP) factor.

The GR factor questions related mainly to episodic memory; the GF factor questions to procedural memory; and the ASP factor questions reflected the general frequency of failures that occurred during short term auditory and semantic memory processing that demanded sustained and focussed attention to diverse auditory stimuli.

Impact of social integration on veterans' self-reported memory

The 392 veterans in the pure socially integrated networks (i.e., Wider Community [WC] and Locally Integrated [LI] Wenger support network types) reported significantly less frequent occurrence of problems with their self-reported memory in every-day life ($M = 40.66$; $SD = 10.56$) than the 151 veterans in the pure socially isolated networks (which included the Local Self-Contained (LSC), Family Dependent (FD), and Private Restricted (PR) support networks; $M = 43.17$; $SD = 11.56$; t [541] = -2.42, p=.016). This finding confirmed **Hypothesis 12**, which predicted that veterans in socially integrated networks would report significantly less frequent problems with their memory than those in the socially isolated networks.

Activities of daily living (ADLs)

The three questions that focused on activities of daily living (ADLs) addressed the veterans' needs for assistance with personal care, domestic tasks, and mobility. The response scales for each question were reversed, so that '1' indicated the need for daily help and higher scores represented greater functional independence; '4' denoted that no help was required.

Sixty eight veterans (10.2%) indicated that they required assistance with their mobility, most of whom reported that they found it difficult to get around their home and community independently (*n* = 41 or 6.1%). Considerably more veterans (*n* = 180 or 27.0%) reported that they needed help with personal care, mostly on an occasional basis (*n* = 148 or 22.1%). However, by far the greatest need for help was reported in relation to domestic tasks, where 275 veterans indicated that they needed assistance; most of these men reported needing occasional help with some household tasks (*n* = 182 or 27.1%); 65 men (9.7%) indicated they needed help with difficult household tasks, and 28 men (4.2%) reported they needed assistance with most or all their household tasks.

The respondents' total scores, which added their responses across the three questions, reflected their general levels of independence across these three different types of ADLs. The veteran sample's mean total ADL score was 10.94 (*SD* = 1.56; Range = 9), with 86.7% of respondents scoring 10 or more. These data indicated that most veterans lived independently within their community settings.

8.8.3 Prevalence of depressive symptoms across Wenger's support network continuum

Both dyadic partners recorded how they felt during the week that they completed their surveys by responding to the 15 Geriatric Depression Scale (GDS-15) questions. The veterans reported significantly more depressive symptoms on average (Veterans' GDS-15 *M* = 2.58, *SD* = 2.32) than their partners (S/Ps' GDS-15 *M* = 2.42, *SD* = 2.47; *t* [1340] = 2.08, *p*=.038). Although the actual mean difference was small, the result was statistically significant, which confirmed **Hypothesis 13a**.

A two-way analysis of variance (ANOVA) explored the impact of gender and Wenger's support network typology on the distribution of the respondents' GDS-15 total scores (refer Figure 8.5), which were substantially positively skewed, and transformed to meet the assumption of normality (as recommended by Tabachnik & Fidell, 2001a). The Levene's test revealed heterogeneity of variance, which suggested that mean differences may really only be significant at an alpha level of .10 instead of .05 (Coakes & Steed, 2001). The between-subjects effects demonstrated a statistically significant main effect for five different types of support networks (*F* [4, 1087] = 14.31, *p*<.001); but no statistically significant main effect for gender (F [1, 1087] = 1.75, p=.186), nor for the interaction effect between gender and the network typology (F [4, 1087] = 0.21, p=.936). The main effect size of the support networks was moderately small (η^2=.05).

Details of this ANOVA are displayed in Figure 8.5. Post-hoc multiple pairwise comparisons using Tamhane's T2 test (due to the heterogeneity of variance) identified that respondents in both the two socially integrated support networks reported significantly fewer depressive symptoms than those in any of the three socially isolated support networks (all at p<.001). These results confirmed **Hypothesis 13b**.

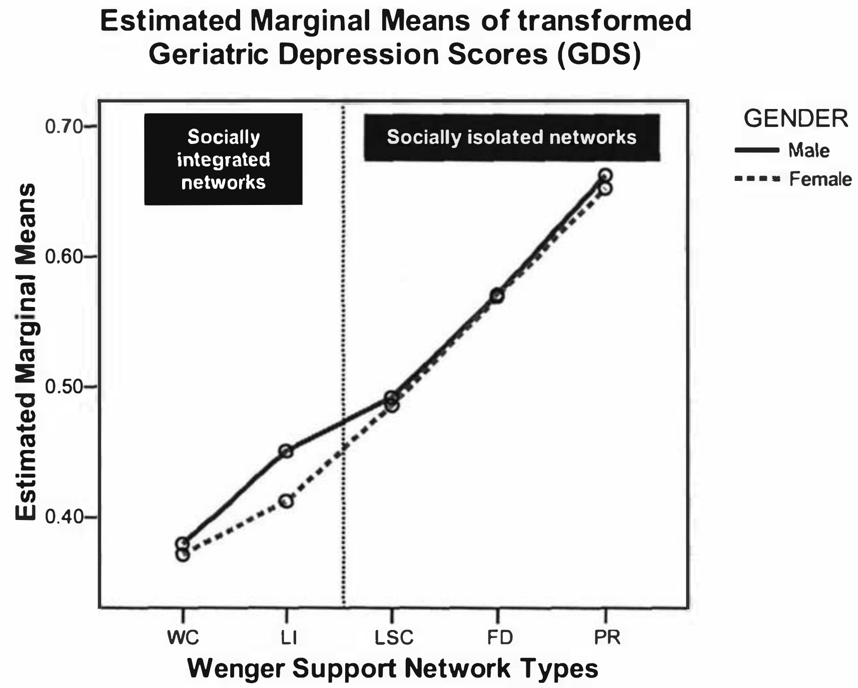


Figure 8.5. Comparisons between independent dyadic partners' self-reported depressive symptoms (GDS-15 total mean scores) across five pure Wenger support networks, arranged along the socially integrated to socially isolated support network continuum (for n=543 veterans and n=545 female partners).

The significant gender difference in the total number of self-reported depressive symptoms was not sustained in this ANOVA which excluded respondents in the transitional networks. Figure 8.5 illustrates the negligible gender differences in the *total* number of depressive symptoms reported by respondents in four of the five pure

Wenger support networks (i.e. excluding LI networks); however, the *range* of depressive symptoms that comprised these totals revealed some significant gender differences.

Both the veteran and female respondents in Private Restricted (PR) support networks reported significantly more depressive symptoms than those in socially integrated networks (at $p<.001$), or those in the Local Self-Contained (LSC) networks (at $p=.003$). These results confirmed **Hypothesis 13c**, which predicted that respondents in the most socially isolated PR support networks would report the highest incidence of depressive symptoms of the five different types of support networks.

8.8.4 Dyadic partners' SF-36 scores

The health-related quality of life (H-QoL) profiles of the veterans and their dyadic partners were encapsulated in the eight SF-36 subscales (Ware, 1997). These subscales were grouped into four physical and four mental health subscales, which were subsequently summarised in the SF-36 Physical Component Summary (PCS) and Mental Component Summary (MCS) scores.

This section briefly describes selected aspects of the New Zealand population SF-36 norms, to provide a comparative context for the dyadic partners' SF-36 profiles. Initially the dyadic partners' mental and physical H-QoL subscale and component scores are compared alongside their respective male and female age-related NZ norms; and then the correlations between the dyadic partners' subscales and the veterans' composite SF-36 physical and mental H-QoL scores are presented in Table 8.21.

New Zealand population SF-36 norms

The levels of self-reported health in the New Zealand (NZ) population are higher in comparison with overseas general population norms (Ministry of Health, 1999a). Age had a profound effect on self-reported health in the NZ population (Ministry of Health, 1999a); a feature that was evident across seven of the eight SF-36 health-related quality of life subscales, which all decreased with increasing age. In addition, NZ males "scored slightly, but significantly, higher than women on most scales, particularly those most related to mental health," whilst "education status impacted on mental health status in females, but not males" (p. 139). Furthermore, although the exclusion of the approximately 13% of people aged over 75 years who live in non-private dwellings from the NZ Health Survey has yielded norms that may over-estimate the mental and physical health of older NZ people (Ministry of Health, 1999a), that normative sample is similar in this respect to the current sample.

Physical H-QoL

Table 8.19 displays the four SF-36 Physical Health subscales and their associated PCS for 620 veterans and 646 S/Ps. The number of cases in each sample reflects the fact that missing responses on the associated subscales contributed cumulatively to the total number of missing cases on the SF-36 PCS.

Table 8.19

Comparisons between the independent dyadic partners' SF-36 Physical Health scores with their equivalent NZ norms for males and females aged 75+ years[a]

	MALE SCORES:		**FEMALE SCORES:**		**Differences between the partners**
SF-36 Physical Health subscales:	**Veterans**	**NZ norms (75+ years)**	**Spouse / Partners**	**NZ norms (75+ years)**	***t* test: *p* value**
Physical Functioning (*n*)	62.95 *(645)*	61.5	61.47 *(662)*	55.4	.302
PF *SD / 95% CI*	*24.84*	*(55.9-67.1)*	*26.75*	*(51.0-59.8)*	
Role Physical (*n*)	45.41 *(664)*	50.7	49.89 *(664)*	56.0	.058
RP *SD / 95% CI*	*42.45*	*(42.7-58.7)*	*43.56*	*(50.1-61.9)*	
Bodily Pain (*n*)	66.41 *(664)*	68.4	64.01 *(664)*	68.2	.097
BP *SD / 95% CI*	*26.00*	*(63.2-73.6)*	*26.66*	*(63.6-72.7)*	
General Health (*n*)	67.34 *(664)*	63.2	66.58 *(660)*	55.7	.491
GH *SD / 95% CI*	*19.31*	*(59.4-66.9)*	*20.84*	*(62.6-68.8)*	
Physical health component summary (PCS) score					
PCS (*n*)[b]	39.98 *(617)*	38.7 *(195)*	40.45 *(646)*	39.4 *(365)*	.468
PCS *SD / 95% CI*	*11.13*	*(36.1-41.3)*	*12.10*	*(37.6-41.1)*	

* $p < .05$

[a] *NZ norms extracted from Table 56, p 146, Ministry of Health, 1999a.*

[b] *The minimum number of respondents with complete data contributing to any one subscale.*

No significant differences emerged between the independent dyadic partners' scores; however, it is worth noting that the veterans' mean scores for both the Role Physical (RP) and Bodily Pain (BP) subscales were lower than those derived from the NZ normative sample of males, aged 75 years and older. In both the male and female samples the respondents' mean PCS was higher than the respective normative mean score for NZ adults aged 75 years and older, indicating both the men and women enjoyed better physical H-QoL.

Mental H-QoL

Table 8.20

Comparisons between the independent dyadic partners' SF-36 Mental Health scores with their equivalent NZ norms for males and females aged 75+ years[a]

	MALE SCORES:		**FEMALE SCORES:**		**Differences between the partners**
SF-36 Mental Health subscales:	**Veterans**	**NZ norms (75+ years)**	**Spouse / Partners**	**NZ norms (75+ years)**	***t* test: *p* value**
Vitality (*n*) VT*SD / 95% CI*	62.16 *(659)* *19.60*	63.2 *(59.6-66.9)*	59.76 *(657)* *19.44*	60.6 *(56.9-64.3)*	.026*
Social Functioning (*n*) SF *SD / 95% CI*	81.09 *(665)* *24.07*	80.9 *(76.9-84.9)*	78.85 *(668)* *25.44*	81.9 *(77.2-86.6)*	.100
Role Emotional (*n*) RE *SD / 95% CI*	73.28 *(655)* *38.05*	74.8 *(68.6-81.1)*	70.60 *(661)* *39.29*	73.9 *(68.0-79.9)*	.209
Mental Health (*n*) MH *SD / 95% CI*	83.68 *(661)* *13.28*	83.0 *(81.0-85.0)*	78.22 *(658)* *14.34*	77.7 *(74.2-81.2)*	.000***
Mental health component summary (MCS) score					
MCS (*n*)[b] MCS *SD / 95% CI*	55.06 *(620)* *8.59*	52.9 *(195)*[b] *(51.5-54.4)*	52.82 *(646)* *9.26*	51.5 *(365)*[b] *(49.3-53.7)*	.000***

* $p < .05$, *** $p < .001$

[a] *NZ norms extracted from Table 56, p 146, Ministry of Health, 1999a.*

[b] *The minimum numbers of respondents with complete data contributing to any one subscale.*

Table 8.20 displays the four SF-36 Mental Health subscales and their associated MCS for the 620 veterans and 646 female dyadic partners. Whilst the dyadic partners' physical health profiles were similar (refer Table 8.19), significant differences emerged between the veterans' and their female dyadic partners' mental health profiles for two subscales (Vitality [VT] and Mental Health [MH]), and the composite MCS. In each instance, the veterans' mean scores were significantly higher, which reflected better mental H-QoL.

The mean MCS for each independent dyadic partner sample was slightly higher than that of the NZ general population of adults aged 75 years and older. A closer examination of the veterans' subscale scores relative to their equivalent NZ age-appropriate norms indicated that their mean Social Functioning (SF) and Mental Health (MH) subscale scores were higher, whilst their mean Vitality (VT) and Role Emotional (RE) subscale scores were lower. Three of the female dyadic partners' mean subscale scores (VT, SF and RE) were lower than their equivalent NZ age-appropriate norms.

Correlations between veterans' composite scores and the dyadic partners' SF-36 subscales

Table 8.21

Correlations between the 620 veterans' composite scores and the independent dyadic partners' eight SF-36 subscales

	VETERANS' PCS:		VETERANS' MCS:	
SF-36 subscales:	**Veterans** (*n*)	**S/Ps** (*n*)[a]	**Veterans** (*n*)	**S/Ps** (*n*)[a]
Physical Functioning (PF)	.862** *(620)*	.155** *(611)*	.202** *(620)*	.085* *(611)*
Role Physical (RP)	.801** *(620)*	.147** *(614)*	.288** *(620)*	.114** *(614)*
Bodily Pain (BP)	.783** *(620)*	.095* *(613)*	.196** *(620)*	.084* *(613)*
General Health (GH)	.705** *(620)*	.127** *(610)*	.442** *(620)*	.105** *(610)*
Vitality (VT)	.667** *(620)*	.071 *(608)*	.577** *(620)*	.132** *(608)*
Social Functioning (SF)	.545** *(620)*	.067 *(617)*	.674** *(620)*	.130** *(617)*
Role Emotional (RE)	.296** *(620)*	.131** *(610)*	.775** *(620)*	.178** *(610)*
Mental Health (MH)	.187** *(620)*	.034 *(608)*	.760** *(620)*	.190** *(608)*

* $p < .05$, ** $p < .01$

[a] *The number of both dyadic partners with complete data determined the women's sample size.*

Table 8.21 displays the correlations between the independent dyadic partners' eight SF-36 physical and mental health subscales and the veterans' physical and mental health composite scores (PCS and MCS). The veterans' physical health correlations were consistently stronger and somewhat more constricted in their range (between .705** and .862**) than their equivalent mental health correlations (which ranged between .577** and .775**). By contrast, although the women's physical and mental health subscales all correlated weakly with the respective veteran composite score, the mental health subscale correlation was comparatively stronger than the others.

Appendix J displays a summary of the PCS and MCS gender differences across the respondents' Wenger support network continuum (refer Figure J.1).

8.9 Empirical links within the composite model of Ageing with Hearing Handicap

The composite model of Ageing with Hearing Handicap depicted in Chapter Six (refer Figure 6.1) informed the selection of salient independent variables from the current research context, for inclusion in three regression analyses. This section addresses the final research aim, initially presenting evidence of simple intercorrelations between the three respective dependent variables of interest (viz.: the veterans' self-reported hearing handicap [HH], and their self-reported physical and mental health-related quality of life [PH-QoL and MH-QoL]) and the associated blocks of salient predisposing, reinforcing, dis/enabling and potentially exacerbating health-related independent variables. These intercorrelations inform the subsequent selection of independent variables for each regression analysis. Only the veterans' perspectives of coping with their hearing losses are included in each regression, due to the relatively high percentage of missing responses from their partners. In addition, the hearing handicap regression restricts the variables that index the presence of potentially exacerbating health-related conditions to those related to the veterans. All the remaining variable blocks include perspectives from both dyadic partners.

8.9.1 Salient biopsychosocial links with the veterans' hearing handicap

Table 8.22

Variables comprising the six ecological variable blocks that explore potential significant links with the veterans' self-reported hearing handicap

VARIABLE BLOCKS:	
Abbreviated labels:	**Variable description**
I Predisposing sociodemographic variables:	
1 *NAL% HL*	Percentage bilateral hearing losses from audiogram
2 *Age*	Chronological age in years
3 *Education*$_{MR}$	MRs' educational experiences restricted to school (*n*=427 or 63.6% = 1)
4 *Branch*	RNZ Air Force veterans versus those who served in other branches (*n*=245 or 36.5% = 1)
5 *Occupation*	Veterans who worked in Farming/Fishing/ Manufacturing/Trade work places where there was increased likelihood of noise exposure (*n*=239 or 35.6% = 1)
6 *Education*$_{S/P}$	S/Ps with no school educational qualifications (*n*=229 or 34.1% = 1)
II Reinforcing structural support variables:	
7 *WCF*$_{MR}$	MRs' Wenger Community Focus factor score
8 *WCF*$_{S/P}$	S/Ps' Wenger Community Focus factor score
9 *WFF*$_{MR}$	MRs' Wenger Family Focus factor score
10 *WFF*$_{S/P}$	S/Ps' Wenger Family Focus factor score
III Dis/Enabling functional support variables:	
11 *SSQs*$_{MR}$	MRs' perceived satisfaction with emotional support
12 *Loneliness*	Availability of friends & feelings of loneliness
13 *SSQs*$_{S/P}$	S/Ps' perceived satisfaction with emotional support
IV Dis/Enabling aural rehabilitation variables:	
14 *Tinnitus*	Ever experienced tinnitus? ('Yes' =1 for *n*=498 or 74.2%)
15 *Age first HAs fitted*	Age in years veteran first fitted with their hearing aid (HA/s)
16 *HAs' perf. in noise*	Performance of hearing aid/s (HA/s) in noisy situations
17 *HAs' perf. in groups*	Performance of hearing aid/s (HA/s) in group situations
18 *Sat. with perf. HAs*	Satisfaction with overall performance of hearing aid/s (HA/s)
19 *Daily use of HAs*	Self-reported daily use of hearing aid/s (HA/s)
20 *Sat. with audios.*	Satisfaction with overall service of audiologists
21 *Contacted HANZ*	Ever contacted the Hearing Association? ('Yes' = 1 for *n*=350 or 52.2%)
V Potentially exacerbating health variables:	
22 *Memory: ASP Mean*	Mean frequency of self-reported problems Attending during Semantic Processing (ASP)
23 *Memory: GR Mean*	Mean frequency of self-reported problems of General Retrieval (GR)
24 *Memory: GF Mean*	Mean frequency of self-reported problems of General Forgetfulness (GF)
25 *GDS-15 total*	Total number of self-reported depressive symptoms
26 *Chronic conditions*	Total number of self-reported chronic conditions
27 *Excessive drinking*	Drink 6 or more drinks on one occasion? (*n*=142 or 21.2% = 1)
VI Potentially exacerbating impact of living with the stigma of hearing losses variables:	
28 *HL & depression*	Frequency HL made veterans depressed
29 *HL & social life*	Frequency HL affected veterans' social lives
30 *HL & family life*	Frequency HL affected veterans' family lives
31 *HL & family roles*	Frequency HL affected veterans' family roles
32 *HL & rec. life*	Frequency HL affected veterans' recreational lives
DEPENDENT VARIABLE (DV):	
1 *HHIE total*	Self-reported Hearing Handicap Inventory total

Based on the ecological approach described within Chapter Six's theoretical and empirical rationale (refer Figure 6.1), a total of 32 dyadic partner variables were grouped into six variable blocks. The variables comprising each of these blocks are listed in Table 8.22, alongside the abbreviated italicised labels used in the matrix. Initially the analysis explores the bivariate links between these 32 variables and the veterans' self-reported hearing handicap (*HHIE total*); and then examines the variable blocks' collective contributions and each individual variable's impact within a multivariate hierarchical regression analysis. Female dyadic partner variables are identified by including 'S/P' within the variable label; whereas apart from those variables that provide dual partner perspectives, the remaining veteran variable labels do not make explicit reference to the veteran main respondents (MRs).

Bivariate links with the veterans' self-reported hearing handicap

Table 8.23 depicts the correlational matrix between the six blocks of independent variables (IVs) and the veterans' self-reported total hearing handicap (HHIE total) scores. Apart from the initial correlation with the veterans' NAL% HL, the general strength of these correlations with the HHIE total are lower in the first four blocks of variables than those in the final two variable blocks. Four noticeable features emerge from an examination of these correlations:

Firstly, increased levels of hearing handicap were associated with significantly less community contact for the veterans (encapsulated by the negative WCF correlation); and both dyadic partners reported significantly lower levels of satisfaction with their perceived availability of emotional support, as the veterans' hearing handicap levels increased. The veterans' feelings of loneliness yielded the strongest correlation with their hearing handicap of all the social support measures.

Secondly, the performance of the veterans' hearing aid technology within the more demanding listening situations (i.e. in noise and in groups) yielded the strongest correlations amongst the block of dis/enabling aural rehabilitation variables, whilst the correlations with the veterans' daily hearing aid use and satisfaction with the overall audiological service provisions were considerably weaker.

Table 8.23

Intercorrelations between the veterans' HHIE total scores and six blocks of salient dyadic partner independent variables[a] (for between *n*=630 to 671 dyadic partners[b])

I Predisposing sociodemographic support variables

II Reinforcing functional support variables

III Dis/Enabling structural support variables

IV Dis/Enabling aural rehabilitation variables

Variables:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 NAL%HL	1.00																				
2 Age	.25***	1.00																			
3 Education$_{MR}$	.06	.09*	1.00																		
4 Branch	-.09*	-.06	-.11**	1.00																	
5 Occupation	.07	.07	.20***	-.08*	1.00																
6 Education$_{SP}$	.09*	-.06	.09*	.03	.04	1.00															
7 WCF$_{MR}$	-.15***	.05	-.07	.05	-.13**	-.05	1.00														
8 WCF$_{SP}$	-.10**	.05	-.04	-.01	-.07	-.06	.42***	1.00													
9 WFF$_{MR}$	-.01	-.05	.08*	-.03	.01	.06	.01	-.03	1.00												
10 WFF$_{SP}$	.03	-.06	.10**	-.07	-.02	.10**	-.04	-.01	.82***	1.00											
11 SSQs$_{MR}$	.03	-.08*	-.03	.00	.05	.05	-.15***	-.10*	-.13**	-.10**	1.00										
12 Loneliness	.05	-.00	-.02	-.05	.00	.02	-.23***	-.14***	-.10*	-.08*	.36***	1.00									
13 SSQs$_{SP}$	.02	-.08*	.04	.02	.09*	-.01	-.18***	-.22***	-.11**	-.08*	.20***	.21***	1.00								
14 Tinnitus	-.05	-.07	-.02	-.01	.04	.01	-.05	-.01	-.05	-.04	.02	.11**	.07	1.00							
15 Age first HAs fitted	-.34***	.34***	.03	.07	.00	-.06	.05	.07	-.07	-.08*	-.05	-.05	-.11**	-.01	1.00						
16 HAs' perf. in noise	.11**	.17***	.13**	-.02	.10**	.01	-.14***	-.01	.01	.01	.05	.10*	.01	.06	-.01	1.00					
17 HAs' perf. in groups	-.09*	-.07	-.09*	.11**	-.06	.02	.18***	.03	-.01	-.03	-.12**	-.08*	-.03	-.04	.05	-.46***	1.00				
18 Sat. with perf. HAs	.06	.02	-.04	.03	-.04	-.01	.11**	.04	-.05	-.05	-.13**	-.11**	-.03	-.07	.01	-.37***	.51***	1.00			
19 Daily use of HAs	-.32***	-.05	.03	-.01	.02	-.00	-.02	-.01	.00	-.01	.07	.02	-.03	.10*	.30***	.08*	-.14***	-.27***	1.00		
20 Sat. with audios.	-.11**	-.04	.02	-.04	-.03	.03	-.14***	-.04	-.08*	-.07	.23***	.16***	.12**	.12**	.03	.14***	-.28***	-.36***	.20***	1.00	
21 Contacted HANZ	.08*	.01	-.03	.02	-.02	-.02	.05	.03	.04	.04	-.02	.00	-.02	.06	-.11**	.01	-.03	-.00	-.12**	-.05	1.00
HHIE total	.31***	.06	.08*	-.08*	.11**	.05	-.19***	-.07	.03	.06	.17***	.27***	.12**	.13**	-.24***	.41***	-.37***	-.34***	-.14***	.19***	-.07

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

[a] *Refer to the variable block descriptions in Table 8.22 for details of the abbreviated variable names used in this table.*

[b] *Missing data were imputed; all variables in this part of the table included 671 cases.*

Table 8.23 (*continued*)

V Potentially exacerbating health variables

VI Stigmatising impact of HL variables

Variables:	22	23	24	25	26	27	28	29	30	31	32
22 Memory: ASP *M*	1.00										
23 Memory: GR *M*	.68***	1.00									
24 Memory: GF *M*	.50***	.58***	1.00								
25 GDS-15 total	.27***	.28***	.21***	1.00							
26 Chronic conditions	.12**	.15***	.04	.32***	1.00						
27 Excessive drinking	-.02	.02	.08	-.09*	.01	1.00					
28 HL & depression	-.29***	-.24***	-.16***	-.39***	-.14***	.02	1.00				
29 HL & social life	-.33***	-.25***	-.21***	-.25***	-.05	-.02	.43***	1.00			
30 HL & family life	-.29***	-.22***	-.15***	-.23***	-.03	-.04	.39***	.57***			
31 HL & family roles	.31***	.20***	.19***	.25***	.02	.00	-.29***	-.40***	-.43***	1.00	
32 HL & rec. life	-.26***	-.21***	-.18***	-.26***	-.06	-.04	.36***	.56***	.50***	-.38***	1.00
HHIE total	.44***	.30***	.17***	.41***	.11**	-.07	-.58***	-.66***	-.57***	.52***	-.54***

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

[a] *Refer to the variable block descriptions in Table 8.22 for details of the abbreviated variable names used in this table.*

[b] *These numbers reflect the dyads where both partners had complete data. Ten veterans did not report what chronic conditions they had, & 41 veterans omitted the excessive drinking question. Missing data were imputed for the continuous variables, so that 11 of the 12 variables included 671 cases.*

Thirdly, the strength of the correlations between each of the veterans' self-reported frequency of forgetting factors and their hearing handicap varied.

Fourthly, the moderately strong correlations in the final variable block highlighted the pervasiveness of the social constrictions associated with hearing handicap across the veterans' social, family and recreational spheres. Veterans with higher levels of hearing handicap also acknowledged significantly more frequently that their hearing losses had made them feel depressed.

Hearing handicap hierarchical regression

Hierarchical regression analysis assessed the contributions of the 24 significantly correlated variables within the six independent variable (IV) blocks listed in Table 8.23, in relation to the dependent variable (DV), the veterans' self-reported hearing handicap (i.e. their HHIE total scores). This type of regression was selected as the researcher controls the entry of blocks of variables, and is thus able to assess the proportion of variance attributable to a particular block of variables, after variance due to other IVs or blocks of IVs is accounted for (Tabachnick & Fidell, 2001b). Table 8.24 presents the results of each of the six successive variable blocks' contributions that accounted for the explained variance in the veterans' self-reported hearing handicap total scores.

Step 1 examined the contribution of the predisposing social demographic variables. In Step 2 the unique contribution of the veteran's reinforcing structural support network variable was estimated, after controlling for the effect of their predisposing demographic variables. Step 3 estimated the contribution of the dis/enabling functional support variables, after controlling for the impact of the predisposing and reinforcing variables. Step 4 controlled for the predisposing demographic and both the reinforcing structural and dis/enabling functional support variable blocks, before examining the additional contribution of the dis/enabling aural rehabilitation variables. Step 5 controlled for the preceding predisposing, reinforcing, and dis/enabling variable blocks, prior to determining the contribution of potentially exacerbating health-related variables; and finally, Step 6 controlled for all the variables that were entered up to and including Step 5, before determining the magnitude of the contribution from those variables that measured the stigmatising impact of the veterans' hearing losses on their lives.

Table 8.24

Hierarchical multiple regression of salient independent variables on the veterans' self-reported hearing handicap (i.e. their HHIE total scores), showing standardised regression coefficients (R, R^2, Adjusted R^2, and R^2 change) for n=658 dyadic partners with no missing data[a]

	Steps:					
Blocks of independent variables:	**1**	**2**	**3**	**4**	**5**	**6**
I Veterans' predisposing demographic variables:						
Bilateral hearing losses (NAL% HL)	.304***	.286***	.281***	.189***	.161***	.096***
Education	.043	.039	.047	.021	-.001	.021
Occupation	.090*	.075*	.073*	.055	.013	.020
II Veterans' reinforcing structural support variables:						
Wenger Community Factor scores (WCF_{MR})		-.129**	-.062	-.014	.040	.014
III Dyadic partners' dis/enabling functional support variables:						
Veterans' satisfaction with availability of emotional support ($SSQs_{MR}$)			.064	.036	.017	.014
Veterans' perceived loneliness and availability of friends			.213***	.171***	.080**	-.017
S/Ps' satisfaction with availability of emotional support ($SSQs_{S/P}$)			.034	.018	.043	.000
IV Veterans' dis/enabling aural rehabilitation variables:						
Ever had tinnitus?				.094**	.081**	.038
Age when fitted with their first hearing aid(s)				-.102**	-.083**	-.007
Perceptions of hearing aids' performance in noisy situations				.234***	.176***	.106***
Perceptions of hearing aids' performance in group situations				-.122**	-.096**	-.058*
Overall satisfaction with the performance of their hearing aid(s)				-.187***	-.174***	-.100***
Daily use of their hearing aid(s)				-.158***	-.147***	-.080***
Overall satisfaction with audiological service provisions				.044	.033	.055*
V Veterans' potentially exacerbating health-related variables:						
Attending during Semantic Processing (ASP) memory in everyday life					.250***	.138***
General Retrieval (GR) memory in everyday life					.040	.006
General forgetfulness (GF) memory in everyday life					-.081**	-.098***
Geriatric Depression Scale (GDS-15) total					.236***	.109***
Total number of chronic conditions veterans reported they had					-.022	-.009
VI Veterans' perceptions of the stigmatising impact of hearing losses (HL):						
Attributions of depression to hearing losses						-.246***
Perceptions that HL affects their social life						-.229***
Perceptions that HL affects their family life						-.105***
Perceptions that HL affects their family roles						.138***
Perceptions that HL affects their recreational life						-.100***
R	0.330***	0.353***	0.430***	0.628***	0.708***	0.852***
Total R^2	0.109	0.125	0.185	0.395	0.501	0.726
Adjusted R^2	0.105	0.119	0.176	0.382	0.486	0.715
R^2 change	0.109***	0.016**	0.060***	0.210***	0.106***	0.225***

[a] $n = 658$ also excluded three outlying dyadic partner cases.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

Table 8.24 reports the standardised beta coefficients (β) for each variable within the six successive blocks of independent variables (IVs). The total variance explained by each step of the equation is provided (R^2 and adjusted R^2), along with the added variance explained by each block of variables while controlling for the previous blocks (R^2 change). R was significantly different from zero at the end of each of the six steps in the regression.

At Step 1 the veterans' predisposing social demographic variables alone explained 10.5% of variance (adjusted R^2) in the veterans' hearing handicap, $F\,(3,654) = 26.64$, $p<.001$. After Step 2, with the addition of the single structural support variable indexing the veterans' frequency of contact with their communities, the total variance explained in the DV increased to 11.9% (adjusted R^2), $F\,(4,653) = 23.28$, $p<.001$. The R^2 change after entering the reinforcing structural support variable was significant, $F\,(1,653) = 11.87$, $p=.001$. After Step 3, with the addition of the perceived functional support variables, the total variance explained in the DV was 17.6% (adjusted R^2), $F\,(7,650) = 21.04$, $p<.001$. These reinforcing functional support variables accounted for an additional 6% of variance in hearing handicap after controlling for the predisposing and reinforcing variables, and yielded a significant R^2 change of $F\,(3,650) = 15.93$, $p<.001$.

Introducing the Step 4 dis/enabling aural rehabilitation variables, after controlling for the impact of the predisposing, reinforcing and dis/enabling social support variable blocks, resulted in a more than two fold increase in the total variance explained in the DV to 38.2% (adjusted R^2), $F\,(14,643) = 29.97$, $p<.001$. These aural rehabilitation variables accounted for an additional 21% of the explained variance in hearing handicap, and yielded a significant R^2 change of $F\,(7,643) = 31.89$, $p<.001$. The variables indexing the potential impact of exacerbating cognitive, emotional, and general health-related conditions associated with ageing in Step 5 accounted for a further 10.6% of the unique variance explained when the predisposing, reinforcing and dis/enabling variables were controlled, so that 48.6% (adjusted R^2) of the total variance in hearing handicap was accounted for ($F\,[19,638] = 33.7$, $p<.001$). The R^2 change after entering the potentially exacerbating health-related variable block was significant, $F\,(5,638) = 27.12$, $p<.001$. The final variable block comprising the veterans' potentially exacerbating perceptions of the stigmatising impact of living with hearing handicap in Step 6 accounted for an additional 22.5% of the explained variance in the veterans' hearing handicap, and yielded a significant R^2 change of $F\,(5,633) = 101.85$, $p<.001$. The final adjusted R^2 total explained 71.5% variance in hearing handicap, which was accounted for by these six steps in this hierarchical regression ($F\,[24,633] = 69.82$, $p<.001$).

Examining the IVs' beta coefficients at each step of the regression analysis provides opportunities to observe their contributions on the DV within each block of variables, and the extent to which the additional IVs in the subsequent steps alter these effects. For example, with all the variables entered in the equation at Step 6, only the objective NAL% HL measure within the predisposing variable block remained significantly associated with the veterans' hearing handicap; although the magnitude of this variable's effect was diminished by the introduction of the successive variable blocks.

The single structural support variable contributed the least amount of explained variance in the model, and none of the three functional support variables were significantly related to the veterans' hearing handicap in Step 6. The significant contribution of the veterans' diminished frequency of contact with their communities in Step 2 appeared to be mediated by the subsequent introduction of functional support variables. Given the weak bivariate associations of the functional support variables with hearing handicap, it is noticeable that neither partners' satisfaction with the perceived availability of emotional support exhibited statistically significant links with the DV on their introduction to the model in Step 3. The final Step 3 variable, which gauged the veterans' reflexive perceptions of the availability of friends and their associated feelings of loneliness, was significantly related to hearing handicap at Steps 3, 4, and 5; however, the magnitude of that effect diminished with the introduction of each of these successive variable blocks, and failed to sustain any significant impact in the final model.

Five of the seven dis/enabling aural rehabilitation variables were significantly related to the veterans' hearing handicap in the final model. The effect of the presence of tinnitus and the age when the veterans were first fitted with their hearing aids decreased slightly when the potentially exacerbating health-related variables were introduced in Step 5; and appeared to be subsequently mediated by the addition of the stigmatising impact variables at Step 6. The veterans' overall satisfaction with the delivery of audiological services was not significantly related to the DV on entry. The effects of the remaining four variables within the dis/enabling aural rehabilitation variable block were all linked to the performance and use of hearing aid technologies. The introduction of the final two variable blocks reduced the magnitude of the effects of these variables on the DV.

Two of the five variables indexing the veterans' potentially exacerbating health-related conditions (namely General Retrieval (GR) in everyday life and the veterans' total number of chronic conditions) were not significantly linked to the HHIE total at either Step 5 or Step 6. The veterans' frequency of reporting problems attending during semantic processing (ASP variable) yielded the strongest impact in Step 5; and the veterans' self-reported depressive symptoms were also significantly related to the DV. In both cases, the impact of these variables was diminished quite considerably in the presence of the final variable block. The veterans' frequency of self-reported general forgetfulness (GF variable) in everyday life was also significantly related to the DV at Step 5 and Step 6.

All five variables in Step 6 were significantly related to the DV. Of these the veterans' attributions of depression to their hearing losses contributed the most to the variance explained by any variable in the final model ($\beta = -0.246, p=<.001$); although the impact on their social lives was almost as prominent ($\beta = -0.229, p=<.001$). In addition to the acknowledged overall impact of hearing handicap on the veterans' social lives, the curtailment of their perceived social agency within their family roles was more prominent ($\beta = 0.138, p=<.001$) than their perceptions of the actual impact of hearing losses on either their family ($\beta = 0.105$, $p=<.001$) or recreational lives ($\beta = 0.100$, $p=<.001$).

Hypotheses related to the veterans' hearing handicap

The results from the hierarchical regression reported in Table 8.24 support the overarching **Hypothesis 14**: Each of the six variable blocks in the composite model of Ageing with Hearing Handicap provided significant, but variable, explanatory links with the veterans' self-reported hearing handicap; and accounted for 71.5% of the total variance explained.

However, the results did not support **Hypothesis 14a**, which predicted that the dis/enabling functional measures of the dyadic partners' social support would be more strongly associated with the veterans' hearing handicap than their reinforcing structural support measures. Although the structural support variable block contributed 1.6% of the total variance in hearing handicap at Step 2, and the functional support variable block contributed 6% to the total variance explained at Step 3, none of these social support measures provided significant explanatory contributions in the final model (especially following the addition of the final three variable blocks).

The final model did support **Hypothesis 14b**, which predicted that the dis/enabling aural rehabilitation variables would explain more variance in the veterans' hearing handicap than the predisposing variables, including their actual hearing losses (i.e. NAL% HL). The dis/enabling aural rehabilitation variables contributed 21% unique variance at Step 4, compared to the 10.9% for the Step 1 predisposing variable block. The Step 6 column in Table 8.24 shows clearly that collectively four aural rehabilitation variables and use of the veterans' hearing aids were significantly related to the DV.

Hypothesis 14c predicted that the veterans' self-reported memory in everyday life would be significantly related to their hearing handicap. The results confirmed this prediction for two of the three 'frequency of forgetting' memory factors that emerged in the dataset, viz.: the Attending during Semantic Processing (ASP) factor, which was more strongly related to the DV ($\beta = 0.138$, p=<.001) than the General Forgetfulness (GF; $\beta = -0.098$, p=<.001) factor. The General Retrieval (GR) factor failed to add any significant explanatory power to hearing handicap in the final model.

Hypothesis 14d predicted that the veterans' perceptions of their spoiled social identities attributable to their hearing losses would account for the largest amount of variance in their self-reported hearing handicap. The final step contributed the largest percentage (22.5%) of variance to the total amount explained in the final model (adjusted $R^2 = 71.5\%$), confirming this fourth hypothesis. In addition, all five variables in this block were significantly related to the DV.

8.9.2 Empirical links with the veterans' physical health-related quality of life

Guided by the theoretical overview that informed the development of an ecological model to explore the veterans' hearing handicap, 38 dyadic partner independent variables (IVs) were also selected to explore their bivariate empirical associations with the veterans' mental and physical health-related quality of life (H-QoL). These IVs were similarly grouped into six variable blocks: With the exception of the veterans' bilateral hearing losses variable, the first three blocks comprised the same predisposing sociodemographic, reinforcing structural support and dis/enabling functional IVs as those in the hearing handicap regression model.

The NAL% HL variable was included in the fourth variable block, which comprised the potentially exacerbating veteran perspectives of ageing with the stigmatising impact of hearing losses. The final two variable blocks focused on further potentially exacerbating health-related variables, in order to explore which respective dyadic partners' physical and mental health dimensions were associated with the veterans' H-QoL.

Table 8.25 lists ten potentially exacerbating impact of ageing with hearing losses IVs in variable block four, seven potentially exacerbating physical health-related IVs in variable block five, and nine potentially exacerbating mental health-related IVs in variable block six. Table 8.26 presents the bivariate associations of the 22 variables within the initial four variable blocks, as well as the 16 within with the final two variable blocks; with the veterans' SF-36 physical and mental H-QoL composite scores (i.e. their SF-36 PCS and MCS scores).

In each H-QoL regression model the dyadic partners' respective potentially exacerbating physical/mental health-related variables are included within the fifth variable block, while the respective composite scores' four complementary SF-36 mental/physical health subscales are included in the final variable block. While the original intention was that each regression model would include the female dyadic partners' corresponding SF-36 component scores in variable blocks five and six, in the veterans' PH-QoL regression model the women's SF-36 Role Emotional subscale was substituted for their composite $MCS_{S/P}$, as the Table 8.21 correlations demonstrated that this subscale was the only one that correlated with the veterans' SF-36 PCS_{MR}.

Bivariate links with the veterans' physical health-quality of life (PH-QoL)

The correlations between the blocks of independent variables (IVs) and the veterans' mental and physical H-QoL are presented in Table 8.26. The variable blocks are demarcated with dotted lines and labelled on the extreme right hand side of both tables.

This section only presents significant correlations with the veterans' PH-QoL. Accordingly, the following summary comments reflect both the number and strength of the significant correlations with *SF-36* PCS_{MR} within the structure of the six variable blocks listed above:

i. Four of the five ***predisposing sociodemographic variables*** were significantly but weakly correlated with the *SF-36* PCS_{MR} (i.e., *Age*, $Education_{MR}$, *Branch &* $Occupation_{MR}$); the veterans' mean age yielded the strongest of these correlations.

ii. Two of the ***reinforcing structural support*** Wenger network factor scores were significantly but weakly correlated with the *SF-36* PCS_{MR} (i.e., the veterans' Wenger Community Focus factor scores [WCF_{MR}] & their partners' Wenger Family Focus factor scores [$WFF_{S/P}$]). Whilst the independent dyadic partners' Wenger factor scores were not significantly correlated with each other, the dyadic partners' Family Focus factor scores were very similar ($r = .83$, $p<0.001$); whereas their Community Focus factor scores were less so ($r = .42$, $p<0.001$).

iii. Only one of the ***dis/enabling functional support variables*** was significantly but weakly correlated with the *SF-36* PCS_{MR} (*Loneliness*), despite the fact that there appeared to be some degree of shared variance between the veterans' feelings of loneliness and satisfaction with the perceived availability of emotional support ($r=.36$, $p<0.001$).

Table 8.25

Variables comprising the six ecological variable blocks that explore potential significant links with the veterans' physical and mental H-QoL

VARIABLE BLOCKS:	
I Predisposing sociodemographic variables:	
5 variables as for hearing handicap model excluding NAL% HL (refer Table 8.22)	
II Reinforcing structural support variables:	
4 variables identical to hearing handicap model (refer Table 8.22)	
III Dis/Enabling functional support variables:	
3 variables identical to hearing handicap model (refer Table 8.22)	
IV Potentially exacerbating impact of ageing with hearing losses (HL) variables:	
Abbreviated labels:	**Variable description:**
13 *NAL% HL*	Percentage bilateral hearing losses from audiogram
14 *Tinnitus*	Ever experienced tinnitus? (*n*=498 or 74.2% = 1)
15 *Sat. with perf. HAs*	Satisfaction with overall performance of HAs
16 *Sat. with audios.*	Satisfaction with overall service of audiologists
17 *HHIE total*	Self-reported hearing handicap inventory (HHIE) tot.
18 *HL & depression*	Frequency HL made veterans depressed
19 *HL & social life*	Frequency HL affected veterans' social lives
20 *HL & family roles*	Frequency HL affected veterans' family roles
21 *Memory: ASP Mean*	Frequency of problems Attending during Semantic Processing (ASP)
22 *Memory: GR Mean*	Frequency of problems with General Retrieval (GR)
V Potentially exacerbating physical health-related variables:	
Abbreviated labels:	**Variable description:**
23 *Chronic conditions*	Total number of self-reported chronic conditions
24 *ADL total*	In/dependence performing activities of daily life (ADL)
25 *SF-36* $PCS_{S/P}$	S/P SF-36 Physical Composite Score ($PCS_{S/P}$)
26 *SF-36* PF_{MR}	MR SF-36 Physical Functioning (PF) score
27 *SF-36* RP_{MR}	MR SF-36 Role Physical (RP) score
28 *SF-36* BP_{MR}	MR SF-36 Bodily Pain (BP) score
29 *SF-36* GH_{MR}	MR SF-36 General Health (GH) score
VI Potentially exacerbating mental health-related variables:	
Abbreviated labels:	**Variable description:**
30 *GDS-15*$_{MR}$ *total*	MR self-reported depressive symptoms
31 *GDS-15*$_{S/P}$ *total*	S/P self-reported depressive symptoms
32 *Excessive drinking*	Drink 6 or more drinks on one occasion? (*n*=142 or 21.2% = 1)
33 *SF-36* $RE_{S/P}$	S/P SF-36 Role Emotional ($RE_{S/P}$) score
34 *SF-36* $MCS_{S/P}$	S/P SF-36 Mental Composite Score ($MCS_{S/P}$)
35 *SF-36* VT_{MR}	MR SF-36 Vitality (VT) score
36 *SF-36* SF_{MR}	MR SF-36 Social Functioning (SF) score
37 *SF-36* RE_{MR}	MR SF-36 Role Emotional (RE) score
38 *SF-36* MH_{MR}	MR SF-36 Mental Health (MH) score
DEPENDENT VARIABLES (DVs):	
1 *SF-36* PCS_{MR}	MR SF-36 Physical H-QoL composite (PH-QoL)
2 *SF-36* MCS_{MR}	MR SF-36 Mental H-QoL composite (MH-QoL)

iv. Nine of the ten variables that gauged the ***potentially exacerbating impact of ageing with hearing losses*** yielded significant but consistently weak correlations with the *SF-36* PCS_{MR}. The highest of these correlations occurred between the veterans' frequency of self-reported problems during general retrieval (Memory: GR *M*) and their PH-QoL (r = -.19, p<0.001); however, correlations with their hearing handicap total and the dichotomous variable that gauged how frequently the veterans acknowledged their hearing losses had made them depressed also registered correlations of a similar magnitude.

v. All three of the ***potentially exacerbating physical health-related variables*** were significantly correlated with the $SF\text{-}36\ PCS_{MR}$; however, the strength of these correlations varied considerably, as both the veterans' total number of chronic conditions (*Chronic conditions*) and their independence performing activities of daily living (*ADL total*) correlated moderately, whilst the variable which gauged the female dyadic partners' equivalent SF-36 composite physical health score ($SF\text{-}36\ PCS_{S/P}$) correlated weakly. The correlations with the veterans' four SF-36 PH-QoL subscales are referred to in the following section, which deals with the $SF\text{-}36\ MCS_{MR}$.

vi. Six of the eight relevant ***potentially exacerbating mental health-related variables*** were significantly related to the $SF\text{-}36\ PCS_{MR}$ (as stated earlier, the $SF\text{-}36\ MCS_{S/P}$ was omitted from the $SF\text{-}36\ PCS_{MR}$ analysis). Of these six variables, two veterans' MH-QoL subscales ($SF\text{-}36\ VT_{MR}$ & $SF\text{-}36\ SF_{MR}$) and the total number of depressive symptoms the veterans reported ($GDS\text{-}15_{MR}$ *total*) were moderately correlated with the veterans' PH-QoL. The weakest significant correlations with the veterans' PH-QoL occurred between their dyadic partners' total number of self-reported depressive symptoms ($GDS\text{-}15_{S/P}$ *total*) and their SF-36 Role Emotional (RE) mental health subscale ($SF\text{-}36\ RE_{S/P}$).

The veterans' self-reported physical H-QoL (PCS_{MR}) failed to correlate significantly with their mental H-QoL ($r = -.02$ with MCS_{MR}).

Table 8.26

Intercorrelations between the veterans' health-related quality of life (i.e. their SF-36 PCS & MCS total scores) and six blocks of salient dyadic partner independent variables[a] (for between n=630 to N=671 dyadic partners[b])

I Predisposing sociodemographic variables

II Reinforcing features of structural support variables

III Dis/Enabling features of functional support variables

IV Potentially exacerbating impact of ageing with hearing losses variables

Variables:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	PCS$_{MR}$
1 Age	1.00																						
2 Education$_{MR}$	.09*	1.00																					
3 Branch	-.06	-.11**	1.00																				
4 Occupation$_{MR}$	-.07	-.20***	.08*	1.00																			
5 Education$_{S/P}$	-.06	.09*	.03	-.04	1.00																		
6 WCF$_{MR}$	.05	-.07	.05	.13**	-.05	1.00																	
7 WCF$_{S/P}$	.05	-.04	-.01	.07	-.06	.42***	1.00																
8 WFF$_{MR}$	-.05	.08*	-.03	-.01	.06	.01	-.03	1.00															
9 WFF$_{S/P}$	-.06	.10**	-.07	.02	.10**	-.04	-.01	.82***	1.00														
10 SSQs$_{MR}$	-.08*	-.03	.00	-.05	.05	-.15***	-.10*	-.13**	-.10**	1.00													
11 Loneliness	-.00	-.02	-.05	.00	.02	-.23***	-.14***	-.10*	-.08*	.36***	1.00												
12 SSQs$_{S/P}$	-.08*	.04	.02	-.09*	-.01	-.18***	-.22***	-.11**	-.08*	.20***	.21***	1.00											
13 NAL%HL	.25***	.06	-.09*	-.07	.09*	-.15**	-.10*	-.01	.03	.03	.05	.02	1.00										
14 Tinnitus	-.07	-.02	-.01	-.04	.01	-.05	-.01	-.05	-.04	.02	.11**	.07	-.05	1.00									
15 Sat. perf.of HAs	.02	-.04	.03	.04	-.01	.11**	.04	-.05	-.05	-.13**	-.11**	-.03	.06	-.07	1.00								
16 Sat. with audios.	-.04	.02	-.04	.03	.03	-.14***	-.04	-.08*	-.07	.23***	.16***	.12**	-.11**	.12**	-.36***	1.00							
17 HHIE total	.06	.08*	-.08*	-.11**	.05	-.19***	-.07	.03	.06	.17***	.27***	.12**	.31***	.13**	-.34***	.19***	1.00						
18 HL & depression	.01	-.01	.05	.09*	.03	.12**	.04	.01	-.02	-.11**	-.28***	-.07	-.16***	-.10*	.11**	-.01	-.58***	1.00					
19 HL & social life	.03	-.01	-.02	.08*	-.02	.13**	.04	.01	.02	-.12**	-.21***	-.11**	-.18***	-.10*	.24***	-.09*	-.65***	.43***	1.00				
20 HL & family roles	.05	.05	.05	-.00	.01	-.08*	-.02	.01	.04	.19***	.25***	.14***	.20***	.06	-.20***	.12**	.52***	-.29***	-.40***	1.00			
21 Memory: ASP *M*	.08*	.11**	-.07	-.19***	.06	-.17***	-.08*	-.02	.00	.15***	.16***	.05	.13**	.09*	-.17***	.12**	.44***	-.29***	-.33***	.31***	1.00		
22 Memory: GR *M*	.13**	.10*	-.00	-.12**	.02	-.13**	-.02	-.03	-.03	.16***	.10**	.04	.01	.04	-.13**	.11**	.30***	-.24***	-.25***	.20***	.68***	1.00	
SF-36 PCS$_{MR}$	-.17***	-.09*	.12**	.09*	.08	.12**	.03	-.06	-.08*	-.06	-.19***	-.05	-.11**	-.08	.10*	-.08*	-.19***	.19***	.09*	-.18***	-.14**	-.19***	1.00
SF-36 MCS$_{MR}$	-.04	-.04	.07	.05	.08*	.11**	-.01	.03	.05	-.24***	-.35***	-.07	-.08*	-.08	.06	-.07	.34***	.35***	.21***	-.20***	-.20***	-.15***	.02

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

[a] *Refer to the variable block descriptions in Tables 8.22 & 8.24 for details of the abbreviated variable names used in this matrix.*

[b] *The variation in sample size reflects the different numbers of dyads where both partners have complete data for any given variable.*

Table 8.26 (*continued*)

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	PCS$_{MR}$
23 Chronic conditions	1.00																
24 ADL total	.26***	1.00															
25 SF-36 PCS$_{S/P}$	-.05	-.12**	1.00														
26 SF-36 PF$_{MR}$	.39***	.50***	-.14**	1.00													
27 SF-36 RP$_{MR}$	-.39***	-.41***	.14***	-.62***	1.00												
28 SF-36 BP$_{MR}$	-.40***	-.37***	.10**	-.59***	.51***	1.00											
29 SF-36 GH$_{MR}$	.45***	.41***	-.10*	.59***	-.55***	-.47***	1.00										
30 GDS-15$_{MR}$ total	.32***	.36***	-.10*	.41***	-.43***	-.35***	.47***	1.00									
31 GDS-15$_{S/P}$ total	.03	.07	-.54***	.10*	-.11**	-.06	.07	.09*	1.00								
32 Excessive drinking	-.02	-.05	.05	-.01	.09*	-.04	-.04	.01	.04	1.00							
33 SF-36 RE$_{S/P}$	.03	.11**	-.28***	.12**	-.17***	-.10*	.07	.11**	.51***	.03	1.00						
34 SF-36 MCS$_{S/P}$	-.01	-.06	.04	-.02	.10**	.07	-.08	-.11**	-.51***	-.08*	-.73***	1.00					
35 SF-36 VT$_{MR}$	.37***	.41***	-.13**	.61***	-.59***	-.51***	.66***	.54***	.07	-.02	.13**	-.11**	1.00				
36 SF-36 SF$_{MR}$	.28***	.42***	-.09*	.51***	-.54***	-.41***	.50***	.46***	.10*	-.01	.16***	-.17***	.55***	1.00			
37 SF-36 RE$_{MR}$	.23***	.28***	-.13**	.38***	-.47***	-.27***	.34***	.36***	.13**	-.04	.26***	-.18***	.38***	.47***	1.00		
38 SF-36 MH$_{MR}$	.24***	.22***	.01	.23***	-.26***	-.29***	.44***	.44***	-.01	.00	.05	-.11**	.52***	.41***	.29***	1.00	
SF-36 PCS$_{MR}$	-.46***	-.53***	.15***	-.86***	.80***	.78***	-.69***	-.43***	-.11**	.04	-.13**	.04	-.65***	-.53***	-.29***	-.18***	1.00
SF-36 MCS$_{MR}$	-.13***	-.22***	.03	-.08*	.21***	.13***	-.35***	-.44***	-.05	.00	-.15***	.21***	-.52***	-.56***	-.64***	-.71***	.02

V Potentially exacerbating PHYSICAL health-related variables

VI Potentially exacerbating MENTAL health-related variables

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

[a] *Refer to the variable block descriptions in Tables 8.22 & 8.24 for details of the abbreviated variable names used in this matrix.*

[b] *The variation in sample size reflects the different numbers of dyads where* ***both*** *partners have complete data for any given variable.*

Table 8.27

Hierarchical multiple regression of salient dyadic partner independent variables on the veterans' PH-QoL (i.e. their SF-36 PCS scores), showing standardised regression coefficients (R, R^2, Adjusted R^2, and R^2 change) for n=590 dyadic partner cases with no missing data[a]

	Steps:					
Blocks of independent variables:	**1**	**2**	**3**	**4**	**5**	**6**
I Predisposing sociodemographic variables:						
Age	-.17***	-.19**	-.18***	-.15***	-.04	.00
Education$_{MR}$	-.04	-.03	-.03	-.02	-.00	-.01
Branch	.09*	.09*	.08*	.09*	.03	.01
Occupation$_{MR}$ (i.e. those with potentially higher risk of noise exposure)	-.06	-.05	-.05	-.06	-.11**	-.09**
II Reinforcing structural support variables:						
Veterans'/MRs' Wenger Community Factor scores (WCF$_{MR}$)		.11**	.07	.06	.01	.00
Spouse/partners' (S/Ps') Wenger Family Factor scores (WFF$_{S/P}$)		-.08	-.09*	-.09*	-.06	-.05
III Dis/Enabling functional support variables:						
Veterans' perceived loneliness and availability of friends: Loneliness			-.16***	-.11*	-.05	.01
IV Potentially exacerbating impact of ageing with HL variables:						
Bi-lateral hearing losses (NAL% HL)				-.02	-.03	-.02
Overall satisfaction with hearing aids (HAs)				.03	.05	.04
Overall satisfaction with audiological services				-.02	-.00	.01
Hearing Handicap Inventory (HHIE) Total				.01	.02	.14**
Attributions of depression to their hearing losses (HL)				.11*	.04	.03
Perceptions their HL affected their social lives				-.07	-.05	-.04
Perceptions their HL affected their family roles				-.13**	-.09*	-.06
Memory: Attending during Semantic Processing (ASP)				.10	.11*	.05
Memory: General Retrieval (GR)				-.16**	-.12**	-.05
V Potentially exacerbating physical health-related variables:						
Total number of chronic conditions					-.35***	-.23***
Independence performing ADLs					-.38***	-.21***
S/Ps' Physical health composite score: SF-36 PCS$_{S/P}$					.07*	.02
VI Potentially exacerbating mental health-related variables:						
Veterans' Geriatric Depression Scale total scores: GDS-15$_{MR}$ total						-.05
S/Ps' Geriatric Depression Scale total scores: GDS-15$_{S/P}$ total						-.03
S/Ps' SF-36 Role Emotional subscale scores: SF-36 RE$_{S/P}$						-.00
Veterans' SF-36 Vitality subscale scores: SF-36 VT$_{MR}$						-.49***
Veterans' SF-36 Social Functioning subscale scores: SF-36 SF$_{MR}$						-.24***
Veterans' SF-36 Emotional Role subscale scores: SF-36 RE$_{MR}$						-.06
Veterans' SF-36 Mental Health subscale scores: SF-36 MH$_{MR}$						.25***
R	0.224***	0.262***	0.303***	0.366***	0.661***	0.801***
Total R^2	0.050	0.069	0.092	0.134	0.437	0.642
Adjusted R^2	0.044	0.059	0.081	0.110	0.418	0.626
R^2 change	0.050***	0.018**	0.023***	0.042**	0.303***	0.206***

[a] n=590 also excluded two outlying dyadic partner cases.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$ (both 2-tailed)

Physical health-related quality of life hierarchical regression

The PH-QoL hierarchical regression analysis assessed the contributions of 26 significantly correlated independent variables within the six blocks of independent variables (IVs) listed in Table 8.27, in relation to the veterans' self-reported SF-36 composite PH-QoL (i.e. the $SF\text{-}36\ PCS_{MR}$).

Table 8.27 presents the results of each of the six successive variable blocks' contributions that accounted for the explained variance in the veterans' SF-36 composite PH-QoL scores. Step 1 examined the effect of veterans' predisposing social demographic variables. In Step 2 the unique contribution of the dyadic partners' reinforcing structural support network variables were estimated, after controlling for the effect of the veterans' predisposing demographic variables. Step 3 estimated the contribution of the sole veteran dis/enabling functional support variable, after controlling for the impact of the predisposing and reinforcing variables. Step 4 controlled for the veterans' predisposing demographic and both the dyadic partners' reinforcing structural and the veterans' dis/enabling functional support variable blocks, before examining the potentially exacerbating effects of ageing with hearing losses.

Step 5 controlled for the preceding predisposing, reinforcing, dis/enabling, and the potentially exacerbating effect of ageing with hearing losses variable blocks, prior to determining the additional impact of the dyadic partners' potentially exacerbating physical health-related variables; and finally, Step 6 controlled for all the variables that were entered during Step 5, before determining the magnitude of the contribution of the dyadic partners' potentially exacerbating mental health-related variables, including the veterans' SF-36 mental health subscale scores.

Table 8.27 presents the results of each of the six successive variable blocks' contribution that accounted for the explained variance in the veterans' SF-36 composite PH-QoL scores. Step 1 examined the effect of veterans' predisposing social demographic variables. In Step 2 the unique contribution of the dyadic partners' reinforcing structural support network variables were estimated, after controlling for the effect of the veterans' predisposing demographic variables. Step 3 estimated the contribution of the sole veteran dis/enabling functional support variable, after controlling for the impact of the predisposing and reinforcing variables. Step 4

controlled for the veterans' predisposing demographic and both the dyadic partners' reinforcing structural and the veterans' dis/enabling functional support variable blocks, before examining the potentially exacerbating effects of ageing with hearing losses. Step 5 controlled for the preceding predisposing, reinforcing, dis/enabling, and the potentially exacerbating effect of ageing with hearing losses variable blocks, prior to determining the additional impact of the dyadic partners' potentially exacerbating physical health-related variables; and finally, Step 6 controlled for all the variables that were entered during Step 5, before determining the magnitude of the contribution of the dyadic partners' potentially exacerbating mental health-related variables, including the veterans' SF-36 mental health subscale scores.

Table 8.27 also reports the standardised beta coefficients (β) for each variable within the six successive blocks of named variables. The total variance explained by each step of this equation is provided (R^2 and adjusted R^2), along with the added variance explained by each block of variables while controlling for the previous blocks (R^2 change). R was significantly different from zero at the end of each of the six steps

At Step 1 the predisposing veteran social demographic variables alone explained 4.4% of variance (adjusted R^2) in the veterans' physical health-related quality of life (PH-QoL), $F(4,585) = 7.76$, $p<.001$. After Step 2, with the addition of the veterans' frequency of contact with their communities and their spouse/partners' distance from and frequency of contact with their families, the total variance explained in the DV increased to 5.9% (adjusted R^2), $F(6,583) = 7.12$, $p<.001$; a change of only 1.8% ($F[2,583] = 5.74$, $p<.01$). After Step 3, with the addition of the sole functional support variable, the veterans' availability of friends and perceived feelings of loneliness, the total variance explained in the DV was 8.1% (adjusted R^2), $F(7,582) = 8.41$, $p<.001$. This dis/enabling functional support variable accounted for an additional 2.3% of variance in the veterans' PH-QoL, after controlling for the predisposing and reinforcing variables ($F[1,582] = 14.82$, $p<.001$).

When the potentially exacerbating variables that encapsulated the impact of ageing with hearing losses were entered at Step 4, after controlling for the impact of the predisposing, reinforcing and dis/enabling social support variable blocks, the total variance explained in the DV increased to 11.0% (adjusted R^2), $F(16,573) = 5.53$,

$p<.001$. These variables accounted for an additional 4.2% of the explained variance in the veterans' PH-QoL (F [9,573] = 3.09, p=.001). The variables that indexed the dyadic partners' potentially exacerbating physical health in Step 5 accounted for a further 30.3% of the unique variance explained (F [3,570] = 102.16, $p<.001$), when the predisposing, reinforcing, dis/enabling and potentially exacerbating impact of hearing losses variables were controlled, so that 41.8% (adjusted R^2) of the total variance in the veterans' PH-QoL was accounted for (F [19,570] = 23.26, $p<.001$). The final variable block (Step 6) comprising the dyadic partners' potentially exacerbating mental health variables accounted for an additional 20.6% of the explained variance in the veterans' PH-QoL (F [7,563] = 46.38, $p<.001$). This yielded a final total of 62.6% (adjusted R^2) total explained variance in the veterans' PH-QoL that was accounted for by the 26 IVs in these six variable blocks (F [26,563] = 38.95, $p<.001$).

As in the hearing handicap regression, the IVs' beta coefficients at each step of this regression analysis provided opportunities to observe their effects on the DV within each block of variables, and the extent to which the additional IVs in the subsequent steps altered these effects. For example, with all the variables entered in the equation at Step 6, only the veterans' dichotomous occupational status variable within the predisposing variable block was significantly associated with the veterans' PH-QoL; however, this variable only achieved significance at Step 5, suggesting some sort of suppressor effect. Veterans' age was not significantly related to the DV in the final model, although this variable initially emerged as the most influential of the four sociodemographic variables; however, its influence appeared to be reduced by the potentially exacerbating physical health-related variables in Step 5. The weak but significant impact of service in the NZ Air Force was similarly reduced by the Step 5 variable block.

The dyadic partners' reinforcing structural support variables contributed the least amount of explained variance in the model, and in Step 6 neither variable was significantly related to the veterans' PH-QoL. The significant contribution of the veterans' less frequent contact with their communities in Step 2 appeared to be mediated by the subsequent introduction of the dis/enabling functional support variable. This functional support variable failed to exhibit statistically significant links with the

DV in the final model, as it too appeared to be mediated in the presence of the Step 5 physical health-related variables, after the reduction of its initial effect at Step 4.

The three remaining IV blocks introduced potentially exacerbating variables associated with ageing, namely the stigmatising impact of hearing losses, in addition to those that gauged the dyadic partners' physical and then their mental health. In the first of these blocks, only the veterans' hearing handicap total was significantly related to the DV in the final model, such that higher levels of hearing handicap were significantly related to higher levels of the veterans' PH-QoL. However, this effect only became apparent at Step 6, again suggesting a suppression effect. Of the nine IVs that gauged the stigmatising impact of ageing with hearing losses, only three were initially significantly related to the DV, namely: the veterans' frequency of forgetting during General Retrieval (GR), their perceptions that their hearing losses had affected their family roles, and their attributions of depression to their hearing losses. The last of these variables appeared to be mediated by the introduction of the subsequent dyadic partners' physical health-related variable block in Step 5; which also reduced the impact of the GR memory and attributions of depression variables. However, the significant effect of these two variables in Step 5 appeared to be mediated by the introduction of the dyadic partners' mental health-related variables in the final step.

The two potentially exacerbating veteran physical health-related variables (i.e., the total number of chronic conditions and independence performing activities of daily living) exerted similarly significant effects in relation to the DV in the final model; however their impact was reduced by the introduction of the potentially exacerbating dyadic partner mental health-related variables. On the other hand, the S/Ps' SF-36 PCS was not significantly related to the DV in the final model, having demonstrated a significant but weak relationship in Step 5, which also appeared to be mediated in the presence of the potentially exacerbating dyadic partner mental health-related variables.

Finally, three veteran mental health-related variables were significantly related to their PH-QoL in the final step: the SF-36 mental health subscales that gauged the veterans' vitality ($SF\text{-}36\ VT_{MR}$), mental health ($SF\text{-}36\ MH_{MR}$), and social functioning ($SF\text{-}36\ SF_{MR}$). Of these, the effect of the vitality subscale was almost twice that of any of the other significant contributors to the final model ($\beta = -0.487, p=<.001$).

8.9.3 Empirical links with the veterans' mental health-related quality of life

Informed by the revised ecological model described in 8.9.2 (which draws on the variables listed in Tables 8.22 and 8.25), this section initially summarises the bivariate correlations between salient ecological independent variables (IVs) and the veterans' MH-QoL (i.e. $SF\text{-}36\ MCS_{MR}$) depicted in Table 8.26, before reporting on the MH-QoL regression. The section concludes by focusing on evidence from the veterans' PH-QoL and MH-QoL regression models that relate to three specific hypotheses associated with the final research aim.

Bivariate links with the veterans' mental health-related quality of life (MH-QoL)

The following observations report on both the number and strength of significant correlations between the veterans' mental health-related quality of life (MH-QoL) and the six blocks of independent variables (IVs), depicted in Table 8.26:

i. Only one spouse/partners' ***predisposing sociodemographic variable*** was significantly but weakly correlated with the veterans' MH-QoL (i.e., the spouse/partners' education - $Education_{S/P}$).

ii. Only one veteran ***reinforcing structural support*** Wenger network factor score was significantly but weakly correlated with the veterans' MH-QoL (i.e., WCF_{MR}).

iii. Two of the veterans' ***dis/enabling functional support variables*** yielded stronger, but still moderately weak, significant correlations with the veterans' MH-QoL (i.e., $SSQs_{MR}$ & *Loneliness*).

iv. Seven of the ten variables that gauged the ***potentially exacerbating impact of ageing with hearing losses*** yielded stronger but still moderately weak significant correlations with the veterans' MH-QoL. Both the veterans' hearing handicap ($r = -.34$, $p<0.001$) and their attributions of depression to their hearing losses ($r = .35$, $p<0.001$) yielded the strongest correlations within this variable block.

v. Two of the four ***potentially exacerbating dyadic partner mental health-related variables*** of interest correlated significantly with the veterans' MH-QoL: The total number of the veterans' depressive symptoms (*GDS-15*$_{MR}$ *total*) correlated moderately, whilst the correlation with the S/Ps' composite mental health score (*SF-36 MCS*$_{S/P}$) was weak.

vi. Only the veterans' ***potentially exacerbating physical health-related variables*** were significantly correlated with their MH-QoL. The strength of these correlations varied considerably, with the physiologically based measures (such as physical functioning, bodily pain and total number of chronic conditions) yielding weaker correlations, whilst those that assessed the functional implications of physical limitations (such as independence performing ADLs and physical role) correlated more strongly. The veterans' SF-36 general health subscale was the strongest correlation within this variable block (*SF-36 GH*$_{MR}$).

Mental health-related quality of life hierarchical regression

Hierarchical regression analysis assessed the contributions of 19 significantly correlated independent variables within the six blocks of independent variables (IVs) listed in Table 8.26, in relation to the dependent variable (DV), the veterans' self-reported Mental health-related quality of life (i.e. *SF-36 MCS*$_{MR}$). Table 8.28 presents the results of each of the six successive variable blocks' contributions that accounted for the explained variance of the veterans' SF-36 composite MH-QoL scores. Steps 1 to 4 proceeded as for the PH-QoL regression. Step 5 controlled for the preceding predisposing, reinforcing, dis/enabling, and the potentially exacerbating effects of ageing with hearing losses variable blocks, prior to determining the additional impact of the dyadic partners' potentially exacerbating mental health-related variables; and finally, Step 6 controlled for all the variables that were entered during Step 5, before determining the magnitude of the contribution of the dyadic partners' potentially exacerbating physical healthy-related variables, including the veterans' SF-36 subscale scores.

Table 8.28 also reports the standardised beta coefficients, the total variance explained by each step of this equation (R^2 and adjusted R^2), along with the added variance explained by each block of variables while controlling for the previous blocks (R^2

change). *R* was significantly different from zero at the end of five of the six steps, with Step 1 not providing any significant contribution to the explained variance.

At Step 1 the predisposing S/P demographic variable alone explained an insignificant 0.2% of variance (adjusted R^2) in the veterans' MH-QoL, *F* (1,578) = 1.93, *p*=.165. After Step 2, with the addition of the veterans' frequency of contact with their communities, the total variance explained in the DV increased to 1.3% (adjusted R^2), *F* (2,577) = 4.83, *p*=.008, a change of only 1.3% (*F* change [1,577] = 7.70, *p*=.006). After Step 3, with the addition of the veteran functional support variables, the total variance explained in the DV was 13.3% (adjusted R^2), *F* (4,575) = 23.29, *p*<.001. These dis/enabling functional support variables accounted for an additional 12.3% of variance in the DV, after controlling for the predisposing and reinforcing variables (*F* change [2,575] = 41.07, *p*<.001). When the potentially exacerbating variables that encapsulated the impact of ageing with hearing losses were entered at Step 4, having controlled for the effects of the predisposing, reinforcing and dis/enabling social support variable blocks, the total variance explained in the DV increased to 23.9% (adjusted R^2), *F* (11,568) = 17.56, *p*<.001. These variables accounted for an additional 11.4% of the explained variance in the veterans' MH-QoL (*F* change [7,568] = 12.44, *p*<.001). The variables that indexed the dyadic partners' potentially exacerbating mental health in Step 5 accounted for a further 7.4% of the unique variance explained when the predisposing, reinforcing, dis/enabling and potentially exacerbating impact of hearing losses variables were controlled (*F* change [2,566] = 31.17, *p*<.001), so that 31.2% (adjusted R^2) of the total variance in the veterans' MH-QoL was accounted for (*F* [13,566] = 21.23, *p*<.001). The final Step 6 variable block comprising the dyadic partners' potentially exacerbating physical health accounted for an additional 6.6% of the explained variance in the veterans' MH-QoL (*F* change [6,560] = 10.14, *p*<.001). This yielded a final total of 37.3% (adjusted R^2) total explained variance in the veterans' MH-QoL that was accounted for by these six variable blocks (*F* [19,560] = 19.14, *p*<.001).

As in the previous regressions, the IVs' beta coefficients at each step of the analysis displayed in Table 8.28 provided opportunities to observe their effects on the DV within each block of variables, and the extent to which the additional IVs in the subsequent steps altered these effects, and/or yielded comparable results to the PH-QoL regression.

For example, with all the variables entered in the equation at Step 6, more than half the IVs were significantly associated with the veterans' MH-QoL, as opposed to over a quarter of those that were significantly related to their PH-QoL (i.e., 10 of the 19 MH QoL IVs in comparison with seven of the 26 PH-QoL IVs).

The sole predisposing sociodemographic variable (*Education*$_{S/P}$) was not significantly related in the final model, although this variable registered significant (albeit weak) contributions to the explained variance in both Step 3 and Step 4 of the regression equation. Likewise, the sole reinforcing structural support variable (*WCF*$_{MR}$) failed to contribute significantly in the final model, but did so when introduced to the regression in Step 2; an effect that appeared to be mediated by the subsequent introduction of the dis/enabling functional support variable block. Both the veterans' functional support variables (*SSQs*$_{MR}$ *& Loneliness*) registered statistically significant links with the DV in the final model; effects that were evident when these variables were introduced in Step 3 and were sustained throughout the regression equation. However, the impact of the veterans' perceived loneliness and availability of friends appeared to be reduced by the potentially exacerbating impact of ageing with hearing losses and the mental health-related variable blocks; whereas their perceived satisfaction with the availability of emotional support sustained a consistent impact on the DV despite the introduction of additional variable blocks.

The three remaining IV blocks introduced potentially exacerbating variables associated with ageing, namely the stigmatising impact of hearing losses, in addition to those that gauged the dyadic partners' mental and then their physical health. In the first of these blocks, three variables were significantly related to the DV in the final model: Significantly higher levels of MH-QoL were associated with more frequent acknowledgement by veterans that their hearing losses had made them depressed, lower levels of self-reported hearing handicap, and decreased frequency of forgetting whilst attending during semantic processing (ASP) in everyday life.

Self-reported hearing handicap was initially the most influential of the seven variables that gauged the potentially exacerbating impact of ageing with hearing losses, along with the veterans' attributions of depression to their hearing losses; however, the introduction of potentially exacerbating mental health variables appeared to reduce the impact of hearing handicap comparative to the veterans' attributions regarding feeling depressed, and this effect was sustained in the final model, after controlling for the potentially exacerbating physical health-related variables. The ASP memory factor only added a significant contribution to the explained variance of the veterans' MH-QoL in the final model, after controlling for the potentially exacerbating mental and physical health-related variables.

Both the potentially exacerbating mental health variables (*$GDS\text{-}15_{MR}$ & $SF\text{-}36\ MCS_{S/P}$*) exerted significant effects in relation to the DV in the final model; however, the impact of the veterans' depressive symptoms was reduced by almost a third with the introduction of the potentially exacerbating dyadic partner physical health-related variables. This was not the case for their dyadic partners' SF-36 composite mental health score.

Finally, three of the veterans' physical health-related variables were significantly related to their MH-QoL in Step 6: the SF-36 physical health subscales that gauged the veterans' general health (*$SF\text{-}36\ GH_{MR}$*) and physical functioning (*$SF\text{-}36\ PF_{MR}$*), in addition to their independence performing activities of daily living (*ADLs*). Of these, the veterans' general health was the most significant contributor to the explained variance in the final model (β=-0.303, p=<.001), such that those with good general health also reported higher levels of MH-QoL. Although the veterans' physical functioning also contributed significantly to the explained variance in the final model, in this case lower levels of physical functioning were associated with higher levels of MH-QoL. This apparently counter-intuitive result is discussed in the following chapter. The third variable, independence performing ADLs, demonstrated that those who were less dependent on others enjoyed better MH-QoL.

Table 8.28

Hierarchical multiple regression of salient dyadic partner independent variables on the veterans' MH-QoL (i.e. their SF-36 MCS scores), showing standardised regression coefficients (*R*, R^2, Adjusted R^2, and R^2 change) for *n*=580 dyadic partner cases[a] with no missing data

	Steps:					
Blocks of independent variables:	**1**	**2**	**3**	**4**	**5**	**6**
I Predisposing sociodemographic variables:						
Education$_{S/P}$	.06	.06	.08*	.09*	.07	.04
II Reinforcing structural support variables:						
Veterans'/MRs' Wenger Community Factor scores (WCF$_{MR}$)		.12**	.03	.02	.07	-.05
III Dis/Enabling functional support variables:						
Veterans' perceived satisfaction with emotional support: SSQ$_{MR}$			-.12**	-.10**	-.10**	-.10**
Veterans' perceived loneliness and availability of friends: Loneliness			-.30***	-.22***	-.14***	-.12**
IV Potentially exacerbating impact of ageing with HL variables:						
Bilateral hearing losses (NAL% HL)				-.01	.00	-.00
Hearing Handicap Inventory (HHIE) Total				-.22***	-.14*	-.14*
Attributions of depression to their hearing losses (HL)				.20***	.15**	.16***
Perceptions their HL affected their social lives				-.06	-.04	-.03
Perceptions their HL affected their family roles				.06	.06	.06
Memory: Attending during Semantic Processing (ASP)				-.08	-.10	-.10*
Memory: General Retrieval (GR)				.01	.06	.06
V Potentially exacerbating mental health-related variables:						
Veterans' Geriatric Depression Scale total scores: GDS-15$_{MR}$ total					-.30***	-.21***
S/Ps' Mental health composite score: SF-36 MCS$_{S/P}$					.12**	.10**
VI Potentially exacerbating physical health-related variables:						
Total number of chronic conditions						-.01
Independence performing ADLs						-.09*
Veterans' SF-36 Physical Functioning subscale scores: SF-36 PF$_{MR}$						.22***
Veterans' SF-36 Physical Role subscale scores: SF-36 RP$_{MR}$						.04
Veterans' SF-36 Bodily Pain subscale scores: SF-36 BP$_{MR}$						-.07
Veterans' SF-36 General Health subscale scores: SF-36 GH$_{MR}$						-.30***
R	0.058	0.128**	0.373***	0.504***	0.573***	0.627***
Total R^2	0.003	0.016	0.139	0.254	0.328	0.394
Adjusted R^2	0.002	0.013	0.133	0.239	0.312	0.373
R^2 change	0.003	0.013**	0.123***	0.114***	0.074***	0.066***

[a] *n=580 also excluded twelve outlying dyadic partner cases.*

* *p*<0.05 ** *p*<0.01 *** *p*<0.001 (both 2-tailed)

8.9.4 Salient biopsychosocial links with the veterans' health-related quality of life

The results from the two hierarchical regressions reported in Tables 8.27 and 8.28 supported the overarching **Hypothesis 15** as the six variable blocks comprising the composite model of Ageing with Hearing Handicap model provided significant, but variable, explanatory links with the veterans' self-reported physical and mental H-QoL. The models accounted for 62.6% of the total variance in the veterans' physical H-QoL (i.e., their PCS scores); but only 37.3% in their mental H-QoL (i.e., their MCS scores).

Four hypotheses addressed the relative contributions of the dyadic partners' social support, the veterans' hearing handicap, and the potentially exacerbating dyadic partner variable blocks to the veterans' PH-QoL and MH-QoL regression equations.

Hypothesis 15a predicted that the reinforcing structural support variable block would exert a comparatively stronger influence accounting for the explained variance of the veterans' PH-QoL in comparison with the dis/enabling functional support variable block. The PH-QoL regression equation failed to confirm this prediction, as the two structural support variables accounted for 1.8% of the veterans' PH-QoL (*F* change [2,582] = 5.74, *p*=.003), whereas the sole dis/enabling functional support variable contributed 2.3% (*F* change [1,582] = 14.82, *p*<.001).

Conversely, **Hypothesis 15b** predicted that the contribution of the dis/enabling functional support variable block would exert a comparatively stronger influence in comparison with their reinforcing structural support variable block when accounting for the explained variance of the veterans' MH-QoL. The MH-QoL regression equation confirmed this prediction, as 12.3% of the MH-QoL's explained variance was provided by the dis/enabling functional support variable block (*F* change [2,575] = 41.07, *p*<.001); whereas the sole veteran variable comprising the MH-QoL's reinforcing structural support variable block contributed 1.3% (*F* change [1,577] = 7.70, *p*=.006).

Hypothesis 15c predicted that the potentially exacerbating impact of ageing with hearing losses variable block would exert a comparatively stronger influence in relation to the veterans' mental rather than their physical H-QoL. The regression equations confirmed this prediction, as 11.4% of the MH-QoL's explained variance was provided by that unique block of variables (*F* change [7,568] = 12.44, $p<.001$), whereas the PH-QoL's variable block only contributed 4.2% (*F* change [9,573] = 3.09, $p=.001$).

The methodological and conceptual implications of these findings are discussed in the following chapter.

CHAPTER NINE: DISCUSSION

- **9.1 Coping trajectories: Hearing handicap and aural rehabilitation**
  - **9.1.1 Veteran perspectives**
  - **9.1.2 Spouse/partner perspectives**
  - **9.1.3 Reflections**
- **9.2 Social support**
  - **9.2.1 Wenger support networks**
  - **9.2.2 Functional support**
  - **9.2.3 Reflections**
- **9.3 Health-related quality of life**
  - **9.3.1 Veterans' profiles of chronic conditions and independence performing ADLs**
  - **9.3.2 Veterans' self-reported frequency of forgetting**
  - **9.3.3 Partners' emotional well-being**
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  - **9.3.5 Reflections**
- **9.4 Multivariate findings**
  - **9.4.1 Veterans' hearing handicap**
  - **9.4.2 Veterans' health-related quality of life**
  - **9.4.3 Evaluating the composite model of Ageing with Hearing Handicap**
- **9.5 Concluding comments**
  - **9.5.1 Strengths and limitations**
  - **9.5.2 Ecological implications: Coping with hearing handicap across Wenger's support network continuum**
  - **9.5.3 Hearing health policy implications**
  - **9.5.4 Future research**
  - **9.5.5 Contributions of the present research**

Chapter Nine discusses the research findings in relation to the doctoral study's four research aims and their associated hypotheses (refer Tables 6.5 and D.2). The chapter begins by comparing dyadic partner perspectives of the veterans' hearing handicap (HH) and aural rehabilitation coping trajectories (i.e. research aims 1 and 2); and then discusses the downstream impact of social support on the veterans' memory and both *partners' emotional wellbeing (i.e. research aim 3); before focussing on both partners' health-related quality of life (H-QoL). Each of these first three sections concludes with reflections on the methodological implications of the findings. Discussions of the hypotheses associated with the fourth and final research aim examine the utility of using the composite model of Ageing with Hearing Handicap (refer Figure 6.1) to identify key independent variables that accounted for a significant amount of the variance in the veterans' self-reported HH and their physical (PH-QoL) and mental health-related quality of life (MH-QoL). A consideration of the doctoral study's general strengths and limitations precedes the penultimate focus on the ecological implications of these results. These are framed using Cohen's (1992) Transactional Model of Stress (refer Figure 5.5) to integrate the significant social and emotional findings observed across Wenger's support network continuum, and then suggest policy implications and future research possibilities. Final summary statements note the contributions of the current research.*

This chapter discusses the findings, focussing on each of the four research aims stated in Chapter One, and their associated hypotheses articulated in Chapter Six (refer to either Table 6.5, or Table D.2 - which includes the outcomes of the hypothesis testing).

9.1 Coping trajectories: Hearing handicap and aural rehabilitation

The first two research aims focussed on both partners' perspectives of the veterans' aural rehabilitation coping trajectories. The associated findings were subsequently integrated into the final aim which explored biopsychosocial facets of ageing with hearing handicap (HH).

9.1.1 Veteran perspectives

As predicted, significantly more experienced hearing aid users reported having had their hearing tested more recently (**Hypothesis 1**), suggesting that experienced users' health beliefs prioritised monitoring their existing hearing levels. On the other hand, respondents who identified themselves as 'first time' hearing aid users reported they were significantly less satisfied with the overall performance of their hearing aids

(**Hypothesis 2**), despite having significantly lower NAL% HL levels, and reporting significantly less handicap. First time users were also more likely to report wearing their aids for only half a day or less (**Hypothesis 3**). Whilst these results attest to the variable adaptive processes of 'first time' hearing aid users, they also affirmed Erber's (2003) observations that many older adults who postpone seeking help for their hearing problems may also lack appropriate personal and environmental support and information, to encourage them to derive maximal benefits from enhanced communication opportunities (see also Blakey, Alpass, Pachana, & Long, 2003). Applying these results to Glass and Balfour's (2003) adapted Ecological Model of Ageing (EMA - depicted in Figure 2.1) suggests that the interactive processes which developed experienced users' personal coping competencies appeared to support attaining the potential benefits associated with buoyant environmental features; whereas the first time users' personal coping competencies appeared to exacerbate their environmental stresses (Erler, 1995).

The veterans' assessments of the performance of their hearing aids across three different listening situations demonstrated that whilst amplifying previously unheard sound frequencies, the technologies were unable to compensate for the complementary cognitive and psycholinguistic capabilities required when attending to listening, comprehending, and responding to conversational speech; especially in demanding listening situations (refer Figure 8.1). Clearly 'upstream' aural rehabilitation services that focus solely on the technological amplification of sound whilst ignoring the cumulative psychosocial sequelae of ageing with HH that were described in Chapter Three (see for example Gagné, Hétu, & Getty, 1995; Gomez & Madey, 2001; Noble & Hétu, 1994; and Stephens, 1996) diminish the veterans' opportunities to develop appropriate coping competencies, and accentuate the likelihood of stressful environmental interactions. In addition, the dearth of coherent information about the potentially exacerbating effects of age-related hearing losses (ARHL; refer to Pichora-Fuller [2003] among others cited in Chapter Two) highlights the need for co-ordinated interdisciplinary approaches and environmental interventions that prioritise the multi-faceted components of communication as a crucial contributors to sustaining the H-QoL of older adults (Scialfa, Pichora-Fuller, & Spadafora, 2004).

9.1.2 Spouse/partner perspectives

Stephens' (1996) sociomedical model has described the evolving links between spoiled social identities and HH, including communication partners. Furthermore, the nature of 'shared functional disability' has been illustrated by Lanham Harned's (2000) analysis of older couples' conversations with and without the stress of coping with hearing losses. Hallberg (1996), Hétu et al. (1995) and Dalton et al.'s (2003) observations about coping with hearing losses in the context of family relationships informed the four hypotheses linked to the second research aim. These hypotheses explored differences in the partners' perceptions of the stigmatising impact of the veterans' hearing losses on the veterans' social and emotional agency. As predicted, a significantly greater proportion of women partners reported that the veterans' hearing losses had affected their partners' social, family, and recreational lives at least half the time (**Hypothesis 4**). Moreover the women were more likely to report that hearing losses had restricted their partners' social agency fulfilling their family roles (**Hypothesis 5**), and had made their partners emotionally detached in their interpersonal relationships (**Hypothesis 6**). Given these results, it was not surprising that significantly more women also acknowledged that their partners had been depressed about their hearing losses (**Hypothesis 7**).

The differences between the partners' perceptions were highly significant and consistently robust. They affirmed Stephens' (1996) sociomedical model explaining the development of handicap within dyads; however, the extent to which the older women respondents in the present study were more acutely aware of the accumulative social and emotional impact on their partners' lives over many decades is deserving of more attention. Getty and Hétu's (1994) ecological investigation of how somewhat younger male workers coped with noise-induced hearing losses highlighted how stigmatised they felt in social situations; but that their spouses were more likely to express dissatisfaction about their partners' diminished social roles and the consequential impact on their intimate relationships. As less research attention has been devoted to the experiences of older dyads' appraisals of living with a lifetime of the stigmatising effects of HH attributable to toxic noise, it's useful to be mindful of the growing body of evidence in both human and animal studies which suggests that once damaged by hazardous noise, on-going age-related hearing losses appear to foster continuing declines over time that are probably not based on simple linear additivity (refer Gates et al., 2000; Mills et al., 1998; and Wiley et al., 1998). The divergent appraisals of the partners in the present research may well reflect the women's perceptions of these continuing declines over time; especially in the face of cultural stereotypes that project negative attitudes in relation to ageing and disability (Brown & Draper, 2003; Henrard, 1996). In addition the women may well be aware of the indirect impact of tinnitus on their partners' wellbeing (Erlandsson & Hallberg, 2000).

Despite these robust differences between the independent dyadic partners, researchers and clinicians need to exercise caution when reviewing proxy responses that are used to assess "the more subjective domains of emotion, memory and communication" (p. 2598, Duncan, Lai, Tyler, Perera, Reker, & Studenski, 2002). Accordingly, the partners' proxy responses are evaluated in the following section's reflections on methodological implications.

9.1.3 Reflections

Methodological implications

Despite the significantly different partner appraisals gauging the social and emotional legacies of ageing with HH reported above, the emotional subscale of the screening version of the Hearing Handicap Inventory (HHIE-S) failed to detect a significant difference between the partners' responses (refer Table 8.10). A closer examination of bivariate associations between the veteran responses for the entire 25-item HHIE questionnaire and their social and emotional subscale totals revealed that the five questions comprising the spousal screening version's emotional subscale (i.e. HHIE questions 2, 5, 9, 14 & 15) were not the most strongly associated with these veterans' full HHIE emotional subscale total scores.

A possible explanation for the HHIE screening version's apparent lack of sensitivity in this sample relates to the fact that the questionnaire was originally designed as a screening instrument to detect HH for partners who were *about* to embark on aural rehabilitation. The complementary partner perspectives reported in this research reflect diverse first time to experienced adaptive coping trajectories that have evolved over many decades, and demonstrate that the five items comprising the HHIE-S emotional subscale were more limited in their scope of being able to provide a valid gauge of these older partners' perceived differences. The accordance between the partners' HHIE-S emotional subscale responses is contrary to research of proxy reports for older adults, which found that not readily observable subjective components (such as bodily pain, role emotional and social functioning) reflected the poorest person-proxy agreement (Perkins, 2007). Perkins noted that several factors (including the length of the relationship between proxy and actual respondents, ethnicity, care giving burden, and the time spent care giving) may differentially impact on the accuracy of proxy responses. These factors could differentially affect communication partners' proxy perceptions, as opposed to those of care givers.

Despite the limitations noted regarding the choice of items comprising the screening version of the HHIE, the 25-item questionnaire provided a valid and reliable self-report gauge of the veterans' subjective social and emotional experiences of coping with HH. For example, significant bivariate intersections in the dataset between the veterans' most frequently reported depressive symptoms and the emotional consequences of ageing with HH indicated that veterans who reported difficulties because their hearing limited or hampered their personal lives, were also likely to have reported they 'prefer to stay at home', and had dropped their involvement in 'activities and interests' (reflecting their constricting social agency).

Finally, it is worth noting that the current research did not include any 'upstream' measures that gauged the acoustic and/or physical aspects of the veterans' environments that might have impacted on sustaining interactive communication (refer Figure 2.1). This omission is addressed in the suggestions about future research.

The following section focuses on the hypotheses associated with the first part of the third research aim, which explored the structural features of Wenger's (1994) social support networks and their associated functional support characteristics.

9.2 Social support

Cross-cultural findings from a review of European countries and peoples indicated that despite the wide range of languages, cultures, political systems, and histories represented, broad similarities existed in the types of inter-personal relationships created and the sources and dynamics of social support networks (Wenger, 1997a). Wenger's (1994) network typology distinguished between well-functioning and malfunctioning types of support networks. *Well-functioning networks* were defined as those where members handled the problems of every day life routinely, recognised when help was needed and requested it; and problems within such networks were generally solved by service provision, advice or advocacy. In contrast, *malfunctioning networks* may have always exhibited problem behaviours, strained or inadequate relationships or communication problems, which become exacerbated in the presence of an increasingly dependent older person; and members may resist or reject interventions to improve or work around relationships. Wenger stated that whilst malfunctioning networks could occur in any network type, they were more common amongst socially isolated Family Dependent (FD) and Private Restricted (PR) networks, which had a greater proportion of older adults in poor health. She also noted that as support networks' capacities to provide informal support differed, profiling the distribution of networks extends health service planners' understanding of the workings of the community in general, as well as providing helpful individual assessment tools for clinicians when planning interventions.

9.2.1 Wenger support networks

Distributions of Wenger support networks

The sociodemographic characteristics of the respondents (especially higher educational attainment and better H-QoL than the non-respondents) are reflected in the sample's Wenger support network distribution. The comparatively higher prevalence of Wider Community (WC) support networks in the independent dyadic partner samples reflects what Wenger (1994) described as 'a commonly middle-class adaptation' of older adults who were more likely to be married, lived far away from their relatives, and valued their independence. Wenger noted that older adults in WC support networks typically anticipated predictable problems, and often became their own case managers, although they might need help or support to establish the appropriate links with service providers. Given both partners' relatively higher SF-36 Physical Functioning and General Health subscale mean scores in comparison with their age- and sex-appropriate NZ normative scores, it is unsurprising that there was a comparatively higher prevalence of Wider Community (WC) and likewise comparably fewer socially isolated Family Dependent (FD) and Private Restricted (PR) support networks (Wenger, 1997b).

The relatively higher proportion of Local Self-Contained (LSC) support networks within the socially isolated networks suggests the presence of a group of self-reliant older adults with restricted capacities for reciprocating support exchanges (Wenger, 1994). Wenger noted that in the UK these older adults were statistically most likely to have been blue collar workers who earned modest incomes, and had no-one specifically identified by cultural norms to provide regular help and personal care.

Structural factors in Wenger's support networks

The data suggested that as the frequency of the partners' contact with their respective communities declined (i.e. their Wenger Community Focus [WCF] factor scores diminished), the differing capacities of two clusters of support networks (i.e. the Locally Integrated / Family Dependent cluster versus the Wider Community / Local Self Contained / Private Restricted cluster) to provide adequate compensatory functional support hinged on the relative proximity and accessibility of their family / whanau (reflected in higher Wenger Family Focus [WFF] factor scores). Moreover, the relative proximity of family support also appeared to determine the extent co-dependent partners were able to provide appropriate levels of reciprocal compensatory support that sustained each other's social and emotional well-being.

Evidence of the socially isolating impact of ageing with HH was readily apparent, as the veterans' hearing losses *and* handicap increased along the socially integrated to isolated support network continuum. In addition, although significantly more females lived in socially integrated support networks (as predicted in **Hypothesis 8**), *both* partners in the severe/profoundly hearing impaired partner cohort reported significantly less frequent contact with their respective communities, when compared with the mild/moderately affected dyadic partner cohort. This finding draws attention to the importance that veterans and their communication partners should be supported to develop personal coping competencies that minimise the harmful effects of unwanted social isolation.

The structural similarities between the Locally Integrated (LI) and Family Dependent (FD) support networks' access to functional support provided by family / whanau ensured that both partners in these networks reported comparatively higher levels of satisfaction with the perceived availability of emotional support than their neighbouring networks along Wenger's support network continuum. This finding questions J.E.

Fries' (1998) observations that family and friends/neighbours were equally important when providing emotional and tangible support exchanges. The downstream impact of these mezzo level structural features appeared to provide protective psychosocial mechanisms that ensured the veterans in these emotionally supportive networks did not feel socially isolated or lonely (see also Cavanaugh, 1998; Oxman, Berkman, Kasl, Freeman, & Barrett, 1992).

Social isolation gradient

In the three support networks with family members who were geographically remote (i.e. Wider Community [WC], Local Self Contained [LSC] and Private Restricted [PR] support networks), the numbers of veterans who reported that they felt lonely increased proportionately along the social isolation gradient encapsulated in Wenger's socially integrated to isolated support network continuum. This feature was amplified in the equivalent spousal appraisals across the support network continuum, and demonstrated that with increasing social isolation, the women were increasingly likely to report that their partners felt lonely (Blazer, Burchett, et al., 1991; Blazer & Hughes, 1991; Krause & Shaw, 2000). Given these complementary spousal appraisals, it is unsurprising that Wenger (1994) has reported that the carers of older adults in LSC networks, who were typically their spouses, were also likely to report feeling isolated.

The women's community contact was significantly stronger if their partners had mild/moderate as opposed to severe/profound hearing losses (Blakey et al., 2006). Furthermore, the data suggested that in the absence of potentially exacerbating chronic health conditions (especially respiratory disease, evident in the somewhat younger veterans in Family Dependent [FD] support networks), and not having family members who lived within 2-10 Km, older veterans' support networks appeared to have gravitated towards the Local Self Contained [LSC] support network configuration, where family members resided within 10-30 Km away and had at least weekly contact. On the other hand, veterans whose relatives (particularly children) lived over 100 Km away and to whom they spoke less often than monthly, were more likely to gravitate towards socially isolated Private Restricted (PR) networks, as their contact within their communities declined (Wenger, 1997b).

In the absence of any longitudinal studies which provide evidence of the causative links between HH and socioemotional selectivity in veterans and their communication partners, the present study's descriptive cross-sectional constellations of the partners' sociodemographic and HH profiles across Wenger's social isolation gradient, has suggested that as the partners' potentially unsolicited social isolation increased, there was a corresponding negative impact on their emotional wellbeing (Arlinger, 2003; Pinquart & Sorensen, 2001).

The ensuing sub-section, which focuses on the hypotheses linked to the third research aim, discusses the significant differences in functional support evident across Wenger's support network continuum.

9.2.2 Functional support

Although research examining the social dynamics of ageing well has recommended that appropriate interventions for older adults should endorse their dignity, autonomy and needs for social engagement (Glass, 2003), no in-depth studies have explored patterns of coping that sustain productive engagement in later life (Lazarus, 1999b). However, DiMatteo's (2004) meta-analysis provides a sound evidence-based rationale that clinicians should routinely assess patient relationships when prescribing treatments, in order to facilitate appropriate support to achieve the treatment goals, and thereby enhance not only their patients' quality of life, but potentially also those of other family members who may be caring for or supporting them.

Gender differences in functional support

Four publications referred to in Chapter Five reported differential gender effects in three longitudinal studies that linked social support and health (refer Avlund et al., 1998; Avlund, Lund, Holstein, Due, et al., 2004; Fuhrer et al., 1999; and Shye et al., 1995). Of these, Shye and colleagues' 15-year follow-up of older research participants in Almeda county California, found that men derived protection from smaller networks than women; whilst the 7-year MacArthur Study data demonstrated that the salutogenic effects of these social ties on physical functioning were stronger for male respondents (Unger et al., 1999); and a 1.5 year longitudinal follow-up of Danish men and women over the age of 75 years found that 80 year-old men with diminished access to instrumental support experienced greater risk of functional declines (Avlund, Lund, Holstein & Due, 2004).

Given this evidence, it is unsurprising that the women in the doctoral sample listed significantly more people available to provide emotional support to them (**Hypothesis 9a**); however, these women were likewise significantly less satisfied with their perceived availability of this emotional support (**Hypothesis 9b**). A closer look at the data depicted in Figure 8.3 revealed how the structural aspects of support impinged on the actual number of people respondents listed available to provide emotional support, such that only in the socially isolated Family Dependent (FD) and Private Restricted (PR) support networks were no gender differences apparent; whereas with the exception of the PR networks (where the gender differences were pronounced), the women respondents were uniformly consistently less satisfied than their male counterparts, across all the support networks depicted across Wenger's support network continuum, in Figure 8.4. Despite affirming the gender differences apparent in the entire sample, the relatively weak support for hypotheses 9a and 9b draws attention to the changing nature of these gender differences across Wenger's social network gradient; and the possible confounding effects of partners coping with the functional implications of hearing handicap as they aged. This variability also illustrates why other health researchers such as Pescosolido (1992) have prioritised social networks as the mechanisms through which individuals learn about, come to understand and attempt to handle difficulties about their health (see also Pescosolido, 2007).

Socially integrated versus isolated network extremes and functional support

The current research explored differences in the perceived availability of emotional support at either end of Wenger's support network continuum. Respondents in the emotionally supportive Locally Integrated (LI) networks, who enjoyed stronger links with both their communities *and* families, not only listed the most people available to provide emotional support but were the most satisfied with their perceived access to such support. This finding affirmed Litwin's (1998) observations that networks with typically diverse social resources were linked to better health outcomes, as multiple providers of support off-set potential negative effects (Felton & Berry, 1992). On the other hand, the respondents in the Private Restricted (PR) networks who reported tenuous links with their communities and geographically remote families listed the least people, and were correspondingly the least satisfied with their perceived availability of emotional support. These findings confirmed **Hypotheses 10 and 11**, and provided convergent, cross-cultural validity of Wenger's (1994) socio-emotional gradient within the current research context.

9.2.3 Reflections

Methodological implications

Given the ecological perspectives of the current research, and the need for compact structural support measures of both the veterans and their partners' to enter into the multivariate regression analyses, the Wenger Family Focus (WFF) and Community Focus (WCF) factor scores were derived using principal components analysis. Whilst these two continuous measures provided succinct uni-dimensional gauges that included all the cases in the sample, they did not entirely capture the unique multi-dimensional nature of the intersections between these two factors represented across the five support network categories.

Missing responses for Sarason et al.'s (1987) Social Support Questionnaire (SSQ) were problematic, and may have contributed to the somewhat lower alpha coefficient reported for the veterans' perceived satisfaction with the availability of emotional support (SSQs). The positively skewed SSQ responses reflected comparatively higher levels of perceived emotional support in the respondent sample, which was not surprising, as it was comprised of dyads. However, the distribution of SSQ scores across Wenger's network continuum provided support of convergent validity with Wenger's descriptions of the availability of emotional support within the different types of networks (Wenger, 1994; 1997b).

The following section uses social epidemiological perspectives to examine the downstream impact of these structural and functional features of social support on both partners' health-related quality of life (H-QoL).

9.3 Health-related quality of life

This section begins with brief comments on the prevalence of chronic conditions within the veteran sample, before exploring further hypotheses that focussed on the veterans' self-reported memory in every day life, and the partners' depressive symptoms across Wenger's support network continuum.

9.3.1 Veterans' profiles of chronic conditions and independence performing ADLs

The relative incidence of chronic conditions in the veteran sample mirrored that of older adults in NZ in 2000, including the high prevalence of problems with eyesight, arthritis, hypertension and coronary disease (Statistics NZ, 2004). Although they were younger, the veterans in the Family Dependent (FD) networks reported the highest average incidence of complex co-morbid conditions (n = 3.8). By comparison, the veterans in the Private Restricted (PR) support networks reported fewer comorbid conditions and lower prevalence rates across all conditions, except for sight impairment, which would have exacerbated their HH (Erber, 2003). In addition, the levels of hearing losses and handicap increased across Wenger's support network continuum (refer Table 8.16); however, the veterans in the FD support networks reported comparably higher levels of subjective handicap relative to their objective NAL% HL. The physical H-QoL of veterans in the FD and PR support networks reflected the functional implications of these differences, and the high incidence of sight impairment reported by these veterans draws attention to the functional implications of coping with dual sensory losses (Erber).

Apart from a few more older veterans in Private Restricted (PR) networks reporting that they occasionally needed help with household tasks (a characteristic feature of the entire veteran sample, noted in the previous chapter), the veterans in the socially isolated PR and Family Dependent (FD) support networks reported very similar levels of independence when performing a range of activities of daily living (ADLs).

9.3.2 Veterans' self-reported frequency of forgetting

Evidence from the Epidemiological Studies of the Elderly research project in the USA demonstrated that the odds of declining cognitive functioning were nearly twice as great in socially disengaged older adults, due to the reduced opportunities for reciprocal communication which foster self-esteem and facilitate self-care (Bassuk, et al., 1999). Similar findings reported in the Swedish Kungsholmen three year longitudinal study (Fratiglioni, et al., 2000) led Berkman (2000) to comment that complex interpersonal interactions mobilise cognitive processes. Veterans in the socially isolated networks reported significantly more frequent self-reported occurrence of forgetting in their everyday lives than those in the socially integrated networks, which confirmed **Hypothesis 12**. The lack of stronger statistical support for this hypothesis undoubtedly reflected the diversity of the three factors that comprised the overall 'self-reported frequency of forgetting in everyday life' construct. Nevertheless, this finding supports the growing body of evidence referred to above that links social engagement with cognitive functioning in older adults, and leads to the closer examination of these links with the partners' emotional well-being (see also Zunzunegui, Alvarado, Del Ser, & Otero, 2003).

9.3.3 Partners' emotional well-being

Bowling (1994) noted that research evidence linking older adults' network support and their physical health was stronger and more consistent than equivalent associations with their mental health; and that changes in access to and provision of support could have a direct effect on older adults' mental health (see Thoits, 1991). In addition, Penninx, et al.'s (1999) prospective study of patients hospitalised for psychiatric services in Quebec, Canada, reported that cognitive impairment and hearing problems were more likely to be associated with depression, and increased the risks of subsequently developing disabilities with mobility and experiencing difficulties performing ADLs.

Gender differences

It is unsurprising in the light of the literature reviewed in Chapters Two and Three, that the hearing impaired veterans reported significantly more depressive symptoms than their partners (**Hypothesis 13a**); especially as most of the partners indicated that they did not have any hearing losses (Heine, Erber, Osborn, & Browning, 2002; Horowitz, 2003). However, significantly different gender-specific constellations of depressive symptoms were identified: For example, significantly more veterans reported that they had problems with their memory, chose to remain at home and were bored.

Social isolation gradient

As predicted in **Hypothesis 13b**, both the male and female respondents in the socially integrated support networks reported significantly fewer depressive symptoms than those in socially isolated networks; which replicated Krause's (1991) finding that older adults in unsupportive social networks reported higher levels of depression. In the present study, the most significant differences in the depressive symptoms reported by respondents in these two groups included lower energy levels and a preference to stay at home rather than going out and doing things (reported by those in socially isolated support networks; see also Heine & Browning, 2004). In addition, significantly more socially isolated respondents indicated that their lives were empty and that they felt pretty worthless the way they were. These symptoms encapsulated the cumulative stigmatising effects of social isolation on the respondents' emotional agency (refer Brooks et al., 2001); and illustrated what Heckhausen and Schulz (1995; 1998) described as a loss of security and primary control over their environments.

Given these significant differences across the social isolation gradient, it was unsurprising that the total number of depressive symptoms increased as respondents became more socially isolated, and that those in the most socially isolated Private Restricted [PR] networks reported the highest number of depressive symptoms of all the support networks (which conformed **Hypothesis 13c**). Reviewing the prevalence and readily apparent gender differences of self-reported depressive symptoms across Wenger's social isolation gradient illustrates why Blazer's (2005) editorial on depression and social support in late life concluded: "Social support is a most important factor in preventing the onset and progression of depression in later life." (p. 499). Moreover, the depressive symptoms that characterised those in the most socially isolated networks clearly demonstrated the close links between social and emotional agency for those respondents who were unable to exercise autonomy in their daily lives (Garstecki & Erler, 1998; Gomez & Madey, 2001).

The ensuing section explores the links between the veterans' social and emotional well-being, and their health-related quality of life (H-QoL).

9.3.4 Partners' health-related quality of life

It is instructive to comment briefly on the partners' SF-36 subscale profiles in comparison with their age-appropriate NZ normative profiles, prior to considering the gender differences that were apparent in the respondents' health-related quality of life (H-QoL).

The 75+ years New Zealand (NZ) normative male and female age bands of SF-36 mean scores were chosen for comparison purposes with the respondents' profiles, as that age band was closest to the average ages of the veterans and their partners (refer Ministry of Health, 1999a). The fact that both the independent partner samples' average composite mental and physical H-QoL scores were higher than their equivalent NZ norms attests to a potential respondent selection bias towards participants with better H-QoL. This potential bias was particularly noticeable in the much higher General Health (GH) subscale mean scores for both the veterans and their partners; and to a much lesser extent, in their slightly higher Mental Health (MH) subscale mean scores. In addition, the potential lasting presence of the 'healthy soldier bias' cannot be discounted, especially given the robust physical H-QoL of veterans in the socially integrated networks (Bross & Bross, 1987; see also Khaw, 1997).

No significant differences were detected between the partners in relation to their physical H-QoL mean scores; although both partners' Role Physical (RP) and Bodily Pain (BP) subscale mean scores were much lower than their equivalent NZ norms, indicating that despite their better levels of self-reported general health, the respondents also reported more disabilities in their everyday activities attributable to their physical problems, and limitations in their activities on account of experiencing bodily pain (Ware, 1997). On the other hand, there were significant gender differences in two of the mental-H-QoL subscales, with the veterans reporting significantly better levels of Mental Health (MH) and Vitality (VT) than their partners; although for both the men and women their VT subscale mean scores were below their equivalent NZ norms. It is also worth noting that despite the socially isolating impact of HH, the veterans reported comparatively higher Social Functioning (SF) subscale mean scores in comparison with their equivalent NZ norms; whilst their partners reported comparatively lower SF subscale mean scores. This concurs with the findings noted earlier about the relatively higher levels of support reported by the veterans, in addition to the significant gender differences that typified the respondents' perceptions of the availability of emotional support.

Salutogenic links between the veterans' comparatively better levels of Social Functioning and their MH-QoL composite scores were visible across all but the most socially isolated Family Dependent (FD) and Private Restricted (PR) support networks, where the presence of age-related chronic conditions appeared to exacerbate the socially isolating effects of the veterans' HH, as per Glass and Balfour's (2003) adapted EMA. The negative impact of social isolation on the mental health of the women (*n*=38) as opposed to veterans (*n*=57) in these two networks suggested the possible presence of downstream collateral effects on their communication partners' H-QoL (Christakis, 2004), which became evident as the veterans' HH levels became more pronounced (Stephens, France, & Lormore, 1995). These results foreshadow the significant links that emerged in the multivariate regression analyses between the partners' mental but not their physical health.

9.3.5 Reflections

Methodological implications

The social epidemiological models reviewed in Chapter Five suggested that older adults living with their spouse/partner as opposed to those who lived alone would be more likely to report better physical and mental health (Cohen, 1988; Holmen, Ericsson, Andersson, & Winblad, 1992). Furthermore, Bookwala and Schulz's (1996) findings have reported that one spouse's assessments of well-being and depression predicted the other's well-being, even after controlling for known predictors of these outcomes. They suggested that, given the similarity of their findings across affective and nonaffective domains, multiple mechanisms such as contagion, mate selection, and common environmental influences were likely to contribute to this phenomenon. Moreover, Brooks et al. (2001) have illustrated how environmental influences such as the benefits derived from amplification for those with hearing losses accrued to both partners (see also Heine, Erber, et al., 2002). In addition, in the present study, the comparisons between the respondents' SF-36 profiles with their equivalent age- and sex-appropriate NZ norms affirmed that on average the veterans and their partners did indeed report better H-QoL composite scores, which appeared to confirm the lasting presence of a 'healthy soldier bias' in the veterans, in addition to a positive social support selection bias for the independent partner samples. Although the prevalence of better health profiles within the dataset afforded opportunities to explore the dimensions of positive ageing (refer Baltes & Carstensen, 1996b; Bowling, 1993; Callahan & McHorney, 2003), they similarly reduced the chances of identifying salient eco-social variables which might compromise health outcomes in more representative older, hearing impaired veteran samples.

The total number of depressive symptoms the respondents reported varied significantly across Wenger's social isolation network gradient, thereby demonstrating how the perceived availability of emotional support of respondents in socially integrated networks mitigated their well-being (Newsom & Schulz, 1996). Although these results may well have encapsulated a potential confounding of hearing impairment on gender, Wenger's network continuum provided a useful analytical prism to illustrate the links between social isolation and emotional wellbeing. It is also instructive to be mindful that the analyses of variance excluded the transitional and inconclusive network cases (*n* = 256), which represented 19% of the combined partner samples. Future research should explore the associated emotional health profiles of respondents in these networks.

The upcoming section, which focuses on the multivariate findings within this dataset, is informed by similar social epidemiological perspectives that were framed using the PRECEDE model's organisational diagnosis and articulated in the composite model of Ageing with Hearing Handicap (refer Figure 6.1).

9.4 Multivariate findings

This section focuses on the fourth and final research aim and the associated hypotheses that tested the presence of significant multivariate empirical links with the veterans' HH within the dataset, as a prelude to examining those related to their health-related quality of life (H-QoL). The three hierarchical regression analyses were guided by the theoretical framework articulated in the generic composite model of Ageing with Hearing Handicap. This procedure afforded the analysis increased statistical control, and provided more robust tests of the predicted relationships with the three dependent variables (DVs) of interest than the simple bivariate correlations (Tabachnick & Fidell, 2001b). For example, although only those independent variables (IVs) that correlated significantly with the respective DVs were selected for entry into the regressions, the final statistical models demonstrated the disparities evident between the bivariate and multivariate results in the dataset.

9.4.1 Veterans' hearing handicap

The generic composite model of Ageing with Hearing Handicap accounted for 71.5% of the total variance explained by the six blocks of IVs that were entered into the HH regression model, which confirmed the overarching **Hypothesis 14**. The final model in this regression illustrated the pervasive influence of HH across diverse facets of the veterans' social, emotional and cognitive functioning. The ensuing discussion of the associated hypotheses addresses each of these aspects.

Only one of the four hypotheses that predicted significant multivariate empirical links with the veterans' HH was not supported by the results (i.e. **Hypothesis 14a**). The hierarchical regression revealed that although the veterans' contact with their communities (WCF_{MR}) declined significantly as their HH increased, this impact was completely mediated by the introduction of the subsequent three dis/enabling functional support variables, particularly the variable that gauged the dynamic interplay between the veterans' perceptions of social connectedness and their feelings of loneliness. Despite the more powerful initial explanatory power of these functional support variables, the next two steps comprising the dis/enabling aural rehabilitation variables (in Block IV) and the exacerbating health-related variables (in Block V) partially mediated the veterans' perceptions of loneliness. The inclusion of variables in the final step that encapsulated multiple perspectives of the stigmatising constraints on the veterans' social and emotional agency, as they coped with additional age-related sensory losses that exacerbated the adaptive challenges of ageing in an audible world, completely mediated the impact of the veterans' perceptions of loneliness. As a result, none of the social support variables introduced in the initial stages of the regression sustained any significant impact in the final model. On the one hand, this highlighted the pervasive nature of communication disorders across multiple facets of the veterans' lives (refer Garstecki & Erler, 1998; Hétu, 1996; Simmons, 2005; van den Brink et al., 1996); however, it also demonstrated that given the predominance of socially integrated networks in the sample, the reflexive question about the veterans' availability of friends and perceived loneliness provided a more sensitive gauge of the veterans' emotional coping than Sarason et al.'s (1987) perceived emotional support questionnaire (the SSQ).

The evidence supporting **Hypothesis 14b's** prediction that the block of aural rehabilitation variables would explain more variance in the veterans' HH than the block comprising predisposing variables (which included the veterans' bilateral hearing losses), emphasises the inadequacy of the 'objective' measures of hearing losses in comparison with the ecologically diverse, subjective perceptions reflecting the veterans' aural rehabilitation experiences. The fact that a number of these aural rehabilitation variables accounted for significantly increased levels of HH in the final regression model reinforces Gatehouse's (2003) challenge to audiologists that they need to provide a more holistic approach to aural rehabilitation. For example, Kiessling et al. (2003) suggest that engaging appropriate decision-analytic perspectives should determine which potential individual variables (e.g. daily use of hearing aid[s], overall satisfaction with performance of aid[s] and audiological service provisions) as opposed to physical and social environmental variables (e.g. managing listening in noisy or group situations) are amenable to reducing the social and emotional impact of HH on older adults' lives.

Likewise, **Hypothesis 14c's** prediction that in the final model of the regression analysis the veterans' self-reported memory in everyday life would be significantly related to their HH draws attention to the difficulties facing older veterans with limited energy resources, who have to concentrate carefully in order to minimise auditory processing errors so that they understand spoken language (Gordon-Salant, & Fitzgibbons, 1997; Montgomery, 1994; Neils, Newman, Hill, & Weiler, 1991; Pichora-Fuller, & Souza, 2003). Pichora-Fuller (2003) stated that the prevalence of perceptual and cognitive stressors such as noise and memory load which exacerbate age-related problems understanding spoken language depend on social-emotional factors. It is unsurprising, therefore, that in the final model, the increased frequency of veterans reporting they experienced problems attending during semantic processing was also associated with more depressive symptoms; and that both of these variables were linked to increased levels of HH. Given that three quarters of the veterans reported they had experienced tinnitus at some stage, it is worth noting that in the final model the binary tinnitus measure appeared to have been mediated somewhat by the intervening health-related variable block that included cognitive and emotional variables; and much more so by the veterans' perceptions of the stigmatising impact of hearing losses. Erlandsson and Hallberg's (2000) research findings revealed that impaired concentration, feeling depressed, perceived negative attitudes, hypersensitivity to sounds, average hearing level (best ear) and tinnitus duration were directly related to psychological distress. They also demonstrated that tinnitus-specific life circumstances such as depressive cognitions and social support indirectly affected the research participants' quality of life.

Given the length of time since most of the veterans first acquired their hearing losses, the lengthy delays before they engaged in aural rehabilitation (Hallberg, 1996; O Mahoney et al., 1996; van den Brink et al., 1996), and the hearing world's reluctance to readily accommodate older adults' communication needs (Carson, 1997; Carson & Pichora-Fuller, 1997; Cummings, Sproull, & Kiesler, 2002; Heine & Browning, 2002), it is unsurprising that the veterans' perceptions of the stigmatising impact of coping with their HH across a range of everyday situations accounted for the greatest proportion of explained variance in their self-reported perceptions of HH (Hétu, 1996; Simmons, 2005). Whilst these results confirmed **Hypothesis 14d**, the comparative beta values of the five variables that comprised this final variable block highlighted the pre-eminence of the veterans' emotional burden, as they coped with the inevitable disruptions to their social lives because of their communication difficulties.

Of the remaining nine variables that accounted for significant proportions of the explained variance in the final HH regression model, the link between the veterans reporting more frequent difficulties concentrating whilst listening to spoken language and higher levels of depressive symptoms reinforced the comparative dominance of the emotional sequelae of HH in these older veterans (Arlinger, 2003; Heine & Browning, 2004). Moreover, the results also suggested that veterans who reported a higher incidence of depressive symptoms associated with higher HH levels (Wenger, 1997b) likewise experienced difficulties concentrating in noisy or group situations (Naramura et al., 1999; Pichora-Fuller, 2003); although the respondents actually reported that they perceived their hearing aids' performance as poor in these situations. Similarly, veterans with higher levels of HH were more likely to be significantly less satisfied with the overall performance of their aids, reported that they wore them less frequently on a daily basis, and also expressed some dissatisfaction with their audiological service provisions. Although higher levels of HH were associated with more pronounced bilateral hearing losses, the fact that the veterans also reported significantly *less* frequent occurrence of general forgetfulness discounted the possibility that cognitive declines associated with advanced age significantly exacerbated the veterans' HH. The 14 variables identified in the final model as potential risk factors for higher levels of HH provide a useful profile of these older New Zealand veterans' hearing health, and their aural rehabilitation needs. For example, client education about the nature of age-related hearing losses should prepare partners to meet future challenges, and enable them to isolate communication problems attributable to technological limitations as opposed to those that reside in their physical or social environments.

The ensuing section focuses on further significant empirical links between the veterans' social support, HH, and their physical and mental health-related quality of life (H-QoL).

9.4.2 Veterans' health-related quality of life

The generic 'Ageing with Hearing Handicap' model also provided the theoretical rationale for the two final regression analyses and their associated hypotheses. In the first instance, the regression model accounted for 62.6% of the total variance in the veterans' physical H-QoL, but only 37.3% of their mental H-QoL. Nevertheless these results confirmed the overarching prediction that the model would explain significant proportions of the variance in the veterans' physical and mental H-QoL (i.e. **Hypothesis 15).** However, the evidence failed to support **Hypothesis 15a,** which predicted that in the veterans' self-reported physical H-QoL, the block of reinforcing structural support variables would account for relatively more variance than the block of dis/enabling functional support variables (Uchino, 2004b). In the final model of the physical H-QoL regression, none of the social support measures accounted for any significant links with the veterans' physical health; however, it was noticeable that the veterans' SF-36 Social Functioning subscale scores, which measured the quantity and quality of their social activities (Ware, 1997), accounted for a significant amount of the variance explained, as veterans who reported lower levels of physical health likewise reported they were significantly less active socially.

On the other hand, as predicted in **Hypothesis 15b,** the functional support measures accounted for the largest proportion of the explained variance of all six variable blocks included in the veterans' mental H-QoL regression; although in that final model the veterans' perceived loneliness appeared to have been partially mediated by the block of potentially exacerbating ageing with hearing losses variables (particularly those variables which reflected the veterans' increasing feelings of helplessness in relation to controlling their social, emotional and cognitive agency in the hearing world), in addition to the potentially exacerbating mental health variables (including higher levels of the veterans' self-reported depressive symptoms which exacerbated the environmental press on their personal coping competencies; and to a lesser, but nevertheless still significant extent, the female partners' mental H-QoL, which appeared to facilitate environmental buoying and thereby mitigate the downstream impact of ageing with HH on the veterans' mental H-QoL).

The model also demonstrated that the potentially exacerbating impact of ageing with hearing losses variable block accounted for almost three times as much of the explained variance in the veterans' self-reported mental in comparison with their physical H-QoL, which confirmed **Hypothesis 15c**. The impact of the veterans' HH became evident in the final model of the physical H-QoL regression, after the introduction of the potentially exacerbating mental health-related variable block. The beta values in this final model suggested that controlling for the veterans' decreased vitality and social functioning subscale scores, alongside their better than average mental health subscale scores, revealed a suppressed significant link between increased levels of self-reported HH and better physical H-QoL. This effect could be an artefact of the 'healthy soldier bias' (Bross & Bross, 1987); a selection bias which may well have been amplified by the prevalence of supportive networks that nurtured adaptive coping strategies which sustained both partners' social participation. It appears, therefore, that the impact of HH on the veterans' physical H-QoL in this dataset occurred in the presence of the veterans' above average mental health subscale scores, and was largely attributable to their reduced energy levels and constricting social activities. These results build on the earlier discussion of the partners' emotional well-being, which noted that respondents in socially isolated networks were more likely to report lower energy levels and preferred to stay at home.

On the other hand, the negative impact of the veterans' HH in the final model of their mental H-QoL appeared to be more pervasive, as significant links were evident across three variable blocks in the model. Increased depressive symptoms and attributing feeling depressed to their hearing losses drew attention to these veterans' loss of primary control, associated with their constrained social and emotional agency (Schulz & Heckhausen, 1996). Moreover, the data illustrated that increased levels of self-reported HH were significantly associated with fewer friends, enhanced feelings of loneliness, declining satisfaction with the perceived availability of emotional support, and increased difficulties concentrating whilst following conversations. In addition, the reflective links between both partners' mental H-QoL scores demonstrated that veterans who enjoyed better mental H-QoL were significantly likely to have partners with similar mental H-QoL scores.

The implications of these diverse findings are explored in the next section.

9.4.3 Evaluating the composite model of Ageing with Hearing Handicap

Methodological implications

The lack of support for the two hypotheses that addressed differences between the comparative contributions of structural and functional support measures (i.e. **Hypothesis 14a** in relation to the veterans' HH and **Hypothesis 15a** in relation to their physical H-QoL) highlighted the methodological challenges that confront researchers examining the effect of social relationships on health (Uchino, 2004). Guided by Lareiter and Baumann's (1992) theoretical diagram (refer Figure 4.1) the doctoral study's data collection included Wenger's (1994) Network Assessment Instrument (NAI – a structural support measure), and Sarason et al.'s (1987) Social Support Questionnaire (SSQ – a functional support measure). Clearly the constructs encapsulated in the two components derived from the principal components factor analysis of Wenger's NAI responses (i.e. WCF and WFF factors) failed to sustain their significant impact in these multivariate analyses. In retrospect, dichotomous dummy variables of different network categories that encapsulated the complex interactions between these two derived factors could have been used to explore which networks provided positive or negative reinforcement of the partners' aural rehabilitation coping strategies, as they faced the challenges of the veterans ageing with HH. For example, the socially integrated and emotionally supportive Locally Integrated (LI) networks should have nurtured the partners' adaptive coping and promoted successful ageing (Wenger, 1997b); whereas the socially isolated and emotionally unsupportive Private Restricted (PR) support networks would undoubtedly have exacerbated the environmental stress both partners reported, as depicted in Glass and Balfour's (2003) EMA. However, these solutions are informed by the knowledge gleaned from the analyses conducted and results presented in the previous chapter.

The noticeably smaller amount of variance explained by the regression models in the veterans' mental as opposed to their physical H-QoL draws attention to the possibilities of a constricted range of mental health scores in this sample of dyadic partners, in addition to a lack of a measure of post traumatic stress disorder (PTSD) in the veterans' mail out survey (Spiro et al., 1994). In an earlier publication from the Hearing Aid Research Project (HARP) face-to-face interview cohort, Alpass et al. (2004) drew attention to the negative relationship in the dataset between PTSD and cognitive status; and that those veterans in Private Restricted social networks had poorer cognitive functioning. They concluded that health professionals need to be aware of the concomitant possible influence of past trauma when dealing with older veterans, especially if they have been exposed to combat during their tours of duty.

The final section's concluding comments focus on this study's potential strengths and limitations before demonstrating the utility of Cohen's (1992) Transactional Model of Stress (TMS, refer Figure 5.5), to explain how living with acquired hearing losses exacerbated by age-related sensory losses can affect *both* partners' social connectedness, as they adapt to the on-going challenges of ageing in an audible world.

9.5 Concluding comments

9.5.1 Strengths and limitations

Response rates provide an indirect indication of the extent of non-respondent bias; and, as Snowdon (2001) has indicated that older 'refusers' were more likely to be depressed, it appears that the non-responding HARP veterans would most likely have revealed lower levels of education, higher levels of disablement, and compromised physical and especially mental H-QoL (Asch, Jedrziewski, & Christakis, 1997); as well as a greater prevalence of socially isolated support networks. In addition, given that the doctoral sample comprised dyadic partners, the results potentially reflect salutogenic perspectives that may considerably underestimate the long term negative consequences of ageing with acquired hearing losses in the general NZ veteran population. However, the traditional limitations linked to sampling biases in the current research have in fact afforded opportunities to explore eco-social facets of coping with the stigmatising impact of social-emotional selectivity associated with the veterans' acquired hearing losses, in both the veterans and their partners.

Methodological:

Whilst large samples provide opportunities to detect consistently different effects, they may disguise the presence of important participant variables which need to be teased out (Coolican, 1999). Results from the current research sample which illustrate both of these features have demonstrated the utility of Wenger's (1994) social network gradient to tease out consistent gender differences linked to functional support and emotional wellbeing across the support network continuum, and also identify unusual results. These significant gender differences may well be confounded by the presence of hearing loss in the veteran sample.

Focusing the doctoral research aims on dyadic partners' appraisals of coping with the veterans' spoiled social identities over many decades have provided opportunities to test the reliability, and ecological validity of a variety of salient self-report measures within the context of research focussing on older NZ respondents. Apart from the few notable instances of missing data that were generally more evident in the female respondents' dataset, and the compression of variance associated with sampling biases which decreased the sensitivity of some measures (for example the SSQ), the variables selected for inclusion yielded reliable self-report indicators of the constructs of interest. Although self-report measures may be considered unreliable, they have been shown to improve the predictive validity for functional decline of vulnerable older adults in community settings (Saliba, Elliott, Rubenstein, Solomon, Young, Kamberg, et al., 2001). Moreover, whilst Hyde and Riko's (1994) 'Decision Analytic Approach' to aural rehabilitation stressed the need to include self-report coping and client satisfaction measures, the current dataset also included objective measures of the veterans' hearing impairment. In addition, given the relatively older average age of the respondents, it is instructive to note Feher, Larrabee and Crook's (1992) finding that memory impairment did not affect their older research participants' accuracy when self-reporting depressive symptoms.

Researchers using cross-sectional datasets need to be mindful of the potential influence of confounding factors (e.g. the differing perspectives provided by first time and more experienced users); and the caveats in relation to establishing causative links between the variables (Coolican, 1999). In addition, in the present research sample the differences between the independent (i.e. male and female respondents) versus co-dependent (i.e. respondents residing in the same household) partner results require careful delineation, and challenges for future researchers regarding developing flexible measures and units of analysis that include either or both independent and co-dependent partners' perspectives.

Improving the sensitivity of some of the measures included in the composite model of Ageing with Hearing Handicap could potentially increase the total variance explained by the model (e.g. the binary tinnitus measure and a more appropriately constructed gauge of the partners' emotional coping efficacy, which accommodates those factors that could potentially differentiate communication partner' proxy responses – refer Perkins, 2007). Moreover, Macintyre, Ellaway and Cummins' (2002) observations about the inadequate conceptualisation, operationalisation and measurement of "place effects" on health, point to the need to develop contextual indexes which gauge the communication-friendly characteristics of older adults' physical and social environments (Inui, 2003).

When conducting a large number of individual tests in a dataset there is an increased possibility of reporting a chance association as 'statistically significant'; a potential problem which limited the interpretation of bivariate relationships in the present study. Although collinearity among the variables was generally low, the links between some of the potentially exacerbating impact of ageing with hearing losses variables may have adversely affected the multivariate analyses.

Whilst acknowledging the foregoing limitations, the use of multivariate analyses and cautious interpretation of the bivariate relationships are positive features of the current statistical strategy (Paddison, 2006).

Conceptual:

The composite model of Ageing with Hearing Handicap that guided the multi-level analyses integrated elements from diverse theoretical models to facilitate a naturalistic understanding of the world in which the veterans and their partners lived, and to identify the factors that had contributed to their H-QoL (refer Inui, 2003). Moreover, the transdisciplinary ecological perspectives that shaped the model recognised the presence of multiple biopsychosocial determinants of health in the older veteran respondents, and the importance of understanding more about both the veterans and their partners' capacities to accommodate the fluctuating demands of successful ageing in changing environments (Baltes & Carstensen, 1996b; Inui). For example, Glass and Balfour's (2003) adapted EMA provided a helpful template that not only guided the diverse literatures reviewed, but subsequently provided a conceptual framework that assisted interpreting the results and suggesting potential dynamic links between and across salient variables. However, the absence of measures that gauged the acoustic and physical aspects of place proved to be noticeable conceptual and methodological omissions.

The exploratory use of a clinical tool such as Wenger's (1994) NAI to provide both a categorical support network typology and continuous structural support measures demonstrated the utility of the support network continuum's classification's across Wenger's social isolation gradient; and the associated empirical links with the respondents' emotional agency offered fresh insights about the intersections between the structural and functional features of social support in the respondent sample. Furthermore, the need to consider these intersections among co-dependent partners has highlighted the importance of developing conceptual models that accommodate that level of analysis.

9.5.2 Ecological implications: Coping with hearing handicap across Wenger's support network continuum

Wenger's (1994) social isolation gradient provided a prism that illustrated both the positive and the negative aspects and functional implications of social relationships in the respondent sample (Uchino, 2004). For example, significant univariate findings of fluctuating support linked to the perceptions of the veterans' HH cast shadows across socially isolated respondents' capacities to cope resiliently with their changing environments (Inui, 2003). As only the functional support measures accounted for significant variations in the veterans' mental H-QoL, the ecological implications of these findings are explored using Cohen's (1992) Transaction Model of Stress (TMS - depicted in Figure 5.3) to integrate the univariate results. The organising framework of the TMS recognises the dynamic complexities encapsulated in these cross-sectional results, and offers insights about future research possibilities (Inui).

Whilst the first two pathways of Cohen's TMS provide 'upstream' eco-social perspectives filtered through different support networks, pathways 3 and 4 describe the 'mezzo level' *stress buffering* and *main effects* mechanisms that link the support networks with a range of 'downstream' biopsychosocial factors that have been shown to influence respondents' H-QoL. The aural rehabilitation literature reviewed suggested that timely and ecologically salient interventions should reduce the 'downstream' impact of coping with the attendant social and emotional stresses associated with communication problems on the respondents' lives (Carson & Pichora-Fuller, 1997; Noble & Hétu, 1994). Despite this, many of the veterans reported they had delayed seeking help for their communication difficulties for 20 years on average; and yet these delays could potentially be reduced if primary health physicians routinely considered social interactions as valuable indicators of their patients' health (Dassow, 2007).

Furthermore, coordinating the on-going provisions of timely and appropriate eco-social support behaviours within communities is crucial to sustain older partners' social and emotional agency, minimise network failure and disruption, and promote positive ageing (Hill, 2006; Ministry of Social Development Te Manatû Whakahiato Ora, 2001). Moreover, Hétu et al. (1995) recognised the pivotal role that stigmatising cognitive-emotional beliefs played in sustaining or undermining the confidence of communicators with acquired hearing losses within specific social contexts. In the present study, the noticeable differences between the first time and more experienced hearing aid users' coping trajectories highlighted the need for easily accessible, on-going family-centred support programmes that include opportunities to explore the disempowering feelings of stigma associated with HH, and enhance and affirm using alternative problem-solving strategies that alleviate the associated distress (Andersson & Willebrand, 2003). In addition, the protective cognitive and emotional benefits of sustained social engagement readily apparent in the dataset (DiMatteo, 2004), endorsed the goal of 'ageing in place', articulated in NZ's positive ageing strategy (Cannuscio, Block, & Kawachi, 2003; Feldman, & Oberlink, 2003; Ministry of Social Development Te Manatû Whakahiato Ora).

9.5.3 Hearing health policy implications

The body of evidence from this doctoral study can be drawn on to suggest diverse potential policy implications for Aotearoa New Zealand's hearing health agenda. These implications are framed using Glass and Balfour's (2003) adapted Ecological Model of Ageing (EMA) depicted in Figure 2.1 (refer Chapter Two), which coincidentally highlights the generative utility of this model within the current research context: Apart from structuring the trans-disciplinary literature review that guided the formulation of the doctoral study's four research aims and their associated hypotheses, this model has also shaped the composite model of Ageing with Hearing Handicap (refer Figure 6.1) that guided the study's multivariate statistical analyses. It seems appropriate, therefore, to use this framework to integrate the study's diverse findings (summarised in Table D.3), and suggest potential policy implications that foreshadow the final 'Phase 5 Administrative & policy diagnosis' column of Green and Kreuter's (1991) adapted PRECEDE model (refer Figure 1.2).

Neighbourhood factors or characteristics:

Given the considerable lapse of time before the veterans sought help for their communication difficulties, and the evidence that this delay was highly likely to have exacerbated the environmental press over time due to the impact of the veterans' hearing losses and downstream constraints on both partners' social and emotional agency (Glass & Balfour, 2003), hearing health promotion that sustains interactive communication is deserving of prioritised attention within Aotearoa New Zealand's (NZ's) public health agenda. More specifically, these hearing health programmes should target environments where evidence has demonstrated that people are exposed to increased risks of losing their hearing acuity because of harmful noise levels or other environmental agents (e.g. smoke, in-ear electronic listening devices, or ototoxic drugs). This in turn will require collaboration between national, regional and local government services, to routinely monitor the acoustic environments of community settings so that they are more effective in supporting the long-term communication needs of all the people who use them.

Hand-in-glove with this initiative, primary care settings should routinely screen all age groups within their enrolled populations with objective and subjective diagnostic hearing health tests; and consider eliciting significant communication partners' subjective proxy responses of communication difficulties in at-risk populations, especially for people aged 65 years and over. Moreover, people identified with hearing losses and their communication partners should be supported appropriately with complementary eco-social interventions (e.g. participation in self-help groups) that affirm the partners' emerging adaptive coping competencies to minimise the stigma of living with their hearing losses, and enable sustained social participation by nurturing more buoyant interactions across their acoustic and social environments.

Managing environments to support adaptive coping competencies that sustain health-related quality of life:

The study's findings in relation to first time versus the more experienced hearing aid users endorse Erber's (2003) comment that the earlier the aural rehabilitation intervention, the greater the benefits that will accrue; especially for older people who may lack the energy reserves to develop a new repertoire of adaptive coping competencies whilst managing exacerbating co-morbid conditions such as chronic illness, depression and concomitant age-related sensory losses with central nervous system sequelae (refer to Chapter Two's review).

The differing aural rehabilitation coping trajectories between those veterans who self-identified as first time versus the more experienced hearing aid users distinguished some aspects of veterans with active as opposed to more passive coping profiles. Clearly, coordinated and holistic person-centred health care delivered within the context of family/whanau is essential to accommodate older persons' needs more appropriately. By proactively identifying the presence of any age-related sensory or other hearing losses at the earliest possible chance, clinicians could minimise the likely occurrence of maladaptive passivity coping with aural rehabilitation needs. Moreover, endorsing the five steps of the decision-analytic approach to on-going aural rehabilitation articulated by Kiessling et al. (2003), should continue to refine the delivery of evidence-based clinical practice of hearing health services at both the individual and the population levels within Aotearoa NZ (refer Chapter Three); although Greville (2005) has noted the need to improve the quality of NZ's census questions to generate more reliable and valid national statistics about the incidence and profiles of people living with hearing losses in the future.

All front-line clinicians should be aware of the potential social and emotional sequelae borne by those who have live with invisible disabilities, and the likely presence of similar collateral sequelae in their communication partners (Christakis, 2004); a feature that was observed amongst those veterans who were older and had more profound objective hearing losses in the doctoral dyadic partner sample. In addition, by arranging Wenger's (1994) support network typology along a socially integrated to isolated network continuum, the emotional neediness of older dyads in the socially isolated networks became readily apparent; especially for those whose relatives lived some distance away, and more particularly for the women in the Private Restricted networks whose needs suggested they may benefit from receiving emotionally supportive respite care.

The findings in relation to Wenger's support networks demonstrate why both DiMatteo (2004) and Pescosolido (1992, 2007) have stated that health care interventions should routinely assess the social relationships and resources available to family members within their social support networks, as the characteristics and availability of these resources shape clients and their family/whanau's evolving responsiveness to their well being and treatment plan(s). Clearly clinicians who consult with older people living with sensory losses and residing in socially isolated networks need to be funded to provide appropriately coordinated care that meets these clients' specific biopsychosocial needs within the context of their family/whanau. In this regard, the subsidised availability of individual or group counselling services for both communication partners should be central to on-going aural rehabilitation treatments plans.

Minimising maladaptive responses:

Health services that cater for older people and their families should recognise that those in socially isolated support networks, who report decreased vitality and prefer to remain at home, may also have trouble concentrating. The study's findings demonstrated that a significant number of these older veterans experienced difficulties attending during semantic processing, and that this accounted for significant variations in both their hearing handicap and mental H-QoL. Clinicians need to be aware that in such cases remembering advice about treatment plans during consultations (especially if the information is transmitted telephonically), is highly likely to be compromised. Screening for the presence of age-related hearing losses and tinnitus, and respectfully and sensitively assessing the social and emotional agency and support needs of these clients is an important stepping stone to assisting them accommodate their loss of primary control over their social environments, and discovering whether any potential strategies might assist them recover specific losses (Heckhausen, 1997; Heckhausen & Schulz, 1995). Ignoring these symptom clusters, or rushing through consultations without accommodating the communication needs of clients, accentuates the client's experiences of environmental press; and may well also trigger despondent maladaptive responses that are likely to result in exacerbating functional declines, as per the pathways shown in the adapted EMA (refer Figure 2.1).

These policy implications reinforce the importance of providing person-centred health care that accommodates the eco-social realities of NZ's ageing population within the lives of their family/whanau (Ministry of Social Development Te Manatû Whakahiato Ora, 2001); proactively coordinates care across the full spectrum of services (King, 2001); and routinely evaluates the effectiveness of clinicians' consultation contexts, to assure the integrity of the information exchanged.

9.5.4 Future research

Recommendations regarding future research are linked to the three dominant topics within this research, viz. HH, social support, and health-related quality of life (H-QoL); and grounded within the eco-social context of NZ's veteran population.

Focussing initially on HH, it is instructive to note that Noble and Hétu (1994) advocated adopting an ecological approach to research which attended to the disabling and enabling interactions between persons and their environments. Within this conceptual framework, there is an obvious need to evaluate current hearing health promotion programmes within the NZ Defence Forces and NZWP, to examine the timeliness and adequacy of notifications and follow-up in relation to hearing screenings and the benefits of early intervention for veterans and their communication partners. Similarly, in order to limit the handicapping effects of hearing losses and tinnitus on ex-service personnel and their families, the physical environments of meeting places and communication processes used by veterans and their families to access services and information should be scrutinised, to identify and remove any potential barriers (physical, communication and social) that could inhibit the participation of older veterans with sensory losses. In addition, as the literature suggested that the trajectory and functional impact of age-related hearing losses are exacerbated by existing acquired hearing losses and smoking, research should be undertaken to develop a fuller understanding of the evolution, magnitude, and implications of these late-life developments. Moreover, given recent observations of a review of the tinnitus literature that clinical expertise in relation to tinnitus treatment options was 'generally lacking' (p. 1226, Henry, Dennis, & Schechter, 2005), research is needed in New Zealand to guide the development of appropriate evidence-based guidelines in relation to tinnitus treatment (see for example, Henry, Schechter, Loovis, Zaugg, Kaelin, & Montero, 2005).

Within the realm of social support, it would be useful to look at Wenger's transitional networks over time, to discover what predisposing factors enable eco-social mechanisms that buffer independent and co-dependent dyadic partner support networks from social isolation in the face of sensory losses and exacerbating age-related chronic conditions; and identify opportunities to develop appropriate interventions that sustain acceptable levels of productive engagement in vulnerable networks. Aligned to this is the need to develop a fuller understanding of how individuals' cognitive and emotional schema interact with eco-social coping mechanisms that elicit and sustain emotionally supportive relationships as older adults navigate challenges in late life (Naito-Chan, 2005; Uchino, 2004).

Conceptually ecological research integrates diverse measures (Inui, 2003); however Callahan and McHorney (2003) have suggested that "We need a whole science of new methods for analysis, measurement, and integrative research to better embrace complexity" (p. 390). For example, Cannuscio et al (2003) have recommended that clinicians need to incorporate the community living situations of older adults into routine clinical assessments and care. Research could likewise elucidate the underlying mechanisms by which Wenger support networks influence mutually agreed treatment goals for selected conditions; and examine whether the links vary by condition, type of support network, or any aspects of the provider behaviors (Pescosolido, 2007; Syme, 2003). There is also a need to understand how the social environment may influence treatment outcomes in ways other than the provision of social support (Gallant, 2003).

9.5.5 Contributions of the present research

Grounded in disability and gerontological contexts, this ecologic inquiry has focused on the nature of, and necessary ingredients for ageing successfully in the audible world. The conceptualisation of successful ageing did not require the absence of disease or disability, but emphasised the importance of preserving older adults' social and emotional agency as a prelude to sustaining their capacities to adapt and cope successfully in the changing circumstances of their lives (Baltes & Carstensen, 1996b; Inui, 2003).

The integration of interdisciplinary perspectives across the domains of aural rehabilitation, social support and H-QoL, within an ecological framework that focuses on older adults' everyday experiences within their community settings, has presented conceptual and methodological challenges. Resolving these challenges has contributed potential solutions to the emerging 'new science of complexity' (Callahan & McHorney, 2003). For example, by fusing Stephen's (1996) overall model for the development of HH with social epidemiological perspectives that included environmental factors, the resulting adapted Ecological Model of Ageing (EMA) suggested potential etiological pathways of successful adaptations and/or functional declines, as the veterans coped with additional potentially exacerbating health conditions. More specifically, however, components of the EMA were included in the composite biopsychosocial conceptual framework that was developed to explore the impact of multi-level empirical links within the dataset, on the older veterans' self-reported HH and ultimately their health-related quality of life (H-QoL). This composite model of Ageing with Hearing Handicap successfully guided the bivariate and multivariate analyses in the study.

The EMA also provided a useful interpretive tool for developing a more informed understanding of the ecological implications of the study's results. Consequently, the diverse findings have enhanced our understanding of the links between older veterans ageing with the invisible burden of HH, and the downstream impact this has on both the veterans and their partners' social and emotional wellbeing (Yorgason, 2003). In this respect, the research has demonstrated the utility of using Wenger's (1994) Network Assessment Instrument (NAI) within the cultural context of Aotearoa New Zealand. Moreover, apart from examining psychometric properties of the NAI, the arrangement of the five support networks along a social integration to isolation continuum has provided a means of linking these results to other social epidemiological perspectives. Integrating the insights gleaned from the multiple measures that varied significantly across Wenger's social isolation gradient, has added a H-QoL focus to the growing body of evidence linking social relationships and all-cause mortality (refer Uchino, 2004). Moreover, the composite model of Ageing with Hearing Handicap has illustrated how the pervasive and stigmatising impact of the veterans' hearing losses impacted directly on their mental H-QoL, and only indirectly on their physical H-QoL. Finally, Cohen's Transactional Model of Stress (TMS) has also provided an opportunity to explore the dynamic consequences of observed and emergent socioemotional selection processes that were evident across Wenger's support network continuum.

These results provide much needed insights about NZ's ageing veterans and their spouses. Likewise, they draw specific attention to the importance of hearing health agendas across *all* age groups, and the need for actors in the audible world to facilitate interactive communication that supports inclusive participation, affirms individual's social and emotional agency, and thereby contributes to the common good by enhancing social cohesion within our communities. Hearing health promotion programmes that specifically address the needs of older adults (Purchase-Helzner, 2004; Strawbridge et al., 2000) should inevitably also focus on issues of empowerment and social justice (Minkler, 1994); issues which underpinned Carson and Pichora-Fuller's (1997) systematic step-by-step approach that emphasised the active involvement of community members in all phases of aural rehabilitation programme planning, implementation, and evaluation, and coincidentally support New Zealand's positive ageing strategy (Ministry of Social Development Te Manatû Whakahiato Ora, 2001).

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Appendix A

HARP research project's potential participant contact package including: letter, information sheets and consent forms

Work and Income NZ
Te Hiranga Tangata

War Pensions
National Office
PO Box 12 , 36
WELLINGTON

6 May 1999

Dear Ex-service Person

RE: Massey University's School of Psychology Hearing Aid Research Project

The War Pensions section of Work and Income NZ provides many hearing aids to ex-service people with service related hearing loss. There is a need to know if services, aids and other assistive listening devices are still meeting ex-service personnel requirements.

The School of Psychology from Massey University, funded by a grant from the War Pensions Medical Research Trust, is undertaking research concerning ex-service personnels' satisfaction with their hearing devices.

To protect the privacy of war pensioners, this letter has been mailed out by the War Pensions National Office, on behalf of the Massey Research Team. The research team has not been given war pensioners' name and address or any detail of your war disablement pension. The research team will obtain responses from participants through pen and paper questionnaires, which participants will complete, and through interviews with research team members.

As a war pensioner with a hearing loss, taking part in this research project is entirely your decision, and you can choose to withdraw at any time, without incurring any penalty. Your decision whether or not to participate will **not** affect your war pension, or access to any other benefits or services that you currently receive. However, this project is supported by the War Pensions Advisory Board because it will gather important information, which will help the Board plan for the future. Your participation in this research project is requested.

Yours sincerely

Nigel Bickle
Secretary for War Pensions

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

Hearing Aid Research Project
Main Study Information Sheet

Who are the researchers and where can they be contacted?

My name is **Judy Blakey** and I am a research officer attached to the **Hearing Aid Research Project team**, based at Massey University's School of Psychology. I am being supervised by **Dr. Nancy Pachana**, a senior lecturer in the School of Psychology, also at Massey University.

We can be contacted at:
School of Psychology
Massey University
Private Bag 11 222
Palmerston North

Or by facsimile at:
(06) 350 5673

Judy Blakey's telephone at:
(06) 350 5558

Judy Blakey's Email at:
J.A.Blakey@massey.ac.nz

Free-phone for callers outside the Manawatu toll free zone:
0800 - 363 957

What is the research project about?

The research project will examine how older New Zealand ex-service personnel use their hearing aid devices. It will examine how individual changes associated with ageing (such as memory) and social factors (such as a person's family and friends) may affect hearing aid use. The results of this study may help audiologists assist older service personnel to use their hearing aid devices correctly.

Please ensure you read **ALL THREE PAGES** of this information sheet.

How will the project be organised?

Research on this project began in March 1999, with a pilot study in the Manawatu area. Results from this pilot study have guided the research team in their design of both the questionnaires and procedure for the main study. The main study will involve contacting a larger group of New Zealand ex-service personnel, who live throughout the country. A small, randomly selected sample of participants, who have completed the mail out survey and who live in the lower North Island will be contacted, and offered a chance to take part in a brief face-to-face interview.

What will you be asked to do as a participant in the main study?

As a participant in the main study, you will be asked to answer a number of questions:

Mail contact: A mail-out will ask you to fill in a survey that should take you about 90 minutes to complete. The survey will be made up of different parts that will ask you **general background information, including details about your general health and well being, your hearing aid use and satisfaction, your knowledge and appreciation of various hearing aid services, your reasoning and memory abilities, and your links with your family, friends and local community.** Once you have finished filling in the survey, you will be asked to place the completed questionnaires into a FREEPOST envelope, to be returned to Judy Blakey, at Massey University.

Face-to-face interview: **If you live in the lower North Island**, and have indicated your willingness to participate in a face-to-face interview when you returned your completed mail out survey, you will be contacted by a member of the research team to organise a location, date and time for the interview that is convenient to you both. This interview should take 30 minutes of your time, and will explore your **thinking processes and memory**. The research team will negotiate with community organisations (such as The Hearing Association) in the main centres throughout the lower North Island, to arrange to use easily accessible offices, with parking, as local interview venues. If you are unable to travel independently to these venues, every effort will be made to visit you at an alternative location.

Will anyone else be involved in the research?

Research has shown that hearing loss affects the patterns of communication within a household. We are interested in reporting the experiences of others (e.g. partners and family) who live in the same household as the hearing impaired veteran. Permission will be sought from another person who lives in the same household, to contribute to this aspect of the research process. A separate, plain brown envelope is provided, so that the other person can complete their consent form, and include it in the FREEPOST envelope supplied.

What will the other person be asked to do?

The mail out survey will include a short questionnaire for the other person to complete, and return, together with the main survey. **The purpose of this questionnaire will be to identify the problems that hearing loss may be causing the main respondent**, and will focus on **the person's general health and their links with family, friends and the local community**. Completion of these questions **should take about 15 minutes**.

Will any name(s) appear in the research report?

All responses to the self-report questionnaires and the interviews will be **kept strictly confidential**. Your questionnaires and thinking skills records will be given a code number, so that no one will be able to link your name with your responses.

What are your rights?

- You can discuss any questions you may have about any aspect of the study with the researcher, before you take part in it and during the course of your participation.
- You may refuse to answer any question, or withdraw from the study at any time.
- The information you provide is strictly confidential to the researcher, and will only be used for the purposes of this research project.
- The information you provide will not affect any of the services or benefits that you currently receive.
- If you choose to, you can request to receive feedback and information about the results of the research project, once it is completed.

☐☐☐☐☐

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

Hearing Aid Research Project Main Study Consent Form

Veteran's Declaration

I have read the Main Study Information Sheet, and had the details of this research project explained to me. Any questions that I have, have been answered to my satisfaction, and I understand that I may ask further questions at any time. I know that I have the right to withdraw from this research project at any stage, and to decline to answer any particular questions. I agree to provide information to the researchers on the understanding that my name will not be used, without my permission, in any publications. I also agree to allow the research team to access, for the purposes of this project only, the records related to my hearing assessments, held by the War Pensions C.P.U. I agree to participate in this study under the conditions set out in the Main Study Information Sheet.

Date: ____________________ **Signed:** ______________________________

Name: ____

Address: ____

____

____

What is your date of birth? (Please state day / month / year)

☐☐ ☐☐ ☐☐
day month year

What is your telephone number? STD CODE ☐☐ NUMBER ☐☐☐☐☐☐☐

If you would like to receive feedback from this project, in the form of a brief written summary, please tick the appropriate box: YES ☐ NO ☐

Te Kunenga ki Pūrehuroa

☐☐☐☐☐

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

Hearing Aid Research Project Main Study Consent Form

Declaration of Other Person

(To be completed by the Other Person living in the same household as the veteran respondent; placed in the supplied plain brown envelope, and returned, together with the completed Veteran's Declaration, in the supplied FREEPOST envelope.)

I have read the Main Study Information Sheet, and had the details of this research project explained to me. Any questions that I have, have been answered to my satisfaction, and I understand that I may ask further questions at any time. I know that I have the right to withdraw from this research project at any stage, and to decline to answer any particular questions. I agree to provide information to the researchers on the understanding that my name will not be used, without my permission, in any publications. I agree to participate in this study under the conditions set out in the Main Study Information Sheet.

Date: ____________________ **Signed:** ____________________________

Name: ____

Address: ____

____

____

If you would like to receive feedback from this project, in the form of a brief written summary, please tick the appropriate box: YES ☐ NO ☐

«Number»

«Title» «First_Names» «Surname»
«Address_Line_1»
«Address_Line_2»
«Address_Line_3»
«Address_Line_4»

Dear «Title» «Surname»

Re: Hearing Aid Research Project Main Respondent Mail Out Survey

Thank you for agreeing to participate in this research project. The enclosed mail out survey looks at how often (if at all) you wear your hearing aid/s, and consists of six parts:

- **PART 1** gathers details about your background;
- **PART 2** looks at your use of your hearing aid, and satisfaction with its performance, as well as hearing aid services in the community;
- **PART 3** identifies problems related to your hearing loss;
- **PART 4** focuses on your general health and well being;
- **PART 5** collects information about your social networks;
- **PART 6** questions your memory in everyday life.

Please answer all the questions from each of the six parts, even if you no longer wear your aid/s, or only wear one/them occasionally.

Completion of this survey will take some time (probably more than an hour). However, in return for your effort, it may be possible to provide you and future hearing aid wearers with a better hearing aid rehabilitation service.

When you have completed the survey, please place it in the enclosed, addressed, FREEPOST envelope. If another person in your household has agreed to participate in this study, their completed survey should **also be included in the same FREEPOST envelope**, before posting it.

Your confidentiality is assured at all times.

Yours faithfully

Judy Blakey

Judy Blakey

Appendix B

Veteran's letter and mail out survey

Hearing Aid Research Project Main Study

A research project conducted on behalf of the New Zealand War Pensions Medical Research Trust Board by independent researchers from Massey University

Please read the following instructions carefully:

- All the information you give us is in confidence and will be used only for the purposes of this study.
- Please attempt every question and be careful not to skip any pages.
- There are no right or wrong answers, we want the response which is best for you.
- It is important that you give your own answers to the questions. Please do not discuss your answers with others.
- Do not linger too long over each question, usually your first response is best.
- The survey is comprehensive and appears long, however we have used a large print size to make the text easier to read.
- We suggest that you plan to answer the questions over a few sittings. You will find a bookmark inside the front cover, to help you mark your place, as you progress through the survey. Each of the six parts of the survey is also printed in a different colour, to help you monitor your progress.

☐☐☐☐☐

If you live ...

.. in the SOUTH ISLAND,

OR .. NORTH of the line linking New Plymouth with Napier,

please tick the box on this line, → ☐

and then go straight to PART 1 on the next page.

[The instructions below apply ONLY to those NOT living in the areas mentioned above.]

Please tick ONE of the the boxes below, to indicate if you DO OR DO NOT WISH to participate in a 30 minute face-to-face interview with a member of the research team, at a time and location that is convenient to you both.

YES, I wish to be interviewed ☐ *- please continue.*

OR

NO, I do NOT wish to be interviewed ☐ *- please go straight to PART 1 on the next page.*

If you have indicated your willingness to participate in the face-to-face interview, you will be telephoned by a member of the research team, to set up an interview time and venue.

Please enter your telephone number below:

Telephone number: STD CODE ☐☐ NUMBER ☐☐☐☐☐☐☐

Interviews will take place during July, August and September of 2000. If you know you will be away at any time during these three months, please specify the dates you will be away below, so as to assist us organise the interviewing schedule:

____

Thank you. PART 1 begins on the next page.

Hearing Aid Research Project Main Study Survey

PART 1

Firstly we would like some general background information about you.
Please tick the circle ✓ next to the answer which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

1 **What is your date of birth?** (Please state **day / month / year**.)

				1	**9**		
day		month				year	

☐☐☐
☐☐☐

2 **What is your gender?**

○ Male ○ Female ☐

3 **Which ethnic group/s do you belong to?**
(You may tick more than one circle.)

- ○ 1 New Zealander of European descent ☐
- ○ 2 New Zealander of Maori descent ☐
- ○ 3 Pacific Islander ☐
- ○ 4 Asian ☐
- ○ 5 Other (Please specify) ☐

____

4 **Which of the following best describes the area where you live?**
(Please tick one circle.)

○ 1 Main Urban Area:	A city with population of 30,000 or more e.g. Palmerston North
○ 2 Secondary Urban Area:	A town / city with a population of between 10,000 & 29,999
○ 3 Minor Urban Area:	A town with a population of between 1,000 & 10,000
○ 4 Rural Centre:	A town with a population of between 300 & 1,000
○ 5 Rural Area:	Outside a town / city boundaries

☐

<u>Please tick the circle</u> ✓ which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

5 **Do you live . . . . (You may tick <u>more than one</u> circle.)** **Office Use Only**

○ 1 with your spouse / partner and no one else? ☐

○ 2 with your spouse / partner and family? ☐

○ 3 with relatives? ☐

○ 4 alone? ☐

○ 5 with other adults? ☐

○ 6 in a rest home / nursing home / veterans' home? ☐

○ 7 with young children aged 12 years or under? ☐

○ 8 Other (Specify in space provided below) ☐

____

6 **Are you retired?**

○ Yes ○ No ☐

7 **IF** you **<u>ARE</u> RETIRED** what <u>was</u> your main occupation? ☐

____

8 **IF** you **ARE <u>NOT</u> RETIRED** what <u>is</u> your main occupation? ☐

____

9 **What is your <u>highest</u> educational qualification?**
(Please tick <u>one</u> circle.)

○ 1 No school qualification

○ 2 School certificate passes

○ 3 School qualifications, University Entrance and above

○ 4 Trade certificate or Professional certificate or diploma

○ 5 University degree, diploma, or certificate ☐

Please tick the circle ✓ which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

10 **What would be the total income that YOU ALONE received from all sources, including benefits, before tax or anything was taken out of it, in the past 12 months?**
(Please specify the approximate dollar amount below.)

$ ______________________ (approximately)

☐ ☐ ☐
☐ ☐ ☐

If you live alone, please miss out Q11 and go straight to Q12

11 **What would be the total income that EVERY OTHER MEMBER of your household received from all sources, including benefits, before tax or anything was taken out of it, in the past 12 months?**
(Please specify the approximate dollar amount below.)

$ ______________________ (approximately)

☐ ☐ ☐
☐ ☐ ☐

12 **In which branch of the service were you employed?**
(You may tick more than one circle.)

1 ○ NZArmy ☐

2 ○ RNZNavy ☐

3 ○ RNZAirForce ☐

4 ○ Other (Please specify, for example, RAF)

____

____

______________________ ☐

Please write details in the spaces provided.

13 **What is/are your service number/s?**

Office Use Only

(Please enter details in the boxes provided, below.
Start entering data from the **LEFT hand side** of the boxes.
When you have entered your number leave any spare boxes blank.
If you have MORE THAN ONE service number, please ensure you specify WHICH BRANCH each number is associated with, in the space provided BENEATH the boxes.)

↓ Start here

Service Number: ☐☐☐☐☐☐☐☐
associated with ...
(Specify branch) ______________________

↓ Start here

Service Number: ☐☐☐☐☐☐☐☐
associated with ...
(Specify branch) ______________________

↓ Start here

Service Number: ☐☐☐☐☐☐☐☐
associated with ...
(Specify branch) ______________________

14 **Where did you serve on <u>active</u> service?**
(e.g. North Africa)
(e.g. Vietnam)
(Please specify by writing EACH place on a SEPARATE line.)

1 ______________________
2 ______________________
3 ______________________
4 ______________________
5 ______________________

Please write details in the spaces provided.

15 If you did NOT serve on active service, where did you serve? (for example, JForce)
(Please specify by writing EACH place on a SEPARATE line.)

Office Use Only

1 ______________________ ☐☐

2 ______________________ ☐☐

3 ______________________ ☐☐

4 ______________________ ☐☐

5 ______________________ ☐☐

16 If you have served on United Nations duty, where did you serve?
(Please specify by writing EACH place on a SEPARATE line.)

1 ______________________ ☐☐

2 ______________________ ☐☐

3 ______________________ ☐☐

4 ______________________ ☐☐

17 In your own words, describe HOW your hearing became impaired during your period/s of service.
(e.g. gunfire in Vietnam)
(e.g. exposure to engine noise in a ship or an aircraft)
(Please specify by writing EACH SOURCE on a SEPARATE line.)

1 ______________________ ☐☐

2 ______________________ ☐☐

3 ______________________ ☐☐

4 ______________________ ☐☐

5 ______________________ ☐☐

Thank you for completing PART 1 of the survey.
PART 2 continues on the next page.

Hearing Aid Research Project Main Study Survey

PART 2

Section I asks you to assess your daily use, satisfaction with, and performance of your hearing aid/s.

Please tick the one circle ○ of the answer that best applies to you.

Office Use Only

1 **Do you use your hearing aid/s ...**

○ 1 every day?	○ 2 most days?	○ 3 some days?	○ 4 occa-sionally?	○ 5 not at all?

☐

If you answered "not at all" to Q1
please miss out Q2 and Q3, and go straight to Q4

2 **When you wear the hearing aid/s, do you use it/them ...**

○ 1 all day long?	○ 2 most of the day?	○ 3 about half the day?	○ 4 less than half the day?	○ 5 only short periods?

☐

3 **How many hours a day do you think you use your hearing aid/s on an average day ....**

○ 1 less than 2 hours?	○ 2 between 2 & 4 hours?	○ 3 between 4 & 6 hours?	○ 4 between 6 & 8 hours?	○ 5 more than 8 hours?

☐

4 **Is/Are your current hearing aid/s your first ever hearing aid/s?**

○ **Yes** ○ **No** ☐

5 **Approximately how long have you been using hearing aid/s?**
(If less than one year, please enter the number of months; **otherwise** enter the number of years, in the space provided below.)

EITHER (Less than one year) ____________ **months** ☐☐

OR (One year, or more) **years** ☐☐

6

6 The table below lists words and expressions that may be used to describe your current feelings about your hearing aid/s and its/their use. Please indicate how much, if at all, you agree with the statements. To do this write the appropriate number in the box alongside the statement, using the key provided. If the word or expression does not apply to you, ensure that you enter the number that indicates this.

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Use the following key for your response:				
1 all the time	2 most days	3 some days	4 now and then	5 does not apply

My hearing aid ...

1	.. is difficult to insert		
2	.. is conspicuous		
3	.. is helpful		
4	.. is tiresome		
5	.. makes me feel less tense		
6	.. boosts my confidence		
7	.. makes me feel stupid		
8	.. is easy to use		
9	.. is not very helpful		
10	.. is noisy		
11	.. is difficult to manipulate		
12	.. is beneficial in company		
13	.. is uncomfortable		
14	.. is invaluable		
15	.. is unnecessary		
16	.. is indispensable		
17	.. I regret not obtaining one sooner		

Please ensure that you have entered a number from the key above in every box in the table, before you turn this page.

7 The table below lists five different situations where you are likely to use your hearing aid. Please rank them in their order of importance to you, using the following 5 point scale:

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Most Important 1——2——3——4——5 Least Important

- If two or more situations are <u>equally important</u>, enter the same rank numbers for them.
- If a particular situation does <u>not</u> apply to you, tick the circle in the 'Does not apply' column.

(Please enter a rank number, from 1 to 5, next to each situation below.)	RANK NUMBER ↓	Does not apply	
In person to person conversation		○	☐
In a group of family or friends at home		○	☐
Listening to music		○	☐
Listening to TV (or radio) news		○	☐
With a group of people in noisy conditions (i.e. club, bus, pub, etc.)		○	☐

3 Now you are asked to rate the <u>overall</u> performance of your hearing aid/s in each of the same situations, listed below. Please tick the circle that best indicates the performance of your hearing aid/s in the given situation.

(Please tick <u>one</u> circle for <u>each</u> line.)	1 very good	2 good	3 aver-age	4 poor	5 use-less	
In person to person conversation	○	○	○	○	○	☐
In a group of family or friends at home	○	○	○	○	○	☐
Listening to music	○	○	○	○	○	☐
Listening to TV (or radio) news	○	○	○	○	○	☐
With a group of people in noisy conditions (i.e. club, bus, pub, etc.)	○	○	○	○	○	☐

3

Please tick the one circle of the answer that best applies to you.

Office Use Only

9 Please try to assess your overall satisfaction with your hearing aid/s on the 5 point scale below. Ticking circle number 1 means you are totally dissatisfied. Ticking circle number 5 means that you are totally satisfied. Please indicate how satisfied you are by ticking one circle below:

Totally Dissatisfied	1	2	3	4	5	Totally Satisfied
	○	○	○	○	○	

☐

10 Many people get tinnitus (which is noise such as ringing, buzzing or whistling) in their head or ears. Have you ever had these sorts of noises in your head or ears?

○ Yes - *please continue*

○ No - *please go to Q19a on page 11* →

☐

11 Do you still get ringing, buzzing or whistling noises inside your head or ears .... (Please tick one circle.)

○ 1	○ 2	○ 3	○ 4	○ 5
all the time?	most of the time?	half the time?	sometimes?	never?

☐

If you answered 'never' to Q11 (above) please go to Q19a on page 11 →

12 Do these noises usually last for longer than five minutes? (Please tick the correct response.)

○ Yes ○ No

☐

13 When do you hear these noises? (Please tick one circle.)

○ 1	○ 2	○ 3
Only after loud sounds? (e.g. loud music, shooting etc.)	Both after loud sounds and at other times	Only at other times

☐

Please tick the one circle of the answer that best applies to you.

14 **In which ear or side of the head are you affected by these noises?**
(Please tick one circle.)

○ 1 Equally in BOTH EARS, or in the middle of the head?	○ 2 More on the right?	○ 3 More on the left?

☐

15 **How annoying are these noises when they are at their worst?**

○ 1 Severely annoying	○ 2 Moderately annoying	○ 3 Slightly annoying	○ 4 Not at all annoying

☐

16 **Does wearing a hearing aid/s help to cover up ringing and tinnitus (head noise) ....**

○ 1 all the time?	○ 2 most of the time?	○ 3 half the time?	○ 4 sometimes?	○ 5 never?

☐

17 **Does your tinnitus (head noise) intrude on any everyday activities ....**

○ 1 all the time?	○ 2 most of the time?	○ 3 half the time?	○ 4 sometimes?	○ 5 never?

☐

18 **Does your tinnitus (head noise) stop you from sleeping ....**

○ 1 all the time?	○ 2 most of the time?	○ 3 half the time?	○ 4 sometimes?	○ 5 never?

☐

Please tick the circle which you believe gives an accurate indication of your CURRENT situation.

Office Use Only

19a **Have you ever had an operation inside....**

○ 1 both your ears?	○ 2 your left ear?	○ 3 your right ear?

☐

OR ○ **Does not apply as I have never had surgery inside my ear.** *Please go straight to Q20*

19b **If you DID have an operation inside your ear/s was this on....**
(You may tick more than one circle.)

○ 1 the outer canal?	○ 2 the ear drum?	○ 3 the middle ear bones?

☐

OR ○ **Do not know**

20 **Has your use of your hearing aid/s EVER been affected by....**
(You may tick more than one circle.)

○ 1 the presence of wax in the ear wearing the aid?	○ 2 the presence of sweat OR heat moisture in the ear wearing the aid?	○ 3 other discharges e.g. runny OR pus-like liquid in the ear wearing the aid?

☐

OR ○ **None of the above have affected my use of my hearing aid/s.**

Please tick the circle which you believe gives an accurate indication of your CURRENT situation.

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21 Do any of your close family members have a hearing problem?
(Apart from hearing loss associated with old age?)
(Please tick the correct response.)

○ Yes ○ No ☐

22 If your hearing has deteriorated with the passage of time, has this deterioration been sudden or gradual?
(Please tick one circle.)

○ Sudden deterioration ○ Gradual deterioration ☐

OR ○ Does not apply as I am unaware of any deterioration in my hearing

23 Which hand do you use for everyday tasks?
(Please tick one circle.)

○ 1 Mostly or exclusively my **RIGHT HAND.**	○ 2 Mostly or exclusively my **LEFT HAND.**	○ 3 Sometimes my **RIGHT HAND** **AND** sometimes my **LEFT HAND.**

☐

24 Have you at any stage been advised by an audiologist or hearing specialist to wear TWO hearing aids, one for each ear?

○ Yes - *please continue* ○ No - *please go to Q26 on page* 13 → ☐

25 If you were advised to wear two aids, but have chosen to wear only one, please specify your reasons for this choice below.

____

____

____

Please tick the circle which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

26 Do you currently have a hearing aid for each ear?

1 ○ YES - one for EACH ear *Please miss out Q27 and go to Q28*	2 ○ NO - LEFT ear ONLY *Please answer Q27, then go to page 14*	3 ○ NO - RIGHT ear ONLY *Please answer Q27, then go to page 14*

27 Please specify below, the reason/s why you wear your aid in the ear you indicated in question 26 above.

____

____

If you answered Q27 above,
please go to Section II Q1 on page 14

28 If you have a hearing aid for each ear, do you wear your hearing aids in BOTH ears ... (Please tick one circle.)

○ 1 all the time?	○ 2 most of the time?	○ 3 half the time?	○ 4 sometimes?	○ 5 never?

29 When you wear BOTH hearing aids how helpful is this?
(Please tick one circle.)

○ 1 Extremely helpful	○ 2 Fairly helpful	○ 3 A little helpful	○ 4 Fairly unhelpful	○ 5 Extremely unhelpful

30 Why do you wear BOTH aids as often as you do?

____

____

____

ection II gathers information about your hearing aid/s, and your ppreciation of various hearing aid services.

lease tick the circle next to the answer which you believe gives an ccurate indication of your CURRENT situation, or write details in the paces provided.

a What year did YOU first notice you had difficulty hearing?

Office Use Only

year

1	9		

OR ○ Cannot remember the year

b What date/s did you receive the hearing aid/s that you currently use? If you currently use hearing aids in BOTH ears, please indicate the date you received EACH hearing aid.

(Please state **month** and **year**. If you have forgotten the month then only enter the year.)

	month		year			
LEFT aid:			1	9		
RIGHT aid:			1	9		

OR ○ Cannot remember the year/s

How would you rate the explanation the audiologist gave you about your hearing problem, BEFORE you were fitted with your hearing aid/s?

(Please tick one circle.)

○ 1 excellent	○ 2 very good	○ 3 good	○ 4 fair	○ 5 poor

How do you rate the information and instructions that you were given DURING your hearing aid fitting, to ensure that you were able to use your hearing aid to the best of your ability?

(Please tick one circle.)

○ 1 excellent	○ 2 very good	○ 3 good	○ 4 fair	○ 5 poor

Office Use Only

The diagrams below show 4 different types of hearing aids. Please tick the circle/s that match/es the type/s of aid/s which you CURRENTLY use. If your aid/s do/es not match any of those shown, then describe the features of your aid/s in the space provided below. Tick more than one circle ONLY if you CURRENTLY use more than one type of aid.

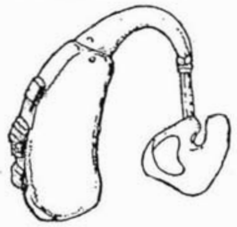
Please also indicate WHICH EAR/S use/s that type of aid, by circling the appropriate word below the diagram:

Example: (If you use the same type of aid in both ears, you should ...)

BOTH?	LEFT?	RIGHT?	[✓ BOTH?]	LEFT?	RIGHT?

What type/s of hearing aid/s do you currently use?

○ 1 Behind-the-Ear



BOTH? LEFT? RIGHT?

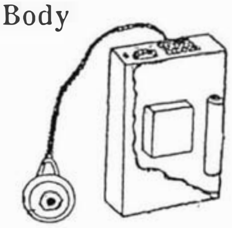
○ 2 In-the-Ear

BOTH? LEFT? RIGHT?

○ 3 Canal

BOTH? LEFT? RIGHT?

○ 4 Body



BOTH? LEFT? RIGHT?

OR My Hearing Aid does not match any of those shown in the diagrams above. Please briefly describe its features below, and indicate in which ear you use it.

Please tick the circle ✓ next to the answer which you believe gives an accurate indication of your CURRENT situation.

Office Use Only

5 The question below asks how you control your hearing aid/s. (You may tick more than one circle, if you currently use aids that are controlled in different ways.)

Please also indicate in WHICH EAR/S you use the type of control described, by circling the appropriate words:
.. in BOTH ears? / .. in the LEFT ear? / .. in the RIGHT ear?
as you did for question 4 on the previous page.

Is/Are the hearing aid/s you currently use CONTROLLED ...

<table>
<tr><td colspan="2">○ 1
by a volume wheel on the hearing aid ...
✎ ◯ ↓</td><td colspan="2">○ 2
automatically...
✎ ◯ ↓</td><td colspan="2">○ 3
by remote control..
✎ ◯ ↓</td></tr>
<tr><td colspan="2">.. in BOTH ears?</td><td colspan="2">.. in BOTH ears?</td><td colspan="2">.. in BOTH ears?</td></tr>
<tr><td>.. in the LEFT ear?</td><td>.. in the RIGHT ear?</td><td>.. in the LEFT ear?</td><td>.. in the RIGHT ear?</td><td>.. in the LEFT ear?</td><td>.. in the RIGHT ear?</td></tr>
</table>

☐☐

6 How many years since your hearing was last tested?

(Please tick one circle.)

○ 1 within the past year	○ 2 within the past two years	○ 3 within the past three years	○ 4 within the past four years	○ 5 four years (or more)

☐

OR ○ Cannot remember

7 Did YOU pay an extra amount for (a) higher technology hearing aid/s?

(Please tick one circle.)

○ Yes ○ No

OR ○ Does not apply as NZ War Pensions paid the full amount

☐

Please tick the circle next to the answer which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

8 How satisfied are you with the overall service supplied by your audiologist? (Please tick one circle.)

○ 1 extremely satisfied	○ 2 very satisfied	○ 3 satisfied	○ 4 slightly dissatisfied	○ 5 extremely dissatisfied

9 Please specify how the service supplied by your audiologist could be improved:

____

____

____

10 Have you heard of the Hearing Association?

○ Yes - *please continue*

○ No - *please go to PART 3 of the survey, on page 19* →

11 Please indicate the source of your information about the Hearing Association.

(You may tick more than one circle.)

○ 1 Spouse / partner
○ 2 Friend
○ 3 Newspaper
○ 4 Telephone book
○ 5 Doctor
○ 6 Audiologist
○ 7 NZ War Pensions
○ 8 RSA
○ 9 Other (specify below)

____

____

12 What do you believe is the main function of the Hearing Association?

____

____

____

Please tick the circle next to the answer which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

13a **Have you ever personally contacted the Hearing Association?**

○ Yes - *please continue*

○ No - *please go to PART 3 of the survey, on page 19* →

13b **Was your contact with the Hearing Association by a personal visit, or via telephone?**

○ Visit ○ Telephone

14 **For what reason did you contact the Hearing Association?**

15 **How helpful was the Hearing Association to you?**
(Please tick one circle)

○ 1 extremely helpful	○ 2 very helpful	○ 3 helpful	○ 4 slightly **un**helpful	○ 5 extremely **un**helpful

Thank you for the time you have given to complete PART 2.

Before you continue with the survey, please take some time to double check that you have not skipped a page by accident, or left out any questions by mistake.

PART 3 continues on the next page.

PART 3

The purpose of this part of the survey is to identify the problems your hearing loss may be causing you.
Please tick the circle corresponding to the word (Yes, Sometimes, or No) that best describes your reaction to the given situation. Do not skip a question if you avoid a situation because of your hearing problem.

	(Please tick one circle on each line.)	Yes	Sometimes	No	Office Use Only
1	Does your hearing problem cause you to use the phone less often than you would like?	○	○	○	☐
2	Does your hearing problem cause you to feel embarrassed when meeting new people?	○	○	○	☐
3	Does your hearing problem cause you to avoid groups of people?	○	○	○	☐
4	Does a hearing problem make you irritable?	○	○	○	☐
5	Does a hearing problem cause you to feel frustrated when talking to members of your family?	○	○	○	☐
6	Does a hearing problem cause you difficulty when attending a party?	○	○	○	☐

Please check that you have ticked a circle for every item, before you turn this page.

Please tick the circle corresponding to the word (Yes, Sometimes, or No) that best describes your reaction to the given situation. Do not skip a question if you avoid a situation because of your hearing problem.

	(Please tick one circle on each line.)	Yes	Sometimes	No	Office Use Only
7	Does a hearing problem cause you to feel "stupid" or "dumb"?	○	○	○	☐
8	Do you have difficulty when someone speaks in a whisper?	○	○	○	☐
9	Do you feel handicapped by a hearing problem?	○	○	○	☐
10	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbours?	○	○	○	☐
11	Does a hearing problem cause you to attend religious services less often than you would like?	○	○	○	☐
12	Does a hearing problem cause you to be nervous?	○	○	○	☐
13	Does a hearing problem cause you to visit friends, relatives, or neighbours less often than you would like?	○	○	○	☐
14	Does a hearing problem cause you to have arguments with family members?	○	○	○	☐

Please ensure that you have not left out any items on this page.

Please tick the circle corresponding to the word (Yes, Sometimes, or No) that **best** describes your reaction to the given situation. **Do not skip a question** if you avoid a situation because of your hearing problem.

(Please tick one circle on each line.)		Yes	Sometimes	No	Office Use Only
15	Does a hearing problem cause you difficulty when listening to the TV or radio?	○	○	○	☐
16	Does a hearing problem cause you to go shopping less often than you would like?	○	○	○	☐
17	Does any problem or difficulty with your hearing upset you at all?	○	○	○	☐
18	Does a hearing problem cause you to want to be by yourself?	○	○	○	☐
19	Does a hearing problem cause you to talk to family members less often than you would like?	○	○	○	☐
20	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	○	○	○	☐
21	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	○	○	○	☐
22	Does a hearing problem cause you to feel depressed?	○	○	○	☐

Please ensure that you have not left out any items on this page.

Please tick the circle corresponding to the word (Yes, Sometimes, or No) that best describes your reaction to the given situation. Do not skip a question if you avoid a situation because of your hearing problem.

	(Please tick one circle on each line.)	Yes	Sometimes	No	Office Use Only
23	Does a hearing problem cause you to listen to the TV or radio less often than you would like?	○	○	○	☐
24	Does a hearing problem cause you to feel uncomfortable when talking to friends?	○	○	○	☐
25	Does a hearing problem cause you to feel left out when you are with a group of people?	○	○	○	☐

Please ensure that you have ticked a circle for each one of the previous 25 items, before continuing with item 26 below.

26 The table below lists six areas of your life that may have been affected in the past, or may currently be affected by your hearing loss. Please indicate (WITHOUT any discussion about this question) how much YOU THINK each area has been affected by your hearing loss.

Office Use Only

Use the following key for your responses:

1	2	3	4	5
never?	sometimes?	half the time?	most of the time?	all the time?

	(Please enter the number, using the key above, next to each area below)	NUMBER ↓	Office Use Only
a	Working life affected		☐
b	Social life affected		☐
c	Family life affected		☐
d	Recreational life affected		☐
e	Made me depressed		☐
f	Created physical pain & suffering		☐

Thank you for completing PART 3. PART 4 starts over the page.

PART 4

These next questions are about how you feel, and how things have been with you over the past week. For each question, please tick the circle for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	(Please tick one circle on each line.)	Yes	No	Office Use Only
1	Are you basically satisfied with your life?	○	○	☐
2	Have you dropped any of your activities and interests?	○	○	☐
3	Do you feel that your life is empty?	○	○	☐
4	Do you often get bored?	○	○	☐
5	Are you in good spirits most of the time?	○	○	☐
6	Are you afraid that something bad is going to happen to you?	○	○	☐
7	Do you feel happy most of the time?	○	○	☐
8	Do you often feel helpless?	○	○	☐
9	Do you prefer to stay at home rather than going out and doing things?	○	○	☐
10	Do you feel you have more problems with memory than most?	○	○	☐
11	Do you think it is wonderful to be alive?	○	○	☐

These next questions are about how you feel, and how things have been with you over the past week. For each question, please tick the circle for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	(Please tick one circle on each line.)	Yes	No	Office Use Only
12	Do you feel pretty worthless the way you are now?	○	○	☐
13	Do you feel full of energy?	○	○	☐
14	Do you feel that your situation is hopeless?	○	○	☐
15	Do you think that most people are better off than you are?	○	○	☐
16	Do you drink alcohol?	○	○	☐

17 On how many days in the last seven would you say you drank any type of alcohol? (Please tick one circle.) ☐

○ 1	○ 2	○ 3	○ 4	○ 5	○ 6
every day	5 - 6 days	3 - 4 days	1 - 2 days	not at all	don't know

18 How many drinks containing alcohol do you have on a typical day, when drinking? (Please tick one circle.) ☐

○ 1	○ 2	○ 3	○ 4	○ 5	○ 6
1 or 2 drinks	3 or 4 drinks	5 or 6 drinks	7 to 9 drinks	10 or more	don't know

19 How often do you have six or more drinks on one occasion? (Please tick one circle.) ☐

○ 1	○ 2	○ 3	○ 4	○ 5	○ 6
never	less than monthly	monthly	weekly	daily or almost daily	don't know

Please check to make sure that you have not left out any of the questions from the first two pages of PART 4. Questions in the next section focus on your general health.

The following questions focus on <u>long-term health problems</u> you may have.

Long-term health problems are more severe health problems that you have had for six months or more, or something that is likely to last for at least six months. Please tick the circle corresponding to the word 'Yes' OR 'No' to indicate if a doctor, nurse or other health care worker has told you that you have any of the following long-term health problems. Please do not skip any questions.

	(Please tick one circle on each line.)	Yes	No	Office Use Only
1	Cancer?	○	○	☐
2	Diabetes?	○	○	☐
3	Epilepsy?	○	○	☐
4	High blood pressure or hypertension?	○	○	☐
5	Heart trouble, e.g., angina or myocardial infarction?	○	○	☐
6	Asthma?	○	○	☐
7	Other respiratory conditions, e.g., bronchitis?	○	○	☐
8	Stomach ulcer or duodenal ulcer?	○	○	☐
9	Chronic liver trouble, e.g., cirrhosis?	○	○	☐
10	Bowel disorders, e.g., colitis or polyps?	○	○	☐
11	Hernia or rupture?	○	○	☐
12	Chronic kidney or urinary tract conditions?	○	○	☐
13	Chronic skin conditions, e.g., dermatitis or psoriasis?	○	○	☐
14	Arthritis or rheumatism?	○	○	☐
15	Hepatitis?	○	○	☐
16	Sight impairment or loss?	○	○	☐

The following questions focus on your general health, how you feel, and how well you are able to do your usual activities. Please tick the circle ✓ of the answer that best applies to you. If you are unsure about how to answer any question, please give the best answer you can.

Office Use Only

1 **In general, would you say your health is:**
(Please tick one circle.)

○ 1	○ 2	○ 3	○ 4	○ 5	☐
excellent	very good	good	fair	poor	

2 **Compared to one year ago, how would you rate your health in general now?**
(Please tick one circle.)

○ 1	○ 2	○ 3	○ 4	○ 5	☐
much better now than one year ago	somewhat better now than one year ago	about the same	somewhat worse now than one year ago	much worse now than one year ago	

3 **The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?**

	(Please tick one circle on each line.)	**Yes, limited a lot**	**Yes, limited a little**	**No, not limited at all**	
a	**Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	○	○	○	☐
b	**Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	○	○	○	☐
c	Lifting or carrying groceries	○	○	○	☐

3 (contd.) **Does your health now limit you in these activities? If so, how much?**

	(Please tick **one** circle on **each** line.)	**Yes, limited a lot**	**Yes, limited a little**	**No, not limited at all**	**Office Use Only**
d	Climbing **several** flights of stairs	○	○	○	☐
e	Climbing **one** flight of stairs	○	○	○	☐
f	Bending, kneeling or stooping	○	○	○	☐
g	Walking **more than one kilometre**	○	○	○	☐
h	Walking **half a kilometre**	○	○	○	☐
i	Walking **100 metres**	○	○	○	☐
j	Bathing or dressing yourself	○	○	○	☐

4 **During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of your physical health? Answer Yes or No to each question.**

	(Please tick **one** circle on **each** line.)	Yes	No	
a	Cutting down the **amount of time** you spent on work or other activities	○	○	☐
b	**Accomplished less** than you would like	○	○	☐
c	Were limited in the **kind** of work or other activities	○	○	☐
d	Had **difficulty** performing the work or other activities (e.g. it took extra effort)	○	○	☐

Office Use Only

5 **During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of any emotional problems (such as feeling depressed or anxious)? Answer Yes or No to each question.**

	(Please tick one circle on each line.)	**Yes**	**No**	
a	Cutting down the **amount of time** you spent on work or other activities	○	○	☐
b	**Accomplished less** than you would like	○	○	☐
c	Didn't do work or other activities as **carefully** as usual	○	○	☐

6 **During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups? (Please tick one circle.)**

○ 1 not at all	○ 2 slightly	○ 3 moderately	○ 4 quite a bit	○ 5 extremely	☐

7 **How much bodily pain have you had during the past 4 weeks? (Please tick one circle.)**

○ 1 none	○ 2 very mild	○ 3 mild	○ 4 moderate	○ 5 severe	○ 6 very severe	☐

8 **During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?**
(Please tick one circle.)

○ 1 not at all	○ 2 a little bit	○ 3 moderately	○ 4 quite a bit	○ 5 extremely	☐

9 These questions are about how you feel and how things have been with you <u>during the past 4 weeks</u>. For each question, please tick the circle ○ that comes closest to the way you have been feeling.

(Please tick <u>one</u> circle on <u>each</u> line.)

Office Use Only

	How much of the time during **the past 4 weeks....**	**All of the time**	**Most of the time**	**A good bit of the time**	**Some of the time**	**A little bit of the time**	**None of the time**	
a	**Did you feel full of life?**	○	○	○	○	○	○	☐
b	**Have you been a very nervous person?**	○	○	○	○	○	○	☐
c	**Have you felt so down in the dumps that nothing could cheer you up?**	○	○	○	○	○	○	☐
d	**Have you felt calm and peaceful?**	○	○	○	○	○	○	☐
e	**Did you have a lot of energy?**	○	○	○	○	○	○	☐
f	**Have you felt down?**	○	○	○	○	○	○	☐
g	**Did you feel worn out?**	○	○	○	○	○	○	☐
h	**Have you been a happy person?**	○	○	○	○	○	○	☐
i	**Did you feel tired?**	○	○	○	○	○	○	☐

10 **During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?**
(Please tick one circle.)

Office Use Only

○ 1	○ 2	○ 3	○ 4	○ 5
all of the time	most of the time	some of the time	a little of the time	none of the time

☐

11 **How TRUE or FALSE is each of the following statements for you?**
(Please tick one circle on each line.)

a **I seem to get sick a little easier than other people.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

☐

b **I am as healthy as anybody I know.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

☐

c **I expect my health to get worse.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

☐

d **My health is excellent.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

☐

Thank you for completing PART 4. Please ensure you have answered every question, before turning to PART 5.

PART 5

These next questions collect information about your social networks. For each question, please tick the circle for the answer that comes closest to your personal situation. Please do not skip any questions.

Office Use Only

1 **How far away, in distance, does your nearest child or other relative live?** ***Do NOT include your partner / spouse.*** **(Please tick one circle.)**

A ○ No relatives
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand ☐

2 **If you have any children, where does your nearest child live? (Please tick one circle.)**

A ○ No relatives
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand ☐

3 **If you have any living sisters or brothers, where does your nearest sister or brother live? (Please tick one circle.)**

A ○ No sisters or brothers
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand ☐

For each question, please tick the circle for the answer that comes closest to your personal situation. Please do not skip any questions.

Office Use Only

4 **How often do you see any of your children or other relatives to speak to?**

(Please tick one circle.)

A ○ Never / No relative
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

5 **If you have friends in this community / neighbourhood, how often do you have a chat or do something with one of your friends?**

(Please tick one circle.)

A ○ Never / No friends
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

6 **How often do you see any of your neighbours to have a chat with or do something with?**

(Please tick one circle.)

A ○ No contact with neighbours
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

For each question, please <u>tick the circle</u> for the answer that comes closest to your personal situation. Please do not skip any questions.

Office Use Only

7 Do you attend any religious meetings? (Please tick <u>one</u> circle.)

A ○ Yes, regularly
B ○ Yes, occasionally
C ○ No

☐

8 Do you attend meetings of any community / neighbourhood or social groups, such as old people's clubs, lectures or anything like that? (Please tick <u>one</u> circle.)

A ○ Yes, regularly
B ○ Yes, occasionally
C ○ No

☐

The following questions ask about <u>people who give you help or support</u>.

Each question has TWO parts:

<u>Part one</u>: List all the people you know, but not yourself, who you can count on for help or support in the way described in the question. Only write the person's initials. Do not write more than one person next to each of the numbers beneath the question, and do not list more than nine people per question. If you have no support for a question, tick the circle beside the words 'No one'.

<u>Part two</u>: Tick the circle to indicate how satisfied you are with the overall support you have for each question area. Do this for all questions, even where you have ticked 'No one'.

<u>Completed Example</u>:

e.g. (a) Who do you know who you can trust with information that could get you into trouble?

○ No one
1 *K B*
2 *A B*
3 *A J*
4 ____
5 ____
6 ____
7 ____
8 ____
9 ____

e.g. (b) How satisfied are you with the support that you <u>currently</u> receive? (Please tick <u>one</u> circle.)

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

1a **Who can you really count on to take your mind off your worries when you feel under stress?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ____________________
2 ____________________
3 ____________________
4 ____________________
5 ____________________
6 ____________________
7 ____________________
8 ____________________
9 ____________________

☐☐

1b **How satisfied are you with the support that you <u>currently</u> receive? (Please tick <u>one</u> circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little **dis**-satisfied	○ 5 fairly **dis**-satisfied	○ 6 very **dis**-satisfied

☐

2a **Who can you really count on to help you feel more relaxed when you are under pressure or tense?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ____________________
2 ____________________
3 ____________________
4 ____________________
5 ____________________
6 ____________________
7 ____________________
8 ____________________
9 ____________________

☐☐

2b **How satisfied are you with the support that you <u>currently</u> receive? (Please tick <u>one</u> circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little **dis**-satisfied	○ 5 fairly **dis**-satisfied	○ 6 very **dis**-satisfied

☐

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

3a **Who accepts you totally, including your worst and best points?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ______________________
2 ______________________
3 ______________________
4 ______________________
5 ______________________
6 ______________________
7 ______________________
8 ______________________
9 ______________________

☐☐

3b **How satisfied are you with the support that you currently receive? (Please tick one circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little **dis-**satisfied	○ 5 fairly **dis-**satisfied	○ 6 very **dis-**satisfied

☐

4a **Who can you really count on to care about you, regardless of what is happening to you?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ______________________
2 ______________________
3 ______________________
4 ______________________
5 ______________________
6 ______________________
7 ______________________
8 ______________________
9 ______________________

☐☐

4b **How satisfied are you with the support that you currently receive? (Please tick one circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little **dis-**satisfied	○ 5 fairly **dis-**satisfied	○ 6 very **dis-**satisfied

☐

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

5a Who can you really count on to help you feel better when you are feeling generally 'down in the dumps'?

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ________________

2 ________________

3 ________________

4 ________________

5 ________________

6 ________________

7 ________________

8 ________________

9 ________________ ☐☐

5b How satisfied are you with the support that you currently receive? (Please tick one circle.)

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dissatisfied	○ 5 fairly dissatisfied	○ 6 very dissatisfied

☐

6a Who can you count on to help you feel better when you are very upset?

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ________________

2 ________________

3 ________________

4 ________________

5 ________________

6 ________________

7 ________________

8 ________________

9 ________________ ☐☐

6b How satisfied are you with the support that you currently receive? (Please tick one circle.)

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dissatisfied	○ 5 fairly dissatisfied	○ 6 very dissatisfied

☐

<u>Please tick the circle</u> ✓ which you believe gives an accurate indication of your CURRENT situation.

Office Use Only

7 **Thinking about your relationship <u>with other people</u>, would YOU say ...**

(Please tick <u>one</u> circle.)

○ 1 I have plenty of friends, and am never lonely?

○ 2 Although I have friends, I am occasionally lonely?

○ 3 I have some friends, but am often lonely for company?

○ 4 I am socially isolated and feel lonely.

☐

8 **Thinking <u>specifically about your hearing loss</u> and your relationship <u>with your family</u>, would YOU say ...**

(Please tick <u>one</u> circle.)

○ 1 My role in the family is unaffected by my hearing loss?

○ 2 There are <u>some</u> parts of my family role that I cannot carry out, due to my hearing loss?

○ 3 There are <u>many</u> parts of my family role that I cannot carry out due to my hearing loss?

○ 4 I cannot carry out any part of my family role due to my hearing loss?

☐

9 **Thinking about YOUR relationships <u>generally</u> (for example, with your partner/spouse, relatives or friends) would YOU say that <u>because of your hearing loss</u> your relationships are ...**

(Please tick <u>one</u> circle.)

○ 1 .. very close and warm?

○ 2 .. sometimes close and warm?

○ 3 .. seldom close and warm?

○ 4 .. not close and warm?

○ 0 .. unchanged?

☐

The next questions look at how independent you are in your daily life. For each question, please <u>tick the circle</u> ✓ for the answer that comes closest to your personal situation. Please do not skip any questions.

Office Use Only

10 Do you need any help looking after yourself?

(Please tick <u>one</u> circle.)

○ 1 I need no help at all.
○ 2 Occasionally I need help with personal care tasks.
○ 3 I need help with the more difficult personal care tasks.
○ 4 I need daily help with most or all personal care tasks. ☐

11 When doing household tasks (such as preparing food, gardening, housework or cleaning the car) do you ...

(Please tick <u>one</u> circle.)

○ 1 .. need no help at all?
○ 2 .. occasionally need some help with household tasks?
○ 3 .. need help with the more difficult household tasks?
○ 4 .. need daily help wih most or all household tasks? ☐

12 Thinking about how easily you can get around your home and community, do you find that ...

(Please tick <u>one</u> circle.)

○ 1 .. I get around my home and community by myself, without any difficulty.
○ 2 .. I find it difficult to get around my home and community by myself.
○ 3 .. I **cannot** get around my community by myself, but **can** get around my home, with some difficulty.
○ 4 .. I cannot get around my community or my home by myself. ☐

Thank you for completing PART 5.

PART 6 starts over the page.

PART 6

The following two sections have statements that relate to your memory in everyday life. In Section I the statements focus on your ability to remember specific types of information (for example, the name of the person just introduced to you).

I **The statements below give examples of using your memory in everyday situations. Please indicate your ability to remember the specific type of information by writing the appropriate number in the box alongside the statement, using the key provided. If a situation does not apply to you, ensure that you enter the number that indicates this.**

Please do not leave out any statements.

Office Use Only

Use the following key for your responses:					
1 very poor	2 poor	3 fair	4 good	5 very good	6 does not apply

My ability to remember...

1	.. the gifts I have received on special occasions (for instance Christmas or my birthdays) during the past several years is ...	☐	☐
2	.. the name of a person just introduced to me is ...	☐	☐
3	.. to turn out lights, turn off appliances, and lock doors when leaving home is ...	☐	☐
4	.. specific facts from a newspaper or magazine article I have just finished reading is ...	☐	☐
5	.. verbal directions to a place given minutes earlier is ...	☐	☐
6	.. the details of holidays or special occasions of my childhood is ...	☐	☐
7	.. telephone numbers or zip codes that I use on a daily or weekly basis is ...	☐	☐

I contd.

Please indicate your ability to remember specific types of information by writing the appropriate number in the box alongside the statement, using the key provided. If a situation does not apply to you, ensure that you enter the number that indicates this.

Please do not leave out any statements.

Office Use Only

Use the following key for your responses:					
1 very poor	2 poor	3 fair	4 good	5 very good	6 does not apply

My ability to remember ...

8	.. to write letters I intend to write, or make telephone calls I intend to make is ...		☐
9	.. the meanings of words I use only rarely is ...		☐
10	.. which door I entered when shopping in a large department store or mall is ...		☐
11	.. the details of family events that occurred during the past year is ...		☐
12	.. the addresses of close family members, friends or associates is ...		☐
13	.. to take along, when leaving home or work, any items that I intended to take (for instance, an umbrella or a letter to mail) is ...		☐
14	.. the meaning of words that once I knew very well is ...		☐
15	.. how to reach a place I have visited once or twice is ...		☐
16	.. who was with me at events attended weeks or months ago is ...		☐
17	.. the telephone numbers or postal codes that I use on a monthly basis or less often is ...		☐
18	.. where I have put objects (such as keys) in my home or office is ...		☐

Section II statements focus on how often you have trouble remembering specific things (for example, forgetting what you intended to buy at a grocery store or a pharmacy).

II **The statements below list examples of difficulties using your memory in everyday situations. Please indicate HOW OFTEN you have trouble with your memory by writing the appropriate number in the box alongside each statement, using the key provided below. If a statement does not apply to you, ensure you enter the number that indicates this. Please do not leave out any statements.**

Office Use Only

Use the following key for your responses:					
1 very often	2 often	3 some-times	4 rarely	5 very rarely	6 does not apply

1	I have difficulty recalling a word I wish to use ...		☐
2	I miss the point that someone else is making during a conversation ...		☐
3	I go into a room to get something, and forget what I was after ...		☐
4	I have to stop and think when distinguishing right from left ...		☐
5	I forget which waiter took my order in a restaurant ...		☐
6	I feel that a word or name I want to remember is 'on the tip of my tongue' but cannot recall it ...		☐
7	I have difficulty following a conversation when there are distractions in the environment, such as noise from a TV or a radio ...		☐
8	I forget to bring up an important point in a conversation that I intended to mention ...		☐
9	I dial a number and forget whom I was calling before the phone is answered ...		☐
10	I fail to recognise people who recognise me ...		☐

II contd.

Please indicate HOW OFTEN you have trouble with your memory by writing the appropriate number in the box alongside each statement, using the key provided below. If a statement does not apply to you, ensure you enter the number that indicates this. Please do not leave out any statements.

Use the following key for your responses:					
1 very often	2 often	3 some-times	4 rarely	5 very rarely	6 does not apply

11 I forget the name of a familiar object ... ☐ ☐

12 I have to re-read earlier paragraphs from a newspaper or magazine story to understand the point ... ☐ ☐

13 I arrive at the grocery store or pharmacy and forget what I intended to buy ... ☐ ☐

14 I forget an appointment or other event that is very important to me ... ☐ ☐

15 I meet people who seem familiar, but can't remember where I met them ... ☐ ☐

16 I fail to remember a name or word when trying to, but recall it later ... ☐ ☐

17 I have trouble finding my place again when interrupted in reading ... ☐ ☐

18 I store an important item in a place where it will be safe, and then forget where it is ... ☐ ☐

19 I take a surprisingly long time to recall a fact that I know quite well (and do eventually remember)... ☐ ☐

20 I confuse one word with another when they sound the same ... ☐ ☐

Thank you for completing PART 6.

Please read the final check list of instructions on the outside cover page, before you return your completed survey.

Mail Out Survey Final Page

Before you place the completed survey in the addressed, FREEPOST envelope, please complete the check list below:

Please ...

- .. check to see that you have NOT skipped any pages. ☐
- .. double check to make sure you have entered ALL the information that you intended to. ☐
- .. ensure that if another person in your household has received a survey to complete, their completed questionnaire is sealed in the supplied PLAIN BROWN envelope, and then placed into your supplied, addressed FREEPOST envelope, together with your completed survey. ☐

The two completed surveys MUST BE MAILED TOGETHER.

If you have any queries related to any aspects of this research project, please do not hesitate to contact us.

Research team contact details:

Telephone at:
(06) 350 5558

Fax at:
(06) 350 5673

Free-phone at:
(Only for callers outside the Manawatu toll free zone)
0800 363 957

Mail at:
School of Psychology
Massey University
P/Bag 11 222
Palmerston North

Email Judy at:
J.A.Blakey@massey.ac.nz

Thank you, once again, for your time completing this survey.

Appendix C

‘Other person’s (i.e. spouse/partner’s) letter and mail out survey

«Number»

«Title» «First_Names» «Surname»
«Address_Line_1»
«Address_Line_2»
«Address_Line_3»
«Address_Line_4»

Dear «Title» «Surname»

Re: Hearing Aid Research Project 'Other Person' Survey Letter

Thank you for your participation in this study. The 'Other Person' Survey is being conducted in order to explore the social impact of hearing impairment.

The survey consists of four parts:

- **PART 1** mainly gathers details about your background;
- **PART 2** asks you to identify difficulties that the hearing impaired ex-service person in your household may face, as a result of their hearing loss;
- **PART 3** collects information about your social networks;
- **PART 4** focuses on your general health and well being.

Please answer all the questions from each of the four parts.

Completion of this survey will take about fifteen minutes. In return for your effort, it may be possible to provide current and future hearing aid wearers with a better hearing aid rehabilitation service.

When you have completed your survey, please place it in the SAME BROWN envelope in which you received it. This should then be returned to the research team at Massey University, together with the hearing impaired ex-service person's completed Mail Out Survey, **in the same FREEPOST envelope**.

Your confidentiality is assured at all times.

Yours faithfully

Judy Blakey

Judy Blakey

Hearing Aid Research Project Main Study
Other Person Survey

A research project conducted on behalf of the New Zealand War Pensions Medical Research Trust Board by independent researchers from Massey University

Please read the following instructions carefully:

- All the information you give us is in confidence and will be used only for the purposes of this study.
- Please attempt every question and be careful not to skip any pages.
- There are no right or wrong answers, we want the response which is best for you.
- It is important that you give your own answers to the questions. Please do not discuss your answers with others.
- Do not linger too long over each question, usually your first response is best.
- Text is printed on BOTH SIDES of the pages in this questionnaire. Please make sure that you read, and respond to questions on EVERY PAGE.
- You will find a bookmark inside the front cover, for your use.

☐☐☐☐☐

If you are willing to agree to participate in any further contact with the researchers, for example in a face-to-face interview, or an invitation to participate in a group discussion, please tick the appropriate box below:

YES, I am willing to be contacted again ☐

My contact Telephone number is:	STD CODE	NUMBER
	☐☐	☐☐☐☐☐☐☐

OR

NO, I do NOT wish to be contacted again ☐

Please ensure that you read the check list of instructions on the outside back cover of this survey, when you have completed answering all the questions.

PART 1 starts on the next page.

Hearing Aid Research Project Main Study
Other Person Survey

PART 1

Firstly we would like some general background information about you.
<u>Please tick the circle</u> next to the answer which you believe gives an accurate indication of your CURRENT situation; or write details in the spaces provided.

Office Use Only

1 What is your date of birth? (Please state **day / month / year.**)

				1	9		
day		month				year	

☐ ☐ ☐
☐ ☐ ☐

2 **What is your gender?**

○ Male ○ Female ☐

3 **Which ethnic group/s do you belong to?**
(You may tick <u>more than one</u> circle.)

- ○ 1 New Zealander of European descent ☐
- ○ 2 New Zealander of Maori descent ☐
- ○ 3 Pacific Islander ☐
- ○ 4 Asian ☐
- ○ 5 Other (Please specify) ☐

____

4 **Are you retired?**

○ Yes ○ No ☐

5 IF you <u>ARE</u> RETIRED what <u>was</u> your main occupation?

____ ☐

6 IF you ARE <u>NOT</u> RETIRED what <u>is</u> your main occupation?

____ ☐

Please tick the circle which you believe gives an accurate indication of your CURRENT situation; or write details in the spaces provided.

Office Use Only

7 **What is your highest educational qualification?**

(Please tick one circle.)

- ○ 1 No school qualification
- ○ 2 School certificate passes
- ○ 3 School qualifications, University Entrance and above
- ○ 4 Trade certificate or Professional certificate or diploma
- ○ 5 University degree, diploma, or certificate ☐

Do YOU currently have a hearing problem?
(Including hearing loss associated with old age)

○ Yes ○ No ☐

The next questions relate to the hearing impaired ex-service person in your household, who will be referred to as 'the main respondent'.

The table below lists six areas of the main respondent's life that may have been affected in the past, or may currently be affected by their hearing loss. Please indicate (WITHOUT any discussion about this question) how much YOU THINK each area has been affected by the main respondent's hearing loss.

Office Use Only

Use the following key for your responses:

1 never?	2 some-times?	3 half the time?	4 most of the time?	5 all the time?

(Please enter the number, using the key above, next to each area below)	NUMBER ↓	
Working life affected		☐
Social life affected		☐
Family life affected		☐
Recreational life affected		☐
Made them depressed		☐
Created physical pain & suffering		☐

Please tick the circle which you believe gives an accurate indication of your CURRENT situation; or write details in the spaces provided. The term 'main respondent' refers to the hearing impaired ex-service person in your household.

Office Use Only

10 **Thinking about the relationships that the main respondent has with other people, would YOU say ...**

(Please tick one circle.)

○ 1 He/She has plenty of friends, and is never lonely?
○ 2 Although he/she has friends, he/she is occasionally lonely?
○ 3 He/She has some friends, but is often lonely for company?
○ 4 He/She is socially isolated and feels lonely?

☐

11 **Thinking specifically about the hearing loss of the main respondent and their relationship with their family, would YOU say ...**

(Please tick one circle.)

○ 1 His/Her role in the family is unaffected by their hearing loss.
○ 2 There are some parts of their family role that he/she cannot carry out, due to his/her hearing loss.
○ 3 There are many parts of their family role that he/she cannot carry out due to his/her hearing loss.
○ 4 He/She cannot carry out any part of his/her family role due to his/her hearing loss.

☐

12 **Thinking about the main respondent's relationships in general (for example, with his/her partner/spouse, relatives or friends) would YOU say that because of their hearing loss their relationships are ...**

(Please tick one circle.)

○ 1 .. very close and warm?
○ 2 .. sometimes close and warm?
○ 3 .. seldom close and warm?
○ 4 .. not close and warm?
○ 0 .. unchanged?

☐

Please tick the circle which you believe gives an accurate indication of your CURRENT situation; or write details in the spaces provided.

The term 'main respondent' refers to the hearing impaired ex-service person in your household.

13 **The table below lists five different situations where the main respondent is likely to use their hearing aid/s. Please rank these situations, without any discussion with him / her, in what YOU consider to be their order of importance TO THEM.**

Office Use Only

Use the following 5 point scale:

Most Important	1 —— 2 —— 3 —— 4 —— 5	Least Important

- **If two or more situations are equally important, enter the same rank numbers for them.**
- **If a particular situation does not apply to you, tick the circle in the 'Does not apply' column.**

(Please enter a rank number, from 1 to 5, next to each situation below.)	RANK NUMBER ↓	Does not apply	
In person to person conversation		○	☐
In a group of family or friends at home		○	☐
Listening to music		○	☐
Listening to TV (or radio) news		○	☐
With a group of people in noisy conditions (i.e. club, bus, pub, etc.)		○	☐

Thank you for completing PART 1.

PART 2 continues on the next page.

Hearing Aid Research Project Main Study
Other Person Survey

PART 2

The purpose of this part of the survey is to identify the problems that YOU have observed that the main respondent's hearing loss may be causing THEM. Please do not discuss the questions with the main respondent whilst responding to this questionnaire.

Please tick the circle ✓ corresponding to the word (Yes, Sometimes, or No) that best describes your observation of the main respondent in the given situation. Do not skip a question if he/she avoids a situation because of their hearing problem.

	(Please tick one circle on each line.)	Yes	Some-times	No	Office Use Only
1	Does a hearing problem cause the main respondent to feel embarrassed when meeting new people?	○	○	○	☐
2	Does a hearing problem cause the main respondent to feel frustrated when talking to members of your family?	○	○	○	☐
3	Does the main respondent have difficulty hearing when someone speaks in a whisper?	○	○	○	☐
4	Does the main respondent feel handicapped by a hearing problem?	○	○	○	☐

Please check that you have ticked a circle for every item, before you turn this page.

Please tick the circle ✓ corresponding to the word (Yes, Sometimes, or No) that best describes your observation of the main respondent in the given situation. Do not skip a question if he/she avoids a situation because of their hearing problem.

	(Please tick one circle on each line.)	Yes	Some-times	No	Office Use Only
5	Does a hearing problem cause the main respondent difficulty when visiting friends, relatives, or neighbours?	○	○	○	☐
6	Does a hearing problem cause the main respondent to attend religious services or other meetings in public venues less often than s/he would like?	○	○	○	☐
7	Does a hearing problem cause the main respondent to have arguments with family members?	○	○	○	☐
8	Does a hearing problem cause the main respondent difficulty when listening to the TV or radio?	○	○	○	☐
9	Do you feel that any difficulty with hearing limits or hampers the main respondent's personal or social life?	○	○	○	☐
10	Does a hearing problem cause the main respondent difficulty when in a restaurant with relatives or friends?	○	○	○	☐

Thank you for completing these questions.
Please ensure you have ticked a circle for each one of the 10 items.
PART 3 starts on the next page.

Hearing Aid Research Project Main Study
Other Person Survey

PART 3

These next questions collect information about YOUR social networks. For each question, please tick the circle for the answer that comes closest to your personal situation. Do not skip any questions.

Office Use Only

1 **How far away, in distance, does your nearest child or other relative live? *Do NOT include your partner / spouse.* (Please tick one circle.)**

A ○ No relatives
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand

☐

2 **If you have any children, where does your nearest child live? (Please tick one circle.)**

A ○ No relatives
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand

☐

3 **If you have any living sisters or brothers, where does your nearest sister or brother live? (Please tick one circle.)**

A ○ No sisters or brothers
B ○ Same house **OR** less than 2 kilometres (Km) away
C ○ From 2 Km to less than 10 Km away
D ○ From 10 Km to less than 30 Km away
E ○ From 30 Km to less than 100 Km away
F ○ 100 Km or more away **within** New Zealand
G ○ **Outside** New Zealand

☐

or each question, please tick the circle for the answer that comes closest o your personal situation. Please do not skip any questions.

Office Use Only

How often do you see any of your children or other relatives to speak to?

(Please tick one circle.)

A ○ Never / No relative
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

If you have friends in this community / neighbourhood, how often do you have a chat or do something with one of your friends?

(Please tick one circle.)

A ○ Never / No friends
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

How often do you see any of your neighbours to have a chat with or do something with?

(Please tick one circle.)

A ○ No contact with neighbours
B ○ Daily
C ○ 2-3 times a week
D ○ At least weekly
E ○ At least monthly
F ○ Less often ☐

For each question, please tick the circle for the answer that comes closest to your personal situation. Please do not skip any questions.

Office Use Only

7 **Do you attend any religious meetings? (Please tick one circle.)**

A ○ Yes, regularly
B ○ Yes, occasionally
C ○ No

☐

8 **Do you attend meetings of any community / neighbourhood or social groups, such as clubs, lectures or anything like that? (Please tick one circle.)**

A ○ Yes, regularly
B ○ Yes, occasionally
C ○ No

☐

The following questions ask about people who give you help or support.
Each question has TWO parts:
Part one: List all the people you know, but not yourself, who you can count on for help or support in the way described in the question. Only write the person's initials. Do not write more than one person next to each of the numbers beneath the question, and do not list more than nine people per question. If you have no support for a question, tick the circle beside the words 'No one'.

Part two: Tick the circle to indicate how satisfied you are with the overall support you have for each question area. Do this for all questions, even where you have ticked 'No one'.

Completed Example:

e.g. (a) **Who do YOU know who you can trust with information that could get you into trouble?**

○ No one
1 *KB*
2 *AB*
3 *AJ*
4
5
6
7
8
9

e.g. (b) **How satisfied are YOU with the support that you currently receive? (Please tick one circle.)**

○ 1 very satisfied	[✓ 2 fairly satisfied]	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

1a **Who can YOU really count on to take your mind off your worries when you feel under stress?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ______________ 5 ______________
2 ______________ 6 ______________
3 ______________ 7 ______________
4 ______________ 8 ______________
                   9 ______________ ☐☐

b **How satisfied are YOU with the support that you currently receive? (Please tick one circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

a **Who can YOU really count on to help you feel more relaxed when you are under pressure or tense?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ______________ 5 ______________
2 ______________ 6 ______________
3 ______________ 7 ______________
4 ______________ 8 ______________
                   9 ______________ ☐☐

b **How satisfied are YOU with the support that you currently receive? (Please tick one circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

3a **Who accepts YOU totally, including your worst and best points?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ____________________
2 ____________________
3 ____________________
4 ____________________
5 ____________________
6 ____________________
7 ____________________
8 ____________________
9 ____________________

☐☐

3b **How satisfied are YOU with the support that you __currently__ receive? (Please tick __one__ circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

4a **Who can YOU really count on to care about you, regardless of what is happening to you?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one
1 ____________________
2 ____________________
3 ____________________
4 ____________________
5 ____________________
6 ____________________
7 ____________________
8 ____________________
9 ____________________

☐☐

4b **How satisfied are YOU with the support that you __currently__ receive? (Please tick __one__ circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

For each question, please enter the answers that come closest to your personal situation. Please do not skip any questions.

Office Use Only

5a **Who can YOU really count on to help you feel better when you are feeling generally 'down in the dumps'?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ____________________

2 ____________________

3 ____________________

4 ____________________

5 ____________________

6 ____________________

7 ____________________

8 ____________________

9 ____________________

☐☐

5b **How satisfied are YOU with the support that you <u>currently</u> receive? (Please tick <u>one</u> circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

6a **Who can YOU count on to help you feel better when you are very upset?**

(Please write the initials of the people who give you help or support; if no-one, then tick the circle.)

○ No one

1 ____________________

2 ____________________

3 ____________________

4 ____________________

5 ____________________

6 ____________________

7 ____________________

8 ____________________

9 ____________________

☐☐

6b **How satisfied are YOU with the support that you <u>currently</u> receive? (Please tick <u>one</u> circle.)**

○ 1 very satisfied	○ 2 fairly satisfied	○ 3 a little satisfied	○ 4 a little dis- satisfied	○ 5 fairly dis- satisfied	○ 6 very dis- satisfied

☐

Thank you for completing PART 3. PART 4 starts on the next page.

Hearing Aid Research Project Main Study
Other Person Survey PART 4

The following questions focus on YOUR general health, how YOU feel, and how well YOU are able to do your usual activities. Please tick the circle of the answer that best applies to YOU. If you are unsure about how to answer any question, please give the best answer you can.

Office Use Only

1 **In general, would you say your health is:**
(Please tick one circle.)

○ 1 excellent	○ 2 very good	○ 3 good	○ 4 fair	○ 5 poor

☐

2 **Compared to one year ago, how would you rate your health in general now?**
(Please tick one circle.)

○ 1 much better now than one year ago	○ 2 somewhat better now than one year ago	○ 3 about the same	○ 4 somewhat worse now than one year ago	○ 5 much worse now than one year ago

☐

3 **The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?**
(Please tick one circle on each line.)

		Yes, limited a lot	Yes, limited a little	No, not limited at all	
a	**Vigorous activities**, such as running, lifting heavy objects, participating in strenuous sports	○	○	○	☐
b	**Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	○	○	○	☐
c	Lifting or carrying groceries	○	○	○	☐

3 contd.) **Does your health now limit you in these activities? If so, how much?**

	(Please tick one circle on each line.)	Yes, limited a lot	Yes, limited a little	No, not limited at all	Office Use Only
d	Climbing several flights of stairs	○	○	○	☐
e	Climbing one flight of stairs	○	○	○	☐
f	Bending, kneeling or stooping	○	○	○	☐
g	Walking more than one kilometre	○	○	○	☐
h	Walking half a kilometre	○	○	○	☐
i	Walking 100 metres	○	○	○	☐
j	Bathing or dressing yourself	○	○	○	☐

4 **During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of your physical health? Answer Yes or No to each question.**

	(Please tick one circle on each line.)	Yes	No	
a	Cutting down the amount of time you spent on work or other activities	○	○	☐
b	Accomplished less than you would like	○	○	☐
c	Were limited in the kind of work or other activities	○	○	☐
d	Had difficulty performing the work or other activities (e.g. it took extra effort)	○	○	☐

Office Use Only

5 **During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of any emotional problems (such as feeling depressed or anxious)? Answer Yes or No to each question.**

	(Please tick one circle on each line.)	**Yes**	**No**	
a	Cutting down the **amount of time** you spent on work or other activities	○	○	☐
b	**Accomplished less** than you would like	○	○	☐
c	Didn't do work or other activities as **carefully** as usual	○	○	☐

6 **During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups? (Please tick one circle.)**

○ 1 not at all	○ 2 slightly	○ 3 moderately	○ 4 quite a bit	○ 5 extremely	☐

7 **How much bodily pain have you had during the past 4 weeks? (Please tick one circle.)**

○ 1 none	○ 2 very mild	○ 3 mild	○ 4 moderate	○ 5 severe	○ 6 very severe	☐

8 **During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?**
(Please tick one circle.)

○ 1 not at all	○ 2 a little bit	○ 3 moderately	○ 4 quite a bit	○ 5 extremely	☐

These questions are about how you feel and how things have been with you <u>during the past 4 weeks</u>. For each question, please tick the circle that comes closest to the way you have been feeling.
(Please tick <u>one</u> circle on <u>each</u> line.)

Office Use Only

	How much of the time during <u>the past 4 weeks</u>....	All of the time	Most of the time	A good bit of the time	Some of the time	A little bit of the time	None of the time	
a	Did you feel full of life?	○	○	○	○	○	○	☐
b	Have you been a very nervous person?	○	○	○	○	○	○	☐
c	Have you felt so down in the dumps that nothing could cheer you up?	○	○	○	○	○	○	☐
d	Have you felt calm and peaceful?	○	○	○	○	○	○	☐
e	Did you have a lot of energy?	○	○	○	○	○	○	☐
f	Have you felt down?	○	○	○	○	○	○	☐
g	Did you feel worn out?	○	○	○	○	○	○	☐
h	Have you been a happy person?	○	○	○	○	○	○	☐
i	Did you feel tired?	○	○	○	○	○	○	☐

Office Use Only

10 **During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)? (Please tick one circle.)**

○ 1 all of the time	○ 2 most of the time	○ 3 some of the time	○ 4 a little of the time	○ 5 none of the time

☐

11 **How TRUE or FALSE is each of the following statements for you? (Please tick one circle on each line.)**

a **I seem to get sick a little easier than other people.**

○ 1 definitely true	○ 2 mostly true	○ 3 don't know	○ 4 mostly false	○ 5 definitely false

☐

b **I am as healthy as anybody I know.**

○ 1 definitely true	○ 2 mostly true	○ 3 don't know	○ 4 mostly false	○ 5 definitely false

☐

c **I expect my health to get worse.**

○ 1 definitely true	○ 2 mostly true	○ 3 don't know	○ 4 mostly false	○ 5 definitely false

☐

d **My health is excellent.**

○ 1 definitely true	○ 2 mostly true	○ 3 don't know	○ 4 mostly false	○ 5 definitely false

☐

These next questions are about how you feel, and how things have been with you <u>over the past week</u>. For each question, please <u>tick the circle</u> ✓ for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	(Please tick <u>one</u> circle on <u>each</u> line.)	**Yes**	**No**	**Office Use Only**
1	Are you basically satisfied with your life?	○	○	☐
2	Have you dropped any of your activities and interests?	○	○	☐
3	Do you feel that your life is empty?	○	○	☐
4	Do you often get bored?	○	○	☐
5	Are you in good spirits most of the time?	○	○	☐
6	Are you afraid that something bad is going to happen to you?	○	○	☐
	Do you feel happy most of the time?	○	○	☐
	Do you often feel helpless?	○	○	☐
	Do you prefer to stay at home rather than going out and doing things?	○	○	☐
0	Do you feel you have more problems with memory than most?	○	○	☐
1	Do you think it is wonderful to be alive?	○	○	☐

These next questions are about how you feel, and how things have been with you over the past week. For each question, please tick the circle ✓ for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	(Please tick one circle on each line.)	Yes	No	Office Use Only
12	Do you feel pretty worthless the way you are now?	○	○	☐
13	Do you feel full of energy?	○	○	☐
14	Do you feel that your situation is hopeless?	○	○	☐
15	Do you think that most people are better off than you are?	○	○	☐

Please make sure that you have not left out any questions by mistake. Every question should have one of the circles ticked.

Please indicate what YOUR RELATIONSHIP is to the MAIN RESPONDENT by circling the appropriate word below, or writing details in the space provided.

Office Use Only ☐☐

spouse	sister	mother	aunt	niece
partner	brother	father	uncle	nephew
child	grandchild	friend		

____

Thank you for completing PART 4 of the survey.

Please turn the page to read the final instructions.

Other Person Survey Final Page

Before you place the completed survey in the supplied, PLAIN BROWN envelope, please read the check list below:

Please ...

- Check to see that you have NOT skipped any pages. ☐
- Double check to make sure you have entered ALL the information that you intended to. ☐
- When you have completed your survey, place it in the supplied PLAIN BROWN envelope. Once you have sealed this envelope, give it to the main respondent to place in their supplied, addressed FREEPOST envelope, together with their completed survey. Both surveys MUST BE MAILED TOGETHER.

If you have any queries related to any aspects of this research project, please do not hesitate to contact members of the research team at Massey University.

Research team contact details:

Telephone at:
(06) 350 5558

Fax at:
(06) 350 5673

Free-phone at:
(Only for callers outside the Manawatu toll free zone)
0800 363 957

Mail at:
School of Psychology
Massey University
P/Bag 11 222
Palmerston North

Email Judy at:
J.A.Blakey@massey.ac.nz

Thank you for your time!

Appendix D

Descriptive summaries of the doctoral research sample selection processes, the statistical procedures used, and the outcomes of hypothesis testing

Table D.1

Descriptive summary of the nested HARP veteran and doctoral dyadic partner samples' recruitment, selection and data collection processes

HARP MAIN STUDY PARTICIPANT RECRUITMENT & DATA COLLECTION DURING 2000-2001

Phases:	Associated actions:	Dates:
Phase 1	NZWP CPU Hamilton staff selected a stratified random sample comprising **one third of the 8957 potential veterans' names listed** in their January 2000 database of veterans who received hearing aid battery benefits.	**January to April 2000**
	A total of **2921 veterans in this randomly selected potential participant pool received a first contact letter** (FCL) inviting them to participate in the HARP study, together with a request that a communication partner might also wish to join the study ***(to enable the simultaneous recruitment of a subset of veterans together with their dyadic partners for the doctoral study)***.	**Late April**
Phase 2	During the first 12 weeks **947 veterans (a 32.42% response rate)** contacted the Massey University research officer opting to join the HARP study, and subsequently received a self-report mail out survey (MOS) to complete and return (refer Appendix B). If a communication partner responded with the veteran, that person received the "Other Person" self-report MOS to complete and return (refer Appendix C).	**April to end June**
	At the beginning of July **the 1897 veterans (64.94%)** who had not yet responded to the FCL **subsequently received a follow-up second contact letter** (SCL), which repeated the request that recipients also invite their communication partners to participate.	**July**
	By mid October a total of **1382 veterans (a 47.31% response rate)** had agreed to participate in the HARP study; over two thirds of whom **(*n*=930 veterans)** were linked to a communication partner respondent.	**by mid October**
	The **final HARP veteran sample comprised *n*=1249 veterans**, as nearly 10% of respondents failed to complete their surveys, or chose to withdraw from the study for a variety of reasons. Within this final sample **a subset of *n*=805 veterans** were linked to communication partners who had also completed and returned their surveys, and ***thereby provided a potential dyadic partner participant pool for the doctoral study (selection details are presented on the following page).***	
Phase 3	All the veterans in the final HARP sample provided signed consent enabling the research officer to access their medical records held in NZWP's Hamilton office. Information of when the veterans had had their most recent hearing assessments and details in relation to their associated bilateral hearing losses (i.e. NAL% HL) were extracted from the veterans' files, and recorded electronically. ***This respondent NAL% hearing loss database comprising objective hearing loss measures was used as a supplementary data source in both the HARP and doctoral study analyses.***	**January & February 2001**

Table D.1 (continued)

DOCTORAL STUDY'S DYADIC PARTNER SUB-SET SELECTION PROCESSES

(applied after conclusion of the HARP study in 2001)

HARP potential participant pool:	Data:
A *subset of 805 veterans from the HARP study sample*, each of whom had completed and returned their mail out surveys (refer Appendix B) between April and mid-October, 2000, along with a linked communication partner who had similarly completed and returned the 'Other Person' survey (refer Appendix C) within the same time period, *provided the potential dyadic partner participant pool for the doctoral study.*	**Veteran and Other Person' survey responses**
The unique identification code for each veteran *enabled the researcher to select the appropriately matched objective NAL% hearing loss information from the electronic database, for each veteran who had responded with a dyadic partner.*	**Bi-lateral NAL% HL profiles**

DOCTORAL STUDY'S dyadic partner selection criteria:

1) Only male veterans;

2) Who were aged 65+ years when completing their survey booklet;

3) And whose female spouse/partner who resided in the same household had similarly completed a survey booklet;

4) And that both partners lived independently in the community.

DOCTORAL STUDY'S actual dyadic partner sample:

- **n=703 dyads met the criteria listed above; however**
- **n=32 dyads were subsequently excluded because of excessive missing data in critical questionnaires (notably those related to social support variable measures); hence**
- **n=671 dyads remained – almost two thirds (64.45%) of all those veterans who had responded with a communication partner**

Table D.2
Descriptive list of statistical procedures used

Procedures:	Descriptions (refer Coakes & Steed, 2001):
Bivariate correlation	A **Pearson product-moment correlation coefficient** (denoted by the letter r) describes the relationship between two continuous variables. The simple bivariate correlation is the most common measure of linear relationships, and ranges from -1 to +1. The value indicates the strength of the relationship, while the sign (+ or -) indicates the direction. The coefficient's associated p value indicates the significance of the result. Generally $p < .05$ is deemed to be significant. Correlational analysis has a number of underlying assumptions: (i) the data must be collected from related pairs; (ii) data should be interval or ratio measures; (iii) the scores for each variable should be normally distributed; (iv) the relationship between the two variables must be linear; and (v) the variability in scores for one variable is roughly the same at all values of the other variable.
Chi-square test of the relationship between two categorical variables	**Chi-square** (denoted by the symbol χ^2) testing of the relationship between two categorical variables can be conducted after three assumptions are met: (i) random sampling of the population; (ii) the independence of the observed variables (i.e. no subject is to be counted twice); and (iii) when the number of cells is <10 and the total sample size is small, the lowest expected frequency required for a chi-square test is five – however, observed frequencies can be any value, including zero.
Cronbach's alpha reliability coefficient	**Cronbach's alpha reliability coefficient** (denoted by the symbol α) is the most commonly used technique to determine the reliability of test scores. Based on the average correlation of items within a test if they are standardised, or the average co-variance among items that are not standardised, this statistic can be interpreted as a correlation coefficient that ranges in value from 0 to 1. χ^2
Factor analysis	**Factor analysis** is a data reduction technique used to reduce a large number of variables to a smaller set of underlying factors that summarise the essential information contained in the variables. **Principal components analysis** (PCA) is one of the exploratory techniques that extract factors to construct reliable measures of constructs. Factor analysis assumption testing includes: (i) a required minimum of five subjects per variable, but sample sizes of 200+ are preferable; (ii) if variables are normally distributed the solution is enhanced; (iii) because factor analysis is based on correlation linearity is important, otherwise the solution is degraded; (iv) factor analysis is sensitive to outlying cases, accordingly these need to be managed appropriately; (v) Multicollinearity and singularity are not relevant for PCA; (vi) the correlation matrix should be inspected for correlations >.3 prior to conducting the analysis; (vii) outlying variables which register low correlations with all important factors may need to be deleted from the analysis.
Multiple regression	**Multiple regression** is an extension of bivariate correlation. The result of regression is an equation that represents the best prediction of a dependent variable (DV) from several independent variables (IVs). Regression is used when IVs are correlated with one another and with the DV. IVs can be either continuous or categorical (which are coded as dummy variables). In contrast, the DV must be measured on a continuous scale. Although there are three major regression models, hierarchical regression was chosen by the researcher so she could determine the order of entry of IV blocks, guided by Green and Kreuter's (1991) flexible research framework described in Figure 1.2.

Table D.2 (continued)

One-way between groups analysis of variance (*ANOVA*) with post-hoc comparisons	At the heart of **ANOVA** is the notion of variance. The basic procedure is to derive two different estimates of population variance from the data, then calculate a statistic from the ratio of these estimates. The *between-groups* variance measures the effect of the independent variable combined with error variance; whilst the *within-groups* variance estimates the error variance by itself. The *F*-ratio calculates the ratio of the between to within-groups variance. A significant *F*-value ($p < .05$) indicates that the population means are probably not all equal, and the post-hoc analysis subsequently locates where the significance lies. **Post-hoc analysis** hunts through the data for any significance by examining all possible comparisons. This type of testing carries risks of type I errors, however the tests (e.g. **Tamhane's T2 procedure**) are designed to protect against these errors, are much stricter than planned comparisons and therefore much harder to obtain significance.
***t* test**	A ***t*-test** is used to determine whether a set or sets of scores differ significantly. If the test is significant ($p<.05$) the researcher rejects the null hypothesis and accepts the alternative hypothesis that the variances are unequal. Three main types of t-test may be applied: One-sample, independent groups and repeated measures. The generic assumptions underlying all types of *t*-test include: (i) interval or ratio level of measurement; (ii) scores randomly sampled from the population of interest; (iii) scores normally distributed in the populations. Two additional assumptions apply in relation to the independent groups' *t*-test: (a) the groups should be independent; and (b) the groups should represent populations with equal variance.
***z* test**	The proportional difference ratio is calculated by dividing the difference in two numbers of events by the square root of their sum. The resulting *z* score has a normal distribution with a mean of 0 and variance of 1. Using commonly available normal distribution tables, *z* scores can be converted into *p* values. This simple test gives an instant feel of the strength of evidence for a treatment difference (Pocock, 2006).

Table D.3
Summary list of research aims, associated hypotheses, outcomes and the extent of support (derived from the *p* values)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM I: ***Comparisons between first time & experienced veterans' aural rehabilitation coping trajectories***					
Hyp. 1	Significantly more experienced hearing aid users in comparison with first time users will have had their hearing tested more recently.	174	↑ *experienced users reported having had hearing assessments more recently:* $z = -4.78, p<.0001$	228	$p<.0001$
Hyp. 2	The first time hearing aid users will be significantly less satisfied than experienced users with the overall performance of their aids.	174	*First time users reported being ↓ satisfied with the performance of their hearing aid device/s:* $t\,(410.54) = 2.13, p=.034$	228	$p=.034$
Hyp. 3	The first time hearing aid users will report significantly less frequent daily use (DU) of their hearing aids than experienced users.	175	↑ *first time users reported less frequent daily use of their hearing aid device/s:* $z = 7.11, p<.0001$	228	$p<.0001$
AIM II: ***Partners' perceptions of the stigmatising impact of hearing losses on the veterans' social & emotional agency***					
Hyp. 4	A significantly greater proportion of female partners in comparison with veterans will report that the veterans' hearing losses affect the veterans' family, social and recreational lives.	175	↑ ♀ *report family impact:* $z = -9.66, p<.0001$ ↑ ♀ *report social impact:* $z = -8.55, p<.0001$ ↑ ♀ *report the recreational impact:* $z = -7.42, p<.0001$	230 230 230	$p<.0001$ $p<.0001$ $p<.0001$
Hyp. 5	More specifically, a significantly greater proportion of women in comparison with veterans will report that the veterans' actual roles in their families are affected by their hearing losses.	175	↑ ♀ *report the impact on their partners' actual role in their family was affected:* $z = -4.56, p<.0001$	230/1	$p<.0001$

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	p values
AIM II: *Partners' perceptions of the stigmatising impact of hearing losses on the veterans' social & emotional agency*					
Hyp. 6	In addition, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses affect their interpersonal relationships.	175	↓ ♀ *affirmed their partners' relationships with others remained warm:* $z = 4.74$, $p<.0001$ ↑ ♀ *stated their partners' relationships with others were less warm:* $z = -2.25$, $p=.0124$	231/2 231/2	$p<.0001$ $p=.0124$
Hyp. 7	Finally, a significantly greater proportion of women in comparison with veterans will report that the veterans' hearing losses (HL) have made their partners feel depressed.	175	↑ ♀ *acknowledged that hearing losses had made their partners depressed:* $z = 7.48$, $p<.0001$	231/2	$p<.0001$
AIM III (i): *Intersecting structural and functional features of social support*					
Hyp. 8	The socially isolating impact of living with hearing losses will ensure that a significantly greater proportion of veterans in comparison with their partners will live in socially isolated Wenger support networks; on the other hand, significantly more women will live in socially integrated support networks.	176	↑ ♂ *lived in socially isolated support networks:* $z = 3.02$, $p=.0013$	233	$p=.0013$
Hyp. 9a	In addition, the impact of living with hearing losses will accentuate the expected gender differences between the partners in relation to the number of people they identify available to provide emotional support, so that the veterans will list significantly fewer people in comparison with their partners.	176	*SSQn gender differences showed ♀ reported having significantly ↑ friends available to provide emotional support:* t (1340) $= -1.96$, $p=.05$	242	$p=.05$

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM III (i): *Intersecting structural and functional features of social support*					
Hyp. 9b	Despite listing fewer people available to provide emotional support, the published literature indicates that male respondents will be significantly more satisfied with their perceived availability of emotional support than the females.	176	*SSQs gender differences showed ♂ reported ↑ satisfaction with the perceived availability of emotional support:* $t\,(1328.958) = -2.29, p=.02$	242	$p=.022$
Hyp. 10	In keeping with Wenger's description of the support network typology, respondents in the Locally Integrated (LI) networks will list the greatest number of people available to provide emotional support, while those in Private Restricted (PR) networks will list the least.	177	*The SSQn ANOVA & Tamhane's T2 tests revealed the greatest mean difference in the numbers of friends perceived available to provide emotional support occurred between respondents in the LI & PR networks,* $p<.001$	244	$p<.001$
Hyp. 11	Accordingly, respondents in Wenger's Locally Integrated (LI) networks will report the highest levels of satisfaction with their perceived availability of emotional support, whilst those in the Private Restricted (PR) networks will report the least satisfaction.	177	*The SSQs ANOVA & Tamhane's T2 tests revealed the greatest mean difference in the respondents' perceived satisfaction with the availability of emotional support occurred between respondents in the LI & PR networks,* $p=.009$	245/6	$p=.009$ *(Note: ♀s in PR networks contributed significantly to this effect)*

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM III (ii): *Functional implications associated with Wenger's support network continuum*					
Hyp. 12	Veterans in socially integrated networks will report significantly less frequent occurrence of forgetting than those veterans in socially isolated networks.	177	*Veterans in socially integrated support networks reported significantly ↓ frequent occurrence of forgetting:* t (541) = -2.42, p=.016	251	p=.016
Hyp. 13a	Given the increased risk of clinical depression in older adults with hearing losses, the veterans will report significantly more depressive symptoms than their partners.	178	*Veterans reported significantly ↑ depressive symptoms in their GDS-15 questionnaire responses than did their partners:* t (1340) = 2.08, p=.038	252	p=.038
Hyp. 13b	In addition, respondents in the socially integrated networks will report significantly fewer depressive symptoms than those respondents in the socially isolated networks.	178	*The GDS-15 ANOVA & Tamhane's T2 tests revealed respondents in socially integrated networks reported significantly fewer GDS-15 questionnaire depressive symptoms,* p<.001	253	p<.001
Hyp. 13c	Finally, those respondents in Wenger Private Restricted (PR) networks, which are the most socially restricted and therefore least likely to be emotionally supportive of all the types of support networks, will report the most depressive symptoms.	178	*The GDS-15 ANOVA & Tamhane's T2 tests revealed the number of depressive symptoms reported by respondents in PR networks significantly different to those in WC & LI networks at* p<.001; and *to those in LSC networks at* p=.003	254	p<.001 *(for WC & LI networks)* p=.003 *(for LSC networks)*

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM IV: *Empirical links with the veterans' self-reported hearing handicap*					
Hyp. 14	The predisposing, reinforcing, dis/enabling and exacerbating variable blocks comprising the composite model of Ageing with Hearing Handicap will explain significant proportions of the variance in the veterans' self-reported Hearing Handicap Inventory (HHIE) total scores.	180	*The final adjusted R^2 total in the HHIE hierarchical regression model explained 71.5% of the variance in the veterans' hearing handicap (F [24,633] = 69.82, $p<.001$). This total was accounted for by the six components comprising the composite model of Ageing with Hearing Handicap (refer Table 8.28).*	264-7	$p<.001$
Hyp. 14a	The partners' functional support measures will account for comparatively more variance than their structural measures of support.	180	*Although the structural support variable accounted for 1.6%, & the functional support variables 6% of the explained variance, none of these variables sustained their significant contributions to the explained variance in the final model.*	264-8	*Not supported: β values not significant in the final model*
Hyp. 14b	The aural rehabilitation variables will explain more variance than their sociodemographic variables, even though the latter block includes the objective measures of the veterans' actual bi-lateral hearing losses (i.e. their NAL% HL).	180	*The dis/enabling aural rehabilitation variables contributed 21% unique variance at Step 4, compared to only 10.9% for the Step 1 predisposing variable block. The final model in Table 8.28 shows clearly that collectively four aural rehabilitation variables and daily use of the veterans' hearing aids were significantly related to their HH.*	264-8	*Almost twice as much variance explained; variables' β values in the final model varied*

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM IV: ***Empirical links with the veterans' self-reported hearing handicap***					
Hyp. 14c	In the final model, the veterans' self-reported memory in everyday life will significantly exacerbate their self-reported experience of HH.	180	*More frequent occurrence of problems Attending during Semantic Processing (ASP) explained 13.8% (p=<.001) of the variance; whereas less frequent General Forgetfulness (GF) explained 9.8% (p=<.001).*	264-8	*p=<.001*
Hyp. 14d	Finally, the veterans' perceptions of their spoiled social identities (explored in the second research aim) will account for the most explained variance of all the variable blocks in the composite conceptual model.	180	The final step contributed the largest percentage (22.5%) of variance to the total amount explained in the final model *(F [5,633] = 103.85, p<.001).*	264-8	*p<.001*
AIM IV: ***Empirical links with the veterans' self-reported health-related quality of life***					
Hyp. 15	The predisposing, reinforcing, dis/enabling and exacerbating variable blocks that comprise the composite conceptual model of Ageing with Hearing Handicap will explain a significant proportion of the variance in both the veterans' self-reported physical and their mental H-QoL (i.e. their SF-36 PCS and MCS scores).	181	*The regression models accounted for 62.6% of the total variance in the veterans' physical H-QoL (F [26,563] = 38.95, p<.001); but only 37.3% in their mental H-QoL (F [19,560] = 19.14, p<.001).*	275 & 285	*p<.001*

Appendix D Table D.3 (continued)

Hyp.	FOCUS:	Page	OUTCOMES:	Page	*p* values
AIM IV: *Empirical links with the veterans' self-reported health-related quality of life*					
Hyp. 15a	As suggested by the international epidemiological literature reviewed in chapter five, the reinforcing structural support measures will account for more variance in the veterans' PH-QoL than the dis/enabling functional support measures.	181	*Two structural support variables accounted for only 1.8% of the veterans' PH-QoL (F change [2,582] = 5.74, p=.003), the one dis/enabling functional support variable contributed 2.3% (F change [1,582] = 14.82, p<.001).*	275 & 286	*Not supported: Functional support measures stronger*
Hyp. 15b	Conversely, dis/enabling functional support measures will account for relatively more variance in the veterans' MH-QoL than the reinforcing structural support measures.	181	*The dis/enabling functional support variable block accounted for 12.3% of the MH-QoL's explained variance (F change [2,575] = 41.07, p<.001); whereas the sole variable comprising the MH-QoL's reinforcing structural support variable block contributed 1.3% (F change [1,577] = 7.70, p=.006).*	285 & 286	*Functional support variables accounted for 11% more of the explained variance*
Hyp. 15c	Given the strong empirical links between hearing losses, social isolation and depression, the potentially exacerbating impact of ageing with stigmatising hearing losses will account for proportionately more variance in the veterans' mental than their physical H-QoL.	181	*The potentially exacerbating impact of ageing with hearing losses variable block accounted for 11.4% of the MH-QoL's explained variance (F change [7,568] = 12.44, p<.001); but only 4.2% (F change [9,573] = 3.09, p=.001) of the PH-QoL's explained variance.*	275, 285 & 286	*Ageing with HL variables accounted for 7.2% more of the explained variance*

Appendix E

Veterans' social demographic profiles within each branch of the armed services in the sample

Typical social demographic profiles of veterans within each branch of the armed services represented in the sample

Although the social demographic profiles of veterans who served in each of the different branches appeared similar, some variations were noticeable. The proportion of veterans who served in the RNZ Air Force who were likely to have no school qualifications (16.7%) was significantly smaller than their counterparts who had served in either the NZ Army (28%; z = -3.32, p<.001) or the RNZ Navy (28.8%; z = -2.20, p<.05). Similarly, the proportion of ex-RNZ Air force personnel whose occupations were in the first three categories (48.2%) was significantly greater than those who served in the NZ Army (35.7%; z = 3.21, p<.01); the comparison with the naval ex-service personnel (36.4%) was not as pronounced (z = 1.71, p<.05). Although comparably more naval veterans indicated that they lived in rural areas and centres, these proportionally differences were not statistically significant differences.

Table E.1

Social demographic characteristics of veterans who served in each branch of the NZ armed services (*N*=671)

Branch (n)	Mean Age (in years) (*SD*)	Mean Income (*SD*)	Percentage with no school educational qualifications	Percentage in 1st 3 occupational categories	Percentage residents of rural areas or centres
NZ Army (*n*=454)	79.44 (4.36)	$19,945.36 ($14,318.47)	28.0%	35.7%	12.1%
RNZ Air Force (*n*=245)	78.90 (3.52)	$21,294.77 ($16,214.25)	16.7%	48.2%	11.4%
RNZ Navy (*n*=66)	77.17 (4.24)	$22,225.35 ($23,511.27)	28.8%	36.4%	19.7%
'Other' branches (*n*=55)	78.86 (4.03)	$22,469.11 ($11,979.97)	18.2%	43.6%	9.1%

Appendix F

Screeplot from the PCA output of all the respondents' Wenger Network Assessment Instrument responses

SPSS printout from the principle components analysis (PCA) of Wenger's Network Assessment Instrument responses

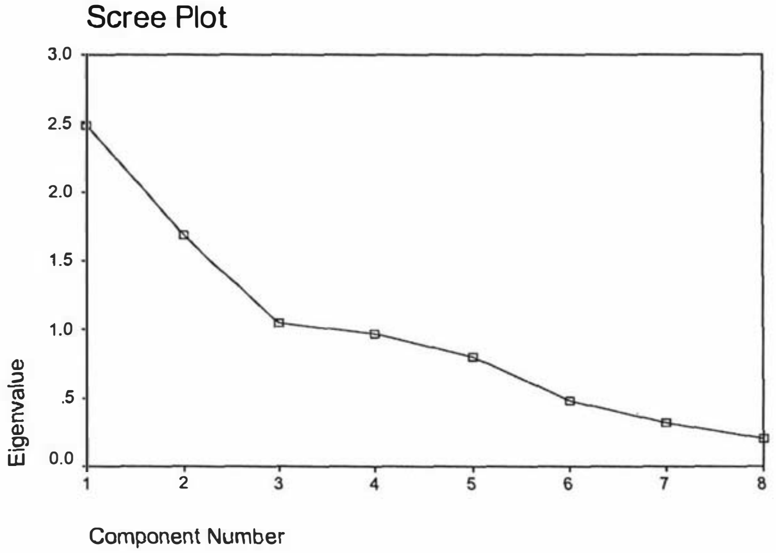


Figure F.1. Scree plot from the SPSS printout of the principal components analysis of Wenger's (1994) Network Assessment Instrument (NAI) responses.

Appendix G

Typical Wenger Family & Community Focused (WFF & WCF) features associated with each of the five ‘pure’, four borderline and the inconclusive support networks

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Table G.1
Characteristic Wenger Family (WFF[a]) & Community (WCF[b]) focussed factor scores across five 'pure' Wenger Support Network Types (SNTs) for *n*=1088 respondents

		Characteristic features:	
Wenger SNTs:	***n***	**Family Focus (WFF):**	**Community Focus (WCF):**
Wider Community (WC) **WFF *M*=2.75 (*SD*=0.46)** **WCF *M*=4.37 (*SD*=0.78)**	268	• **64.9%** have nearest relatives who live **≥100Km** away in NZ • **72%** have a nearest child who lives **≥100Km** away in NZ • **48.9%** speak to their relatives **less often than monthly**	• **43.3%** chat to or do something with friends **2-3 times a week** • **35.1%** chat to their neighbours **at least weekly** • **78.4%** attend community meetings **regularly**
Locally Integrated (LI) **WFF *M*=4.68 (*SD*=0.48)** **WCF *M*=4.44 (*SD*=0.74)**	548	• **66.6%** have nearest relatives who live **2-10 Km** away • **61.7%** have a nearest child who lives **2-10 Km** away • **38.9%** speak to their relatives **2-3 times a week**	• **45.4%** chat to or do something with friends **2-3 times a week** • **43.1%** chat to their neighbours **2-3 times a week** • **64.1%** attend community meetings **regularly**
Local Self-Contained (LSC) **WFF *M*=3.75 (*SD*=0.56)** **WCF *M*=3.30 (*SD*=0.84)**	177	• **43.5%** have nearest relatives who live **10-30 Km** away • **39.5%** have a nearest child who lives **10-30 Km** away • **56.5%** speak to their relatives **at least weekly**	• **42.9%** chat to or do something with friends **at least weekly** • **44.6%** chat to their neighbours **at least weekly** • **37.9%** attend community meetings **occasionally**; & **37.3%** **never** attend them
Family Dependent (FD) **WFF *M*=5.17 (*SD*=0.42)** **WCF *M*=2.72 (*SD*=1.01)**	44	• **75%** have nearest relatives who live **in the same house or < 2 Km away** • **70.5%** have a nearest child who lives **in the same house or < 2 Km away** • **45.5%** speak to their relatives **daily**; & **45.5%** speak to them **2-3 times a week**	• **29.5%** chat to or do something with friends **at least monthly**; & **25%** do so **at least weekly** • **36.4%** chat to their neighbours **at least monthly** • **54.5%** attend community meetings **occasionally**
Private Restricted (PR) **WFF *M*=2.87 (*SD*=0.96)** **WCF *M*=2.54 (*SD*=1.19)**	51	• **58.8%** have nearest relatives who live **≥100Km away** in NZ • **62.7%** have a nearest child who lives **≥100Km away** in NZ • **70.6%** speak to their relatives **less often than monthly**	• **27.5%** chat to or do something with friends **less often than monthly**; & **25.5%** do so **2-3 times a week** • **37.3%** chat to their neighbours **less often than monthly** • **68.6%** **never** attend community meetings

[a] *Wenger Family Focus (WFF) factor comprised 3 items: Questions 1, 2 & 4.*
[b] *Wenger Community Focus (WCF) factor comprised 3 items: Questions 5, 6 & 8.*

Table G.2

Characteristic WFF[a] and WCF[b] factors across four transitional borderline (BL) and the inconclusive (IN) Wenger Support Network Types (SNTs) for *n*=254 respondents

		Characteristic features:	
Wenger SNTs:	***n***	**Family Focus (WFF):**	**Community Focus (WCF):**
Locally Integrated – Borderline (LI-BL) WFF *M*=3.36 (*SD*=0.47) WCF *M*=3.25 (*SD*=0.40)	42	• **38.1%** have nearest relatives who live **in the same house or < 2 Km away** • **31%** have a nearest child who lives **in the same house or < 2 Km away** • **52.4%** speak to their relatives **at least weekly**	• **42.9%** chat to or do something with friends **at least weekly** • **50%** chat to their neighbours **at least weekly** • **85.7%** attend community meetings **regularly**
Local Self-Contained – Borderline (LSC-BL) WFF *M*=3.48 (*SD*=0.35) WCF *M*=3.49 (*SD*=0.42)	79	• **46.8%** have nearest relatives who live **2-10 Km** away • **40.5%** have a nearest child who lives **2-10 Km** away • **64.6%** speak to their relatives **at least weekly**	• **39.2%** chat to or do something with friends **2-3 times a week** • **49.4%** chat to their neighbours **at least weekly** • **43%** attend community meetings **occasionally**
Family Dependent – Borderline (FD-BL) WFF *M*=2.79 (*SD*=0.36) WCF *M*=3.62 (*SD*=0.42)	53	• **83%** have nearest relatives who live **in the same house or < 2 Km away** • **75.5%** have a nearest child who lives **in the same house or < 2 Km away** • **45.3%** speak to their relatives **2-3 times a week**	• **34%** chat to or do something with friends **2-3 times a week** • **30.2%** chat to their neighbours **2-3 times a week** • **52.8%** attend community meetings **occasionally**
Private Restricted – Borderline (PR-BL) WFF *M*=4.06 (*SD*=0.36) WCF *M*=3.66 (*SD*=0.37)	42	• **71.4%** have nearest relatives who live **≥100Km away** in NZ • **66.7%** have a nearest child who lives **≥100Km away** in NZ • **73.8%** speak to their relatives **less often than monthly**	• **38.1%** chat to or do something with friends **2-3 times a week** • **38.1%** chat to their neighbours **2-3 times a week** • **47.6%** **never** attend community meetings
inconclusive (IN) WFF *M*=3.32 (*SD*=0.41) WCF *M*=3.68 (*SD*=0.43)	38	• **39.5%** have nearest relatives who live **2-10 Km away** • **34.2%** have a nearest child who lives **2-10 Km away** • **50%** speak to their relatives **at least weekly**	• **39.5%** chat to or do something with friends **at least weekly** • **34.2%** chat to their neighbours **at least weekly** • **34.2%** **regularly OR occasionally** attend community meetings

[a] *Wenger Family Focus (WFF) factor comprised 3 items: Questions 1, 2 & 4.*

[b] *Wenger Community Focus (WCF) factor comprised 3 items: Questions 5, 6 & 8.*

Appendix H

Perceived availability of emotional support across Wenger's support network continuum (including 'pure', borderline & inconclusive networks)

Independent dyadic partners' perceptions of the availability of emotional support profiles and of the veterans' loneliness

Table H.1

Independent dyadic partners' perceived emotional support profiles and their perceptions of the veterans' loneliness across Wenger's support network continuum (for *n*=543 veterans and *n*=545 S/Ps)

Variables:	Wenger's support network continuum:				
	Wider Community (WC)	Locally Integrated (LI)	Local Self Contained (LSC)	Family Dependent (FD)	Private Restricted (PR)
Number of veterans	129	263	94	26	31
(% of n=543)	*(28.5)*	*(48.4)*	*(17.3)*	*(4.8)*	*(6.8)*
Number of S/Ps	139	285	83	18	20
(% of n=545)	*(25.5)*	*(52.3)*	*(15.2)*	*(3.3)*	*(3.7)*
SSQn[a]:					
Veterans' mean = 3.46 *(SD=2.29)*	3.21 *(1.97)*	3.78 *(2.33)*	3.61 *(2.58)*	2.93 *(2.20)*	1.90 *(1.39)*
S/Ps' mean = 3.66 *(SD=2.22)*	3.64 *(2.21)*	4.01 *(2.17)*	3.17 *(2.12)*	2.86 *(2.23)*	1.86 *(1.36)*
SSQs[b]:					
Veterans' mean = 5.66 *(SD=0.59)*	5.64 *(0.58)*	5.74 *(0.50)*	5.53 *(0.66)*	5.56 *(0.78)*	5.51 *(0.84)*
S/Ps' mean = 5.59 *(SD=0.72)*	5.61 *(0.64)*	5.68 *(0.57)*	5.48 *(0.64)*	5.47 *(1.04)*	4.54 *(1.72)*
Number of respondents who reported that the veterans felt lonely[c]:					
Veterans (173 or *31.9%*) *(% of veterans' networks)*	42 *(32.6%)*	70 *(26.6%)*	35 *(37.2%)*	8 *(30.8%)*	18 *(58.1%)*
S/Ps (235 or *43.1%*) *(% of S/Ps' networks)*	58 *(41.7%)*	118 *(41.4%)*	39 *(47.0%)*	5 *(27.8%)*	15 *(75.0%)*

[a] *SSQn represents the PERCEIVED NUMBER of people on average available to provide emotional support (in six different situation) and ranges from no-one to a maximum of nine people.*

[b] *SSQs represents the PERCEIVED SATISFACTION with the emotional support provided and ranges from 'very dissatisfied' (=1) to 'very satisfied' (=6).*

[c] *Number of respondents reporting the veterans' feelings of loneliness, which ranged from feeling socially isolated and lonely (=1) to having friends but still feeling lonely occasionally (=3).*

Table H.2

Independent dyadic partners' perceived emotional support profiles and perceptions of the veterans' loneliness across their four transitional borderline (BL) and the inconclusive (IN) transitional support networks (for *n*=128 veterans and *n*=126 S/Ps)

Variables:	**Borderline support network continuum:**				
	Locally Integrated-BL (LI-BL)	**Local Self Contained-BL (LSC-BL)**	**Family Dep-pendent-BL (FD-BL)**	**Private Re-stricted-BL (PR-BL)**	**Inconclusive (IN)**
Number of veterans	23	36	33	21	15
(% of n=128)	*(18.0)*	*(28.1)*	*(25.8)*	*(16.4)*	*(11.7)*
Number of S/Ps	19	43	20	21	23
(% of n=126)	*(15.1)*	*(34.1)*	*(15.9)*	*(16.7)*	*(18.3)*
SSQn[a]:					
Veterans' mean=3.12	3.19	3.80	3.10	2.29	2.57
(SD=2.03)	*(2.06)*	*(2.03)*	*(2.07)*	*(2.00)*	*(1.59)*
S/Ps' mean=3.52	4.06	3.39	3.70	3.30	3.34
(SD=2.17)	*(2.45)*	*(2.32)*	*(2.04)*	*(2.41)*	*(1.53)*
SSQs[b]:					
Veterans' mean=5.68	5.78	5.71	5.74	5.44	5.68
(SD=0.49)	*(0.40)*	*(0.51)*	*(0.41)*	*(0.59)*	*(0.49)*
S/Ps' mean=3.56	5.51	5.44	5.65	5.46	5.79
(SD=0.70)	*(0.60)*	*(0.88)*	*(0.47)*	*(0.82)*	*(0.36)*
Number of respondents who reported that the veterans felt lonely[c]:					
Vets (39 or *30.5%*) *(% of veterans' networks)*	8 *(34.8%)*	8 *(22.6%)*	10 *(30.3%)*	8 *(38.1%)*	5 *(33.3%)*
S/Ps (61 or *48.4%*) *(% of S/Ps' networks)*	11 *(57.9%)*	23 *(53.5%)*	10 *(50.0%)*	9 *(42.9%)*	9 *(39.1%)*

[a] ***SSQn represents the PERCEIVED NUMBER of people on average available to provide emotional support (in six different situation) and ranges from no-one to a maximum of nine people.***

[b] ***SSQs represents the PERCEIVED SATISFACTION with the emotional support provided and ranges from 'very dissatisfied' (=1) to 'very satisfied' (=6).***

[c] ***Number of respondents reporting the veterans' feelings of loneliness, which ranged from feeling socially isolated and lonely (=1) to having friends but still feeling lonely occasionally (=3).***

Appendix I

Screeplot from the PCA output of veterans' MAC-S "Frequency of Forgetting in everyday life" item responses

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SPSS printout from the principle components analysis (PCA) of the veterans' responses to Crook and Larrabee's (1990) "Frequency of Forgetting in everyday life" items

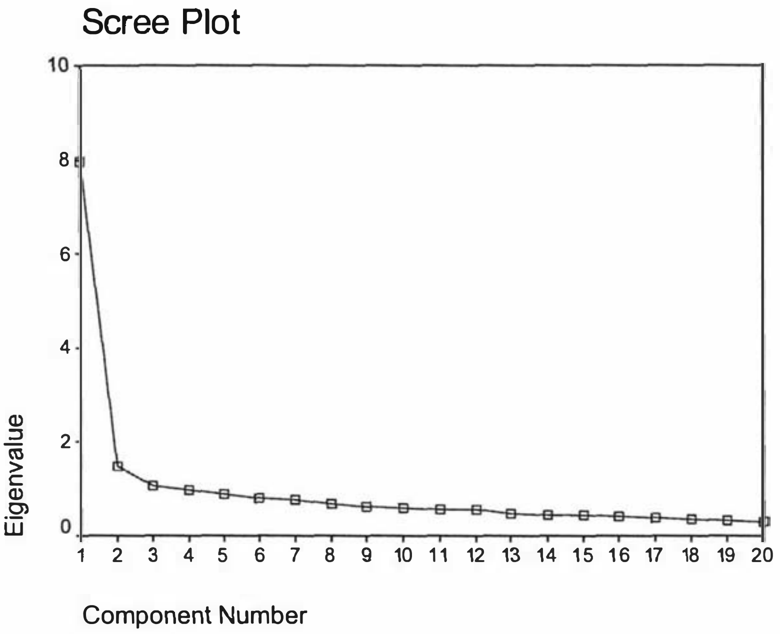


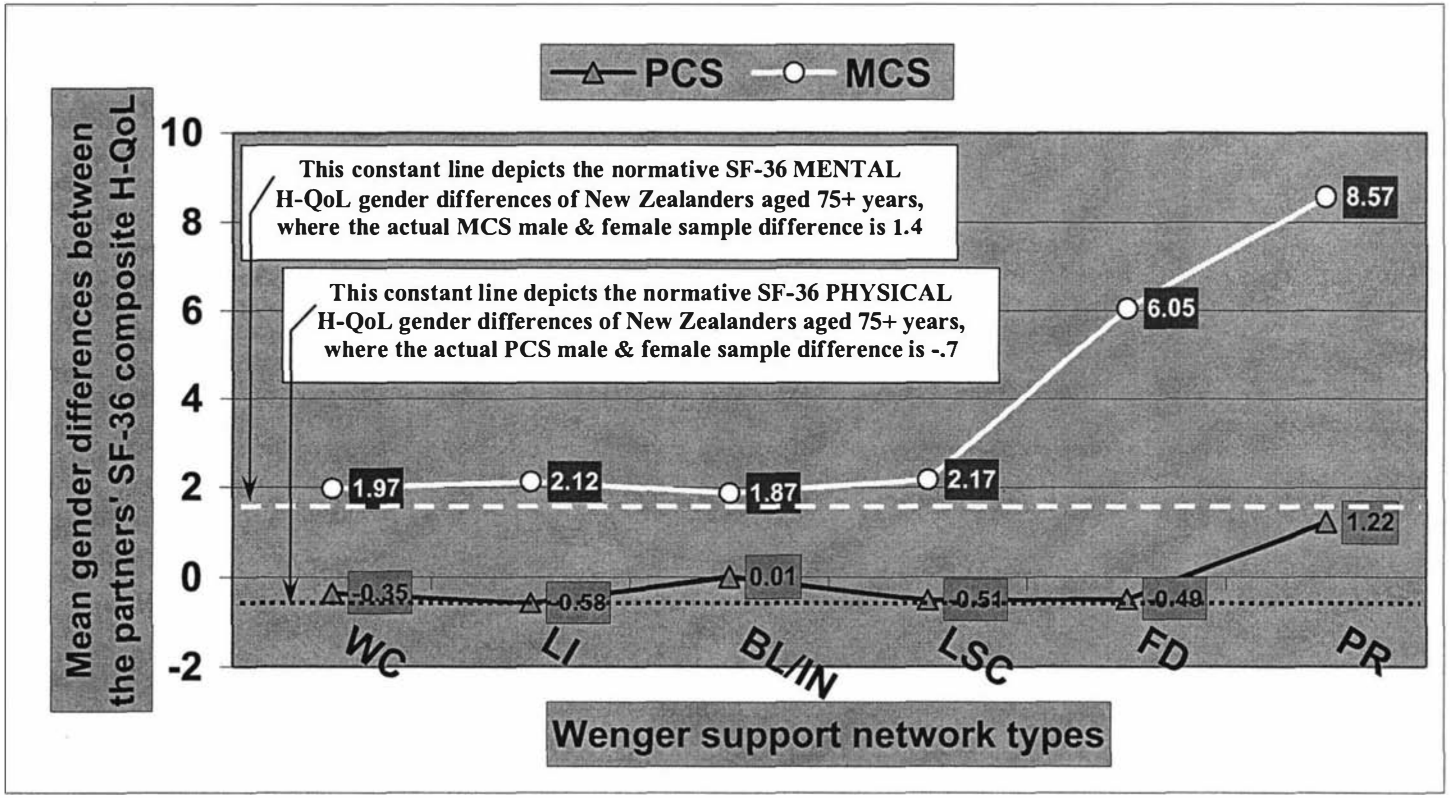
Figure I.1. Scree plot from the SPSS printout of the principal components analysis of Crook & Larrabee's (1990) MAC-S "Frequency of Forgetting" item responses.

Appendix J

Partners' health-related quality of life across Wenger's support network continuum

Figure J.1 depicts the similarities between the dyadic partners' declining self-reported physical and mental health-related quality of life (H-QoL) across Wenger's support network continuum, and illustrates the differences that emerged in the socially isolated networks. The graph reveals that most of the veterans reported somewhat poorer physical H-QoL (PH-QoL) than their partners, except those in the socially isolated Private Restricted (PR) networks, who reported better PH-QoL. By comparison, the veterans reported significantly better mental H-QoL (MH-QoL) than their counterparts, and although both partners' MH-QoL declined across the social gradient encapsulated in Wenger's support network continuum, this was more pronounced for the women in the most socially isolated Family Dependent (FD) and PR support networks (reflected in the steep incline of the MCS mean gender difference plot line, in Figure J.1).

Women in both the Family Dependent [FD] and Private Restricted [PR] support networks may well have been self-managing their *own* chronic conditions; however, no data were collected to gauge this aspect. The small numbers of women in these two groups precluded testing for any proportional differences between them (n=18 FD cases and n=20 PR cases); however, differences in the networks' defining structural characteristics are worth noting, as they suggest the presence of potential stress-buffering features. The women in the PR networks did not receive the same level of family support, especially from children who lived nearby; and although they reported relatively more frequent contact with their neighbours, this did not fulfil their perceived needs for emotional support (graphically illustrated in Figure 8.4). Women in FD networks were also much more likely to have contact with (and potentially support from) members of a church congregation.



This constant line depicts the normative SF-36 MENTAL H-QoL gender differences of New Zealanders aged 75+ years, where the actual MCS male & female sample difference is 1.4

This constant line depicts the normative SF-36 PHYSICAL H-QoL gender differences of New Zealanders aged 75+ years, where the actual PCS male & female sample difference is -.7

Figure J.1. Summary of gender differences in self-reported quality of life encapsulated by the mean differences in the respondents' PCS or MCS across Wenger's support network continuum (for n=617 veterans and n=646 female dyadic partners).
Note: *As the difference scores approach zero, the gender differences disappear; the scores > 0 reflect higher male (or veteran) scores, and those < 0 reflect higher female scores. Clearly women in socially isolated FD & PR support networks reported much lower levels of MH-QoL than the veterans. However, only the women in the PR networks reported worse PH-QoL than the veterans.*