Comparing Group-Based Interventions in Older Adults with Subjective Memory Difficulties

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ABSTRACT

The trend internationally and within New Zealand is of an increasing aging population, with numbers of those with dementia projected to increase rapidly. One way to address this issue is to consider the practical and clinical benefits of running memory intervention groups for older adults with memory difficulties/impairment. The current study intended to address some of the limitations found in memory intervention literature by (a) using a social control group as a control comparison, which has not been done before, and (b) separating out components of memory training interventions (i.e., memory strategies and lifestyle education). Therefore, the aim was to determine the extent to which receiving Memory intervention separately from a Lifestyle Education intervention would affect memory functioning in older adults with subjective memory difficulties, when compared with a social control condition. Participants for the intervention group were recruited from rest homes and retirement villages, while social control participants were community-dwelling older adults already taking part in weekly community group activities. A brief cognitive screen and subjective outcome measures were administered at baseline, post Phase 1, post Phase 2, and at six month follow-up. Quantitative and qualitative information from a total of 13 participants were analysed. Results from each of the outcome measures across the four time points indicated that there were no significant benefits of receiving Memory and/or Lifestyle Education interventions, when compared with a social control condition. However, a small sample size, non-equivalent groups, and lack of random assignment were some of the limitations which made it difficult to reach definite conclusions. Content analysis of qualitative information following intervention sessions provided some valuable considerations for running memory groups in future. In light of its limitations, the current study highlights practical considerations and recommendations for future research in this area. In particular, it identifies the value of conducting memory intervention research with older adults in residential care settings.

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CHAPTER 1: OVERVIEW

The topic for this doctoral research stemmed from an Honours level project conducted by the author in 2009. Normative data were gathered from a sample of adults aged 25 to 85+ years within New Zealand, and comparisons made between two brief cognitive screening measures: the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA). The utility of these screening measures when determining cutoff scores between cognitively normal individuals and those with a clinical syndrome termed mild cognitive impairment (MCI) was briefly explored. An interest in the concept of MCI ensued. As a clinical group most at risk of progressing to dementia, there is clinical significance in conducting research with those with MCI.

The trend internationally and within New Zealand is of an increasing aging population, with numbers of those with dementia projected to increase rapidly (Ministry of Health NZ, 1997). In 2011, the estimated prevalence of dementia in New Zealand was 1.1%, an 18% increase in dementia prevalence over the previous three years (Deloitte Access Economics, 2012). What could be done to address this? As a flow on from the previous research, a research topic was developed which would explore early intervention following the detection and diagnosis of MCI. Specifically, it would focus on whether memory-based interventions can prevent or reduce rates of cognitive decline. Since 2002, a growing interest in utilising cognitive intervention with MCI has resulted in at least 60% of articles on this topic being generated over the last three years (Jean, Bergeron, Thivierge, & Simard, 2010). Hence, the original aim of this doctoral research was to address some of the limitations found in MCI literature on memory interventions, thereby making a small contribution towards knowledge in this area of clinical neuropsychology.

Initial Proposal

In 2010, prior to commencing this study, an enquiry was emailed to a group of health professionals who work with older adults, asking which district health boards (DHBs) within

New Zealand provided memory clinics/services. This was to gain a sense of what has been done in New Zealand already. The email group contacted was the New Zealand Psychologists for Older People (NZPOPs). Eleven responses were received by clinicians associated with different DHBs across the country, and are displayed in Table 1. Note that there are currently 20 DHBs in New Zealand, with 15 in the North Island and five in the South Island.

Of the 11 DHB responses received, only six indicated running memory clinics/services at the time. A questionnaire was then designed to explore in depth, the types of interventions carried out by these clinics/services. This questionnaire was to be used in addition to findings from current literature, to inform how best to conduct intervention groups for the current study. The questionnaire was approved by the Massey University Human Ethics Committee (MUHEC). Appendix A provides a copy of the letter and questionnaire sent to respondents from the NZPOPs group. Of the potential six DHBs, only three responses to the questionnaire were received (from Hawkes Bay, Waikato, and Waitemata DHBs). These three responses can be found in Appendix B.

Based on these responses and findings in MCI literature, the design for the current study was developed. The rationale for this doctoral research was as follows. First, studies to date had not established which aspects of memory interventions delivered in group format, contribute most towards improvements on outcome measures of everyday functioning with MCI (Martin, Clare, Altgassen, Cameron, & Zehnder, 2011; Stott & Spector, 2010). Previous studies had combined memory components with lifestyle and psychoeducation components as the intervention/treatment condition (Kinsella et al., 2009; Kurz, Pohl, Ramsenthaler, & Sorg, 2009; Rapp, Brenes, & Marsh, 2002). Second, previous studies had assigned waitlist/no treatment groups as control conditions for comparison with intervention groups (Jean et al., 2010; Kinsella et al., 2009). The benefits of meeting socially as a group had not been explored as a control condition. This would be useful because it was unclear to what extent teaching memory strategies would be beneficial, or whether meeting in social group settings on a regular basis

Table 1

Eleven Clinician Responses from Different District Health Boards (DHBs) Regarding Memory Clinics/Services Available Within New Zealand

District Health Board	Responses to memory clinics/services
Auckland DHB	Formal memory training is not part of what we offer at present
Bay of Plenty DHB (Mental Health Services for Older People)	About to commence a memory service
Capital and Coast DHB (Psychogeriatric Service)	Does not provide a formally constituted memory clinic. Usually assessment of people with dementia is carried out by multidisciplinary home assessment teams, following referral to the psychogeriatric service
Counties Manukau DHB (Koropiko – Mental Health Services for Older People)	Have nothing of this nature currently
Hawkes Bay DHB (Older Persons Mental Health and Allied Health Service)	Run a cognitive stimulation therapy group aimed at treating memory difficulties, as well as other cognitive impairments associated with dementia
MidCentral DHB (Fielding Community Mental Health Team)	The clinician worked once, individually, in this area in the last 4 years. The clinician comments that it is difficult to assess these clients let alone run groups. Four to eight percent of our clients each year present querying memory difficulties.
Southern DHB (Older People's Health)	Help run an eight week group programme
Taranaki DHB (Mental Health Services for Older Peoples)	Run a monthly memory clinic
Waikato DHB	Run a memory service
Waitemata DHB	Run a memory clinic
Whanganui DHB (Assessment, Treatment and Rehabilitation service)	Run a memory clinic

Note. Respondents were contacted through the New Zealand Psychologists for Older People (NZPOPs) email group.

was in itself sufficient in contributing towards improvements. Hence, the current study would not only separate out the aspects of interventions that are effective (i.e., memory strategies and lifestyle education), but also determine whether a more cost-effective solution would be simply to meet as a group socially, on a regular basis. This would hold important practical implications for current clinic- and hospital-based settings, whose focus has been on finding the resources to run memory intervention groups for those with MCI and those presenting with subjective memory complaints.

The current study was approved by one of the Health and Disability Ethics Committees in New Zealand. Once the study commenced, it quickly became clear that the original research design would not work. The reality and practicality of conducting research in this area, with regard to recruitment of participants, was not completely foreseen. The idea was that sufficient numbers of participants meeting clinical criteria for MCI would be recruited. This would allow for comparisons between two separate intervention conditions, one receiving memory strategies and another lifestyle education, as well as a social control condition. A crossover study design would be used. However, due to the low number of recruited participants, modifications to the research design were made. Modifications included adjusting study criteria to include older adults who experienced subjective memory difficulties, and who generally expressed interest in the study. Instead of using a crossover design, the intervention groups received the same order of intervention (i.e., memory strategies first and lifestyle education second).

Participants for the intervention groups were recruited from retirement villages and rest homes within the region. These locations for recruitment became quickly exhausted, and participants for the social control group were recruited from the community. It also seemed more practical to form a social control group from community-dwelling older adults already involved in weekly community group activities together. Further, the study design consisted of two phases for the Intervention condition. In Phase 1, the intervention condition received Memory intervention once a week for five consecutive weeks. In Phase 2, the intervention

condition then received Lifestyle Education intervention once a week, for five additional weeks. The social control condition received no specific intervention but continued to participate in weekly community group activities for the 10 week period. The social control group was monitored using the same outcome measures, and at the same assessment points as the intervention group. There were four times points for assessment: baseline, post Phase 1, post Phase 2, and six month follow-up. Chapter 5 will provide further details of the study design.

Organisation of the Thesis

This thesis is divided into eight chapters. Chapters 2, 3, and 4 provide a thorough review of the current research literature on this topic, from memory and aging to mild cognitive impairment, cognitive intervention, and cognitive assessment. In light of the literature, these chapters provide a rationale for the current study. Chapter 5 describes the study's aim, hypotheses, and design. Chapter 6 draws attention to the research method, providing a rationale for outcome measures chosen. This chapter also introduces the mixed methods design used to analyse results. Chapter 7 presents quantitative and qualitative findings in relation to the study hypotheses. Finally, Chapter 8 includes a discussion of these findings and contributions to literature. It also provides the limitations of the study, recommendations for future research, and conclusions of the study.

Terminology

Reference to "older adults" made throughout is in accordance with previous literature referring to those individuals over 65 years of age. The terms "memory deficits", "memory difficulties", and "memory problems" are used interchangeably. The terms "cognition" or "cognitive" refers to mental abilities which includes a combination of skills relating to domains of attention, learning, memory, language, and praxis, as well as executive functions such as planning, judgement, goal setting, and decision making (Fillit et al., 2002). Another way to

think about cognition is that it is the ability to consciously know, think, and learn (Cicerone et al., 2000).

When referring to constructs for cognitive status, there are several similar terms which have been used in literature, to identify varying degrees of cognitive impairment (Collie & Maruff, 2002). These include “age-associated memory impairment”, “age-related cognitive decline”, and “cognitive impairment-no dementia” (Collie & Maruff, 2002). In the current study however, the terms most commonly used to capture a spectrum of cognitive difficulties will include “normal aging”, “mild cognitive impairment”, and “dementia”.

CHAPTER 2: MEMORY AND AGING

A Basic Overview of Memory

Research on memory and aging has revealed the importance of a memory systems perspective (Dixon, Rust, Feltmate, & See, 2007). According to this perspective, memory is viewed as consisting of several systems with differing neuroanatomical origins, and where information is processed in different ways for later use (Budson, 2009). One or more of these systems can be disrupted by different disorders. Hence, an understanding of memory systems can aid in the diagnosis and treatment of disorders which cause memory dysfunction (Budson, 2009). Although there is an inclination to talk about different memory systems and processes as parts of distinct cognitive domains, memory is interconnected with other cognitive domains such as attention and executive function.

Initially, Atkinson and Shiffrin (1968) hypothesised that independent memory systems store information for different lengths of time. They developed a model of human memory based on sensory memory, short-term memory, and long-term memory (Atkinson & Shiffrin, 1968). This model of information processing portrayed that environmental stimuli flowed from one store to the next (Cowan, 2008). Information would enter a unitary short-term memory store through a series of very brief sensory memories (Baddeley, 2004). The short-term store was limited in capacity. Hence the longer that information resided in this store, the greater the probability of transference to long-term memory (Baddeley, 2004).

However, by the early 1970s, problems with this model were identified. First of all, there was no evidence that holding an item of information in short-term memory would guarantee learning (Baddeley, 2004). Craik and Lockhart (1972) were influential in proposing a framework called *levels of processing*, where the depth or level of information processing would determine the probability of its subsequent recall or recognition. For example, learning the semantics or meaning of a word, or associating it with a personal experience, would result in

better remembering of the word than noting its visual characteristics or processing it acoustically (Baddeley, 2004; Craik & Lockhart, 1972). Further, the Atkinson and Shiffrin model made it difficult to account for the existence of all kinds of temporary memory, as it was based on a single and unitary short-term memory store (Cowan, 2008). Subsequently, short-term memory was considered a more complex system which influences other cognitive tasks, and involves different levels of cognitive processing to store information (Baddeley, 2004).

Working memory. Baddeley and Hitch (1974) developed the concept of working memory. Working memory was illustrated as a multicomponent system. This provided an explanation for how a wide range of complex cognitive tasks could be associated with the role of temporary information storage (Baddeley, 2000). Subsequently, short-term memory and working memory were considered as similar, but slightly separate entities. More specifically, working memory was considered to be a system with limited capacity, where temporary storage and manipulation of information occurs, so that performance of complex tasks such as learning, reasoning, and comprehension could take place (Baddeley, 2000). Working memory also requires active and conscious participation (Budson, 2009).

Working memory was traditionally divided into three components (Baddeley & Hitch, 1974). These were the central executive system (i.e., attentional controller), the phonological loop (i.e., held speech-based information), and the visuospatial sketchpad (i.e., held visual and spatial information; Baddeley, 2000; Budson, 2009). Put simply, the central executive system managed and manipulated information that was received from the phonological loop and visuospatial sketchpad, with the help of attention-related processes (Cowan, 2008).

However, working memory and its components are susceptible to interference (Cowan, 2008). When holding information in working memory, it is more prone to failure particularly when greater cognitive demands are placed on it, or when there is an increase in the load of information entering the working memory system (Gathercole, 1999). Age, in particular, has been found to influence working memory capacity (Gathercole, 1999).

The notion of the central executive system was extended to include a fourth component of working memory, the *episodic buffer* (Baddeley, 2003). The episodic buffer can integrate multimodal information from a variety of sources with that of long-term memory (Baddeley, 2003). This seemed to explain cross-domain associations in working memory, such as the retention of links that can be made between names and faces (Cowan, 2008). The episodic buffer is thought to be controlled by the central executive system, which can access buffer stores through means of conscious awareness (Baddeley, 2000). Subsequently, the buffer plays an important role in retrieving information from episodic long-term memory (Baddeley, 2000). Therefore, working memory can be represented as a multicomponent system; its function being complex cognition rather than memory per se (Baddeley, 2000).

Encoding, storage, and retrieval. Encoding, storage, and retrieval are three major processes of any memory system. Encoding refers to registering information, storage refers to maintaining information over time, and retrieval refers to accessing stored information through recognition or recall (Baddeley, 2004). Transference of information from working memory to the long-term memory system relies on these basic and sequential processes (Baddeley, 2004). These processes begin with attention, which is crucial to the processing of information and formation of memories (Riddle, 2007). In particular, selective attention is important in disregarding irrelevant sensory stimuli, while regarding those which are relevant and require focus (Riddle, 2007).

Encoding enables remembering to take place by translating stimuli into mental representations for storage (Eustache et al., 1999). Information can be encoded acoustically, visually, spatially, or semantically, and the way that this information is encoded can determine how it is recalled later (Eustache et al., 1999). When measuring difficulties with encoding, the nature of the material delivered may be varied and the way that the material is processed during learning is studied (Baddeley, 2004).

Once encoding takes place, information is ready to be stored and maintained for a longer period of time, within the long-term memory system (Eustache et al., 1999). In determining whether storage has occurred, forgetting is typically measured (Baddeley, 2004). A range of factors may influence whether information is learned, and could therefore affect cognitive functioning temporarily or permanently (Baddeley, 2004). Examples of influencing factors include medication, stress, or other illnesses.

Retrieval is the ability to access stored information from long-term memory in order to use it (Eustache et al., 1999). When measuring retrieval, two methods of recall and recognition can be used to reproduce learned items (Baddeley, 2004). Overall, these basic and sequential processes can be summarised simply as follows: Attention and selection → Encoding → Storage → Retrieval.

Long-term memory system. Long-term memory consists of different, yet interacting subsystems (Tulving, 1987, 1991). The long-term memory system can be divided into *implicit/nondeclarative* memories which are unconscious, and *explicit/declarative* memories which are conscious (Henke, 2010). The concepts of implicit and explicit memory refer more to forms of expression of memory, rather than memory systems per se (Tulving, 1995). Evidence suggests that different neural processes are involved in the formation of implicit and explicit memories (Kessels & de Haan, 2003).

Implicit memories are also termed procedural memories, as they involve skills and tasks which are largely motor-based, automatic in nature, and do not require conscious retrieval of the past (Kessels & de Haan, 2003; Markowitsch, 2010). Skills such as riding a bike and swimming, which can be performed adequately despite not being practised for several years, comprise procedural memory (Nilsson, 2003). Conversely, explicit memories require more conscious retrieval of knowledge that one is aware has been acquired, and represents memories for facts and events (Kessels & de Haan, 2003; Tulving, 1995).

Explicit/declarative memories are further classified as *semantic* or *episodic* memories (Markowitsch, 2010). Tulving (1972) was the first to differentiate between episodic memory and semantic memory. Episodic memory is memory for personally experienced past events, which is more subjective to certain situations and certain times, and is brought to conscious awareness; semantic memory is knowledge about situations, objects, and relations in the world at large, developed earlier in childhood (Tulving, 1972, 1993). Episodic or autobiographical memories involve a time- and place-specific context for encoding of personal experiences (Dixon & De Frias, 2007; Markowitsch, 2010; Nilsson, 2003). Conversely, semantic memories are learned and retained as general knowledge, facts, and beliefs, which are context-free and either true or false (Dixon & De Frias, 2007; Markowitsch, 2010; Nilsson, 2003). It is the view of some that episodic memory is the latest memory system to develop, and subsequently amongst the first to show deficits with advancing age (Dixon & De Frias, 2007). Hence, episodic memory has been considered one of the most vulnerable types of memory to stress, impairment, and brain damage (Markowitsch, 2009).

Prospective memory. *Prospective memory* is another type of memory, and requires remembering to perform an intended action in the future (Kinsella, 2010). Prospective memory is essential in the performance of everyday tasks, such as keeping appointments and paying bills on time (Schmitter-Edgecombe, Woo, & Greeley, 2009). There are prospective and retrospective components involved with prospective memory tasks (Karantzoulis, Troyer, & Rich, 2009). Prospectively, one needs to notice when to do something and initiate the appropriate action (Karantzoulis et al., 2009). Retrospectively, one needs to remember what needs to be done (Karantzoulis et al., 2009). Karantzoulis et al. (2009) also suggest that at least four stages are involved in prospective memory: the formation of intentions, retention of intentions, initiation of intentions, and subsequent execution of intentions. Hence, considerable executive demands are required in the formation and activation of future intentions, in order to successfully carry out prospective memory tasks (Kinsella, 2010; Troyer & Murphy, 2007).

Prospective memory is perhaps more vulnerable to the effects of aging, as a degree of self-initiation and self-monitoring of information is required (Henry, MacLeod, Phillips, & Crawford, 2004).

Aging and Cognition

Normal aging process. The normal aging process refers to nonpathological processes which occur in the brain as a result of increasing age, and have minor effects on cognition (Mahncke et al., 2006). With normal aging, cell death is not seen as commonly as in neurodegenerative diseases such as dementia, although some disruptions to the neural network structures in the brain may occur (Fillit et al., 2002). Normal aging most likely signifies cognitive change rather than significant cognitive decline. In fact, cognitive decline is not an inevitable consequence of normal aging, as there are elderly individuals who appear to avoid cognitive decline (Fillit et al., 2002).

Memory is the cognitive domain that appears most vulnerable to the effects of aging (Kristiansson, 2011). In mid- to late-adulthood, memory failures however small, begin to occur more frequently, and fears surrounding memory loss are evoked (Mather, 2010). Memory loss is a relevant concern for older adults, as memory is a functional tool used on a daily basis, and is essential for an individual's sense of being (Dixon & De Frias, 2007).

Cognitive domains affected by aging. Keeping in mind the different types of memory described previously, not all types are equally affected by aging (Mather, 2010). For instance, procedural memories, which do not require conscious recollection of skills, show little age-related decline (Mather, 2010). Semantic memories which involve context-free general knowledge, facts, and concepts are also more resistant to age-related decline (Gabreli & Hedden, 2004; Mather, 2010). Examples include verbal knowledge and vocabulary. Language functions also remain relatively well-preserved with age (Mather, 2010). However, episodic memory for personal events and information is found to gradually decline with age, at least until

the mid 70s (Dixon et al., 2007; Gabreli & Hedden, 2004). An accelerated decline with this type of memory may be indicative of significant impairment (Dixon et al., 2007).

The ability to learn and recall newly learned information is mostly disrupted by significant episodic memory impairment, while recollection of remotely learned information remains more intact (Budson, 2009). Further, autobiographical memories involving recall and recognition of personal memory for past events, are reported by older adults with less contextual detail than younger adults (Mather, 2010). It is possible that core information from older memories has been retained, but is lacking temporal and spatial details (Riddle, 2007). However, memory for emotionally salient personal events is shown to be more resistant to age-related deficits (Riddle, 2007).

With age, the memory tasks typically affected include remembering names and faces, spatial locations, and lists of information (Dixon & De Frias, 2007). Forgetting people's names is one of the most common memory complaints with increasing age (Mather, 2010). Retrieval also becomes more difficult when good cues are lacking, possibly due to insufficient encoding to begin with (Riddle, 2007). Common memory complaints made by older adults often occur in environments with irrelevant distractions, and where cognitive resources are in competing demand (Potter & Hartman, 2006). Older adults may also have greater difficulty in dividing their attention between two tasks of high attentional demand, due to deficits in one's attentional capacities with increasing age (Henry et al., 2004). When required to hold multiple items in their memory, they have greater difficulty in remembering the initial item when distracted by other incoming stimuli (Fillit et al., 2002). Hence, attentional control is important in undertaking and completing cognitively complex daily activities, especially new and demanding tasks (Belleville, Chertkow, & Gauthier, 2007).

In completing everyday activities, older adults must keep task-relevant information in mind and task-irrelevant information out of mind (Mather, 2010), otherwise this could negatively affect their functional independence. For example, the task of driving requires the

individual to constantly switch attention in response to environmental events. Hence, a degree of flexible attentional control is required (Riddle, 2007). Motor vehicle accidents in older adults are significantly associated with impairments in divided attention (Riddle, 2007). Driving also requires some degree of executive control, which is affected with increasing age (Potter & Hartman, 2006; Rouch et al., 2008).

Further, the possibility exists that a general slowing of information processing speed could account for deficits with attentional capacity in older adults when compared with young adults (Riddle, 2007). Slower speed of information processing is characteristic of the normal aging process, and makes it difficult to successfully perform more than one task simultaneously (Fillit et al., 2002). It has been hypothesised that this could contribute towards decline in memory and other cognitive domains, as simultaneous cognitive operations cannot be undertaken successfully (Fillit et al., 2002).

Chapter Summary: Memory and Aging

This chapter has provided a simple overview of memory systems and processes, as well as cognitive domains affected by aging. It appears that predictors of cognitive functioning can vary reasonably over time and are dependent on individual patterns of change (Dixon & De Frias, 2007). When noticeable slips in memory abilities occur with increasing age, these brief lapses or "senior moments" may indicate the normal aging process (Mather, 2010; McDougall Jr et al., 2010). However, these lapses may also indicate a mild or severe form of memory impairment, depending on the frequency and severity of lapses (McDougall Jr et al., 2010). The following chapter will introduce and discuss mild cognitive impairment, which involves a greater extent of memory and cognitive difficulties than normal aging. Often individuals with mild cognitive impairment will experience memory problems as the earliest symptom, and will find their memory challenging to deal with in an everyday capacity (Schmitter-Edgecombe, Howard, Pavawalla, Howell, & Rueda, 2008). Intra-individual variability becomes more

prominent with mild cognitive impairment, as a number of factors may determine whether an individual will progress to dementia rapidly, gradually, or not at all.

CHAPTER 3: MILD COGNITIVE IMPAIRMENT

This chapter will discuss the concept of mild cognitive impairment (MCI) in terms of the cognitive domains affected with MCI, criteria for diagnosing MCI, how to distinguish MCI from normal aging and dementia, subjective memory complaints and functional impairment observed with MCI, and other factors such as lifestyle, sensory impairment, and comorbid neuropsychiatric symptoms which may influence MCI. Further, cognitive assessment to screen for and monitor deterioration associated with significant cognitive impairment is outlined.

Continuum of Memory Loss: Normal Aging to Dementia

Currently, there is the notion that a continuum of memory loss exists. There are varying degrees of memory impairment along this continuum, with normal aging towards the start point, dementia towards the end point, and MCI somewhere in between (Portet et al., 2006). MCI is a diagnostic term given to someone in a transitional and intermediate clinical state between normal aging and dementia (Gauthier et al., 2006). Dementia is a term given to adults affected by a chronic, progressive, and irreversible global cognitive impairment which has severely affected their daily functioning (Fillit et al., 2002). Alzheimer's disease is the most common type of dementia, as seen in approximately 65-70% of individuals with dementia (Dierckx, et al., 2009; Hatfield, Dudas, & Dening, 2009).

Internationally, consensus has been reached that prior to diagnosing dementia, determining pre-dementia stages of impairment will be relevant for intervention and prevention (Robinson et al., 2011). This issue has become pertinent to the field of aging research following the development of the MCI concept. For some individuals, MCI is a prodromal syndrome of dementia that has been identified as the strongest risk factor for progression to more severe forms of dementia, such as Alzheimer's disease (AD; Fillit et al., 2002). Approximately 10-15% of the clinical population progress from MCI to AD annually, whereas the rate of conversion in

the healthy older adult population is estimated to be 1-2% annually (Gauthier et al., 2006; Rapp et al., 2002).

Other findings suggest that within a few years of receiving a MCI diagnosis, approximately one third of these individuals will convert to AD (Palmer, Musicco, & Caltagirone, 2010). Yet other conversion rates from longitudinal studies predict a range from 10-30% annually for risk of progression from MCI to dementia, with rates of 48-61% over five years (Farias, Mungas, & Jagust, 2005). Variance in annual conversion rates of MCI across studies is greatly due to differences in the diagnostic criteria used and the cohort studied (Portet et al., 2006). For example, clinical settings demonstrate a higher percentage of those converting from MCI to dementia annually than community-based settings (Palmer et al., 2010).

A recent review suggests that from 60-80 years, both men and women have similar rates of decline, despite differences in performance in some cognitive domains between sexes (Ferreira, Santos, Ferri, & Galduróz, 2013). It is uncertain whether this similarity between sexes remains after 80 years (Ferreira et al., 2013). Current literature consistently indicates that heterogeneous etiologies and risk factors involved with MCI may see some individuals progressing to dementia, whereas others may not (Palmer et al., 2010; Vidovich, Lautenschlager, Flicker, Clare, & Almeida, 2009). There are also a number of individuals in the community with MCI who are not diagnosed, nor do they seek help for, or admit to the memory difficulties that they experience (Mitchell, 2008a).

Cognitive Domains Affected with MCI

As mentioned previously, memory is a cognitive domain commonly affected with MCI. Accelerated decline in episodic memory is found in those with MCI, particularly with those who subsequently progress to AD (Albert et al., 2011). This is typically assessed by administering tests of memory recall (Bennett, Golob, Parker, & Starr, 2006). One study that explored free recall, yes/no recognition, and forced choice recognition found that those with MCI are less able

to recall items on these tests (Bennett et al., 2006). However, preservation of semantic memory, incidental learning, and object recognition memory has been found in MCI (Grönholm-Nyman, Rinne, & Lainea, 2010). Despite reduced learning efficacy also found with MCI, and demonstrated by an inefficient use of strategies, Gröholm-Nyman et al. (2010) suggest that it may be useful to consider drawing on these preserved abilities when developing memory interventions.

Findings from neuropathological studies also suggest that individuals with MCI demonstrate rapid rates of forgetting, have reduced ability to encode information, and increased sensitivity to interference when retrieving information (Karantzoulis et al., 2009). Word learning deficits of new object names are found with MCI and AD (Grönholm-Nyman et al., 2010). Further, those with memory impairment find it difficult to remember names and faces, perhaps due to the difficult nature of learning unrelated paired associates (Thoene & Glisky, 1995). However, one study demonstrated that it is possible for individuals with MCI to learn new words, which can have positive implications for cognitive intervention (Grönholm-Nyman et al., 2010).

Further, those with MCI show deficits in selective attention, executive control, and processing speed tasks when compared with young adults and cognitively normal older adults (Ballesteros, Mayas, & Reales, 2013; Belleville et al., 2007). Spatial orientation is also found to be impaired with MCI, which has important consequences in regard to placing limits on independent functioning (Gadler, 2009). Informant reports in one study suggested that in comparison with cognitively normal older adults, those with MCI had greater difficulties with everyday functioning (Aretouli & Brandt, 2010).

Other domains that are affected with MCI include language, perceptual abilities, and psychomotor speed (Belleville et al., 2007; Londos et al., 2008). Therefore, it seems that MCI can affect a range of cognitive domains, some more so than others. This can place limitations on an individual's ability to perform a wide range of cognitive tasks, which can subsequently affect

their ability to function independently. However, some domains are less affected by MCI and can be drawn on in interventions.

Criteria for diagnosing MCI

MCI requires clinical judgment prior to diagnosis, as the sharp demarcation from normal aging to MCI is difficult to determine (Albert et al., 2011). The impairment can occur in one or more cognitive domains as highlighted in Figure 1. There are amnestic and nonamnestic subtypes of MCI (Gauthier, et al., 2006). Distinguishing the subtype of MCI subsequently predicts which type of dementia the individual may progress to (Albert et al., 2011).

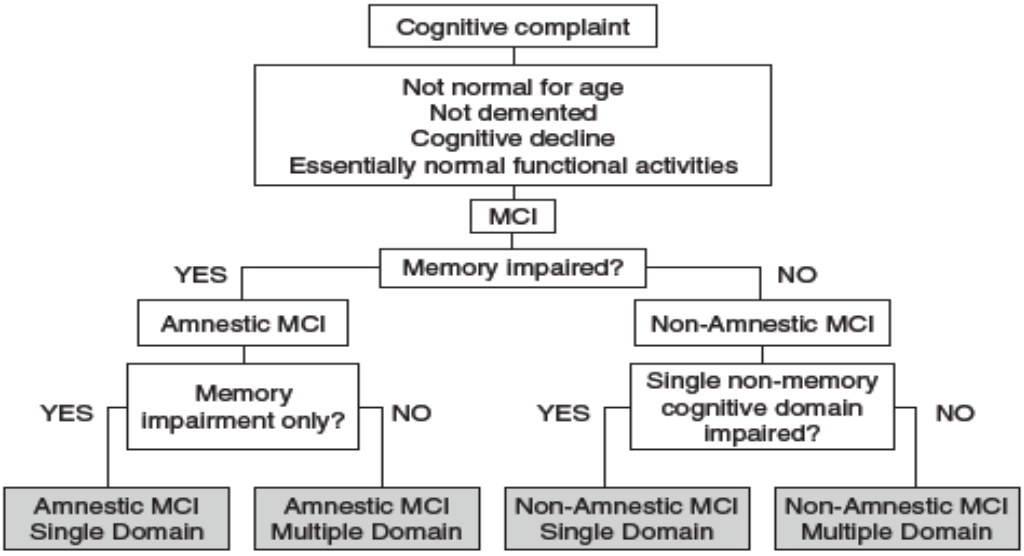

Figure 1. Different Subtypes of Mild Cognitive Impairment (MCI), Amnestic or Nonamnestic, and Single or Multiple Domains. Adapted from "Mild Cognitive Impairment," by E. Tangalos and R. C. Petersen, 2012, Principles and Practice of Geriatric Medicine, Fifth Edition, Minnesota: John Wiley & Sons, Ltd.

Nonamnestic subtype MCI can result in frontotemporal dementia, dementia with Lewy bodies, and vascular dementia (Gauthier, et al., 2006; Petersen & Morris, 2005). Amnestic subtype MCI (aMCI) is most commonly researched (Petersen, 2004). This is because individuals with aMCI are at high risk of progression to AD when clinical and neurological examination reveals

degeneration (Gauthier, et al., 2006; Lee, et al., 2008; Petersen, 2005; Petersen & Morris, 2005). Criteria for aMCI are met when individuals are thought to have predominant memory deficits and complaints (Gauthier, et al., 2006; Petersen & Morris, 2005). Some evidence suggests increased AD risk with the presence of multiple cognitive domain aMCI (Tabert, et al., 2006) rather than pure aMCI alone (Yaffe, Petersen, Lindquist, Kramer, & Miller, 2006).

Table 2 summarises the diagnostic criteria for MCI. It should be noted that the Petersen criteria has been commonly utilised in research studies (Petersen et al., 1999). This criteria states that a subjective memory complaint may be made by the individual and supported by an informant; the memory complaint is confirmed by psychometric testing which reveals performance, generally 1.5 standard deviations (SD) below age- and education-based norms; general cognitive function is intact (i.e., within 0.5 SD of normal healthy individuals); instrumental activities of daily living are not impaired; and there is an absence of dementia (Petersen, 2004; Petersen et al., 1999). Individuals with MCI should be able to function adequately on a daily basis, and their global cognitive abilities are fairly intact. However, there is objective evidence of cognitive decline in at least one of the cognitive domains, which would not be expected for the age and education level of the individual (Roberts, Clare, & Woods, 2009).

Is a Diagnosis of MCI Valuable?

The benefits of disclosing a MCI diagnosis have been debated. The main advantage is recognition of those most at risk of progressing to dementia, particularly with the currently increasing international trend of AD (Binegar, Hynan, Lacritz, Weiner, & Cullum, 2009). This is advantageous as it allows these individuals an opportunity to participate in available interventions, or establish practices that will enable them to continue functioning independently (Patel & Holland, 2012). It also allows them and significant others to consider planning and

Table 2

Criteria for the Clinical and Cognitive Syndrome of MCI

Criteria for MCI	Description
Concern regarding a change in cognition	Evidence of concern about change in cognition in comparison to prior level, as obtained from individual/informant/clinician
Impairment in one or more cognitive domains	Evidence of lower performance in one or more cognitive domains of 1–1.5 SD below expected age and educational background
Preservation of independence in functional abilities	Mild problems performing complex functional tasks that the individual used to be able to perform[a]
Not demented	Cognitive changes should be sufficiently mild, and no evidence of significant impairment in social or occupational functioning

Note. Adapted from Albert et al. (2011).

[a] Includes taking more time, being less efficient, and making more errors than in the past for such activities as paying bills, preparing a meal, and shopping at the store. Independence of functioning in daily life is generally maintained.

making decisions regarding future care (Masellis & Black, 2008; Werner & Korczyn, 2008). It provides individuals a label for their experiences (Werner & Korczyn, 2008), and allows them time to come to terms with this label. However, it is important that individuals given a diagnosis of MCI are aware that they may not necessarily progress to dementia.

Disadvantages of a MCI diagnosis include increased fear and worry, depression, distress, feelings of helplessness, and reduced positive thinking and hope (Palmer et al., 2010; Werner & Korczyn, 2008). Studies have also shown that many individuals are not aware that the concept of MCI exists (Robinson et al., 2011). While expressions of relief are commonly reported that a diagnosis of AD is not given, there is reported fear that a MCI diagnosis still has the potential to lead to AD (Robinson et al., 2011). However, one study found that those diagnosed with MCI viewed the benefits of this diagnosis as greater than its disadvantages (Roberts, Karlawish, Uhlmann, Petersen, & Green, 2010). Despite uncertainty regarding the

progression of MCI to dementia, literature suggests that a diagnostic label of MCI is considered helpful for individuals overall.

Key Differences Between Normal Aging, MCI, and Dementia

What differentiates MCI from normal aging is that over one third of those with MCI have difficulty remembering current events, following television programmes, finding their belongings, and keeping appointments (Aretouli & Brandt, 2010). Of these individuals, approximately 20% have reported difficulties with independent activities of daily living (Burton, Strauss, Hultsch, & Hunter, 2006; Farias et al., 2009). These are more cognitively complex activities such as managing finances and the household, transportation, shopping, and handling medications (Burton et al., 2006). Therefore, differentiation occurs based on the degree of functional impairment. A further difference is that individuals with MCI still retain the ability to learn new information, with greater preserved insight than those with dementia (Clare et al., 2009; Kurz et al., 2009). This has significant implications for clinical intervention, as a reasonable level of insight and learning is required to maintain cognitive function, particularly with tasks involving memory and executive functioning (Clare et al., 2009).

Subjective Memory Complaints and Functional Impairment

The term subjective memory complaints (SMCs) refers to reports about memory or other cognitive complaints in relation to everyday functioning, as made by individuals or significant others (Mitchell, 2008b). Previous findings have revealed that SMCs are not necessarily consistent with objective measures of cognitive functioning (Farias et al., 2005). One study found that nearly 50% of those aged 70 years or younger who reported SMCs had no objective impairment in memory (Vestberg, Passanta, & Elfgrena, 2010). Nonetheless, community-based studies with elderly individuals have found that SMCs are common and cannot be ruled out, as they may be important indicators of subtle cognitive impairment (Minett, Da Silva, Ortiz, & Bertolucci, 2008). Some studies suggest that SMCs precede MCI and

dementia by up to 15 years, and are therefore possible predictors for future cognitive decline (Jessen et al., 2007). Further, SMCs or the evaluation of one's own memory functioning could be a motivating factor for seeking intervention, which could be beneficial for the individual and society in terms of future costs (Ramakers et al., 2008).

While SMCs are common across the lifespan, one study highlighted that there were differences in the qualitative nature of SMCs between older and younger adults (Ginó et al., 2010). For example, older adults were more likely to report that they would become transiently confused (Ginó et al., 2010). However, factors such as depression, anxiety, and psychosocial stress have consistently accounted for variance in the nature of SMCs (Potter & Hartman, 2006). Jessen et al. (2007) found that depression discriminated well between those who did and did not complain about memory. Depression has been found to better correlate with SMCs than cognitive performance with SMCs (Minett et al., 2008). Hence, the validity of memory complaints needs to be examined because whether someone has SMCs may be better associated with low mood than impairment in cognition (Dux et al., 2008; Minett et al., 2008).

One of the criteria for a diagnosis of MCI is some functional impairment in independent activities of daily living. The Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) study found that over a three year period, there was significantly greater decline in everyday functioning in older adults with both amnestic and nonamnestic subtypes of MCI, than those with normal cognitive profiles (Wadley et al., 2007). Hence, some decline in functional abilities can also be expected with MCI (Wadley et al., 2007). Schmitter-Edgecombe et al. (2009) reported that telephone use, social functioning, organisation, household and general activities, medication use, conversation, and food preparation were amongst the functional difficulties noticed with MCI.

Prospective memory was outlined in Chapter 2 as crucial for independent day-to-day functioning in older adults (Raskin & Sohlberg, 2009; Thompson, Henry, Rendell, Withall, & Brodaty, 2010). One of the reasons that prospective memory is susceptible to impairment with

MCI may be due to the greater demand that prospective memory tasks place on executive functioning (Troyer & Murphy, 2007). Executive functioning abilities that are required in performing independent activities of daily living are impaired with MCI (Schmitter-Edgecombe et al., 2009). Research also suggests that a number of physical, social, cognitive, and emotional factors are required to function independently in one's environment (Burton et al., 2006). For example, physical disabilities, medical conditions, depression, motivation, and awareness of deficits are all factors that have an impact on everyday functioning, and are likely to influence whether activities of daily living are performed (Burton et al., 2006). Therefore, overall cognitive status is found to strongly predict functional ability (Burton et al., 2006).

Other Factors Influencing MCI

Lifestyle factors. Modifications made to lifestyle factors can be advantageous in maintaining overall health and cognitive ability (Palmer et al., 2010). For instance, social disengagement and isolation have been identified as significant risk factors in contributing towards cognitive decline in older adults (Fillit et al., 2002). Regularly satisfying social engagement and the capacity to engage in stimulating communicative exchanges can in turn stimulate cognitive structures in the brain (Fillit et al., 2002).

The notion of "use it or lose it" is one which has gained much ground, where those who engage in cognitively stimulating or challenging activities and careers earlier in life, show less cognitive decline in later life (Mather, 2010). This notion is linked to the theory of cognitive reserve. *Cognitive reserve* is a concept related to the preservation of synaptic connections and neurons, and is enhanced and maintained by taking part in stimulating activities of an intellectual and social nature throughout life (Stern, 2002; Treiber et al., 2011). Greater cognitive reserve subsequently allows for more efficient recruitment of alternate brain networks through increased use of strategies, or the use of a variety of strategies, in order to compensate for damaged neural structures (Garrett, Grady, & Hasher, 2010; Stern, 2002).

Further, studies have produced mixed results for the association between physical activity/exercise and cognitive function. A prospective study of community-dwelling older adults found that although increased levels of participation in cognitive leisure activities was correlated with a reduced risk of aMCI, reduced risk of aMCI with physical activity was not found (Verghese et al., 2006). On the other hand, the benefits of engaging in physical activity are found by some to not only prevent medical comorbidities and vascular risk factors, but also to contribute towards preserving cognitive function in later life (Fillit et al., 2002; Mather, 2010). A review of 30 studies on exercise and maintenance/improvement of cognition in older adults has created further debate about this (Snowden et al., 2011). While some positive effects on cognition was seen as a result of exercise, no significant benefits were found, and it was concluded that insufficient evidence exists for physical activity/exercise interventions in improving cognitive abilities in older adults (Snowden et al., 2011).

In general however, lifestyle factors such as physical activity, maintaining normal body weight, a healthy diet, moderate alcoholic intake, and non-smoking could protect against cognitive decline, delay onset, and contribute towards increased global cognitive functioning (Lee et al., 2010). Studies have shown that increased levels of stress and poor quality sleep are other lifestyle factors which impact on memory and learning, and subsequently contribute towards greater cognitive decline (Fillit et al., 2002). Life event stressors in particular are associated with memory failures (Neupert, Almeida, Mroczek, & Spiro, 2006). Literature also suggests that stress negatively impacts on different aspects of subjective and objective memory performance, making it less likely to generate compensatory efforts and problem solving strategies for perceived memory deficits (Garrett et al., 2010).

Sensory impairment. There is an association between sensory functioning and cognitive ability (Mather, 2010). This is possibly due to both being affected by age-related physiological changes (Van Hooren et al., 2005). A few hypotheses may explain this relationship (Clay et al., 2009). The *common cause hypothesis* suggests that due to the

physiological architecture of the brain, an increase in correlation between measures of sensory functioning and intellectual abilities may occur with increasing age (Clay et al., 2009). However, the association between sensory and cognitive impairment cannot be completely explained by the common cause hypothesis, and studies have concluded that specific factors may also determine decline (Clay et al., 2009).

The *sensory deprivation hypothesis* proposes that with inadequate sensory input, the ability to receive intellectually stimulating exchanges with the environment might result in reduced cognitive ability, due to the loss of neurons and reduction in strength of synaptic connections (Clay et al., 2009; Van Hooren et al., 2005). A lack of sufficient sensory input could result in incoming information being distorted. Hence, inaccurate information may be encoded and stored in memory systems (Mather, 2010). Another mechanism may be that greater attentional resources are devoted to interpreting incoming information (Mather, 2010). Therefore, fewer resources are available to process information at the higher cognitive level required for storage of information in memory (Mather, 2010; Pichora-Fuller, 2003).

Findings reveal that in community-dwelling elderly, vision and hearing impairments contribute significantly towards functional decline (Laforge, Spector, & Sternberg, 1992; Lin et al., 2004; Whitson et al., 2007). Further, a New Zealand study found an independent association between lower quality of life and hearing and vision disability using a measure of health-related quality of life; for those with both vision and hearing disabilities, its impact on quality of life increased (Zhang, Moyes, & McLean, 2012). Another study revealed that the combination of being cognitively impaired and having a visual impairment, increased the risk of disability by three to six times in a group of community-dwelling older adults (Whitson et al., 2007). Those with both these impairments also had increased rates of depression and poor health statuses (Whitson et al., 2007).

The appropriate use of technological aids in older adults can have improved consequences for cognitive (and physical) functioning, as individuals are better able to interact

with environmental stimuli, which is essential for memory and learning (Fillit et al., 2002). Further, the specific use of internal memory strategies such as mnemonics, may help in compensating for visual impairments (Colsher & Wallace, 1990). The use of rehabilitative techniques which target sensory function and skills can also increase confidence in one's own cognitive abilities, and may improve cognitive performance (Colsher & Wallace, 1990). This could subsequently improve the individual's quality of life and functional status (Lin et al., 2004).

Comorbid neuropsychiatric symptoms. It is important to note that various neuropsychiatric symptoms such as irritability, anxiety, agitation, and apathy can coexist with MCI (Bruce et al., 2008; Geda et al., 2008). Approximately 50% of those with MCI have at least one neuropsychiatric symptom (Geda et al., 2008). Depression is most commonly reported in those with MCI, with rates as high as 20% experiencing major depression, and an additional 26% meeting minor depression criteria (Bruce et al., 2008). It is suggested that those with MCI and depression are twice as more likely to progress to dementia (Bruce et al., 2008). Further, memory problems may negatively affect individuals' lives by producing higher rates of depression and anxiety, lowered self-confidence, and withdrawal from participation in day-to-day activities (Greenaway, Hanna, Lepore, & Smith, 2008; Schmitter-Edgecombe et al., 2008). Therefore, cognitive symptoms may not only affect older adults with MCI, but noncognitive symptoms also.

Metamemory

While structural changes occur in the brain with increasing age, the concept of metamemory is equally important to consider within memory research. Metamemory reflects one's own awareness, knowledge, and beliefs surrounding memory, as well as perceptions of one's own memory abilities (Do Lam et al., 2012; Valentijn et al., 2006). This may be influential in determining if and when individuals seek intervention, and if motivation to

maintain memory function exists. An aspect of metamemory is "memory self-efficacy", which refers to the judgments, beliefs, and confidence that one holds about how well they function in anticipated situations that require the use of their memory abilities (Valentijn et al., 2006).

Memory self-efficacy can be influential in everyday functioning. Low memory self-efficacy due to previously unsuccessful performance could debilitate or undermine motivation to engage in and perform memory tasks (Valentijn et al., 2006). This may determine whether older adults persist with mastering difficult tasks, rather than avoid them (Wells & Esopenko, 2008). Some suggest that memory performance relies more on the persistence of memory tasks rather than the use of strategies (Wells & Esopenko, 2008). Therefore, there is the possibility that strategies taught in memory interventions may not be as beneficial for those with low memory self-efficacy, who are not willing to engage in and persist with what has been taught.

Low memory self-efficacy can be detrimental to individuals not willing to actively engage in tasks which serve as a protective factor or buffer against further cognitive decline (Valentijn et al., 2006). Studies have identified that older adults have lower memory self-efficacy than younger adults (Wells & Esopenko, 2008). This may be due to older adults internalising negative stereotypes and beliefs associated with aging, which could subsequently produce greater negative beliefs surrounding one's own memory capabilities (Dixon et al., 2007; Wells & Esopenko, 2008).

Guidelines for the Diagnosis and Management of MCI

There has been little in the way of developing guidelines for the diagnosis and management of MCI internationally and within New Zealand, although such guidelines exist for AD and other dementia. This may be because MCI is considered as a clinical syndrome which represents a risk factor, rather than a disease or disorder (Palmer et al., 2010). Instead, it has been suggested that many issues relevant to the diagnosis and management of dementia may well be relevant for those with MCI (Palmer et al., 2010). There are currently no approved

pharmacological interventions to treat MCI (Palmer et al., 2010). Hence, nonpharmacological interventions have been the focus of research around MCI, and will be discussed in detail in Chapter 4. These nonpharmacological interventions include providing education, and teaching cognitive strategies and practical techniques to better manage MCI (Palmer et al., 2010).

Cognitive Assessment

Memory is the cognitive domain most commonly assessed with MCI to determine whether there is a high likelihood that individuals will progress to dementia (Albert et al., 2011). As mentioned previously, episodic memory is one cognitive domain typically impaired with MCI. Episodic memory is assessed through tests of immediate and delayed recall to determine whether information has been attended to, learned, retained over a delay period, and successfully recalled (Albert et al., 2011). Executive function, language, visuospatial skills, information processing speed, and attentional control can be additionally assessed, as these are other cognitive domains impaired with MCI (Fillit et al., 2002).

It would be ideal to conduct a full neuropsychological assessment to determine the cognitive profile of older adults who are experiencing cognitive decline or difficulties. However, this is time consuming and requires substantial effort, which cannot be afforded by clinicians in a practical sense (Fillit et al., 2002). Therefore, brief cognitive screening tools are available to detect significant impairment (Masellis & Black, 2008). However, many brief screens are more appropriate for detecting dementia and not sensitive enough to detect MCI (Lonie, Tierney, & Ebmeier, 2009). Those screened with brief cognitive assessments could typically indicate performance within the normal range, when MCI is present (Fillit et al., 2002; Patel & Holland, 2012). Hence, clinicians should be aware of this issue.

Lonie et al. (2009) recommend that cognitive screening instruments should detect the likely presence of impairment in a clinically meaningful way, resulting in referral to more specialist services. Fifteen cognitive measures were compared in their study, and only four were

found to have adequate sensitivity and specificity values (Lonie et al., 2009). These were the Addenbrooke's Cognitive Examination – Revised (ACE-R), DemTect, Montreal Cognitive Assessment (MoCA), and Memory Alteration Test (M@T). Although these screening measures cover different cognitive domains adequately, one limitation is their lack of assessment of information processing speed (Lonie et al., 2009). Information processing speed is found to predict progression from MCI to dementia, and is impaired prior to the clinical onset of AD (Lonie et al., 2009). Hence, clinicians should be aware of this when administering general cognitive screens.

Further, clinicians should obtain information from self-reports in order to assess an individual's level of insight and awareness of their memory abilities, as well as their metamemory (Troyer & Rich, 2002). This information can indicate whether individuals hold accurate perceptions in comparison with their performance on objective measures, or whether their perceptions are negatively influenced, for example, by negative stereotypes about memory and aging (Troyer & Rich, 2002). Several self-report measures have been developed to assess memory functioning in adults. These include the Metamemory in Adulthood (MIA) questionnaire, Memory Functioning Questionnaire (MFQ), Metamemory Questionnaire (MQ), Memory Controllability Inventory, the Everyday Memory Questionnaire, and the Cognitive Failures Questionnaire (Troyer & Rich, 2002). As these questionnaires were developed mainly for research purposes, clinicians should be aware that one of their limitations include not accurately reflecting or capturing what is targeted in clinical interventions (Troyer & Rich, 2002).

In addition, it is important to consider the appropriate use of cognitive measures in research studies. Repeated testing is a problem as it typically results in test-retest or practice effects, which can affect the interpretation of study findings. Further, practice effects can conceal any deterioration in cognitive functioning, making it more difficult to identify deterioration accurately (Blasi et al., 2009). Repeated testing would also increase familiarity

with the testing procedure, so that improved performance over time could occur, even when different forms of the same test are administered (Blasi et al., 2009). This is called "sophistication" and is a diagnostically relevant concern (Blasi et al., 2009). Therefore, care must be taken in choosing and interpreting the results of cognitive tests, particularly in research studies.

Chapter Summary: MCI

MCI is described as a transitional and intermediate clinical state between normal aging and dementia. MCI is considered the strongest risk factor to indicate progression to more severe forms of cognitive impairment, such as dementia. Some functional impairment is evident in MCI, where performance on more complex cognitive tasks is affected. Basic activities of daily living, such as self-care skills, remain intact however. Various neuropsychiatric symptoms can also coexist with MCI, such as irritability, anxiety, agitation, and apathy. However, depression is most commonly reported in those with MCI.

Lifestyle factors such as social disengagement and isolation, increased levels of stress, poor quality sleep, and physical activity/exercise have been identified as risk factors for cognitive decline. However, there are mixed findings regarding the association between physical activity/exercise and cognitive functioning. Further, sensory functioning is associated with intellectual performance. Vision and hearing impairments contribute towards functional decline as well as cognitive decline in older adults.

SMCs are common in older adults. However, some studies have found little association between performance on objective cognitive tests and self-report measures of memory functioning, while others have found SMCs to precede cognitive impairment. Subjective reports of memory functioning should be gathered nonetheless, as they provide an indication of the individual's level of memory self-efficacy. Low memory self-efficacy can be detrimental in

protecting against further cognitive decline, as these individuals may not be willing to actively engage in tasks or interventions that can help with their memory difficulties.

Several cognitive domains are affected with MCI including episodic memory, selective attention, executive functioning, and information processing speed. Typically, brief cognitive screens are administered to detect the likely presence of MCI in a clinically meaningful way, and should result in referral to specialist services. Care should be taken in interpreting subjective measures of memory, as they were developed mainly for research purposes, and may not accurately reflect what is targeted in clinical interventions. Further, longitudinal research requires the use of same/similar tests over time. Therefore, practice effects and sophistication should be taken into account when considering improvements in performance.

Currently, there are no approved pharmacological interventions to treat MCI, and nonpharmacological interventions have subsequently been the focus of MCI intervention literature. The following chapter will examine and evaluate the outcomes of cognitive interventions for older adults, with or without cognitive impairment.

CHAPTER 4: INTERVENTION

The previous chapter indicated that no pharmacological recommendations existed to *treat* the symptoms of MCI, or prolong the rate of conversion from MCI to dementia (Palmer et al., 2010). For instance, clinical trials conducted with MCI participants have not resulted in successes with galantamine, donepezil, rivastigmine, rofecoxib, and vitamin E (Palmer et al., 2010). Further, there is no single intervention identified as sufficient enough to *prevent or delay* the development of a dementia (Hindin & Zelinski, 2011). However, positive effects of nonpharmacological interventions have been associated with *maintenance or improvements* of cognitive function in healthy older adults (Hindin & Zelinski, 2011). Therefore, the objective of these interventions is not to restore memory functioning to high levels, as with younger adults who are neurologically intact, but to manage, adapt, and compensate for memory losses that have occurred with age, so that individuals can continue to function independently on a day-to-day basis (Dixon & De Frias, 2007). Given the increased burden that MCI and dementias place on healthcare systems and on caregivers, it has become increasingly important to explore potential nonpharmacological interventions that may produce benefits (Farias et al., 2009).

An Overview of Cognitive Interventions

The term *cognitive remediation* has been applied to intervention strategies which aid with mediating decline in memory and other cognitive domains (Mowszowski, Batchelor, & Naismith, 2010). There are three types of cognitive remediation strategies: cognitive stimulation, cognitive training, and cognitive rehabilitation (Mowszowski et al., 2010). Cognitive stimulation is nonspecific involvement in social and cognitive group activities which enhance social, cognitive, and general functioning (Belleville, 2008; Clare, 2003). Cognitive training involves learning and practising theoretically valid strategies and skills related to particular cognitive domains, in order to improve or maintain functioning within that domain (Belleville, 2008; Clare, 2003). Cognitive rehabilitation uses a biopsychosocial model of

understanding the individual, and typically applies individual goals which are contextually, socially, and functionally relevant and attainable for the individual (Clare, Evans, Parkinson, Woods, & Linden, 2011). The difference between cognitive rehabilitation and cognitive stimulation is the individualised approach used in the former, in addition to the wider support network that is considered, personally relevant goals that are identified and modified, and the emphasis placed on working in a holistic way (Clare & Woods, 2004).

Cognitive training interventions are used to enhance cognitive and functional performance in healthy older adults and those with MCI and dementia, by teaching how to apply internal and external memory strategies (Sitzer, Twamley, & Jeste, 2006). The aim of cognitive training is to also compensate for deficits by making more effective use of residual skills of the individual (McKerracher, Powell, & Oyebode, 2005). Compensation strategies are used when there is a mismatch between skills and environmental demands (Bäckman & Dixon, 1992). Internal compensatory strategies include alphabetic searching, face-name association, mental rehearsing, mental retracing, method of loci, pegword system, rhymes, and story method (Kristiansson, 2011). External compensatory strategies include asking someone else to remind you to do something, making calendar notes, reminder notes, photographs, putting something in a special place, using a timer, and writing on the hand (Kristiansson, 2011).

The use of external memory strategies and relying on human memory aids are the most favourable compensatory mechanisms for memory difficulties (Dixon & De Frias, 2007). Memory notebooks have received much empirical support as external aids to facilitate learning and memory, particularly within traumatic brain injury (TBI) literature (Greenaway et al., 2008; Tsaousides & Gordon, 2009). A memory notebook typically consists of different sections such as a calendar, memory log, list of things to do, and names and identifying information about others (Tsaousides & Gordon, 2009). In teaching individuals to use a memory notebook, three phases of learning were originally proposed by Sohlberg and Mateer (1989). These were acquisition, application, and adaptation phases. The acquisition phase enables the individual to

familiarise themselves with the notebook and the purposes of its different sections (Tsaousides & Gordon, 2009). The application phase promotes learning to use the notebook in simulated settings, and the adaptation phase requires the individual to extend the use of the notebook to different naturalistic environments (Tsaousides & Gordon, 2009).

Teaching internal mnemonic strategies such as association, rehearsal, categorization, and imagery have been found to improve memory skills in cognitively normal older adults (Gross et al., 2012; Thompson & Foth, 2005). Combining the use of these strategies has also been found to enhance the memory skills of older adults (Gross et al., 2012). While favourable support exists for the use of internal memory strategies, some research indicates that these strategies may be more complex and effortful, and take a longer time to employ (West, Bagwell, & Dark-Freudeman, 2008). Internal strategies might also overload residual cognitive capacities (McKerracher et al., 2005). Therefore, those with memory difficulties may not use these types of strategies readily.

External memory aids are often recommended as more appropriate compensatory mechanisms (McKerracher et al., 2005). Generally, external strategies are used in situations where interfering events may occur, when there is a long time between learning and recall, when the information to be remembered is difficult, when there is little time available to use internal compensatory techniques, and when there might be a memory overload (Kristiansson, 2011). On the other hand, internal strategies are used when it is difficult, inconvenient, or undesirable to use external aids, when someone does not want to rely on external aids, or when external aids are not available (Kristiansson, 2011).

Cognitive Interventions with Cognitively Normal Older Adults

Various studies have examined the effectiveness of cognitive interventions with cognitively normal older adults. The ACTIVE study is perhaps the largest trial, where 2,382 community-dwelling healthy older adults over 65 years were recruited and assigned to one of

memory intervention, processing speed intervention, or reasoning intervention groups (Ball et al., 2002). Improvements were demonstrated in performance on trained cognitive domains. However, there was failure to generalise training to functional capacity and tasks beyond trained domains (Ball et al., 2002). At five year follow-up, Ball et al. (2002) observed that some gains were still evident.

Reviews and meta-analyses conducted in this area have provided the following conclusions. A review of randomised controlled trials between 1970 and 2007 generated 24 studies looking at the effects of memory training in healthy older adults and those with MCI (Zehnder, Martin, Altgassen, & Clare, 2009). Outcome measures for memory training indicated that most interventions were effective, with significantly better performance on immediate and delayed verbal recall (Martin et al., 2011), as well as paired associate learning (Zehnder et al., 2009). With MCI, significant improvements were seen in immediate recall (Zehnder et al., 2009). However, Zehnder et al. (2009) found that these training effects were no larger than what was found in studies using *active control* conditions (i.e., control conditions receiving alternative treatments).

One review concluded that cognitive interventions in healthy older adults can have positive effects on objective and subjective functioning, although this was not the case in those with MCI (Reijnders, van Heugten, & van Boxtel, 2013). Another review of 30 memory training studies with community-dwelling older adults found that those who received memory training demonstrated larger memory gains in comparison with control groups (Gross et al., 2012). This review also found that training multiple memory strategies resulted in greater gains (Gross et al., 2012). A meta-analysis of 10 studies between 1996 and 2008 revealed that cognitive training resulted in improvements with immediate performance on related tasks; there was no evidence that training generalised to other tasks however (Papp, Walsh, & Snyder, 2009). Further, Hertzog et al. (2009) found that functional status can be enhanced through cognitive training programmes.

A more recent meta-analysis examined 31 randomised controlled trials of cognitive training and mental stimulation in healthy older adults (Kelly et al., 2014). As a result of cognitive training, improvements were found on measures of memory and subjective functioning, when compared with controls receiving no intervention. When compared with active controls, cognitive training produced task-specific benefits for executive functioning; however, performance was not improved on measures of immediate and delayed recall (Kelly et al., 2014). Of interest is that mentally stimulating activities provided in active control conditions were thought to benefit memory performance as much as cognitive training (Kelly et al., 2014).

A multifactorial memory training group for older adults without cognitive impairment demonstrated specific training-related gains in immediate list recall, and maintenance and transfer effects at seven month follow-up, in short-term memory, working memory, long-term memory, and motivational and metacognitive tasks (Vranic et al., 2013). These general transfer effects were substantial, and found with the training group, but not with the active control group (Vranic et al., 2013). Few studies report transfer effects or generalisability of cognitive training to untrained tasks, and this topic is discussed shortly.

Another study comparing three different interventions of health promotion, cognitive training, and a participation-centered course in older adults with memory complaints, did not find a differential effect of the three courses (Cohen-Mansfield et al., 2014). However, significant improvements in memory and visual spatial domains were found overall, as well as secondary benefits of decreased loneliness (Cohen-Mansfield et al., 2014). This study recommends the use of multiple approaches in improving self-reports of memory functioning (Cohen-Mansfield et al., 2014).

In summary, studies with cognitively normal older adults indicate that cognitive training produces benefits largely in trained tasks and domains. While Vranic et al. (2013) found that cognitive training resulted in general transfer effects, with maintenance at seven month follow-up, this is typically not seen in intervention literature. Several studies have found that gains

from cognitive training are not typically transferred to untrained tasks or domains, or generalisable to real world settings. This is a noteworthy limitation of cognitive training. In addition, some reviews suggest that the effects of cognitive training are no larger than those produced by active control conditions (i.e., alternative treatments). A couple of recent studies also recommend incorporating multiple approaches in cognitive/memory training, to produce greater benefits in cognitive domains and on self-reports of memory functioning.

Cognitive Interventions with MCI

The benefits of intervention. The overall effectiveness of group-based interventions targeting MCI can be gauged from a number of recently published reviews and meta-analyses. There is sufficient evidence to support the benefits of cognitive interventions in those with MCI, with interventions also providing secondary benefits. Secondary benefits include improvements in mood, emotional features, subjective perceptions of one's own memory functioning, activities of daily living, and quality of life (Simon et al., 2012).

An earlier review by Belleville et al. (2008) concluded that six out of seven studies with MCI demonstrated beneficial effects of cognitive training on objective measures of memory. Another review of 15 cognitive intervention studies with aMCI revealed statistically significant improvements on 44% of objective measures of memory and 49% of subjective measures of memory, quality of life, and mood (Jean et al., 2010). One review found that while cognitive interventions benefited those with aMCI, the duration of these benefits were variable, with some months to two years following interventions (Simon et al., 2012). Simon et al. (2012) concluded that those with aMCI were able to learn new information and demonstrated some improvements in global cognitive function following cognitive intervention. Another review found that both healthy older adults and those with MCI showed improvements in attention, memory, executive functioning, processing speed, fluid intelligence, and subjective performance as a result of cognitive interventions (Reijnders et al., 2013).

A meta-analysis of 17 clinical studies with MCI revealed significant improvements in cognitive and functional abilities, and improvements were suggested to be domain-specific (Li et al., 2010). However, a review of the literature from 1970 to 2007 by the Cochrane collaboration concluded that while performance gains were seen in healthy older adults and those with MCI following intervention, these gains could not be specifically attributed to cognitive training (Martin et al., 2011). In this review, cognitive training was not found to improve on the effects of active control conditions, thereby demonstrating limited effects (Martin et al., 2011). Alternative interventions received by active controls included unspecific cognitive stimulation, alternative training (i.e., attention training), or noncognitive activities (Martin et al., 2011). Nonetheless, only three MCI studies were analysed by Martin et al. (2011), and definite conclusions cannot be reached without further investigation on this topic.

More recent literature on a cognitive intervention programme for MCI resulted in improvements on cognitive and functional measures that were maintained at one year follow-up (Rojas et al., 2013). These results may be due to the delivery of the programme twice a week, for six months, and providing cognitive training as well as cognitive stimulation (Rojas et al., 2013). Another recent trial compared MCI with cognitively normal older adults over an eight session memory training programme; memory training produced significant changes on four out of eight cognitive parameters (Olchik, Farina, Steibel, Teixeira, & Yassuda, 2013). Results indicated that memory training was the most effective in promoting cognitive change, when compared with an educational intervention group and a control group (Olchik et al., 2013). Following intervention, those with MCI in the memory training group demonstrated cognitive performance typical of those without cognitive impairment, suggesting that some degree of cognitive plasticity is evident in these individuals (Olchik et al., 2013).

Teaching memory strategies. More specifically, there is evidence for the benefits of teaching memory strategies as part of cognitive training with MCI. A review of 10 intervention studies targeting memory impairment in MCI found some evidence for the effectiveness of

using memory strategies in learning new information, such as errorless learning (Stott & Spector, 2010). Further, Stott and Spector (2010) found evidence to support internal and external memory strategies, provided that time frames for teaching were longer, strategies were taught for specific information, and there was greater focus on learning a single strategy rather than multiple ones (Stott & Spector, 2010). Simon et al. (2012) also concluded that learning single strategies and/or specific information were associated with significant results, with recommendations to continue exploring the combined effects of using internal and external strategies.

Summary. Findings in cognitive intervention literature with MCI are similar to those involving cognitively normal older adults. Domain-specific improvements are typically seen on objective cognitive measures, particularly on measures of memory (Stott & Spector, 2010). However, these improvements are not typically generalised to tasks outside of those targeted by the intervention, and cognitive training may not improve on the effects of active control conditions. Further, teaching single memory strategies and for specific information, is found to benefit individuals. There are also secondary benefits of participating in cognitive interventions such as improvements in mood and quality of life.

Generalisability of training

There has been debate surrounding the generalisability of cognitive training to everyday situations in those with and without cognitive impairment. Generalisation is expected to occur outside of training sessions, as some interventions promote practical transfer of skills to everyday situations, and others target domain-general mechanisms that are expected to result in transfer effects on task performance. Reijnders et al. (2013) reported that it is still unclear if cognitive interventions can be generalised to improvements in everyday functioning. With computerized memory training in particular, less evidence exists as to whether these interventions can be generalised (Stott & Spector, 2010).

One reason for the lack of clarity surrounding generalisability of training may be due to studies under investigating everyday functioning in healthy older adults (Kelly et al., 2014). This is evident by the lack of functional outcome measures used in many studies (Kelly et al., 2014). Similarly, another study revealed that transfer of gains and maintenance of these gains have rarely been assessed in older adults within the community, thereby making it difficult to reach specific conclusions (Vranic et al., 2013). Further, longer training periods, the type and duration of training (i.e., 10 intervention sessions at least), and incorporation of adaptive and repetitive training sessions, could result in greater likelihood of generalisation of skills and transfer of effects to untrained cognitive domains (Kelly et al., 2014).

Heterogeneity in Intervention Literature

Differences in intervention outcomes across literature can be attributed to heterogeneity amongst the interventions administered, different methodologies used, and whether memory performance is measured as the primary outcome (Reijnders et al., 2013). Further, some studies have used active control comparisons, while others have used waitlist/no treatment controls (Reijnders et al., 2013). Hence, the varying nature of the control conditions makes it difficult to distinguish the specific aspects of cognitive interventions that are effective (Stott & Spector, 2010). The type of outcome measures used or tasks administered may account for differences in results also. Simon et al. (2012) found that when tasks associated with the intervention were directly measured, the benefits of the intervention were more significant. Another factor to consider is that 82% of studies included participants with an average of 12 years or greater of education (Simon et al., 2012). This might account for the treatment gains found.

A further consideration is whether interventions are administered in group or individual settings, or whether a combined approach is used. While one review found no differences between individual and group interventions (Simon, Yokomizo, & Bottino, 2012), a more recent meta-analysis indicated that group training may benefit memory functioning and subjective

performance more than individual training (Kelly et al., 2014). Group interventions are currently more appealing as they are cost-effective. However, recommendations for more individualised approaches within group training also exist. It has been suggested that interventions should be individualised to capture contextual factors of the individual's situation, and should be taught for an adequate period of time with a greater level of intensity (Stott & Spector, 2010).

Further, cognitive interventions have focused on different aims and taken different approaches to achieving these aims. This makes it difficult to interpret and extend results across studies. In particular, limitations with current MCI literature include poor methodological qualities of studies and the heterogeneous group that may be captured by using varying criteria to diagnose MCI (Stott & Spector, 2010). This, rather than differences in intervention, may explain the varying results between studies (Stott & Spector, 2010). Chapter 5 will discuss how the current study aims to clarify some of the aforementioned issues in intervention literature.

Other Intervention Literature with Older Adults

Observational studies in literature suggest that engaging in greater levels of physical activity can contribute towards a reduction in cognitive decline in older adults. Snowden et al. (2011) systematically reviewed 30 intervention studies on this topic. Some studies demonstrated positive outcomes for certain types of exercise and subsequent effects on cognitive domains; however, many studies found no significant benefits (Snowden et al., 2011). Hence, definite conclusions could not be reached from this review.

Other studies suggest that an active lifestyle, such as engaging in intellectually stimulating activities, may better preserve cognitive function and reduce risk of cognitive decline (Hertzog, Kramer, Wilson, & Lindenberger, 2009). Available evidence indicates that leading a cognitively enriched lifestyle has a positive impact on intellectual functioning over the course of adulthood, particularly in older age (Hertzog et al., 2009). Hence, there are

recommendations for older adults to engage in stimulating activities on a regular basis, particularly activities that are challenging and interesting (Vidovich & Almeida, 2011). Meaningful social engagement has also been associated with better cognitive function in older age, and the social aspects of group activities may positively affect mood and wellbeing (Hertzog et al., 2009). Hence, individuals are advised to engage in meaningful social activities in addition to intellectually stimulating activities throughout life, in order to enhance their cognitive abilities (Vidovich & Almeida, 2011).

Chapter Summary: Intervention

In summary, previous studies with MCI and cognitively normal older adults have concluded that cognitive training is largely beneficial, with domain-specific improvements seen on objective measures of cognitive functioning. However, gains are not typically generalisable to tasks outside trained cognitive domains and in real world settings. Studies also indicate that cognitive training may not improve on the effects of active control conditions (i.e., alternative treatments). However, secondary benefits of cognitive interventions include improvements in mood and quality of life.

When considering findings from intervention literature, a number of limitations should be noted. Heterogeneity in study designs, aims, and outcome measures make it difficult to reach firm conclusions regarding effective outcomes across studies. Poor methodological qualities and the heterogeneous MCI groups studied, also make interpretation of results difficult. Overall, it appears that cognitive/memory training provides some benefits for older adults with and without cognitive impairment, particularly in trained domains. The generalisability of training to everyday situations is typically lacking. The following chapter will consider the limitations of current intervention literature and provide a study design that attempts to address these limitations.

CHAPTER 5: CURRENT STUDY

Rationale for the Current Study

Literature confirms that cognitive interventions produce some benefits for individuals with MCI. However, the previous chapter also highlighted a number of limitations with intervention studies. These included heterogeneity of the concept of MCI, procedures, durations, intensities, training content, and content combinations (Martin et al., 2011; Stott & Spector, 2010). Heterogeneity makes it difficult to examine the overall effectiveness of cognitive training, and to determine whether chosen techniques may be related to the outcomes achieved (Rojas et al., 2013). While the current study did not address all of the limitations mentioned above, it is clear that good quality trials and a more standardized approach for cognitive intervention studies are needed, to help draw firm conclusions about the effectiveness of such interventions (Martin et al., 2011; Stott & Spector, 2010). This should still be strived for in future research in this area.

Two issues were the focus of the current study. Across literature, it has been difficult to determine the specific aspects of cognitive interventions which are effective (Kurz et al., 2009; Stott & Spector, 2010), particularly when the use of an appropriate control comparison is raised as a limitation. Waitlist or treatment-as-usual groups are often used as controls. Comparing these control groups with intervention conditions cannot specifically determine the extent to which nonspecific effects of the group setting or therapeutic attention contribute towards improvements (Kinsella et al., 2009). Further, cognitive interventions usually offer a combination of memory training and education about lifestyle factors which affect cognitive functioning (Kinsella et al., 2009; Kurz et al., 2009; Rapp et al., 2002; Troyer, Murphy, Anderson, Moscovitch, & Craik, 2008). Therefore, it is unclear which components of intervention conditions are beneficial (Jean et al., 2010). It follows that separating out aspects of group interventions and using a social control group as a comparison, can help to determine the

specific effects of cognitive/memory training that are beneficial for older adults with or without cognitive impairment (Kinsella et al., 2009; Stott & Spector, 2010).

The aim of the current study is not to design another intervention for MCI, but to separate out aspects of group interventions and address the issue of control groups raised above. First, the benefits of a control condition where participants meet as a social group on a regular basis have not been explored. Perhaps this in itself is sufficient in contributing towards improvements in memory and cognition. Second, previous studies have combined memory and lifestyle/psychoeducation components into one intervention condition. By separating out these two components, we can ascertain the extent to which teaching memory strategies is beneficial. The use of a social control group and two different intervention conditions (i.e., memory vs. lifestyle psychoeducation) could have practical implications for current clinic- and hospital-based settings, by informing whether allocation of finite resources towards running memory training groups is required.

Initial Study Design

The study had two principal aims: (1) to determine which intervention (memory or lifestyle education) resulted in the greatest improvement in memory performance, as assessed by a general cognitive screen and subjective measures of memory functioning, and (2) to use a social group as a control comparison. The initial plan had been to conduct a randomised controlled trial. Groups would consist of 6-9 individuals as done in previous studies, and would take into account attrition. It was anticipated that attrition would occur, as a review indicated that studies of cognitive functioning in those with MCI resulted in attrition rates ranging from 15% to 33% (Li et al., 2010). Participant inclusion criteria would include a diagnosis of MCI according to Petersen's criteria. There would be no exclusion on the basis of age. Inclusion criteria would also consist of no comorbid medical conditions associated with functional or cognitive decline; no major psychiatric disorder and/or behavioural problems; no significant

cerebrovascular disease; and no significant impairment of vision, hearing, or communication. For further details of the initial design, see Appendix C. However, the initial design required modification due to low participant availability.

Modifications to the Study Design

The greatest modification to the initial study design was to include individuals who experienced subjective memory difficulties (reported by themselves or by others), and who expressed general interest in the study, rather than exclusively selecting those who met criteria for MCI. Modifying the inclusion criteria would potentially result in a greater number of participants to comprise the different groups. Further, the number of sessions would decrease from six to five per Memory and Lifestyle Education interventions, to reduce rates of attrition. On further reading of recent literature at the time, longer term follow-up was recommended, to establish the maintenance of any benefits of intervention (Joosten-Weyn Banningh, Kessels, Rikkert, Geleijns-Lanting, & Kraaimaat, 2008; Stott & Spector, 2010). Hence, the follow-up assessment would increase from three months to six months, to monitor the effects of two specific interventions over a longer period.

There would be three different conditions with two phases: Memory intervention, Lifestyle Education intervention, and Social Control. All those receiving intervention would participate in Memory intervention first, followed by Lifestyle Education intervention. Following the information sessions at the time of recruitment, the expectation of participants was that they would learn memory-related strategies to help them with everyday functioning. Hence, the rationale for providing Memory intervention first was to keep participants engaged in the study, and subsequently lower the rates of attrition. The groups would not be large enough to adequately utilise the crossover design initially proposed. This is because random assignment of participants into smaller subgroups for the two intervention conditions (for each of the two phases), would decrease statistical power further, when testing for order effects.

Recruitment of intervention group participants occurred from two rest homes and one retirement village. Further, the nature of the social control group was modified, as there were three localities where weekly intervention groups were run. Using an existing social control group from the community seemed a logical compromise. Instead of meeting on a weekly basis with a facilitator to participate in social activities, participants in the social control condition were those who were already actively involved in weekly community groups. Both the social control and intervention groups would be assessed with a general cognitive screen and subjective outcome measures, at the same four outcome intervals: baseline, post Phase 1, post Phase 2, and six month follow-up.

Therefore, the overall aim of the study was to determine the extent to which receiving Memory intervention first and Lifestyle Education intervention second, would impact on memory functioning in older adults with subjective memory difficulties, compared with older adults already participating in social group activities within the community.

Hypotheses. Hypotheses were made for each of the outcome measures used to assess memory functioning in this study, and are illustrated in Table 3. Hypotheses were based on findings in literature of performance on these outcome measures following cognitive/memory intervention. Note that the term "significant increase" refers to a statistically significant increase in performance on the outcome measure. In comparison, the term "increase" indicates an increasing trend that is not statistically significant.

It was hypothesised that the nonspecific effects of social interaction in a group environment would result in a slight increase in performance for the social control group on measures of ACE-R, MMQ, MFQ, and QoL-AD, though not as substantial as receiving specific interventions. The intervention group was hypothesised to perform better than the social control group following Memory intervention, on measures of ACE-R, MMQ, MFQ, and QoL-AD. Following Lifestyle Education intervention in particular, it was hypothesised that significant

Table 3

Hypotheses for Each Group at Different Outcome Intervals Based on Outcome Measures

Measure	Intervention group			Social Control group
	Post Phase 1	Post Phase 2	Six Month Follow-Up	Post Phase 1 to Six Month Follow-Up
ACE-R	*Increase* in scores from baseline	Significant *increase* from baseline and post Phase 1	Significant gains maintained	Slight increase, though not as substantial as specific interventions
MMQ Contentment	*Increase* in scores from baseline	Significant *increase* from baseline and post Phase 1	Significant gains maintained	Slight increase, though not as substantial as specific interventions
MMQ Ability	*Increase* in scores from baseline	Significant *increase* from baseline and post Phase 1	Significant gains maintained	Slight increase, though not as substantial as specific interventions
MMQ Strategy	Significant *increase* from baseline	Significant *increase* from post Phase 1	Significant gains maintained	Slight increase, though not as substantial as specific interventions
MFQ Retrospective Functioning	Slight *increase* from baseline	Slight *increase* from post Phase 1	Maintained improvements	Slight increase, though not as substantial as specific interventions
QoL-AD	Slight *increase* in scores from baseline	Slight *increase* in scores from post Phase 1	Maintained improvements	Slight increase, though not as substantial as specific interventions
GDS-15	Similar to baseline	Similar to baseline	Similar to baseline	Similar to baseline
GAI	Similar to baseline	Similar to baseline	Similar to baseline	Similar to baseline

Note. ACE-R = Addenbrooke's Cognitive Examination – Revised; MMQ = Multifactorial Memory Questionnaire (MMQ) Contentment, Ability, and Strategy subscales; MFQ = Memory Functioning Questionnaire, Retrospective Functioning subscale; QoL-AD = Quality of Life Alzheimer's Disease; GDS-15 = Geriatric Depression Scale; and GAI = Geriatric Anxiety Inventory.

improvements in ACE-R scores and subjective MMQ Contentment and Ability scores would be seen and maintained at follow-up.

While the intervention group would see an increase in ACE-R scores following Memory intervention, it was hypothesised that a significant increase would be evident following Lifestyle Education intervention. The rationale for this was that it could take some time for improvements in cognitive functioning to be noticeable on this general cognitive screen. Similarly, with the MMQ Contentment and Ability scales, previous studies have demonstrated that some time elapses before individuals show significant improvements on these measures (Konsztowicz, Anton, Crane, Moafmashhadi, & Koski, 2013; Wiegand, Troyer, Gojmerac, & Murphy, 2013). This factor was taken into account in designing the study and determining the time points of assessment, as well as the length of time between interventions. However, with a restricted time frame to complete this research, the length of time between assessments and interventions was shorter than desired. As such, receiving Memory intervention just prior to Lifestyle Education intervention may have contributed towards difficulty with interpreting improvements following the latter.

On the other hand, the MMQ Strategy subscale was hypothesised to show significant improvements immediately following Memory intervention. The reasoning behind this is that individuals would have had greater exposure to memory strategies following the Memory intervention. Thus, with greater opportunity to practice and utilise these strategies, this would result in greater reporting of memory strategy knowledge and use following Memory intervention. If individuals continued to apply and utilise these strategies throughout, then the post Phase 2 assessment would reveal significant improvements over and above those seen post Phase 1. These gains would be maintained at follow-up.

The MFQ Retrospective Functioning subscale would show slight improvements, though not significant, across time. It was hypothesised that the educational nature of the interventions would result in small changes in perceptions of the relationship between current and

retrospective memory functioning. The QoL-AD scores were also hypothesised to improve across time, though not significantly. The interventions are aimed to reduce fear, worry, or distress about memory difficulties, and to reduce the negative stereotypes associated with aging. As such, aspects of memory, mood, and the self as a whole, were hypothesised to improve with the QoL-AD (Greenaway, Duncan, & Smith, 2013; Londos et al., 2008). The GDS-15 and GAI were chosen to monitor mood and anxiety-related symptoms. Therefore, they were hypothesised to remain similar to baseline performance.

Chapter Summary: Current Study

In summary, this chapter has provided a rationale for the current study and outlined the initial study design. Practical difficulties with recruitment resulted in modifications to this study design. The greatest modification was to include individuals who experienced subjective memory difficulties, rather than screening for those with MCI. All those in the intervention group would receive Memory intervention first, followed by Lifestyle Education intervention. Further, the social control group would comprise of those who were already actively involved in weekly community group activities. The social control group would be assessed at the same four outcome intervals, and with the same outcome measures, as the intervention group. This chapter also outlined the study hypotheses in terms of performance on each outcome measure across time, for both intervention and social control groups. Chapter 6 will describe the study methodology and provide rationales for the outcome measures chosen to measure memory functioning.

CHAPTER 6: METHOD

Ethical Considerations

Ethics approval was obtained for the current study from the Multi-Region Ethics Committee (MEC) of the Health and Disability Ethics Committees (HDECs)[1]. Prior to receiving ethics approval, there were preliminary discussions with managers of rest homes and retirement villages. Following ethics approval, the managers of these settings were contacted so that full permission could be gained to make contact with their residents, in order to form intervention groups for the study. Once permission was granted, locality assessment forms were signed by these managers and sent to HDEC, indicating that appropriate arrangements had been made with each locality organisation involved in the study. Participants were assured privacy by allocating a code for each individual, and utilising that code on all assessment forms for anonymity. Participants were also assured that no personally identifying information would be used in any reports involving this study.

It was anticipated that minor psychological discomfort could result from the group nature of interventions; for example, some participants could be reticent in discussing difficulties. However, participants were made explicitly aware that they could withdraw from the study at any point if they wished to or if they experienced distress. In addition, participants were reminded that there were no obligations to reveal information that made them uncomfortable. Group rules were established at the start of the first intervention session. These rules included keeping discussions confidential to the group and not belittling or bullying others within the group. Participants were assured that they could approach the facilitator before,

[1] The Health and Disability Ethics Committees (HDECs) are Ministerial committees (established under section 11 of the New Zealand Public Health and Disability Act), whose function is to secure the benefits of health and disability research by checking that it meets or exceeds established ethical standards.

during, or after group sessions if they felt uncomfortable or experienced distress as a result of these sessions.

It was also anticipated that observations of participants' behaviours during sessions would indicate whether they were experiencing discomfort or distress. If individuals experienced adverse outcomes as a result of group sessions, or significantly deteriorated in cognitive function, clinical supervision would be sought and appropriate action taken. Cultural issues were considered in consultation with a Maori cultural advisor at Massey University, prior to commencing the study. She was available for contact if required.

Research Design

Based on similar measures used in a similar study by Kinsella et al. (2009), statistical power using the G*Power tool was calculated. To attain a power of 0.8 with a medium-sized effect of 0.50, the total sample size required was approximately 128 participants (i.e., 64 per group). The research design consisted of two phases: (a) Phase 1 – the intervention group would receive Memory intervention first, for 90 minutes, once a week for five weeks, and (b) Phase 2 – the intervention group would receive Lifestyle Education intervention second, for 90 minutes, once a week for another five weeks. The social control group would receive no specific intervention but would be assessed with cognitive outcome measures at the same outcome intervals as the intervention groups. There would be four times points for assessment: baseline, post Phase 1, post Phase 2, and six month follow-up.

The intervention group was obtained from three different localities. For the purposes of statistical analyses, these localities were collapsed together to form one intervention group. On the other hand, the social control group was made up of individuals who attended a weekly community group activity. Therefore, random assignment to intervention and control conditions did not occur. Figure 2 is a diagram that illustrates the current research design (i.e., study

groups, phases of the study, sample sizes at each assessment point, and outcome measures used).

Approximately 14-15 weeks of involvement in the study was required from baseline to post Phase 2 assessment. This did not include the six month follow-up. Typically, two weeks elapsed between baseline assessments and the commencement of the Memory intervention. The exception to this was the seven weeks that elapsed between baseline and Memory intervention for one of the three intervention localities. This was the retirement village, which was the first to undertake the intervention when preparation for the study was being finalised. This may have resulted in the higher attrition rate for this group. One week elapsed between the end of the Memory intervention and the beginning of the Lifestyle Education intervention. These gaps provided the author an opportunity to conduct outcome assessments. Ideally, the gap between Memory intervention and Lifestyle Education intervention should be longer, in order to separate out the effects of two different interventions. However, the limited time frame for this project resulted in a much shorter one week gap.

Inclusion criteria for this study were older adults who frequently reported/were reported to experience memory difficulties. Although no restrictions were explicitly stated regarding the age of participants, all participants were older than 55 years. In meeting with the rest home managers, it was agreed that residents would be excluded from the opportunity to participate if they were severely impaired (physically or cognitively), or if they were likely to be disruptive to other group members. Hence, the rest home managers (and their staff) were able to screen their residents based on their knowledge of them, and provide invitations for suitable residents to participate.

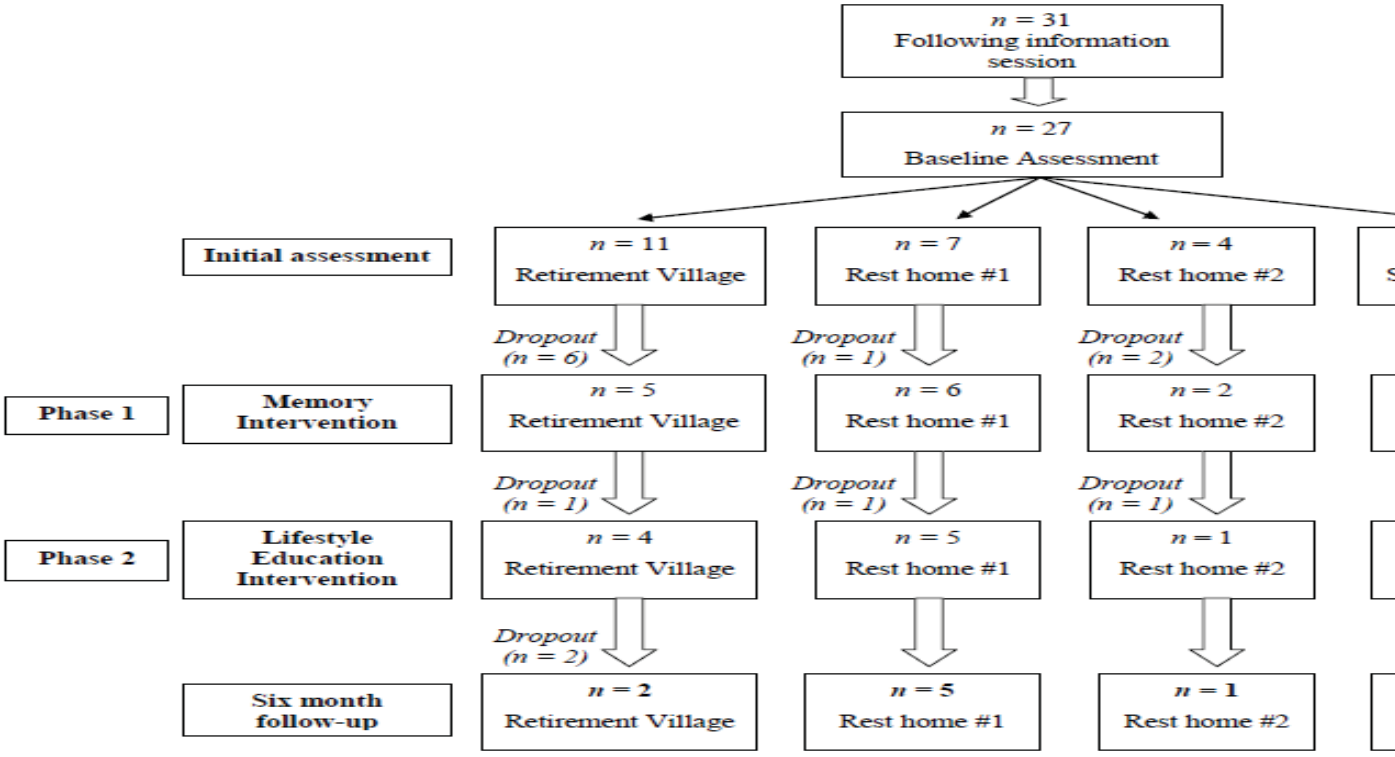

Figure 2. Flow of participants and outcome measures used at different phases of the current study

Participants

Recruitment. Fifteen rest homes and retirement villages within the Wellington region were contacted in 2011, to gain permission to recruit participants for the study. Only three of these were willing to allow access to their residents: two were rest homes and one was a retirement village. Meetings were held with the managers to share the study proposal and to work out the practicalities of conducting the study. All three managers agreed to allow group sessions to take place on their premises, provided that a meeting room was booked in advance. Following this, participants were recruited through invitation. A convenience sampling method was used for recruitment.

Invitation brochures (see Appendix D) were given to the managers or sent to residents, inviting them to an information session to be held about the study. For participants in the retirement village, 60 brochures were distributed in the residents' letterboxes. There were separate information sessions for each of the different locations. For those who could not attend the information session or wanted to find out more information, contact details of the author were provided on the brochures. Information sessions outlined the aim, nature, and timeline of the study, as well as the benefits of participating in such an intervention. Further, information sheets (see Appendix E) were distributed to individuals to take away and read. At the information session, individuals were able to express their interest in the study by writing down their name and contact details on a clipboard provided, which was collected at the end of the meeting. If they required time to consider participation, they were able to contact the author via a Massey University free voicemail system set up for this purpose.

A slightly different approach was taken in recruiting the social control group. As the potential for recruitment through rest homes and retirement villages was exhausted, an approach was made to senior citizen community groups which met regularly (i.e., on a weekly basis). A few individuals of one of these groups agreed to participate, following a brief outline of the study that was presented at the beginning of one of their weekly gatherings. Information sheets

were handed to everyone in the community group, and interest could be expressed by writing down contact details on the clipboard provided, or contacting the author via the free voicemail system.

From the information sessions, those who had left their details on the clipboard were contacted by phone to make appointments for individual baseline assessments. While the rationale for data collection was explained at the information session, it was reiterated at the time of making the appointment. Individuals within a group were always assessed approximately 1-2 weeks within the time frame that other individuals in their group were assessed, to ensure that time of data collection was consistent.

The outcome intervals at which memory performance was measured were chosen on the basis of existing literature, where baseline measures were taken two weeks prior to commencing intervention (Greenaway et al., 2008; Joosten-Weyn Banningh et al., 2008). Further, Banningh et al. (2008), Kinsella et al. (2009), and Troyer et al. (2008) also assessed participants within two weeks of the end of intervention. They found improvements on outcome measures with their intervention groups on everyday memory tasks, knowledge and use of memory strategies, cognitive processing speed, occupational performance, and some of the quality of life domains (Greenaway et al., 2008; Joosten-Weyn Banningh et al., 2008; Kinsella et al., 2009). Follow-up data have been collected from 3-6 months after intervention, where literature has demonstrated some maintenance of intervention gains (Londos et al., 2008; Troyer et al., 2008).

In the current study, the initial assessment took approximately 1.5–2 hours, and provided an opportunity to meet individually with potential participants, answer any questions, provide further information regarding the study, explain confidentiality of group sessions, and sign consent forms. A copy of the consent form can be found in Appendix E. In this initial meeting, those individuals who did not wish to continue had the option to decline further participation, prior to signing the consent form. All participants were informed that they could decline participation without reason at any stage of the study. Demographic information and

baseline data were collected during the initial assessment, in addition to preferences for times of group sessions. Once group times were set, participants were informed by phone as to when sessions would commence, and how many were in their group.

Study sample. Of the 13 participants assessed from baseline to follow-up, nine were females and four were males between 71 and 100 years (M = 82, SD = 9.1), who resided in Wellington, New Zealand. They identified their ethnicities as European (n = 3), New Zealand European (n = 7), Australian European (n = 1), and Scottish (n = 2). Their marital statuses were married (n = 3), widowed (n = 7), divorced/permanently separated (n = 2), and single (n = 1). Their years of education were 12+ years (n = 9) and less than 12 years (n = 4). They rated their physical health at intake as excellent (n = 1), very good (n = 6), good (n = 4), and fair (n = 2). Some participants had sensory impairments (auditory and/or visual; n = 3), and physical limitations due to cerebral palsy (n = 1). Participants' living situations included living independently in the community (n = 5), in a retirement village (n = 2), and in rest homes (n = 6). Participants were taking medication for health conditions (n = 11), with two participants taking antidepressants and mood stabilizers.

The demographic characteristics for participants in each group are shown in Table 4. The mean age of participants in the intervention group was slightly higher than the social control group. Noticeable differences between groups included only 50% of the intervention group receiving 12+ years of education compared with 100% in the social control group, and 50% of the intervention group with significant physical or sensory impairments compared with none in the social control group. Further, 60% of the social control group were still married, and none in the intervention group. However, 62.5% of the intervention group were widowed, compared with 40% of the social control group.

As Figure 2 previously illustrated, the attrition rate for this study was high, from 27 at baseline to 13 at follow-up (approximately 52%). This highlights the difficulties of conducting research with older adults, particularly when requirement for participation is over a longer time

Table 4

Demographic Characteristics for Participants in Intervention and Social Control Groups

Group	Age Mean ± SD	Sex % Male: Female	Education % 12+ yrs : ≤12 yrs	Marital Status %	Ethnicity %
Intervention (*n* = 8)	84.6 ± 9.6	25:75	50:50	Widowed (62.5) Divorced/separated (25) Single (12.5)	European (12.5) NZ European (50) Australian Europe (12.5) Scottish (25)
Control (*n* = 5)	79.0 ± 8.1	40:60	100:0	Married (60) Widowed (40)	European (60) NZ European (40)

frame. There were nine dropouts prior to commencing Memory intervention groups. This was mainly due to lack of interest, other commitments, or health problems, with one person passing away. In Phase 2, at the stage of Lifestyle Education intervention, there were 15 participants remaining. There was no longer a group at one of the rest homes, as only one individual remained interested in continuing with the study. The Lifestyle Education intervention was offered to her, and individual sessions were held with her once a fortnight, where relevant session material was covered.

At the end of Phase 2, ten participants had taken part in both Memory and Lifestyle Education interventions (i.e., 12 weeks of intervention between September and December 2011), and the five social control participants remained (15 participants in total). However, by the six month follow-up assessment, two individuals from the intervention group had declined assessment, as they were no longer interested in participating. Therefore, data from 13 participants were collected throughout the entirety of the study.

Procedure

Assessment procedure. The initial assessment was held at the participants' residences and took approximately 1.5–2 hours. Demographic information, medical history, memory difficulties, current strategy use, and expectations of group sessions were gathered through a semi-structured interview. Participant responses were recorded by the author as precisely as possible. The questions were designed to explore the nature and context of memory difficulties, and participants' attempts to deal with these. Further, these questions would provide an indication of the participant's level of insight and awareness of their memory abilities. Appendix F illustrates the templates used to gather this information.

Facilitators. The author of this dissertation was the primary facilitator for intervention groups and administered assessments at the four different time points. A co-facilitator (i.e., intern psychologist) was present for some of the Memory intervention sessions. The co-facilitator was present when it was anticipated that topics to be covered in session would benefit

from the presence of two people with knowledge in this area. However, the co-facilitator was not present for any of the Lifestyle Education sessions.

Outcome measures. A global cognitive screen and subjective measures of memory were administered with individuals who provided consent to participate in the study. A copy of these measures can be found in Appendix G. These measures were used throughout, with both intervention and social control groups, to evaluate improvements in cognitive and functional abilities prior to and following interventions. Chapter 5 outlined the study hypotheses made for each outcome measure at the different outcome intervals of assessment.

Measures chosen were considered to reflect improvements in areas of everyday functioning, mood, quality of life, contentment with memory, subjective memory ability, memory strategies, and general cognitive functioning. Consideration was given to the possibility that participants may tire of completing lengthy assessments at four different time points. Therefore, in order to engage participants in the assessment process, brevity of measures was an essential consideration. With the Addenbrooke's Cognitive Examination – Revised (ACE-R), three parallel test versions were used to control for practice effects (Mioshi, Dawson, Mitchell, Arnold, & Hodges, 2006).

The ACE-R. The ACE-R is a brief cognitive screen with adequate sensitivity and specificity, taking approximately 10-15 minutes to administer, with a total of 100 points. It incorporates five cognitive domains of orientation/attention, memory, verbal fluency, language, and visuospatial/perceptual tasks. Mioshi et al. (2006) found cutoff scores for the five different subdomains of the ACE-R, to compare an individual's performance against healthy adults (Mioshi et al., 2006). This measure has good reliability (alpha coefficient = 0.8; Mioshi et al. 2006). In addition to its brevity and ease of administration, the ACE-R was chosen to monitor possible deterioration in cognitive function, which may occur across the course of the study. With conversion rates to MCI or dementia being heterogeneous, the use of the ACE-R was considered appropriate.

Age- and education-matched comparisons have been made across MCI, AD, and

control groups with the ACE-R. Three cutoff scores have been found: 88, 82, and 75 (Crawford, 2010). The ACE-R has good sensitivity and specificity values for the cutoff scores of 88 and 82 (Mioshi et al., 2006). For a cutoff of 88 points, sensitivity is 94% and specificity is 89%, and a lower cutoff score of 82 results in sensitivity of 84% and specificity of 100% (Mioshi et al., 2006).

The MMQ. The Multifactorial Memory Questionnaire (MMQ; Troyer & Rich, 2002) contains three scales of Contentment, Ability, and Strategy, each measured on a 5-point Likert scale. The MMQ was designed for use within clinical settings and is psychometrically sound in all three scales that it comprises (Troyer & Rich, 2002). It has excellent content and construct validities, factorial validity, and test-retest and intra-test reliabilities. This questionnaire allows us to measure subjective perceptions of memory functioning as well as memory strategy use. The Contentment subscale contains 18 items, which address emotions and perceptions about one's current memory ability. The Ability subscale contains 20 items about everyday memory situations requiring self-appraisal of one's memory capabilities. The Strategy subscale contains 19 items, which requires reporting of frequency of memory strategy use.

The MFQ. The Memory Functioning Questionnaire – Retrospective Functioning subscale (MFQ; Zelinski, Gilewski, & Anthony-Bergstone, 1990) was also chosen. It consists of five questions assessing changes in current memory ability in comparison with perceived memory ability in earlier life (Zelinski, Gilewski, & Anthony-Bergstone, 1990). Moderate concurrent validity has been found for the MFQ, as well as high internal consistency of scores (Gilewski, Zelinski, & Schaie, 1990; Zelinski et al., 1990).

QoL-AD, GDS-15, and GAI. These questionnaires were used to gauge a sense of other factors which may impact on memory, such as an individual's current quality of life and the severity of problems with mood and anxiety over the past week. To measure the individual's current quality of life, a brief 13-item self-report questionnaire, the Quality of Life – Alzheimer's Disease Scale (QoL-AD; Logsdon, Gibbons, McCurry, & Teri, 1999) was used. One study demonstrated that this questionnaire had good content and construct validities when

administered with individuals with a wide range of severity of dementia (Thorgrimsen et al., 2003).

The 15-item version of the Geriatric Depression Scale (GDS-15; Sheikh & Yesavage, 1986) was chosen as it takes less than five minutes to complete, and can be used to assess the severity of depression, even with older adults with mild to moderate cognitive impairment. This scale demonstrates good construct and criterion validities, as well as moderate internal consistency reliability, when administered with a sample of cognitively intact but functionally impaired primary care patients (Friedman, Heisel, & Delavan, 2005). Overall, the GDS-15 is reported as having good psychometric properties (Friedman, Heisel, & Delavan, 2005).

The 20-item Geriatric Anxiety Inventory (GAI; Pachana et al., 2007) has sound psychometric properties in normal older adults, as well as those from a geriatric psychiary service. It was also chosen for its brevity and ability to capture relevant emotion-related symptoms.

Intervention procedure. To develop more successful intervention programmes, literature identifies a few components, which were given careful consideration in the current study. An example is teaching programmes in group format and with shorter lengths of sessions (Fairchild & Scogin, 2010).

In Phase 1, there were three intervention localities in the study. The author of this dissertation facilitated these intervention groups. Session 1 of the Memory intervention allowed group members time to familiarise themselves with each other, and with the facilitator. Members introduced themselves and shared their memory difficulties and concerns, as well as their current attempts to deal with these. It was emphasised that information shared in group sessions remained confidential to the group, particularly as members lived in the same residential facility as each other. Additional group rules were established. Each group was provided with refreshments halfway through the 90 minute session. This 5-10 minute break was taken so that participants would not be overwhelmed with the information presented in session.

Group sessions were highly structured, and relevant topics were presented in a conversational style, with session handouts provided for participants to refer to. Once the facilitator presented information on a specific topic, the group were able to provide relevant input and share personal experiences as part of a discussion. Some participants were not able to attend all sessions. In these cases, the author made individual face-to-face or phone contact, to ensure that any session material missed was covered prior to the following session.

The facilitator (and co-facilitator) arrived 20-30 minutes early, prior to each session, in order to set up the room. Typically, everyone was seated in a circle format, as it provided a better sense of connectedness with the group. The facilitator arrived early at rest homes in particular, to gather participants together. It became apparent that some residents relied heavily on rest home staff or caregivers for general appointment reminders. Therefore, it was often the case that rest home participants required a reminder 20-30 minutes before sessions commenced, so that they were prepared to attend the group that day. Some participants required assistance to assemble in the meeting room, particularly those with Zimmer frames and wheelchairs.

Participants were told that they would receive a total of 2–3 brief and friendly phone calls during the five week Memory intervention programme. These phone calls were suggested by Sohlberg and Mateer (1989) to remind individuals to use their Memory Notebooks, to monitor whether Memory Notebooks were being used spontaneously, to recap the aim and purpose of each section of the Notebook, and to clarify any questions or concerns that individuals had regarding the session(s). Participants were generally receptive to the phone calls.

At the end of each of the Memory and Lifestyle Education interventions, participants were given an anonymous feedback questionnaire, which consisted of rating scales and written feedback sections, to capture their experiences of group sessions (see Appendix H). Questions were designed to capture whether sessions were helpful and enjoyable, which sessions and strategies were most and least helpful, and any further comments or suggestions. If participants were unable to fill in the questionnaires due to physical or sensory limitations, they were

encouraged to find someone who could help them with completing these. Self-addressed and stamped envelopes were provided with feedback questionnaires, to increase the chances that questionnaires would be returned.

Materials

Tables 5 and 6 provide an overview of the content of both Memory and Lifestyle Education programmes. The content of these programmes were based on what has previously been done in literature. This includes teaching mnemonic techniques, using a Memory Notebook as an external aid, and psychoeducation around topics relevant to memory functioning. Manuals for both the Memory programme and Lifestyle Education programme were developed by the author (see Appendices I and J, respectively), although they were originally developed for those with MCI. However, the topics and strategies covered may be equally relevant and valid for those experiencing subjective memory difficulties and concerns. Corresponding handouts for each session can also be found in Appendices I and J. Some material for the Memory programme manual was taken and adapted from Scheibner (2012). This previous study developed a memory programme for adults in their midlife, with one of its four treatment components being memory strategy training (Scheibner, 2012).

Each participant in the current study was provided with a thin clear folder in which to store their handouts and any other session materials provided. They were also encouraged to bring these folders to sessions. During the Memory intervention, participants were shown Memory Notebooks of varying sizes from which they could each choose one. These Notebooks were purchased from stationery stores and were mostly spiral bound with refillable pages, to promote continued use in the future. For those with visual impairments, bigger Notebooks with larger sized fonts were used. Prior to distributing the Notebooks to participants, the author divided each Notebook into three sections, corresponding with the three sections taught about in sessions. Attached to these sections were introductory pages with the name, purpose, and method of each section visually presented. For example:

Table 5

Overview of Memory Programme

Session 1: Introduction to MCI and Memory	**Session 2: Notebook – Introduction**	**Session 3: Names and Faces**	**Session 4: Internal Memory Strategies**
Introduction to memory programme **(30 min)**	Last session and homework **(5 min)**	Last session and homework **(10 min)**	Last session and homewo + Quiz **(20 min)**
10 min break	Orientation to Memory Notebook **(35 min)**	Contacts & Internal Strategies **(25 min)**	Other Internal Strategies **(20 min)**
MCI and memory **(20 min)**	**10 min break**	**10 min break**	**10 min break**
What else affects memory? **(20 min)**	Daily Calendar and Things to Do **(30 min)**	Names and Faces: Internal strategies **(35 min)**	Internal Strategies continued **(30 min)**
Homework exercise **(10 min)**	Homework exercise **(10 min)**	Homework exercise **(10 min)**	Homework exercise **(10 min)**

Table 6

Overview of Lifestyle Psychoeducation Programme

Session 1: Coping with Age-Related Changes	**Session 2: Anxiety, Stress and Relaxation**	**Session 3: Diet and Exercise**	**Session 4: Keeping Mentally & Socially Active**
Introduction to programme Topic 1: Dementia **(20 min)**	Discuss last session Stress and anxiety **(10 min)**	Discuss last session Introduction to exercising **(15 min)**	Discuss last session Introduction to keeping mentally active **(20 min)**
Topic 2: Grief **(20 min)**	Relaxation techniques **(30 min)**	Building an exercise plan – 4 different types of exercise **(30 min)**	Tips for staying socially engaged **(25 min)**
10 min break	**10 min break**	**10 min break**	**10 min break**
Topic 3: Healthy/Positive Aging **(30 min)**	Incorporating relaxation into your life & the Mindfulness Technique **(30 min)**	Preventing injury & tips for greater activity Nutrition **(30 min)**	Some things to consider Driving with age **(25 min)**
Tips for coping with change **(10 min)**	Mindfulness exercise Homework exercise **(10 min)**	Homework exercise **(5 min)**	Homework exercise **(5 min)**

Daily Calendar section. The purpose is to record and keep track of all important dates, events, and meetings coming up in the future. Method: Enter on the correct date, every appointment, meeting, and important date as you hear about it or make the arrangement. Refer every day for today and future.

These introductory pages were designed to promote greater remembering of the purpose of each section, and to facilitate greater use of these sections. In Session 4 of the Memory intervention, participants were given a brief quiz about the Memory Notebook (see Appendix I). This quiz was similar in format to the "acquisition questions" presented by Greenaway et al. (2008), to test knowledge about what had been discussed in session, and to facilitate better remembering.

Data Analysis

Mixed methods design. Data collected were both quantitative and qualitative in nature. A mixed methods design was used for data analysis in order to find more enriching information from which to draw conclusions regarding the current research topic (Mertens, 2010). As the current study did not have one dominant paradigm, the phases of the mixed methods design were conducted concurrently through a parallel process (Johnson & Onwuegbuzie, 2004). The parallel process involves two types of data being collected and analysed concurrently (Johnson, Onwuegbuzie, & Turner, 2007). On the other hand, a sequential process would involve one type of data resulting in the collection of another type of data (Johnson et al., 2007). Further, there are different ways to develop a mixed methods design, with more stages to suit the research question (Teddlie & Tashakkori, 2006).

Literature suggests that *triangulation of data* commonly occurs with a mixed methods design (Mertens, 2010). Triangulation involves data collection using different methods in order to provide alternative perspectives, rather than reducing understanding to a single perspective (Mertens, 2010). Therefore, contextually rich information can be gathered in order to provide a better understanding of the research question(s) at hand (Rossi, 2012). Triangulation also ensures that the method of data collection is not selective or accountable for data variance

(Rossi, 2012). Whilst triangulation is one rationale for using a mixed methods design, others include complementarity, initiation, development, and expansion (Johnson & Onwuegbuzie, 2004). Table 7 provides an explanation of these rationales. This study seeks to utilise mixed methods research for the purposes of triangulation, complementarity, and expansion (Johnson & Onwuegbuzie, 2004).

Table 7

Summary of Major Purposes or Rationales for Conducting Mixed Methods Research

Term	Purpose/Rationale
Triangulation	In studying the same phenomenon, triangulation allows for corroboration and convergence of results from different methods and designs
Complementarity	The results from one method can be elaborated, enhanced, illustrated, and clarified by results from another method
Initiation	When results have lead to the reframing of the research question as a result of paradoxes and contradictions which occur
Development	The findings of one method are used to help inform the other method
Expansion	The use of different methods for different inquiry components results in the expansion of the breadth and range of the research

Note. Adapted from Johnson and Onwuegbuzie (2004).

Analysis I: Quantitative statistics. Quantitative data were analysed using the Statistical Package for the Social Sciences software (SPSS; version 20.0 for Windows, IBM Corp., Armonk, NY). Data were coded and entered into the SPSS database. Demographic variables of age, sex, level of education, marital status, and ethnicity were also included. Age was measured on a continuous scale. Sex was coded as "male" or "female". Due to a small sample size, education was categorised as either "less than 12 years" or "12 years and greater", as previous studies have utilised this dichotomy for analysis (Rapp et al., 2002). Marital status was coded as "married", "widowed", "divorced or separated", or "single". Ethnicity was coded as "European", "New Zealand European", "Australian European", or "Scottish".

The independent variable for statistical analyses was Group at two levels: intervention and social control. The dependent variables were total scores on Outcome Measures: the ACE-R, MMQ (Contentment, Ability and Strategy subscales), MQF (Retrospective functioning subscale), QoL-AD, GDS-15, and GAI, measured at an interval level. Statistical analyses were conducted with an intervention group of $n = 8$ and social control group of $n = 5$.

Data exploration. Data exploration checked for normal distribution, outliers, homogeneity of variance, and relationships and interactions amongst variables (Zuur, Ieno, & Elphick, 2010). Data for both groups were not normally distributed. While statistical analyses require normal distribution in the population, it is difficult to assess lack of normality in a small sample. Data were positively and negatively skewed, deviating from the normal distribution to a moderate or substantial degree (Mertens, 2010).

One option for obtaining more normally distributed data was to deal with outliers. The ACE-R could have been used to exclude those who had low scores from the study, using the lowest cutoff of score of 82 points (Mioshi et al., 2006). This would have eliminated two intervention group participants from analyses. However, there were a further three intervention group participants whose total ACE-R scores could not be calculated due to physical and sensory impairments, which prevented them from completing this screening measure. These three participants' ACE-R scores were coded as missing values. If outliers had been omitted from this study, this would have resulted in $n = 3$ for intervention group for all statistical analyses involving the ACE-R. In order to retain adequate statistical power, those who obtained lower scores with the ACE-R were not excluded.

Rationale for mixed design ANOVA. A mixed design analysis of variance (ANOVA) was chosen as the main statistical model to analyse data. Change score analyses were also chosen instead of controlling for group differences at baseline using a covariate approach. While conducting an analysis of covariance (ANCOVA) would be one way to approach statistical testing, this was not used in the current study due to lack of randomisation to groups (Jamieson, 2004). It has been argued that with naturally occurring groups, baseline differences may not be

due to chance (Cribbie & Jamieson, 2004). Therefore, using a covariate approach would result in biased conclusions, and using a change score model would produce less biased results (Jamieson, 2004; Oakes & Feldman, 2001).

Prior to conducting the statistical tests, data were examined to see whether assumptions of ANOVA would be met. Assumptions of normality were not met, and there was greater skewness with the distribution of scores. Some sphericity assumptions were violated, and some assumptions for homogeneity of variance were also violated (i.e., ACE-R and MMQ Contentment from post Phase 1 to six month follow-up).

The between-subjects factor for this model was Group at two levels (intervention and social control), and within-subjects factor was Outcome Interval at four levels (baseline, post Phase 1, post Phase 2, and six month follow-up). Two-tailed tests of significance were conducted at the level of $p < .05$. Where post hoc tests were required to determine significant pairwise differences, the Bonferroni correction was chosen to automatically adjust for multiple comparisons where required (Field, 2009). Results are reported using partial eta squared ($\eta p2$), which is a measure of effect size for ANOVA. In particular, partial eta squared explains a proportion of variance that is not explained by other variables in the study (Tabachnick & Fidell, 2013). For partial eta squared, a small effect size is > .01, a medium effect size is > .06, and a large effect size is > .14 (Field, 2005). However, note that partial eta squared values may sum to greater than 1.00 as they are not additive (Field, 2005).

Analysis II: Content analysis. Qualitative data were analysed using content analysis. Content analysis is a method in which data are categorised according to certain words or contexts within text, allowing inferences to be made about meanings of text material (Harper & Thompson, 2012). Qualitative information can be quantified using *coding systems* which are central to content analysis (Reis & Judd, 2000). First of all, coding systems work by identifying themes within text material in a few words or a phrase, which is then classed as a *coding unit* (Reis & Judd, 2000). Descriptions of each coding unit in the form of criteria are provided, alongside examples of verbatim from participants, so that the coding unit is clear to the reader

(Reis & Judd, 2000). Hence, when data are categorised using codes, the frequencies of occurrences of these categories can be quantified (Harper & Thompson, 2012). It is important to categorise data within the context of the data's meaning (Harper & Thompson, 2012). Further, each category that is selected and described should be separate or independent from the other categories, so that one category does not influence the other (Reis & Judd, 2000).

The method of content analysis was chosen as feedback questionnaires received from participants did not have the breadth of text necessary for thematic analysis. However, content analysis of feedback questionnaires could still reveal common thoughts and reactions regarding intervention sessions, which could be valuable for future research. More specifically, this information could be valuable in working with the older adult demographic in rest home and retirement village settings. Therefore, text material from questionnaires were systematically and objectively analysed, and transformed into codes according to concepts or categories (Reis & Judd, 2000). Typically, a select few examples from text material would be provided for each code or category. With eight participants in the intervention group, the majority of their responses were used as examples. Further, some categories occurred in frequencies as few as one, which would typically not occur with a larger sample size. Nonetheless, some valuable information was gathered as a result of applying content analysis to feedback questionnaires in the current study.

CHAPTER 7: RESULTS

Analysis I

Results from data analysis will be reported in five parts: (1) General cognitive ability: ACE-R; (2) Memory and everyday activities: MMQ Ability; (3) Knowledge and use of memory strategies: MMQ Strategy; (4) Memory-related affect and perceived change: MMQ Contentment and MFQ Retrospective Functioning; and (5) Psychological wellbeing: QoL-AD, GDS-15, and GAI. Note that instead of analysing the MMQ total score, this measure was analysed according to its three different subscales. The reason for this was to explore the various aspects of memory functioning captured by the different subscales, and as done by Kinsella et al. (2009).

The primary analysis of interest with a mixed design ANOVA would be the interaction between group and outcome interval on the outcome measures. With an interaction, the two groups would change differently across the four outcome intervals (Tabachnick & Fidell, 2001). However, there were no significant interactions in this study (see Table 8). This indicates that the groups changed similarly across time.

Subsequently, the main effect of outcome interval and the main effect of group were examined for each outcome measure, as main effects demonstrate the effects of the independent variable on the dependent variable (Tabachnick & Fidell, 2001). As the two groups did not change differently across time, the main effect of group would determine whether the two groups were different at any of the outcome intervals. Table 9 reports the means and standard deviations on all outcome measures across time, for both groups. Similarly, these results are presented in graph form in Figures 3-10, and can be used to interpret the quantitative findings of the study.

Table 8

Results from the Mixed Design ANOVA

Measure	Interactions (Outcome Interval x Group)	Main effect of Outcome Interval	Main effect of Group
ACE-R	$F(1.8, 14.4) = .917$, $p = .412$, $\eta p2 = .103$	$F(1.8, 14.1) = 1.346$, $p = .288$, $\eta p2 = .144$	$F(1, 8) = 3.100$, $p = .116$, $\eta p2 = .279$
MMQ Contentment	$F(3, 33) = 1.879$, $p = .152$, $\eta p2 = .146$	$F(3, 33) = .835$, $p = .484$, $\eta p2 = .071$	$F(1, 11) = .029$, $p = .868$, $\eta p2 = .003$
MMQ Ability	$F(1.9, 20.9) = .035$, $p = .961$, $\eta p2 = .003$	$F(1.9, 20.9) = 1.140$, $p = .336$, $\eta p2 = .094$	$F(1, 11) = 3.196$, $p = .101$, $\eta p2 = .225$
MMQ Strategy	$F(3, 33) = .376$, $p = .771$, $\eta p2 = .003$	**$F(3, 33) = 2.933$, $p = .048$, $\eta p2 = .211$**	**$F(1, 11) = 9.803$, $p = .010$, $\eta p2 = .471$**
MFQ	$F(1.9, 21.2) = .101$, $p = .898$, $\eta p2 = .009$	$F(1.9, 21.2) = .040$, $p = .957$, $\eta p2 = .004$	$F(1, 11) = .887$, $p = .367$, $\eta p2 = .075$
QoL-AD	$F(3, 33) = .197$, $p = .898$, $\eta p2 = .018$	$F(3, 33) = .152$, $p = .928$, $\eta p2 = .014$	$F(1, 11) = .775$, $p = .397$, $\eta p2 = .066$
GDS-15	$F(3, 33) = 1.347$, $p = .276$, $\eta p2 = .109$	$F(3, 33) = 2.306$, $p = .095$, $\eta p2 = .173$	$F(1, 11) = .258$, $p = .622$, $\eta p2 = .023$
GAI	$F(1.3, 14.5) = .821$, $p = .412$, $\eta p2 = .069$	$F(1.3, 14.4) = 2.388$, $p = .139$, $\eta p2 = .178$	$F(1, 11) = .257$, $p = .622$, $\eta p2 = .023$

Note. $\eta p2$ = partial eta squared

Table 9

Means and Standard Deviations for Intervention and Control Groups Across the Four Time Points for All Measures

Measures	Intervention (n = 8)					
	Baseline	Post Phase 1	Post Phase 2	Six month follow-up	Baseline	P
ACE-R (n = 10)	84.2 ± 11.7	82.2 ± 14.6	81.0 ± 15.3	82.4 ± 14.0	93.6 ± 6.0	
MMQ Contentment (n = 13)	36.1 ± 6.6	34.9 ± 6.7	33.0 ± 2.8	35.0 ± 5.3	32.0 ± 4.9	
MMQ Ability (n = 13)	24.4 ± 8.7	26.8 ± 10.6	25.4 ± 6.8	26.5 ± 8.9	32.4 ± 3.6	
MMQ Strategy (n = 13)	19.1 ± 8.2	22.5 ± 11.7	22.0 ± 11.2	20.3 ± 9.4	34.4 ± 5.4	
MFQ (n = 13)	13.6 ± 3.4	13.6 ± 4.0	13.8 ± 3.5	14.1 ± 3.4	15.6 ± 4.2	
QoL-AD (n = 13)	35.0 ± 7.3	34.5 ± 6.0	33.9 ± 7.1	33.8 ± 6.1	37.0 ± 5.8	
GDS-15 (n = 13)	2.3 ± 3.4	2.6 ± 3.2	2.5 ± 3.3	3.0 ± 3.3	1.8 ± 2.5	
GAI (n = 13)	1.9 ± 3.5	1.6 ± 3.3	1.1 ± 1.9	1.6 ± 2.8	3.6 ± 5.1	

The possible range of scores on outcome measures are as follows: Addenbrooke's Cognitive Examination – Revised (Questionnaire (MMQ) Contentment subscale 0-72; MMQ Ability subscale 0-80; MMQ Strategy 0-76; Memo Retrospective Functioning subscale 0-35; Quality of Life Alzheimer's Disease (QoL-AD) scale 0-52; Geriatric Depr Anxiety Inventory (GAI) 0-20.

General cognitive screen. The ACE-R was used as a brief cognitive screening measure to assess global cognitive functioning. It was hypothesised that following intervention: (a) the intervention group would perform significantly better on the ACE-R than the social control group, and (b) in particular, ACE-R scores for the intervention group would significantly increase following Lifestyle Education intervention, with gains maintained at follow-up. Both of these hypotheses were not supported by the ANOVA analysis. There were no significant interactions or main effects with this measure. Figure 3 illustrates that the social control group had higher mean scores at baseline than the intervention group, and these scores remained similar across time.

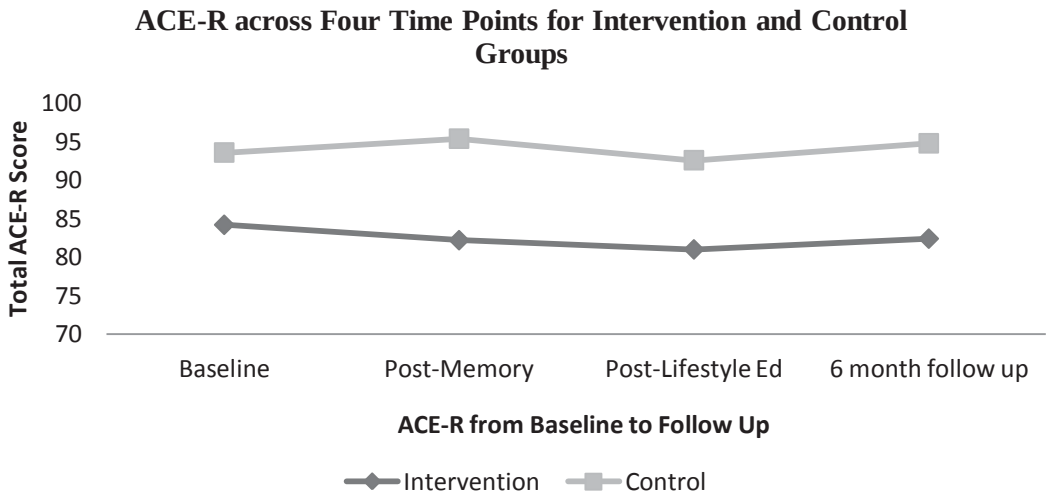

Figure 3. Addenbrooke's Cognitive Examination – Revised (ACE-R) scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up)

Memory and everyday activities. Memory ability in everyday activities was evaluated through subjective ratings on the MMQ Ability subscale. It was hypothesised that following intervention: (a) the intervention group would perform significantly better on MMQ Ability than the social control group, and (b) in particular, MMQ Ability scores for the intervention group would significantly increase following Lifestyle Education intervention, with gains maintained at follow-up. There were no significant interactions or main effects with this

measure. Hence, these hypotheses were not supported. Again, mean baseline scores were higher for the social control group and remained similar across outcome intervals (see Figure 4).

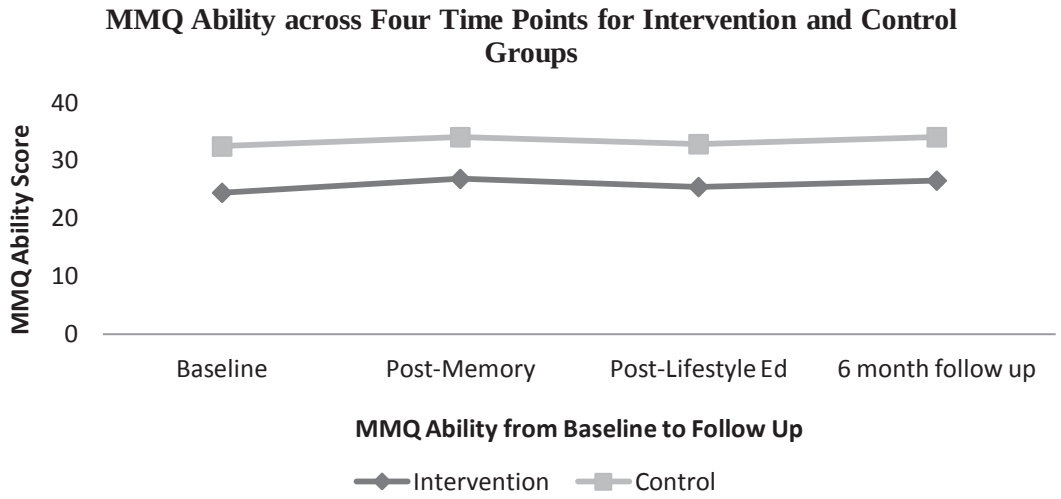

Figure 4. Multifactorial Memory Questionnaire (MMQ) Ability subscale scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up)

Knowledge and use of memory strategies. Memory strategy knowledge and use in everyday life was evaluated through subjective ratings on the MMQ Strategy subscale. It was hypothesised that following intervention: (a) the intervention group would perform significantly better on MMQ Strategy than the social control group, and (b) in particular, MMQ Strategy scores for the intervention group would significantly increase following both Memory and Lifestyle Education interventions, with gains maintained at follow-up. There were no significant interactions with this measure, and hypotheses were not supported.

However, there was a significant main effect of outcome interval on MMQ Strategy ($F(3, 33) = 2.933$, $p = .048$, $\eta p2 = .211$). The effect size is large. This means that MMQ Strategy alone accounted for 21.1% of the variance for outcome interval. The Wilcoxon signed-rank test was then used to determine at which specific outcome interval(s) the significant difference(s) occurred. The Wilcoxon signed-rank test is a nonparametric test, equivalent to the paired samples t test, but does not assume that the sample is normally distributed. Results showed that

both groups changed together, but with significant differences at the specific outcome intervals of baseline to post Phase 1 (Z = -2.185, p = .029) on MMQ Strategy.

There was also a significant main effect of group on MMQ Strategy: F (1, 11) = 9.803, p =.010, $\eta p2$ = .471. The effect size is large. This means that MMQ Strategy alone accounted for 47.1% of the variance for group. Using the nonparametric equivalent of an independent samples t test, the Mann Whitney U test was used to analyse the outcome intervals at which significant differences occurred. All four outcome intervals indicated a significant difference between groups: baseline (U = 37, p = .013), post Phase 1 (U = 34, p = .040), post Phase 2 (U = 37, p = .012), and six month follow-up (U = 38, p = .008). The significant differences between the groups on this measure may be due to the social control group scoring higher at baseline, and continuing to do so across time (see Figure 5).

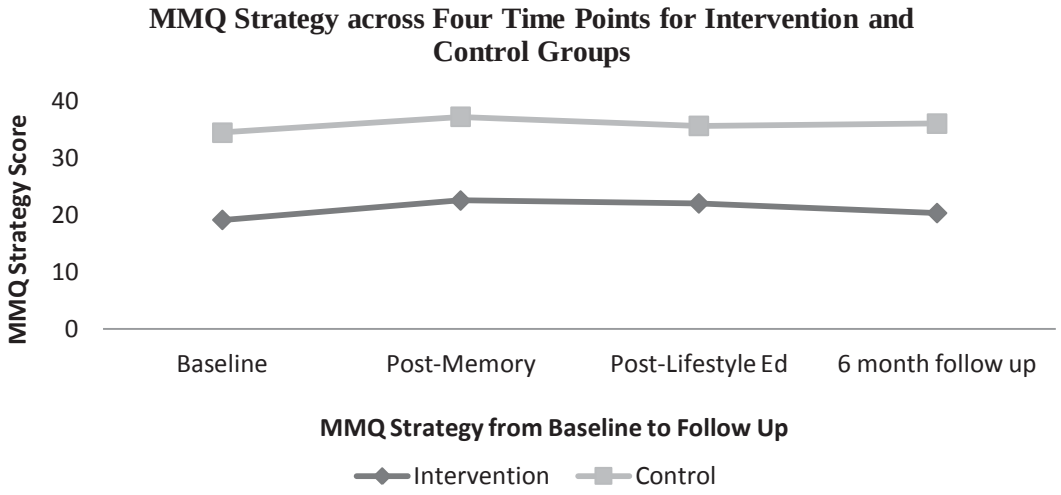

Figure 5. Multifactorial Memory Questionnaire (MMQ) Strategy subscale scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up)

Memory-related affect and perceived change. In order to evaluate memory-related affect and perceived change, participants gave subjective ratings using the MMQ Contentment subscale as well as the MFQ Retrospective Functioning subscale.

With MMQ Contentment, it was hypothesised that following intervention: (a) the intervention group would perform significantly better than the social control group on this measure, and (b) in particular, MMQ Contentment scores for the intervention group would significantly increase following Lifestyle Education intervention, with maintenance of gains at follow-up. There were no significant interactions or main effects with this measure, and these hypotheses were not supported. Figure 6 illustrates a lower score at baseline for the social control group in comparison to the intervention group.

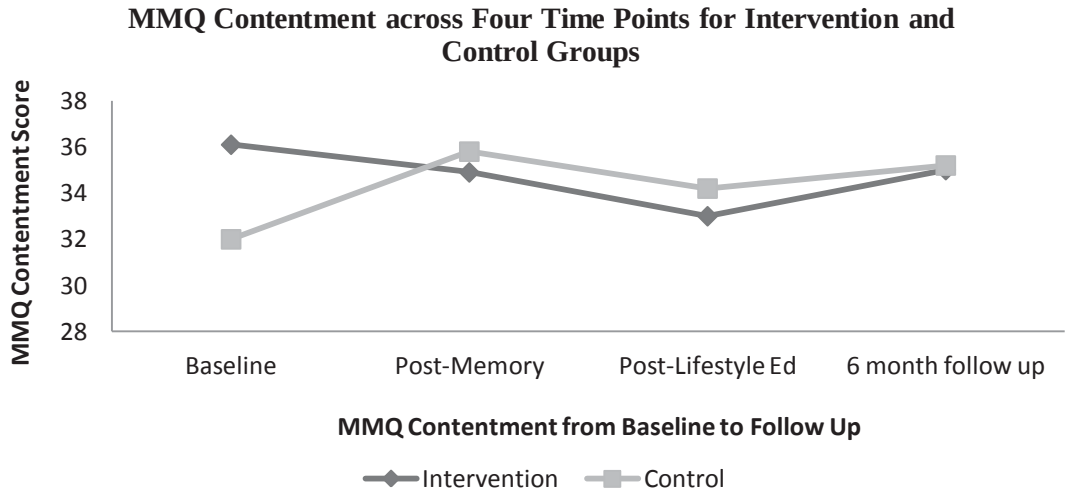

Figure 6. Multifactorial Memory Questionnaire (MMQ) Contentment subscale scores across four different time points for Intervention and Control groups (baseline, post Phase 1 intervention, post Phase 2, and at six month follow-up)

With the MFQ Retrospective Functioning subscale, it was hypothesised that following intervention: (a) the intervention group would perform slightly better on this measure than the social control group, and (b) MFQ scores for the intervention group would improve slightly across time. Again, no significant interactions or main effects existed, and hypotheses were not supported. Figure 7 illustrates that the social control group scored higher at baseline than the intervention group, and this remained consistent across time.

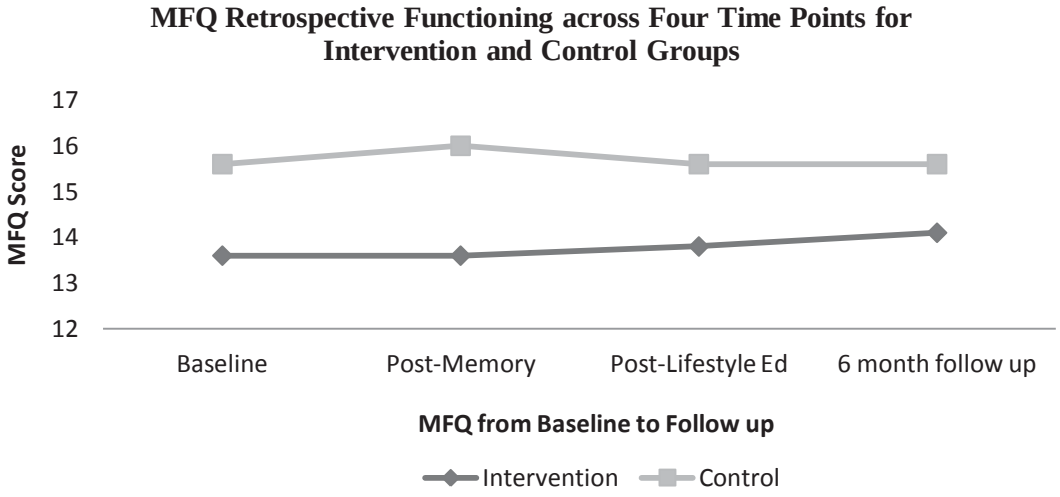

Figure 7. Memory Functioning Questionnaire (MFQ) Retrospective Functioning subscale scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up)

Psychological wellbeing. The QoL-AD, GDS-15, and GAI are subjective measures used to capture emotions and psychological wellbeing impacting on memory performance in everyday life. It was hypothesised that following intervention: (a) the intervention group would demonstrate greater improvements on the QoL-AD than the social control group, and (b) QoL-AD scores for the intervention group would improve across time. There were no significant interactions or main effects with this measure, and hypotheses were not supported. Figure 8 illustrates higher scores from baseline for the social control group compared with the intervention group.

The GDS-15 and GAI were used to monitor mood and anxiety-related symptoms in the study. As such, both groups were expected to score similarly to baseline on both of these measures across time. These hypotheses were confirmed, as scores remained similar across time (see Figures 9 and 10).

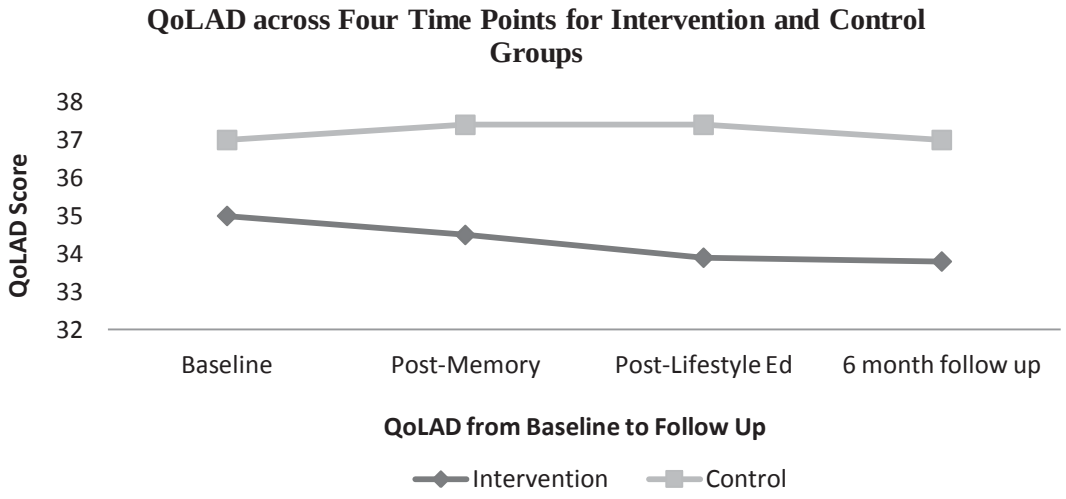

Figure 8. Quality of Life – Alzheimer's Disease (QoL-AD) scale scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up)

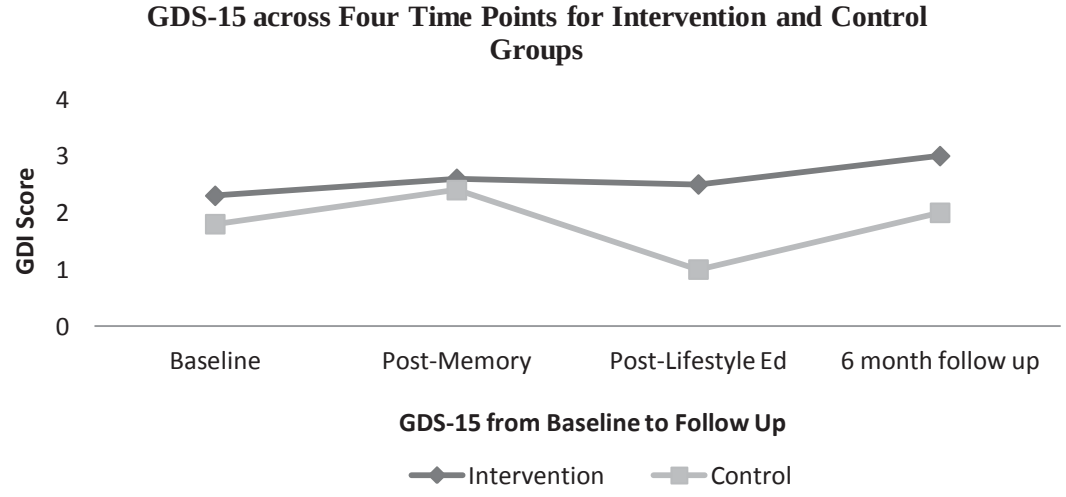

Figure 9. Geriatric Depression Scale (GDS) – 15 item version scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up).

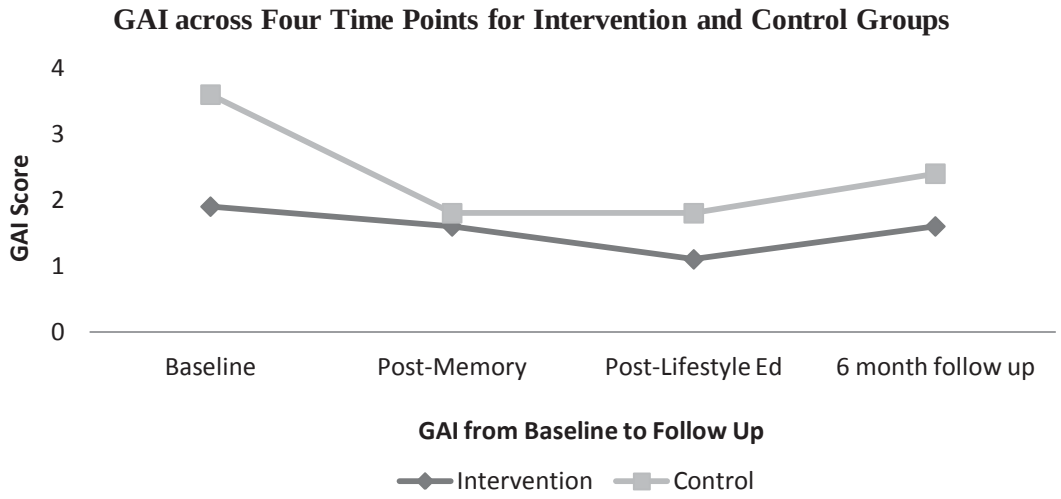

Figure 10. Geriatric Anxiety Inventory (GAI) scores across four different time points for Intervention and Control groups (baseline, post Phase 1, post Phase 2, and at six month follow-up).

In summary, intervention group performance on the ACE-R and subjective measures typically suggested that there were no apparent benefits of receiving intervention, when evaluated with a social control comparison. Majority of the study hypotheses were disconfirmed, with the exception of MMQ Strategy from baseline to post Phase 1 in the intervention group, and the GDS-15 and GAI, which were used as monitoring instruments. The small sample size of the study reduces the power of statistical testing. Therefore, definite conclusions regarding the aims of the study could not be reached.

Although there were no significant differences in age between both groups, 50% of the intervention group had physical/sensory limitations, whereas no participants in the social control group had such limitations. Further, only 50% of the intervention group had received 12+ years of education, whereas 100% of the social control group had received 12+ years. In addition, 60% of the social control group were still married, while majority of participants in the intervention group were widowed. These differences in demographic characteristics between the groups could have contributed towards the differences in mean scores at baseline and across

time, with the social control group typically having higher mean scores at all four outcome intervals.

Analysis II

Qualitative information was gathered from participants in the intervention group through feedback questionnaires as well as researcher observations of group sessions. Participants ranked whether they found sessions "enjoyable" and "helpful" with items on a Likert scale ranging from 0 (*strongly disagree)* to 5 (*strongly agree)*. Figure 11 demonstrates responses from the feedback questionnaire regarding these two items. Both Memory and Lifestyle Education sessions were well received, with the majority of participants agreeing that they found these sessions enjoyable and helpful.

Intervention sessions. The feedback questionnaire also consisted of open-ended questions regarding sessions and strategies which were helpful and not helpful, with space for general comments. Responses from intervention group participants were analysed using content analysis. As described in Chapter 6, responses for each question in the feedback questionnaire were coded using a primary coding scheme. Descriptions of each code and examples from participants are provided. In this way, qualitative information regarding both interventions could be analysed quantitatively, as frequencies.

Tables 10–14 provide in-depth analysis of feedback following Memory sessions, and Table 15 provides an analysis of feedback from Lifestyle Education sessions. It is important to note that the frequencies of responses displayed are not equivalent to the number of participants in the study. One participant's response could receive multiple codes, depending on the context and content of the response.

The greatest frequency of responses to the question "In what way were Memory sessions helpful?" was found to be the use of compensatory strategies (see Table 10). Participants responded in greatest frequency to the question "Which Memory sessions were most helpful?" with Memory Notebook sessions, followed by sessions covering internal mnemonics (see Table 11). Table 12 shows that making links/associations received the greatest

frequency of responses for the question “Which memory strategies were most helpful and why?” When asked “What did you not find helpful in the Memory sessions and why?” the greatest frequency of responses indicated the pegword method as a memory strategy (see Table 13). Table 14 highlights several suggestions and comments regarding the memory sessions. When participants were encouraged to write down general comments, there were some positive responses regarding the nature of the sessions and the processes of the facilitator (see Table 14).

Table 15 illustrates all the responses received about Lifestyle Education sessions. The rate of attrition by the stage of Lifestyle Education sessions meant that considerably less feedback was received from participants than for Memory sessions. Further, the author also noted that several participants made comments about the Memory intervention sessions even when feedback pertained to the most recent Lifestyle Education sessions. In these instances, these responses were incorporated with Memory intervention feedback, which would explain the lack of qualitative information following Lifestyle Education sessions.

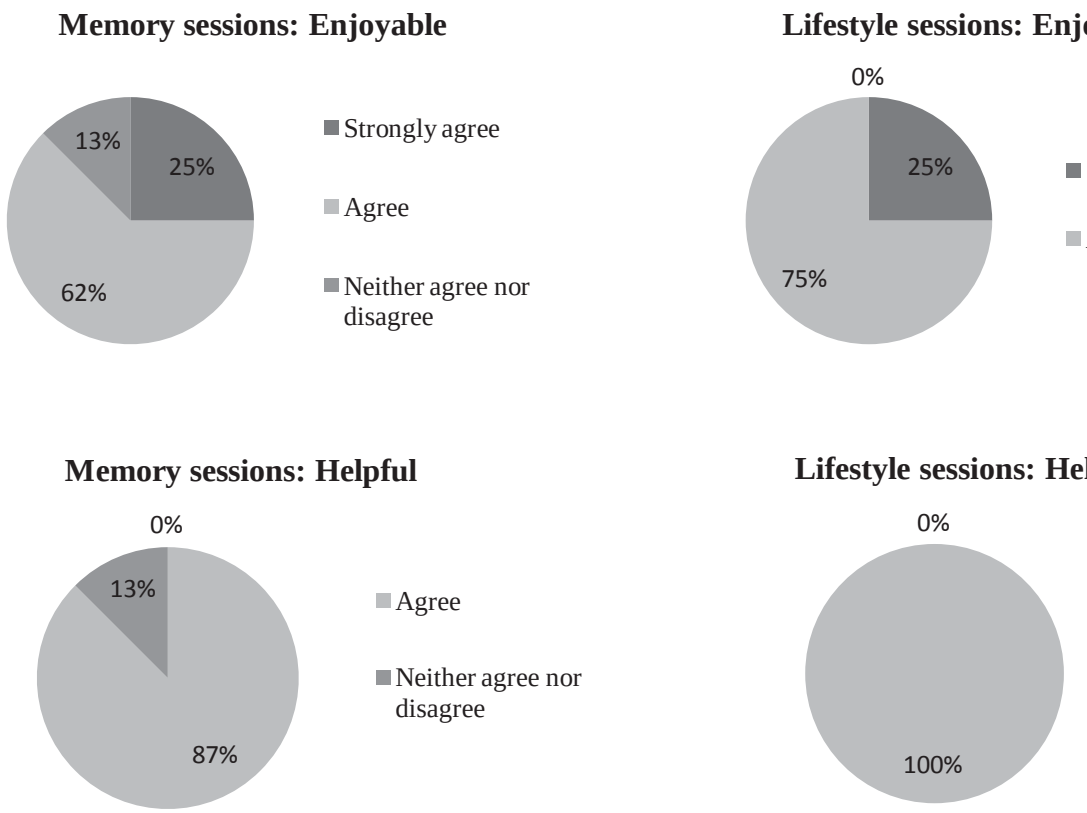

Figure 11. Responses from feedback questionnaires indicating whether Memory and Lifestyle Education sessions were

Table 10

Primary Coding Scheme: "In What Way Were Memory Sessions Helpful?"

Code	Frequency (%)	Descriptions	Examples
Using compensatory strategies	Five (42%)	Participants expressed that learning to use internal and/or external strategies could help compensate for memory functioning with age. Either these were strategies they had been using for a long time and were reinforced during the sessions or were learned as a result of the current intervention.	"The sessions s age and for oth such things as techniques such names". "I have always me". "By focusing o particular the u just recording a definitely helpe "Made aware construct/selec from first 2 or
Normalising memory difficulties	Two (17%)	Enabling participants to recognise that as aging occurs, others have similar experiences with memory difficulties	"Helpful in rein decreases, one "I think we rea same trouble".
Making effort to remember	Two (17%)	Participants realised that compensation of memory abilities occur through active effort	"At the same ti make use of ce "They made m my memory ac
Psychoeducation	One (8%)	The incorporation of elements of psychoeducation was expressed as helpful.	"Gave insights it".

Acceptance	One (8%)	Acceptance of participants' current experiences are part of the process of dealing with memory difficulties also	"...and maybe make us accep
Nonspecific	One (8%)	General/nonspecific comments about the helpfulness of sessions	"Being blind and deaf I have been able to gain some infor

Table 11

Primary Coding Scheme: "Which Memory Sessions Were Most Helpful?"

Session	Frequency (%)	Comments
Memory Notebook	Six (40%)	"Session 2 – i.e., making use of the Memory Notebook on a regular basis. Although I ne have made myself more organised by using the Book and making effort to collect and re well. For example, emergency numbers for car problems, certain birthdays, and things to "I found the memory book session most helpful". "Probably session two in making me more organised". "The memory book sessions were helpful, helping me to increase the note taking in my "Introduction to the memory notebook and calendar were most beneficial".
Internal mnemonics	Five (~33%)	"In general, learning to associate new names of people/places/things with something obv "Have found chunking method of some use". "Also number three, how to remember names of people and employing certain technique "Remembering names – found this session worked really well. Not always successful bu
Introduction/ psychoeducation	Two (~13%)	"I found session 1 a good introduction".
Nonspecific	Two (~13%)	"All sessions were worthwhile..." "It's all very interesting".

Table 12

Primary Coding Scheme: "Which Memory Strategies Were Most Helpful and Why?"

Strategies	Frequency (%)	Comments
Making links or associations	Four (~29%)	"When being introduced a new name, try and associate it with another more fam "Learning new names of people with sounds of 'things' etc...It does take practic "In general, learning to associate new names of people/places/things with somet season etc". "Recalling people's names by their physical characteristics and by limiting them
Letters of the alphabet	Three (~21%)	"Going through letters of the alphabet (does not always work)". "...going through the alphabet as a means of remembering a name".
Memory Notebook	Two (~14)	"The introduction of the memory book, which broadened the scope of what I alr include things to do and contacts list". "The importance of having an organised day routine and writing items down and notebook".
Repetition	One (~7%)	"Repetition (internally in one's brain) helps too".
Rhyming	One (~7%)	"Techniques inside head, example that was given '30 days hath September'. Oft 'Spring forward, fall back".
Simple strategies	One (~7%)	"Keep it simple stupid"
5Ws	One (~7%)	"5Ws – I have already practised this method and find this useful".
Psychoeducation	One (~7%)	"I found session 1 a good introduction"

Table 13

Primary Coding Scheme: "What Did You Not Find Helpful in the Memory Sessions and Why?"

Not helpful	Frequency	Descriptions	Comments
Pegword Method	Five (42%)	--	"Page 13 found it too abstract (my personal view "The internal strategy of listing things to be recal two-shoe, three-tree) etc unwieldy". "The mnemonics for enunciating items a bit by rl "Pegword method – couldn't get my head around
Method of Loci	Three (25%)	--	"Maybe method of Loci. Haven't had to use this
Complexity of strategies	Two (17%)	The unhelpful nature of complicated memory strategies which does not aid with remembering	"...however some of the more complex methods remember something to remember something els methods". "Breaking the name up into chunks, associating r too confusing especially trying to remember seve "The technique using another word to remember memory was doubled not halved".
Sensory impairment	One (8%)	--	"Not being able to see or hear".
Different settings	One (8%)	Applicability of specific memory strategies to different living situations	"Some methods are veered to people in their own or hospital do not apply so markedly".

Table 14

Primary Coding Scheme: "Any Other Comments/Suggestions About Memory Sessions?"

Coding	Frequency (%)	Descriptions	Comments/Suggestions
Processes of the facilitator	Two (29%)	Positive comments regarding the processes of the facilitator	"(The facilitator) listens to each class member an remarks. She explains the schedule well, and hov "(The facilitator) is patient, a good listener, an ex pleasant, clear; delivery measures agreeable to th
Many things to consider	Two (29%)	Comments that the Memory sessions gave a lot for participants to consider/think about	"Generally, plenty of things to work on which sh sessions will reinforce that". "A lot to think about but so far concentrating on alphabet and lists".
Sensory impairment	One (14%)	Sensory impairment affecting the ability to take in information from sessions	"I am completing this survey on behalf of a 90 ye and deaf and she tried to memorise each session being said. She had no notes to call on".
Continued practice	One (14%)	Continued practice of memory strategies throughout the lifespan	"Being 88 years of age and partially blind and de methods all of my life. I still do crossword and B
Atmosphere of group sessions	One (14%)	Positive comments regarding the atmosphere of group sessions	"It was an enjoyable, relaxed get together, thanks personalities of (the facilitator and co-facilitator) people showing interest".

Table 15

Primary Coding Scheme: "In What Way Were Lifestyle Education Sessions Helpful?"

Code	Frequency	Descriptions	Examples
Normalising memory difficulties	One	Enabling participants to recognise that others have similar experiences with memory difficulties	"Helpful in bei doubts on inade
Role of the facilitator	One	Comments of appreciation towards the facilitator and sessions conducted	"(The facilitato very pleasant se
Specific topic	One	Participants found specific topics such as relaxation and mindfulness to be helpful	"The session in instructions I en

Primary coding scheme: "Which Lifestyle Education Sessions Were Most Helpful?"

Session	Frequency	Comments
Nonspecific	One	"All sessions were helpful as were tests to establish any memory loss".

Primary Coding Scheme: "Which Tips and Techniques (Lifestyle Education Sessions) Were Most Helpful and Why?"

Code	Frequency	Examples
Relaxation	One	"I would think some methods of relaxation would be beneficial but am still planning to use tho in my days so far".

Primary Coding Scheme: "What Did You Not Find Helpful in the Lifestyle Education Sessions and Why?"

Code	Frequency	Descriptions	Examples
No valid responses related to Lifestyle Education sessions. Comments pertained to Memory sessions			

Primary Coding scheme: "Any Other Comments/Suggestions About Lifestyle Education sessions?"

Coding	Frequency (%)	Descriptions	Comments/Suggestions
Processes of the facilitator	Three (43%)	Positive comments regarding the processes and personality of the facilitator	"I thought the (facilitator) was a very good lead digressing from the topic, always managed to b "(The facilitator) has a delightful personality ar to look forward to".
Nature of sessions	Three (43%)	Positive comments regarding sessions being enjoyable and valuable	"I enjoyed the sessions". "Overall, enjoyed the sessions". "The sessions were well worthwhile..."
Stress and anxiety	One (14%)	Comments regarding the impact of stress and anxiety on memory	"I find that my main problem is not so much m stressed when having to attempt new tasks on b

CHAPTER 8: DISCUSSION

The previous chapter illustrated the results of the study both quantitatively and qualitatively. In the current chapter, results will be discussed in relation to the study aim and hypotheses. This chapter is divided into five sections: (a) a summary of quantitative and qualitative findings in the current study, (b) implications of these findings and contributions to existing literature, (c) limitations of the current study, (d) recommendations for future research, and (e) conclusions. A mixed methods design was used to analyse data, to provide alternative perspectives and contextually rich information for a better understanding of this research topic.

Summary of Current Findings

Quantitative. The aim of this study was to determine the extent to which receiving Memory and Lifestyle Education interventions impact on memory functioning in older adults with subjective memory difficulties, compared with older adults participating in weekly social group activities within the community. Overall, it was expected that the social control group would show a slight increase in scores on measures of ACE-R, MMQ, MFQ, and QoL-AD, although they were not receiving specific intervention. However, this increase was not expected to be as substantial as receiving specific intervention. The intervention group were expected to perform significantly better on the ACE-R, MMQ Contentment, MMQ Ability, and MMQ Strategy following intervention, with some improvements on the MFQ Retrospective Functioning subscale and QoL-AD.

A mixed design ANOVA procedure was used for the main analysis. There were no significant interactions to indicate that the groups changed differently across time. With MMQ Strategy, there was a significant main effect of outcome interval. This indicated significant differences in mean scores for both groups from baseline to post Phase 1, although both groups changed together across time. Possible explanations for this result include naturally occurring changes in individuals across this time period (i.e., baseline to post Phase 1), expectancy effects of participating in the study, or a Type I error as a result of repeated testing. Further, a significant main effect of group was found with MMQ Strategy, with significant differences

between group scores at all of the outcome intervals. This could be explained by the social control group maintaining higher scores than the intervention group from baseline to six month follow-up.

Overall, there were no apparent benefits of receiving the interventions. The majority of study hypotheses were not supported, with the exception of MMQ Strategy from baseline to post Phase 1 in the intervention group, and the GDS-15 and GAI, which were used to monitor mood and anxiety-related symptoms.

Qualitative. In addition to quantitative findings, qualitative information was gathered in the form of feedback questionnaires following both interventions. Feedback questionnaires were analysed using content analysis. Generally, the intervention group found both Memory and Lifestyle Education sessions enjoyable as well as helpful.

Greater feedback was received about Memory sessions, as those who completed questionnaires following Lifestyle Education sessions continued to refer to content from Memory sessions. The findings from the Memory sessions can be summarized as follows. Learning to use compensatory memory strategies was identified as most helpful in comparison with other aspects of Memory intervention, such as normalising memory difficulties and psychoeducation. However, this may not be surprising considering that the bulk of the Memory intervention was focused on teaching compensatory memory strategies. The specific sessions identified as most helpful were approximately equal for Memory Notebook (40%) and internal mnemonics (33%). Approximately 1.5 sessions each, of the six Memory intervention sessions, were devoted to teaching external strategies and internal strategies. Hence, this finding may not be surprising either.

It is surprising that "making links and associations" was identified as one of the most helpful memory strategies, compared with using the Memory Notebook for instance. Comments indicated that links and associations were used in learning to remember new names. This is highly relevant, as remembering names of people is a commonly reported memory complaint, and of common concern amongst older adults (Mather, 2010). It may be valuable if similar

research in future placed greater emphasis on this strategy as a helpful one for remembering names, as older adults in the current study found it to be.

Based on comments received during Memory sessions, it was not surprising that a number of participants found the pegword method and method of loci least helpful. Participants regarded these strategies as more complex to put into practice, and felt that it may hinder remembering rather than aid it. This study suggests that some internal strategies may be less appealing to use, which is somewhat consistent with literature which suggests that internal strategies are more effortful to use (West et al., 2008). Further, these internal strategies require more intensive effort and continued practice, prior to application in real world settings. This in itself may have been overwhelming for older adults who were looking for more simple ways to deal with their memory difficulties. Another possibility is that some of these older adults have lower memory self-efficacy, and may be unwilling to persevere with more difficult memory tasks, thereby avoiding them (Wells & Esopenko, 2008). Participants' willingness to attempt strategies may therefore have played a role in which strategies were utilised. More effortful strategies require greater motivation to put into practice.

The current study also demonstrated that one of the difficulties faced was ensuring continued use of strategies, such as implementing the Memory Notebook in daily life. Some participants were reluctant to engage in memory-related change behaviour. Instead, some leant towards continuing to use strategies that were familiar to them, despite some of these strategies not necessarily benefiting their memory functioning in the long term. One example was the use of some participants' own calendar systems, which were not always referred to on a daily basis, and not accessible when away from home. Another example was that some participants were not willing to reorganise their contact information in a more systematic manner in the Memory Notebook. They were content with knowing where this information has always been kept, although this existing contact information may be unorganised and may confuse them in future.

On the other hand, positive feedback was received regarding the processes of the facilitator and atmosphere of group sessions. These are important aspects of the group environment, particularly in promoting greater discussion, learning, and continued use of

strategies. However, two issues were brought to greater attention during feedback. These were the impact of sensory impairment on participation in memory interventions, and the applicability of some of the memory strategies to rest home settings.

First, one participant with significant sensory impairment found that the group format of sessions was not helpful, as she could not properly see or hear the information presented. She was also unable to utilise the session handouts. However, she was interested in taking part, and indicated that she had "tried to memorise each session and was not able to take in all that was being said". In this case, the study demonstrated that individuals with sensory impairments would benefit more from individual versus group sessions. This would make sense considering that those with hearing impairments in particular, would struggle to keep up with group discussions. Typically, older adults with significant sensory impairments have been excluded from intervention studies previously. However, clinical settings will likely see older adults with memory difficulties who also present with significant sensory impairment(s), making this an area worth exploring in future. Future research could investigate the use of technological memory aids with these individuals, so that they can continue to function more efficiently on a day-to-day basis.

Second, one participant commented that some of the methods taught were "veered to people in their own homes" and do not apply to different settings such as rest homes or hospitals. While this participant did not provide examples of what methods he/she was referring to, it can be speculated whether this was in relation to learning strategies to remember appointments, writing lists, or carrying around Memory Notebooks. Due to their health statuses, some rest home participants relied heavily on others to remind them of appointments, to do their shopping or errands for them, and were not able to carry their Notebooks with them due to physical limitations. Although the author attempted to present material or strategies most appropriate to the group, this comment does raise issues regarding the applicability of some memory intervention strategies to older adults in residential care or assisted living facilities.

In future, it may be beneficial to provide greater consideration to the contexts within which older adults face memory difficulties, and ensure that material presented is highly

relevant for these contexts. More importantly, intensive training to implement these strategies within these contexts would provide greater success. This recommendation is also made in a review of literature of older adults with memory difficulties (Stott & Spector, 2010). For example, in hindsight, sessions on Memory Notebooks were more appropriate for those in the retirement village who were living and functioning more independently. For those in rest homes, providing the concept of using a key external memory aid in a slightly different way may have been more useful. For instance, some of these individuals have very few appointments and events to attend, and place greater reliance on others to remind them of these. However, this does not benefit the individuals' levels of memory functioning, as they are not proactively developing their memory capacities.

Hence, these individuals could have used a simpler weekly calendar system, placed on their wall, to alert them to the date and upcoming events/appointments, instead of being taught to use the more comprehensive Memory Notebook. Those who are not able to write could request rest home staff or family members to write down important reminders on this calendar system for them. Similar to the Memory Notebook, the key aspects of this calendar system would be that it was easily accessible to the individual and others, greatly visible, and not able to be misplaced. While the Memory Notebook also had sections for remembering things to do and contact information, it is useful to note that rest home staff are typically aware of where important contact information is stored. Therefore, less emphasis could be placed on reorganizing contact information into the Memory Notebook for rest home participants. Another suggestion similar to the calendar system is that individuals could have a whiteboard on their wall where they (or others) could jot down a list of reminders (e.g., shopping items that their family members can purchase for them next time, or a health issue that needs to be raised with a rest home nurse). These are some suggestions intended for those working with older adults in residential care settings.

Researcher Observations

In addition to qualitative information gathered from feedback questionnaires, the author made some observations which may be useful in explaining the quantitative findings, and in working with this population in future.

First, there was less reporting of consistent strategy use with the intervention group at the outset. On the other hand, most of the social control group identified consistently using external and internal memory strategies to begin with. Initial interviews with the social controls indicated that they regularly kept a diary or calendar of some form, and remembered to use or check these at least once a day. Therefore, the social control group appeared more proactive than the majority of the intervention group, and this may explain why the social control group had higher mean scores for memory strategy knowledge and use.

Second, the Memory Notebook was a key component of the Memory intervention, with the aim that it allowed individuals to store important information in one place, under three major sections. While some participants found that keeping a Memory Notebook was valuable, the author observed that very few continued to use it, especially at follow-up. Some individuals had already established systems for remembering appointments, things to do, and contact information, which they had been using for several years or decades. Although some of these systems were not necessarily the most efficient for them, despite continuous encouragement and reminders to use the Memory Notebook, participants typically commented at follow-up assessment that they preferred to continue using the external aids that they had prior to intervention. Similarly, while participants were generally receptive towards learning about internal strategies, the greater issue appeared to be how to get them engaged and invested in implementing a few of these strategies on a daily basis, not only to stimulate their levels of cognitive activity but to protect against cognitive decline. This may explain why the intervention group did not demonstrate expected improvements from baseline scores on MMQ Ability and Strategy subscales.

Third, the level of active effort taken by the intervention group to practice implementing strategies taught in sessions may have influenced outcome. A small number of participants who

made more of a conscious effort in between sessions observed that some of these strategies were beneficial to their daily functioning. These individuals had experimented with strategies that would work best for them, and were able to pick a few to consistently use. Others were more reluctant to apply new strategies, or they were content with the ones they had previously been using, although these may not necessarily have been effective. Again, this may explain why the intervention group did not demonstrate significant gains on subjective memory measures following intervention. In future, teaching new memory strategies may require intensive training in order for older adults to achieve change in memory-related behaviours outside of sessions. Simply being aware of and discussing the range of available memory strategies during intervention sessions, as well as verbally encouraging or checking that these have been done as part of homework assignments, does not necessarily translate into practice in day-to-day settings. Therefore, brief interventions with few resources to carry out intensive training may not achieve expected outcomes.

Fourth, it may be worthwhile undertaking an assessment of motivation to change, prior to intervention. This may provide a better understanding of the extent to which individuals involved in group interventions are willing to implement strategies taught, and contribute towards clarifying some of the study's outcomes. While motivations for volunteering for this study were considered, these were not formally assessed. Some individuals were observed to attend groups in order to gain a sense of belonging or to share their personal experiences with others. Within the rest home and retirement village settings, many individuals were familiar with one another beforehand, and were already involved in different group activities together. They may have volunteered for sessions because they knew someone else who was. In fact, one participant explicitly stated in her initial interview that she wanted to attend this group because her friend had expressed interest in it. Hence, individuals may express interest in taking part in group interventions for different reasons, but may not necessarily be prepared to invest in creating change around their memory-related behaviours.

Fifth, although a future recommendation would be to focus on few but specific memory strategies, and learn to implement these well, some participants commented that learning about

a variety of memory strategies was also useful. They verbally reported that this contributed towards greater awareness of strategies that they could use in different situations. They also reported that as a result of discussing several strategies, they could place a label on strategies that they had been using for years, but had not known that they were using. By labelling it as a strategy, they were more conscious about when and how often they used it. One participant verbally commented that as a result of discussing strategies for learning names, she had taken more of an interest in learning the names of people she met, so that she could address them by their names in future. This has noteworthy implications socially, and in keeping oneself mentally stimulated in order to prevent cognitive decline.

Finally, some participants, particularly those who dropped out of the study in its earlier stages, reported that memory difficulties were one of many problems they were currently dealing with. In working alongside older adults in residential care settings, the author observed that greater numbers of them had significant coexisting health and mental health issues, as well as physical and sensory impairments. These coexisting issues were reported as frustrating for the individual, as he/she would spend much time dealing with them. Subsequently, these issues placed functional and social restrictions on the individual, and were also observed to hinder the individual's capacity to devote significant resources in dealing with their memory difficulties. Subsequently, memory difficulties took a back seat to these other issues. In future, it would be important to formally assess an individual's priority in addressing memory difficulties, as this may explain attrition rates, and contribute towards clarifying some of the study's outcomes.

Contributions to Existing Literature

In addition to the researcher observations above, contributions of the current study to existing literature are modest, but valuable nonetheless. This study explored the notion of using a social control comparison rather than a waitlist condition or an active control condition (i.e., alternative treatment), which has not been done before. Further, this study is novel in that it separated out two major aspects of memory training (i.e., memory strategies and lifestyle education), in order to examine their distinct effects. While this research is a pilot study at best,

future interventions can replicate and extend from the novel contributions made by this study. It is still worthwhile to pursue the initial aims of the study regarding the specific and nonspecific factors which influence outcomes in group-based memory interventions.

The development of the Memory Programme and Lifestyle Education Programme manuals are also contributions to existing literature. These programmes are based on what has already been done in literature, and some aspects of the Memory Programme manual were adapted from Scheibner (2012). Although the manuals were developed for those with MCI, they are versatile and can be used with individuals who have SMCs but not objective cognitive impairment. The simplicity with which information is conveyed in the manuals makes it more user-friendly and appealing for clinicians/researchers. These manuals can be used in future replications of this study, provided that some of the methodological issues of the study are addressed.

Limitations of the Current Study

A number of limitations of the current study are observed. The generalisability of study findings is limited, as results may not be readily applicable to community settings. The validity of conclusions is also limited by the small sample size, and power of statistical testing is reduced (Jean et al., 2010). Therefore, the inferences that can be made about this study are limited, as it is inconclusive whether the specific interventions had no effects, or whether there was insufficient power to detect these effects (Oakes & Feldman, 2001). Further, a small sample is unlikely to reflect the diversity of the larger population from which it was drawn, particularly considering the heterogeneous presentation of those along the spectrum of normal aging to early dementia. Therefore, it is more likely for a Type II error to occur with a small sample, where the effects that actually occur in the population can be missed (Oakes & Feldman, 2001). Further, those who were willing to participate in the study may not accurately represent the population from which they were recruited. A certain type of individual may have chosen to participate in this study (e.g., those with greater levels of motivation), and this reduces the generalisability of findings, even for the rest home or retirement village population.

As not all statistical assumptions for ANOVA were fully met, it is acknowledged that this could affect some of the results found in this study. Violations of statistical assumptions included assumptions of normal distribution, sphericity, and homogeneity of variances for MMQ Strategy post Phase 1 to six month follow-up. In addition, the Bonferroni correction applied to significant post hoc tests is a conservative test that lacks statistical power, particularly with small groups (Tabachnick & Fidell, 2013). This correction increases the risk of generating a Type II error or missing the effects that do exist in the population.

A major limitation was the lack of random assignment to groups, which meant that the groups were naturally occurring. Further, the groups were non-equivalent. The social control group was recruited from the community and the intervention group was recruited from residential care settings. Non-equivalent groups limit inferences that can be made about study results. One indication of this was better performance by the social control group at baseline on most of the outcome measures. However, there were no difficulties with ceiling effects for the social control group, and there was still room for improvement with their performance on outcome measures. It is also possible that the composition of the intervention group itself was heterogeneous, as the retirement village participants appeared more functionally independent than the rest home participants. In future, participants should be recruited from the same population. Study findings would have been more meaningful and easier to compare between the intervention and social control conditions, had these groups been equivalent.

Overall, social control participants from the community appeared more functionally independent than the majority of intervention group participants. It was not fully anticipated that intervention group participants recruited from rest homes in particular, would have higher rates of comorbid health problems, sensory and physical impairments, and would be more functionally dependent on others to help them carry out their everyday activities. While they could have been excluded from the study, as has previously been done, it was a balance between recruiting enough participants to commence the intervention sessions within the limited time frame for the study, and declining those who expressed willingness to participate. These individuals also had a need for interventions that may otherwise not be offered to them.

Lack of a true control condition (i.e., waitlist/no treatment) meant that the extent of the effects of the social group as well as the intervention conditions could not be determined. A true control condition would have helped to determine whether changes over time were the result of the different study conditions or due to maturation. Another limitation was multiple treatment interference. Participants received the Memory intervention followed by a one week break, and then received the Lifestyle Education intervention. There was insufficient time in between to distinguish the effects of each intervention (Mertens, 2010). The Memory intervention received first may have complicated or confounded the results of the Lifestyle Education intervention.

In considering group designs in future, it would be better to include four randomly assigned, parallel groups of older adults from the same population. One group would receive Memory intervention, another Lifestyle Education intervention, another would act as the social control, and the fourth would be a waitlist/no treatment condition. A parallel design would also work better than a crossover design for example, as the two interventions offered could potentially have non-reversible outcomes. A parallel design would also allow participants to commit to the study for a shorter time period, thereby reducing attrition rates.

A clear definition of a "social control" group and its conditions is also required. The social control group should ideally mirror the conditions of the intervention groups as closely as possible, by meeting exclusively in groups of 6-9 participants, without discussing topics regarding memory strategies and lifestyle factors affecting memory. A group facilitator would be present to ensure that some structure of sessions is maintained, and to encourage discussion and problem solving approaches to promote supportive group interactions. Social aspects of the group environment would be enhanced in this condition. More importantly, the social control condition should be differentiated from active control conditions mentioned in literature.

However, the social control condition in the current study consisted of older adults who already attended weekly community group activities. These groups comprised 13-20 older adults from within the community, rather than a more intimate group of 6-9 individuals. Further, the length of time that the social controls spent at weekly community groups was not monitored over the course of the study. Neither was their rate of attendance at these weekly groups. As

they were recruited from a larger pre-existing group, and were already attending these groups at the outset of the study, social control participants could not be prevented from continuing to attend these groups during time periods where the intervention groups were not receiving any intervention. In hindsight, the social control group in this study was essentially a treatment-as-usual condition. However, the notion of a social control group is a novel one that can be better executed in future.

The rate of attrition was higher in the current study (52%) compared with previous literature (up to 33%; Li et al. (2010). Possible reasons for this include loss of interest, total length of receiving two specific interventions, multiple outcome assessments from baseline to follow-up, and greater priority placed on addressing coexisting health/emotional problems. One of the intervention group participants from one of the localities received individual sessions with the researcher, as the rest of her group withdrew from the study. Therefore, a limitation was that half of her sessions were not conducted within a group setting. Despite this, her scores were included in the statistical analyses.

Other limitations include the presence of a co-facilitator for only some sessions of the Memory intervention. This may have influenced the dynamics of the group environment, as feedback questionnaires indicated that the presence of a facilitator and co-facilitator made sessions enjoyable. The co-facilitator should have also been present at the Lifestyle Education sessions, to maintain consistency of the experimental manipulations. Further, a limitation of recruiting within organisations included the initial screening for potential participants by managers. This meant that invitations were not extended to all individuals within these organisations, and most likely resulted in selection bias. Another issue is that individuals within groups from the same organisation could potentially know one another, which may influence their willingness to participate, as well as the extent to which they participated within the groups.

It is important to consider whether side effects of medications taken by participants affected performance on outcome measures with older adults in the study. Some individuals were taking a combination of medications, and others could have started taking new medication.

This could have affected their ability to absorb information during intervention sessions and their performance on assessments. Although a list of medications was obtained at the initial assessment, medication use was not monitored over time. This should be a future consideration for working with this population. In addition, the times of the day during which assessments and intervention sessions were conducted could have affected individual performance. Most individuals are better able to attend and concentrate in the morning, and this would have been the ideal time to conduct assessments and intervention sessions. However, due to availability of participants, sessions were conducted mid-afternoon or in the evening, and assessment times varied.

A further limitation is the use of similar formats of tests at four different outcome intervals. This is a threat to validity, where participants can come to know what to expect, thereby becoming sensitized to the kinds of information that they must pay attention to during testing (Mertens, 2010). It is possible that test-retest effects influenced scores over time. Although different versions of the ACE-R were used, the shortest period within which this measure was re-administered was seven weeks. Further, no objective measures were used to assess improvements in specific cognitive domains such as memory, attention, or executive function. For example, it would have been useful to consider a word list test measuring immediate and delayed recall, such as the Rey Auditory Verbal Learning Test (RAVLT). However, the study relied heavily on the use of subjective reports.

In hindsight, the MFQ Retrospective Functioning subscale was not valuable, as participants were confused about how to rate their memory *"now"* compared with *"one year ago"*, or when they were 18 years. Some individuals reported that the types of information they remembered now compared with when they were 18 years old were entirely different. This subscale could have been omitted as it was not useful. Instead, using a questionnaire to measure metamemory would have been more valuable, such as the Metamemory in Adulthood questionnaire.

Some of the items on the subjective memory measures were redundant. For example, *how often do you forget to pay a bill on time?* Many participants reported having set up

automatic online payments, so that they did not forget to pay their bills. Their responses to this item were either *not applicable* or *never*, where the former is not a response option for any of the subjective measures. Another example where *not applicable* was used was with the QoL-AD, which asks to rate *Marriage* on a Likert scale. When these measures were scored, those responses of *not applicable* were scored as a zero in the total score, and total scores remained the same. Therefore, participants may have scored lower than what they should have, due to these redundant items. This poses a problem as it affects the interpretation of results. However, all participants should have been scored consistently on these items, even if their scores were lower overall. Further, the ACE-R scores that were missing for three participants in the intervention group should have been included in analyses, by using a statistical method to replace the missing values.

Limitations of using subjective outcome measures should be considered. These measures may not accurately capture changes in memory abilities and strategy use following intervention. Previous studies indicate that it may take some time to see changes on subjective outcome measures. Even with improvements on objective cognitive measures, these studies indicate that an individual's memory-related beliefs could remain relatively stable on self-reports because of other factors, such as low memory self-efficacy and negative stereotypes about aging.

Prospective memory is vulnerable to impairment with increasing age. Some studies have measured improvements in memory functioning, based on prospective memory tasks. However, a limitation of the current study was the failure to assess everyday functioning by administering prospective memory measures. Therefore, it was difficult to objectively assess whether transfer of skills from intervention sessions into everyday life occurred following intervention. This is an important consideration for future studies, in order to determine whether specific interventions translate into improved performance on everyday tasks.

It was difficult to implement the Memory Notebook into daily life following Memory intervention. Literature indicates that individuals do not always incorporate the memory strategies that they have learned into their everyday lives (Kurz et al., 2009). This lends

evidence for the need for more intensive training to implement Memory Notebook use outside of sessions. Perhaps intensive training provided through a combination of individual and group sessions, as well as booster sessions, would be more appropriate for the study's purpose.

Another consideration explored in literature is the inclusion of caregivers/significant others in implementing Memory Notebook use within the home environment. This was not considered in the current study. However, it may enhance the generalisation of Memory Notebooks to different environments, without the need to allocate extensive resources and training to help individuals do so. In addition, inviting caregivers to group sessions may have provided participants with greater incentive and motivation to attempt what has been taught, and to persist with strategies and sessions over the course of the study.

Content analysis was considered the most appropriate qualitative method to analyse information from feedback questionnaires. In future, greater depth of qualitative information should be obtained by conducting focus groups or semi-structured interviews with individuals, following each intervention. This would provide more information regarding the effectiveness of interventions, and would also indicate whether secondary benefits were gained as a result of attending intervention sessions. For example, Troyer et al. (2008) found that amongst study participants, there was an improved sense of control in relation to remembering information and managing everyday activities.

While a change score analysis was considered appropriate for examining quantitative data in this study, the limitations of this analysis should also be considered. Change score analysis is concerned with changes in group means. It specifically answers the question of whether the two groups differ in terms of their mean change on outcome measures, across different time points. Hence, there are problems with regression towards the mean and a lack of true independence of data points for those with extreme scores, which could result in biased estimates of change (Dimitrov & Rumrill Jr, 2003). Biased estimates of change is particularly problematic for studies with small sample sizes, lack of random assignment, and non-equivalent groups (Dimitrov & Rumrill Jr, 2003; Little, Bovaird, & Slegers, 2006). A covariate analysis could have been used to adjust post intervention means in relation to differences at baseline, or

to adjust for pre-existing group differences. Having used change score analysis, the differences observed following intervention may be the result of pre-existing group differences rather than the effects of intervention (Linn & Slinde, 1977).

Recruiting within organisations with the wide variety of issues that these older adults presented with, may have resulted in more outlier or extreme cases of performance on outcome measures, in the intervention group. As some individuals would have performed extremely low in comparison with others, statistical tests used in this study would have influenced the group means that were generated, resulting in a lack of true independence of data points, particularly with a small sample. Data exploration revealed less variability in scores amongst the community-dwelling control group, and this may have reflected, more accurately, the mean scores of individual data points within the group.

In conclusion, a number of study limitations are outlined, with some suggestions for future improvements of these limitations. The section below will outline more general recommendations for future research in this area.

Recommendations for Future Research

Following from the limitations described above, several recommendations for future research are made. First, due to the practicalities of conducting research in this area, there is a greater likelihood that research groups will be established from pre-existing groups. However, random assignment to different conditions should continue to be strived for in future, as causal relationships are better established through experimental designs. These designs would help to clarify some of the findings in literature regarding the effectiveness of memory interventions, and whether improvements are due to a specific intervention or to nonspecific group processes.

Second, the intimate discussions and sense of belonging that may have accompanied the intervention group environments are social factors which may contribute towards improvements in memory performance. This can be controlled for in the social control condition by replicating as closely as possible, the small group environment of the intervention condition. A clearer

definition of the nature and conditions of the social control comparison would allow for this in future.

Third, single-case designs should be a consideration when working with small samples, and particularly when working with older adults with significant sensory impairments. This would have been valuable for the current study, as single-case designs can identify information about interventions that have had positive outcomes for certain individuals, as well as the possibility of variables or hypotheses that may be new or may have been omitted when considering group designs (Bennett, 2004). Further, the visual analysis component of single-case research can be supplemented by statistical analysis, to determine the effect sizes of possible outcomes (Barnett et al., 2012). However, care should be taken in planning single-case designs for memory interventions, as it would not be realistic to expect older adults to return to baseline following interventions, due to the learning components involved (Barnett et al., 2012).

Therefore, a possibility is using a multiple baseline design across subjects. This would involve one participant receiving intervention while the other participants continue in the baseline phase (Backman, Harris, Chisholm, & Monette, 1997). As each subsequent individual receives intervention in subsequent dates over time, the effects of history or maturation can be controlled for, and corresponding changes in outcome can be investigated (Backman et al., 1997). Once the intervention has ceased and some time has elapsed, each participant can be assessed to determine any follow-up effects of the intervention.

Fourth, booster sessions are continuously recommended in literature, and may be required for longer term maintenance of gains (Kinsella et al., 2009). Future programmes should consider implementing booster sessions. Fifth, although Kelly et al., (2014) found that group training was more beneficial than individual training, this comparison would also be useful to make in future. The evaluation of combined approaches of group and individual training should also be investigated (Jean et al., 2010). This could be particularly valuable in ensuring that what is taught in group sessions is implemented by the individual outside of these sessions, thereby making the training more intensive. Greater consideration should also be given to how information is delivered to those with sensory impairments, particularly in group settings. If

available, these individuals would benefit more from individual sessions versus group sessions. Sixth, memory intervention sessions should be modified to allocate more time and training towards applying a select few strategies within sessions. This would then lead to more automatic use of these strategies outside of sessions.

Finally, future recommendations with regard to outcome measures are outlined. Subjective memory measures could be more reflective of the content of material learned within intervention sessions. Measures which directly assess trained material should be used more frequently, as these would better capture improvements following intervention (Jean et al., 2010; Martin et al., 2011). Further, the use of self- report logs to capture memory strategy use during intervention may also encourage participants to continue using these strategies more regularly following intervention. This would serve another purpose, by indicating to researchers the frequency of memory strategy use outside of sessions (i.e., objective evidence). The use of outcome measures that are more appropriate for those with sensory or physical impairments is also important. In the current study, ACE-R total scores could not be calculated for those with significant sensory impairments or physical limitations.

In future, recruitment of participants should assess at the outset, levels of motivation, reasons for volunteering to participate in the study, as well as levels of memory self-efficacy. These factors can also determine training success. Further, intervention should aim to incorporate activities based on metamemory. If metamemory is improved, then it will increase participants' motivations to engage in more effortful memory tasks. Participants would also implement strategies that are more efficient and not necessarily ones that they have been using for a long time. Outcome measures should also incorporate a metamemory questionnaire, such as the Metamemory in Adulthood questionnaire.

Working with older adults in residential care settings. Literature identifies a continuous struggle to carry out studies with good methodological quality. This has lead to difficulties with interpreting and generalising findings reported in literature (Stott & Spector, 2010). The current study highlighted some of the issues faced in conducting research in this area. However, it may be worthwhile to continue working with older adults in rest home and

retirement village settings. These individuals also experience memory difficulties/impairment, and teaching few, but simple and concrete memory strategies may improve their quality of life, and benefit their daily functioning. Healthcare professionals already working in these settings can offer memory training on an individual or group basis. This would be a cost-effective and practical solution, as memory difficulties in older adults is a global concern and not exclusive to those who reside in the community.

Another recommendation is that small, informal memory groups are established in these settings. Older adults can meet on a regular basis to talk about their experiences with aging and memory, with some input from a healthcare professional, who would also act as the group facilitator. It is recommended that a facilitator be present at group sessions in order to establish group rules, organise and structure sessions, and share memory-related information. Rest homes and retirement villages typically run a variety of daily programmes for their residents, and may be able to incorporate memory groups into this schedule with the use of nurses, occupational therapists, or other healthcare professionals.

The author's experiences in working with this population indicate that older adults in these settings will be receptive towards attending memory groups, particularly if these groups are incorporated amongst the weekly schedule of activities. Further, discussions in an informal and friendly group environment can lead to sharing of memory strategies amongst group members. At the least, this could facilitate greater knowledge and awareness of memory strategies, in addition to encouraging greater strategy use. An advantage of using rest home employed healthcare professionals as facilitators could be the personal knowledge that they have of the residents attending groups. This knowledge can be used to tailor memory strategies to suit the contexts of these individuals, thereby sharing more relevant ways of dealing with memory difficulties, which could seem more appealing for these individuals to attempt.

As far as the author is aware, two recent intervention studies were conducted in residential care centers and assisted living facilities. Vranic et al. (2013) investigated a multifactorial memory training programme in comparison with an active control group in older adults from residential care centers in Croatia. Specific training-related gains, transfer effects,

and maintenance of these gains were found at seven month follow-up. This was attributed to teaching a combination of memory strategies, with metamemory and motivational components (Vranic et al., 2013).

Another international study compared six sessions of individual training with six sessions of group training, with assisted living residents at risk of cognitive and functional decline (Williams, Herman, & Smith, 2014). The cognitive training programme was called Reasoning Exercises in Assisted Living. Results indicated improvements in measures of problem solving and functional assessment following both group and individual training (Williams et al., 2014). The authors suggest that more than one weekly session should be held at the setting to increase rates of attendance, and group session times should be announced well in advance for better rates of attendance (Williams et al., 2014). Therefore, these recent studies highlight that there are a number of older adults with or without cognitive impairment who have demonstrated certain benefits of receiving cognitive intervention, and who reside in residential care settings, making it worthwhile to continue working with this population in future.

Conclusions

The aim of the current study was to determine the extent to which receiving Memory and Lifestyle Education interventions impact on memory functioning in older adults with subjective memory difficulties, compared with older adults participating in weekly community group activities. At best, the current study may be considered a pilot study. The development of separate manuals for a Memory Programme and a Lifestyle Education Programme enables researchers to use these in future replications of the study. These manuals can be used for group interventions in those with and without cognitive impairment.

Results following Memory and Lifestyle Education interventions suggest that there were no significant benefits of receiving interventions when compared with the social control condition. However, limitations of the study, such as a small sample size and non-equivalent groups for comparison, make it difficult to reach definite conclusions. Further, due to the limited time frame of study completion, both interventions were administered approximately

two weeks apart, thereby making it difficult to distinguish if any, the separate effects of each intervention, and possibly confounding or complicating results. In future, a waitlist/no treatment control condition should also be included as part of an experimental study design.

This study intended to address some of the limitations found in memory intervention literature. In doing so, limitations of its own were created. However, this does not preclude it from providing greater insight into what has been learned as a result. It is clear from this study that a theoretically sound research design does not necessarily transfer to the realities of applying the design. However, more recently, there has been growing interest in researching the effects of memory interventions in those with and without cognitive impairment.

The current study intended to contribute towards intervention literature by introducing novel aspects through: (a) the use of a social control group as a control comparison, which has not been done before, and (b) separating out components of memory training interventions (i.e., memory strategies and lifestyle education), in an attempt to measure the distinct effects of each. It is still important to clarify the initial aims of this study by taking into account the limitations and learnings from its initial attempt. Current literature continues to emphasise the need to distinguish the specific and nonspecific factors of interventions that have contributed towards improvements in populations with or without cognitive impairment.

Further, this research topic is of practical importance for healthcare providers who have finite resources to allocate towards running memory clinics and interventions. This study is not limited in its practical considerations and recommendations for future research in this area, particularly with older adults in rest home and retirement village settings. These recommendations should be considered extensively, should the reader wish to replicate and develop this study further.

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Appendix A

Copy of Letter and Questionnaire Sent to Six Clinicians of the NZPOPs Email Group

Dear

My name is Veena Sothieson and I'm a doctoral student in Clinical Psychology at Massey University, supervised by Professor Janet Leathem. As you are aware, a message was sent out via the New Zealand Psychologists for Older People (NZPOPs) email group recently, enquiring about the running of memory clinics, and/or services for the elderly targeting memory problems within NZ. I'm contacting you now because you kindly contacted me advising that there were clinics/services in your area, and in some cases that you have had some involvement with them.

In the New Year, we are planning to provide and evaluate a group intervention for memory for people with mild cognitive impairment (MCI). Although the intervention will be based on evidence from scientific literature, we wonder whether there are techniques/ ideas that you might have found helpful (or even unhelpful), that you would be willing to share. We are wishing to develop a sensible intervention for New Zealanders, one that avoids difficulties that others may have previously encountered, while still using scientifically proven methods. When we are closer to finalising the intervention, we will tell you what we are planning, should you be interested or wish to collaborate with us. Ultimately, we plan to share the outcomes of this research at a future NZPOPs Conference.

The first stage of this research involves a questionnaire, which we have attached. This seeks to gain a sense of your experiences in helping individuals with memory difficulties. If you are willing to complete it, you may find the headings useful as guide for thinking. Please answer in as much detail as possible, as many questions relevant to your experience(s). Any information that you are able to provide us would be appreciated. If you have any questions about this research, please contact myself or my supervisor.

Thank you so much for your time.

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QUESTIONNAIRE

Anything that you can tell us about past, current, or planned inventions for clients' memory problems would be helpful.

The headings below serve as a guide.

Please answer in as much detail as possible/as relevant.

GROUPS:

What groups have been/ will be involved (e.g. dementia, other cognitive impairment, brain injury, normal individuals with subjective memory complaints)?

Typical number of people in each group?

Length of each session?

Number of sessions?

CONTENT:

Areas/components taught (e.g. psychoeducation, internal/ external strategies, at-home tasks)?

Length of these components in relation to overall sessions?

Devices/ memory aids/ equipment used?

OUTCOME:

Psychometric/ other measures used?

How do you know if sessions worked/ were helpful [e.g. use of diaries to compare frequencies of forgetting...]?

OBSERVATIONS:

What worked well?

What did not work well?

SUGGESTIONS:

Suggestions for future work in this area?

What do you wish/ would like to see in future?

OUR PLANS:

Based on literature to date, we want to trial a 6-week group intervention targeting memory difficulties, specifically with people with a diagnosis of mild cognitive impairment (MCI). However, we plan to control for the social benefits of a group intervention, to see whether the memory strategies we teach (primarily based around the use of memory diaries), contribute significantly towards improvement of everyday memory tasks.

We plan to have three different groups: waitlist (no-intervention) group, social group (teaching lifestyle modifications and psychoeducation), and memory group (teaching lifestyle modifications, psychoeducation, and memory strategies). Assessments will take place along 3 time points (baseline at Week 1, post-sessions at Week 7, and follow-up at Week 19).

Comments/ suggestion about our plan?

Thank you very much for your time taken to complete this. Please save this document and re-attach it to your email reply.

Veena Sothieson & Janet Leathem

Appendix B

Responses to Questionnaires Sent to Clinicians Regarding Memory Clinics/Services

Mental Health for the Elderly team (Hawkes Bay DHB)

- Cognitive stimulation therapy groups are run with a maximum of seven clients per group, with 1-2 facilitators. The therapy is conducted in 60 minute sessions, twice a week for seven weeks, followed by weekly sessions for approximately 4-6 months.
- The COGNISTAT and Quality of Life – Alzheimer's Disease scales are completed at initial assessment, prior to the seven week programme, and at the end of the maintenance phase.
- This programme follows that developed by Aimee Spector, but adapted for New Zealand participants with more age-appropriate activities.
- The programme provides education about dementia/Alzheimer's disease, and teaches remedial and compensatory strategies.
- Feedback about the programme is gathered from individuals, their family, and from standardised assessments.
- Observations of what has worked well include discussions around individual difficulties, age-appropriate and engaging sessions, having two facilitators, and a two hour education session for family/carers regarding cognitive stimulation therapy and dementia.
- Observations of what has not worked well include placing many individuals with frontal lobe dementia in one group.
- In future, having nationally available cognitive stimulation groups would be cost-effective and have a ripple effect of early diagnosis, early intervention, and support for families/carers of those with dementia.

Waikato DHB Memory Service

- A telephone conversation with a clinician about their cognitive remediation course indicated that a total of four sessions are held for two hours per session. Three sessions occur once weekly, and the final session occurs about a month later. The course is presented mainly in a didactic manner, and greater interaction is encouraged in the fourth (and final) session, with opportunity for different issues and questions to be raised.
- A new course commences once every six weeks and the waitlist is approximately four months long. Approximately two months into the waitlist, a Community Mental Health Nurse makes contact with the client and their family.
- Questionnaires such as the Geriatric Depression Scale are given. A baseline assessment of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) is administered.
- Rough estimates of individual presentations at the memory clinic in 2009 included one-third with Alzheimer's disease, one-third with MCI, one-sixth with other dementia, and one-sixth with memory difficulties due to stress/vocation etc. The MCI group was described as varying from those who clinicians were uncertain had MCI to those who could potentially have a diagnosis of dementia.
- One to two family members were also expected to attend the course, as it makes for easier engagement with the individuals.
- Session 1 focuses on the use of external aids such as notepads and other organisational tools, and covers the basic model of memory.
- Session 2 addresses stress, anxiety, what to expect from memory failure, how to deal with it, and setting up good support.
- Session 3 focuses on improving memory using models of attention and recall, and using mnemonics. It also looks at using strategies in the individual's own life and maintaining general skills such as attention, organisation, etc.

- The clients then attempt to apply strategies that they have been taught, and are invited back for a group session (Session 4) one month later. At this final session, they can ask about the course material and discuss problems.
- Approximately one month after Session 4, a follow-up session occurs. This session may vary according to the clients' treatment plans and problems. For example, if their main problem is everyday functioning, follow-up will occur with an occupational therapist. If their main problem is around anxiety/mood, a clinical psychologist will conduct the follow-up.
- This course has been running for one year and was initially intended to target MCI. Groups are largely composed of those with MCI, although some may have early stages of a dementia diagnosis.
- While the course is attended by 6-7 clients per month, the inclusion of family members brings the group total to approximately 14-15 people. Dropout rates are low and most clients have attended the entire course.
- A DVD is being made that can be shared with other family members not able to attend the course.
- At present, no standardized measures are used to evaluate the efficacy and outcomes of the course. However, this is under progress.
- The aim of this memory service is to teach memory strategies and not act as an experiential group.
- High rates of those with memory problems have had vascular incidents.
- What has not worked as well is the travel distance to the course, which might be problematic for clients, and has resulted in the decrease in number of sessions had.

Waitemata DHB

A meeting with a clinician from the Waitemata DHB indicated that clients within the memory clinic were seen individually on a fortnightly basis. There were no formal memory groups, as they currently do not have the resources to conduct group interventions. There are a variety of clients, some with early Alzheimer's disease and others with comorbid mental health difficulties. The aim is to evaluate whether these individuals can effectively manage their memory problems through practical methods such as reducing cognitive load, taking breaks between cognitive tasks, and so forth. The clinician advised of the difficulty in working with a heterogeneous definition of MCI, the heterogeneity of MCI presentation, and recruitment difficulties in having a sample big enough to take into account conversion to dementia. He advised that these factors may contribute towards differences between groups that are being compared in the research study.

Appendix C

Initial Study Design

Three Different Groups

Originally, three different conditions were planned for 90 minutes each week, for six weeks. Group A would receive memory strategies/techniques, Group B would receive lifestyle education information, and Group C would serve as a social control comparison. The rationale for Lifestyle Education being an intervention and not a control condition is due to previous studies generally combining this component with memory intervention (Kinsella et al., 2009; Kurz et al., 2009; Rapp et al., 2002; Troyer et al., 2008). Six groups of participants with two groups for each condition were proposed. Random assignment of participants to groups would occur.

Two Phases

The study would be divided into two phases. In Phase 1, all groups would meet once a week for six weeks, with 90 minutes per session. Assessments would take place at baseline (Time 1), prior to groups starting, and at the end of six weeks (Time 2). If it appeared that either the memory component or lifestyle education component was significantly helpful, Groups A and B would crossover, and Group C would continue to meet on a regular basis for another six weeks. This would be Phase 2. Hence, a total of 12 weeks of group contact would occur for all three conditions.

If Phase 2 took place, there would be another assessment at the end of 12 weeks of group contact (Time 3), and a follow-up assessment three months later (Time 4), to assess whether any gains have been maintained. It was also proposed that there would be a two week gap between baseline and the beginning of the Memory intervention, and a one week gap between the two interventions. Hence, the total length of participation with assessments and intervention (not including the three month follow-up) would be approximately 16 weeks.

Therefore, in Phase 1: Group A = Memory

Group B = Lifestyle education

Group C = Social control

In Phase 1, we hypothesised that Group A > Group B > Group C on outcome measures where assessment at Time 2 (post intervention) would be greater than at Time 1 (baseline). In this case, the participants would proceed to Phase 2, where a crossover design would be used.

In Phase 2: Group A = Lifestyle education

Group B = Memory

Group C = Social control.

We hypothesised that Time 3 (post Phase 2 intervention) would be greater than Time 2, where Group A = Group B, but both would be greater than Group C on outcome measures of everyday functioning. This indicates that receiving both components in any order results in similar gains for Groups A and B at Time 3, and there are additional effects of receiving both components as opposed to either memory intervention or lifestyle education intervention.

Group C was hypothesised to show a slight increase in performance over time. However, this would not be as significant as gains made by Groups A and B. We also hypothesised that effects would be maintained at three month follow-up (Time 4).

So Group A = Group B, but both would still be greater than Group C, where performance on outcome measures at Time 3 = Time 4.

Appendix D

Invitation brochures for Information Sessions About the Study

You are invited to…

An INFORMATION SESSION

…about taking part in some free group sessions to help improve your memory

- Learn about memory and how to cope
- What helps and what doesn't help
- Learn from personal experiences; and how to better manage in the future
- Improve quality of life

When:

Where:

Come along and find out more! Tea and biscuits provided.

This is a research project by Massey University

For questions or more information please contact:

Veena Sothieson

(04) 801 0805

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA

Do you think you're more forgetful now than when you were younger?

Would you like help with improving your memory?

Appendix E

Information Sheet and Consent Form for the Study

Comparing Group-Based Interventions

INFORMATION SHEET

We would like to invite you to participate in this research.

My name is Veena Sothieson and I'm a Doctorate of Clinical Psychology student from Massey University. As part of my research project for Clinical Psychology, I am conducting a study to investigate which factors of group-based cognitive interventions contribute towards improvements in everyday functioning. This is for those individuals experiencing memory and other cognitive difficulties beyond that of normal ageing. The project is under the supervision of Professor Janet Leathem from Massey University.

The reason for carrying out this research is that to date, we know cognitive interventions provide some benefits for those experiencing memory and other cognitive difficulties. But we do not know whether learning memory strategies alone is more beneficial than receiving education/lifestyle information alone, or whether meeting together socially in a group setting contributes towards greater improvements.

We aim to compare these three different types of interventions by running group sessions with individuals who have memory and other cognitive difficulties. The groups will run for 12 weeks (once a week for 90 minutes), with *four assessment points* in the beginning, middle, and end of the group sessions, where we will measure any changes in your functioning. The last assessment will take place *three months after* the end of the groups to assess whether any changes made have been maintained.

There is no cost for participation. However, you may receive benefits from participating, as these types of interventions have been shown to produce some improvements in everyday functioning in previous research.

As there will be sharing of some personal information during group sessions, we will ensure that privacy will be maintained by asking that this information is not discussed outside of sessions.

If there are any concerns regarding your cognitive/emotional functioning, we will discuss this with you and your doctor, with your consent.

The results are kept confidential and all forms and data are stored securely. Your results will be given a code number and then grouped with other participants within your group.

Should you wish to hear about the results of the overall study when it is complete, you will be asked to provide your name, address, and group number on the consent form (which will be stored separately from the data). The report of results will be issued a few months following the completion of group sessions.

This study is voluntary. You are under no obligation to accept this invitation. Should you choose not to participate, it will not affect your decision to participate in future groups/treatments offered to you.

If you decide to participate, you have the right to withdraw from the study (**before 11th December 2011),** ask any questions about the study at any time during participation, provide information on the understanding that your name will not be used, and be provided a summary of the project findings when it is concluded (if requested).

If you have any questions about this study, or any concerns during the course of group sessions, please contact the researcher, **Veena Sothieson** on **(04) 801 0805.**

Thank you for your time.

Veena Sothieson
DClinPsych student
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This study has received ethical approval from the Multi-region Ethics Committee, which reviews national and multi regional studies, ethics reference number (MEC/11/03/027).

Comparing Group-Based Interventions in Mild Cognitive Impairment (MCI)

CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me.

My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name - printed .....

If you would like to receive general information regarding the outcome(s) of this study, please include your group number, name and address below. Please note that this form will be kept separately from your results. Individual results will be coded for purposes of anonymity.

Group Number:

Name:

Address:

Appendix F

Templates for Information Gathering in Initial Interview

DEMOGRAPHIC QUESTIONNAIRE

All information on this questionnaire will be kept confidential. Please do not write your name on this questionnaire so that you may remain anonymous. Thank you.

Year of Birth _____

Gender (Please tick one) □ Male □ Female

Handedness (Please tick one)**:** □ Right □ Left

Ethnicity

□ New Zealand European
□ Máori
□ Pacific Islander
□ Asian
□ Other (please specify): _____

Relationship Status

□ Single
□ Married
□ Widowed
□ Divorced/ permanently separated
□ Other (please specify) _____

Educational Level:

1. Age at leaving full-time education: _____
2. Number of years of education: _____
3. Please tick one: □ No qualifications
   □ Highest qualification (please specify):
   _____

In general do you feel your health is:
□ Excellent □ Very good □ Good □ Fair □ Poor

Initial Assessment Questions

Checklist: ☐ Sign the Consent Form ☐ Complete Demographic Questionnaire ☐ I will ask you some **general** questions before asking you to complete some pencil and paper tasks, and answer some questions on paper. We're really aiming to gain a good sense of people's memory difficulties, which will also help structure the content for group sessions.
Three (at least) concerning memory difficulties:
Current ways of coping with these difficulties on a daily basis (i.e., compensation strategies), helpful vs. unhelpful:
Expectations from group sessions:
List of current medications:
Current impairments and family history:
Convenient dates and times for group sessions:
Names/contact details of others who may be interested in taking part but could not attend Information sessions

Appendix G

Outcome Measures Used in the Study

ADDENBROOKE'S COGNITIVE EXAMINATION – ACE-R

Revised Version A (2004) - NZ Adaptation 1f (December 2007)

Name :
Date of birth :
NHI number :

Date of testing: ____/___/___
Tester's name:_____
Age at leaving full-time education:_____
Occupation:_____
Handedness:_____

ORIENTATION

[Score 0-5] ☐

➢ Ask: What is the	Day _____	Date _____	Month _____	Year _____	Season _____
➢ Ask: Which	Building/ Address _____	Floor/Ward _____	Town/Suburb _____	City _____	Country _____

REGISTRATION

[Score 0-3] ☐

➢ Tell: 'I'm going to give you the name of three objects and I'd like you to repeat after me: lemon, key and ball'. After subject repeats, say ' Try to remember those because I'm going to ask you later'. Score *only* the first trial (repeat 3 times if necessary).

Register number of trials ____

ATTENTION & CONCENTRATION

[Score 0-5] ☐ (for the best performed task)

➢ Ask the subject: 'could you take seven away from a hundred?'. And then seven from each response (5 subtractions). If subject fails, ask: 'did you mean __ ?' If subject still makes a mistake, switch to spelling. If subject corrects himself or herself, continue.

Stop after five subtractions (93, 86, 79, 72, 65). ____ ____ ____ ____ ____

➢ Ask: 'could you please spell **WORLD** for me? Then ask him/her to spell it backwards:

____ ____ ____ ____ ____
D L R O W

MEMORY - Recall

[Score 0-3] ☐

➢ Ask: 'Which 3 objects I asked you to repeat and remember?'

_____ _____ _____

MEMORY – Anterograde Memory

[Score 0 –7] ☐

➢ Tell: ' I'm going to give you a name and address and I'd like you to repeat after me. We'll be doing that 3 times, so you have a chance to learn it because I'll be asking you later'

Score only the third trial

	1st Trial	2nd Trial	3rd Trial
Harry Barnes 73 Church Street Woodville Hawkes Bay	_ _ _ _ _ _ _	_ _ _ _ _ _ _	_ _ _ _ _ _ _

MEMORY – Retrograde Memory

[Score 0 – 4] ☐

➢ Name of current Prime Minister _____
➢ Name of British Royal family member who died in a car crash in Paris ? _____
➢ Name of the current USA president _____
➢ Name of the USA president who was assassinated in the 1960s _____

V E R B A L F L U E N C Y - Letter 'P' and animals

➢ **Letters**
Say: 'I'm going to give you a letter of the alphabet and I'd like you to generate as many words as you can beginning with that letter, but not names of people or places. Are you ready? You've got a minute for that and the letter is letter P'

[Score 0 – 7]

>17	7
14-17	6
11-13	5
8-10	4
6-7	3
4-5	2
3-4	1
<3	0
total	correct

➢ **Animals**
Say: 'Now let's change. I'd like you to generate as many animals as possible, any kind of animal, beginning with any letter, it doesn't matter'.

[Score 0 – 7]

>21	7
17-21	6
14-16	5
11-13	4
9-10	3
7-8	2
5-6	1
<5	0
total	correct

L A N G U A G E - Comprehension

➢ Show written instruction:

[Score 0-1]

Close your eyes

➢ 3 stage command:
'Take the paper in your left hand. Fold the paper in half. Put the paper on the floor'

(use right hand if subject is left handed)

[Score 0-3]

L A N G U A G E - Writing

➢ Ask the subject to make up a sentence and write it in the space below:
Score 1 if sentence contains a subject and a verb (see guide for examples)

[Score 0-1]

L A N G U A G E - Repetition

- Ask the subject to repeat:' hippopotamus'; 'eccentricity; 'unintelligible'; 'statistician' Score 2 if all correct; 1 if 3 correct; 0 if 2 or less.

[Score 0-2] ☐ **Language**

- Ask the subject to repeat: **'Above, beyond and below'**

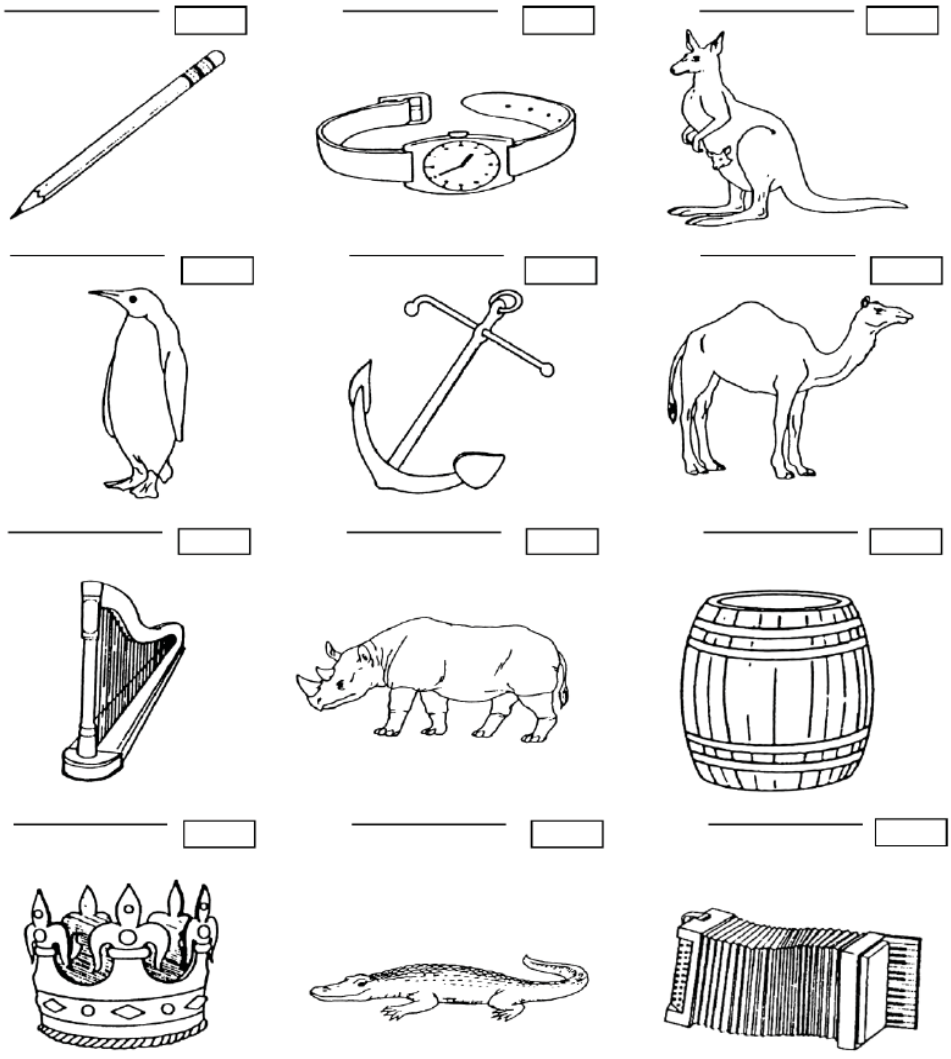
[Score 0-1] ☐ **Language**

- Ask the subject to repeat: **'No ifs, ands or buts'**

[Score 0-1] ☐ **Language**

L A N G U A G E - Naming

- Ask the subject to name the following pictures:



[Score 0-2] pencil + watch ☐ **Language**

[Score 0-10] ☐ **Language**

L A N G U A G E - Comprehension

- Using the pictures above, ask the subject to:
  - Point to the one which is associated with the monarchy _____
  - Point to the one which is a marsupial _____
  - Point to the one which is found in the Antarctic _____
  - Point to the one which has a nautical connection _____

[Score 0-4] ☐ **Language**

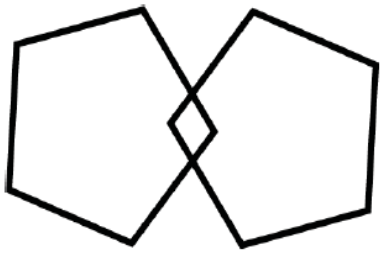
LANGUAGE - Reading

- **Ask the subject to read the following words:** [Score 0-1]

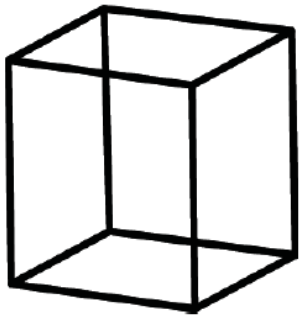
sew
pint
soot
dough
height

VISUOSPATIAL ABILITIES

- **Overlapping pentagons:** Ask the subject to copy this diagram: [Score 0-1]



- **Wire cube**: Ask the subject to copy this drawing (for scoring, see instructions guide) [Score 0-2]

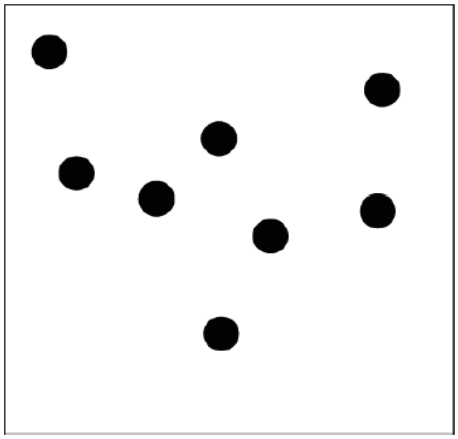


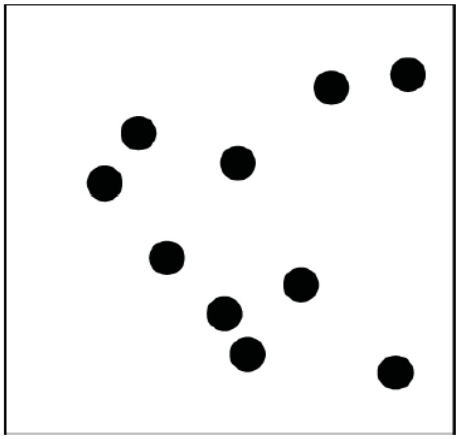
- **Clock:** Ask the subject to draw a clock face with numbers and the hands at ten past five. [Score 0-5]

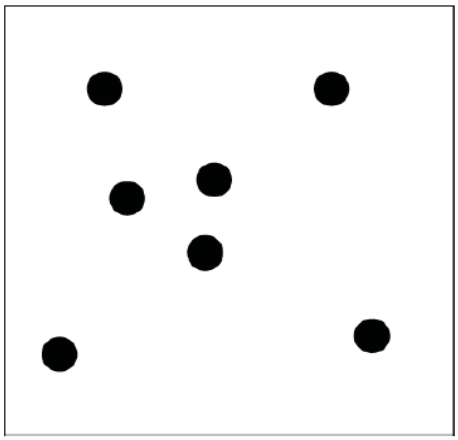
PERCEPTUAL ABILITIES

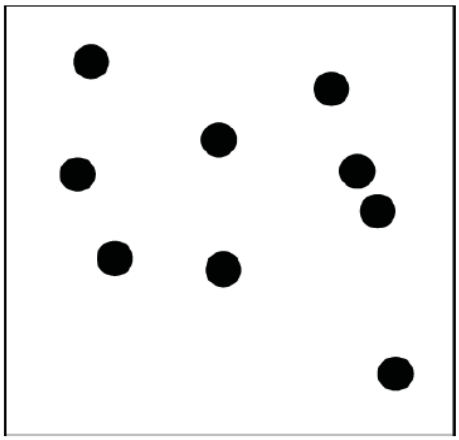
- Ask the subject to count the dots without pointing them

[Score 0-4]



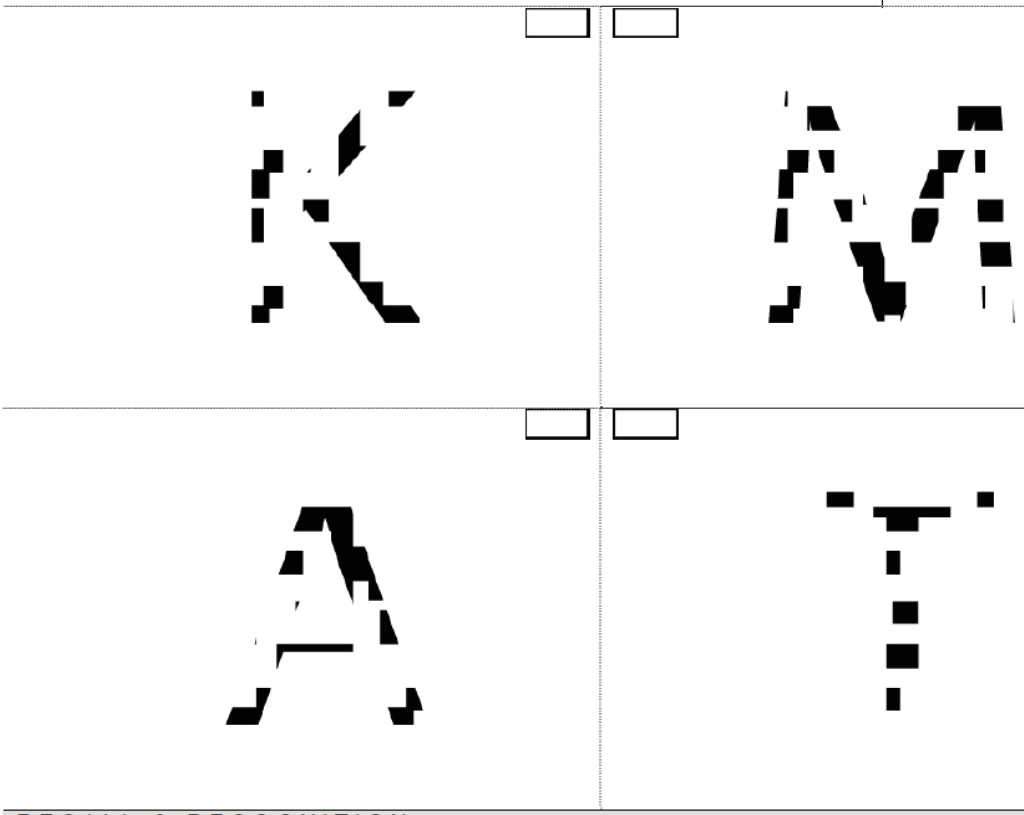






PERCEPTUAL ABILITIES

➢ Ask the subject to identify the letters [Score 0-4]



RECALL & RECOGNITION

➢ Ask ' Now tell me what you remember of the name address we were repeating at the beginning'

Harry Barnes **73 Church Street** **Woodville** **Hawkes Bay**	__ __ __ __ __ __ __	[Score 0-7]

If subject fails to recall any of the 7 items, tick parts recalled and ask the question(s) that will help to recall only the missing one(s) [Score 0-5]

➢ Was it (score considering parts recalled and the recognised ones):

Jerry Barnes		Harry Barnes		Harry Bradford		recalled	
37		73		76		recalled	
Church Road		Cathedral Street		Church Street		recalled	
Norsewood		Woodville		Dargaville		recalled	
Hawkes Bay		Hicks Bay		Bay of Plenty		recalled	

General Scores

MMSE	/30
ACE-R	/100

Fractionated scoring

Cut-off <88 gives 94% sensitivity and 89% specificity for dementia	**Attention and Orientation**	**/18**
	Memory	**/26**
Cut-off <82 gives 84% sensitivity and 1 00% specificity for dementia	**Fluency**	**/14**
	Language	**/26**
	Visuospatial	**/16**

V1f (30-12-07)

Multifactorial Memory Questionnaire (MMQ)

Please circle the following:

I am generally pleased with my memory ability

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

There is something seriously wrong with my memory

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

If something is important, I will probably remember it

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

When I forget something, I fear that I may have a serious memory problem, like Alzheimer's disease

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

My memory is worse than most other people my age

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

I have confidence in my ability to remember things

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

I feel unhappy when I think about my memory ability

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

I worry that others will notice that my memory is not very good

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

When I have trouble remembering something, I'm not too hard on myself

0 Strongly disagree	**1 Disagree**	**2 Undecided**	**3 Agree**	**4 Strongly agree**

I am concerned about my memory

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

My memory is really going downhill lately

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I am generally satisfied with my memory ability

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I don’t get upset when I have trouble remembering something

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I worry that I will forget something important

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I am embarrassed about my memory ability

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I get annoyed or irritated with myself when I am forgetful

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

My memory is good for my age

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

I worry about my memory ability

0	1	2	3	4
Strongly disagree	**Disagree**	**Undecided**	**Agree**	**Strongly agree**

How often do you forget to pay a bill on time?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you misplace something you use daily, like your keys or glasses?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you have trouble remembering a telephone number you just looked up?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you not recall the name of someone you just met?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you leave something behind when you meant to bring it with you?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget an appointment?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget what you were just about to do; for example, walk into a room and forget what you went there to do?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget to run an errand?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you have difficulty coming up with a specific word that you want?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you have trouble remembering details from a newspaper or magazine article you read earlier that day?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget to take medication?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you not recall the name of someone you have known for some time?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget to pass on a message?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget what you were going to say in conversation?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you forget a birthday or anniversary that you used to know well?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you forget a telephone number you use frequently?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you retell a story or joke to the same person because you forgot that you had already told him or her?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you misplace something that you put away a few days ago?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you forget to buy something that you intended to buy?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you forget details about a recent conversation?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you use a timer or alarm to remind you when to do something?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you ask someone to help you remember something or to remind you to do something?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you create a rhyme out of what you want to remember?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you create a visual image of something you want to remember, like a name and a face?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you write things on a calendar, such as appointments or things you need to do?

0	1	2	3	4
Never	**Rarely**	**Sometimes**	**Often**	**All the time**

How often do you go through the alphabet one letter at a time to see if it sparks a memory for a name or word?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you make a list, such as a grocery list or a list of things to do?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you organize information you want to remember; for example, organize your grocery list according to food groups?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you say something loud in order to remember it, such as a telephone number you just looked up?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you use a routine to remember important things, like checking that you have your wallet and keys when you leave home?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you mentally elaborate on something you want to remember; for example, focus on a lot of the details?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you put something in a prominent place to remind you to do something, like putting your umbrella by the front door so that you will remember to take it with you?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you repeat something to yourself at increasingly longer and longer intervals so that you will remember it?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you create a story to link together information you want to remember?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you write down in a notebook things that you want to remember?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you create an acronym out of the first letters in a list of things to remember, such as carrots, apples, and bread (cab)?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you intentionally concentrate hard on something so that you will remember it?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you write a note or reminder for yourself (other than on a calendar or in a notebook)?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

How often do you mentally trace your steps in order to remember something, such as the location of a misplaced item?

0 Never	1 Rarely	2 Sometimes	3 Often	4 All the time

Memory Functioning Questionnaire – Retrospective Functioning (MFQ)

Please circle the following:

How is your memory NOW compared to the way it was...

		much worse			***same***		***much better***	
a.	**1 year ago?**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
b.	**5 years ago?**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
c.	**10 years ago?**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
d.	**20 years ago?**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
e.	**When you were 18?**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

(Gilewski, Zelinski, & Schaie, 1990)

Quality of Life – Alzheimer's Disease Scale (QoL-AD)

Please circle the following:

1. Physical health	**Poor**	**Fair**	**Good**	**Excellent**
2. Energy	**Poor**	**Fair**	**Good**	**Excellent**
3. Mood	**Poor**	**Fair**	**Good**	**Excellent**
4. Living situation	**Poor**	**Fair**	**Good**	**Excellent**
5. Memory	**Poor**	**Fair**	**Good**	**Excellent**
6. Family	**Poor**	**Fair**	**Good**	**Excellent**
7. Marriage	**Poor**	**Fair**	**Good**	**Excellent**
8. Friends	**Poor**	**Fair**	**Good**	**Excellent**
9. Self as a whole	**Poor**	**Fair**	**Good**	**Excellent**
10. Ability to do chores around the house	**Poor**	**Fair**	**Good**	**Excellent**
11. Ability to do things for fun	**Poor**	**Fair**	**Good**	**Excellent**
12. Money	**Poor**	**Fair**	**Good**	**Excellent**
13. Life as a whole	**Poor**	**Fair**	**Good**	**Excellent**

(Logsdon et al., 1996)

Geriatric Depression Scale (15 item version; GDS-15)

Choose and circle the best answer for how you have felt over the **PAST WEEK**:

1. Are you basically satisfied with your life?	YES / NO
2. Have you dropped many of your activities and interests?	YES / NO
3. Do you feel that your life is empty?	YES / NO
4. Do you often get bored?	YES / NO
5. Are you in good spirits most of the time?	YES / NO
6. Are you afraid that something bad is going to happen to you?	YES / NO
7. Do you feel happy most of the time?	YES / NO
8. Do you often feel helpless?	YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things?	YES/ NO
10. Do you feel you have more problems with memory than most?	YES / NO
11. Do you think it is wonderful to be alive now?	YES / NO
12. Do you feel pretty worthless the way you are now?	YES / NO
13. Do you feel full of energy?	YES / NO
14. Do you feel that your situation is hopeless?	YES / NO
15. Do you think that most people are better off than you are?	YES / NO

(Sheikh &Yesavage, 1986)

Geriatric Anxiety Inventory (GAI)

Please answer the items according to how you've felt in the LAST WEEK

		AGREE	DISAGREE
1.	I worry a lot of the time.	O	O
2.	I find it difficult to make a decision.	O	O
3.	I often feel jumpy.	O	O
4.	I find it hard to relax.	O	O
5.	I often cannot enjoy things because of my worries.	O	O
6.	Little things bother me a lot.	O	O
7.	I often feel like I have butterflies in my stomach.	O	O
8.	I think of myself as a worrier.	O	O
9.	I can't help worrying about even trivial things.	O	O
10.	I often feel nervous.	O	O
11.	My own thoughts often make me anxious.	O	O
12.	I get an upset stomach due to my worrying.	O	O
13.	I think of myself as a nervous person.	O	O
14.	I always anticipate the worst will happen.	O	O
15.	I often feel shaky inside.	O	O
16.	I think that my worries interfere with my life.	O	O
17.	My worries often overwhelm me.	O	O
18.	I sometimes feel a great knot in my stomach.	O	O
19.	I miss out on things because I worry too much.	O	O
20.	I often feel upset.	O	O

(Pachana et al., 2007)

Appendix H

Feedback Questionnaires Following Intervention

Memory Sessions Feedback Questionnaire

The following are general questions about the **first 5 memory sessions**.

Please indicate the extent to which you agree or disagree with each statement.

I enjoyed the memory sessions

0	1	2	3	4
Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**

The memory sessions were helpful

0	1	2	3	4
Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**

In what way were they helpful?

_____

_____

_____

_____

_____

Which sessions were most helpful?

_____

_____

_____

_____

_____

Which strategies were most helpful and why?

_____

_____

_____

_____

_____

_____

What did you not find helpful?

_____

_____

_____

_____

_____

Please write any other comments or suggestions you have about the memory sessions

_____

_____

_____

_____

_____

_____

Lifestyle Education Feedback Questionnaire

The following are general questions about the **last 5 Lifestyle Education sessions**. Please indicate the extent to which you agree or disagree with each statement.

1. **I enjoyed the lifestyle sessions**

0	1	2	3	4
Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**

2. **The lifestyle sessions were helpful**

0	1	2	3	4
Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**

In what way were they helpful?

_____

_____

_____

_____

_____

Which sessions were most helpful?

_____

_____

_____

_____

_____

Which tips and techniques were most helpful and why?

_____

_____

_____

_____

_____

_____

What did you not find helpful?

_____

_____

_____

_____

_____

Please write any other comments or suggestions you have about the lifestyle sessions

_____

_____

_____

_____

_____

Mild Cognitive Impairment (MCI) Memory Programme

A programme to enhance everyday memory performance for individuals with mild cognitive impairment

Guidelines for programme facilitators

Adapted from Scheibner, G. B. (2012). Improving memory in midlife: A multiple case study evaluation of a group-based memory programme for healthy middle-aged individuals.

For further information about the MCI Memory Programme, write to:

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Massey University, Wellington Campus
PO Box 756
Wellington
v.sothieson@hotmail.com

Memory Programme Contents

Structure of the MCI Memory Programme

The Memory programme involves five sessions in total, once a week for 90 minutes in duration. Ideally, there will be 6-9 participants in each group. While the format of the programme is structured, a certain degree of flexibility is required to take into consideration the specific memory difficulties of individual group members.

Sessions 1 to 3 will consist of an introduction to how memory is affected with MCI, followed by the implementation of a Memory Notebook for everyday use.

Sessions 4 and 5 will focus on teaching internal memory strategies to complement the use of the Memory Notebook. Session 5 will also include an overview of all previous sessions. Programme handouts are attached to the end of this manual. The content of sessions and details are as follows:

Session 1 – Introduction to MCI and memory
Introduction to group and explanation of MCI memory programme
MCI and memory
What else affects memory? What can be done?

Session 2 – Notebook: Introduction
Orientation to the Memory Notebook
Notebook section: Daily Calendar and Things to Do

Session 3 – Names and Faces
Notebook section: Contacts & Names and Faces
Internal strategies for Names and Faces

Session 4 – Internal Memory Strategies
Memory Notebook quiz
Other Internal Memory Strategies

Session 5 –Overview
Tips to maximise memory and thinking
Overview of memory programme sessions

Overview of MCI Memory Programme structure

Session 1: Introduction to MCI and Memory	**Session 2: Notebook – Introduction**	**Session 3: Names and Faces**	**Session 4: Internal Memory Strategies**	**Session 5: Overview**
Introduction to memory programme **(30 min)**	Last session and homework **(5 min)**	Last session and homework **(10 min)**	Last session and homework + Quiz **(20 min)**	Last session and homework **(10 min)**
10 min break	Orientation to Memory Notebook **(35 min)**	Contacts & Internal Strategies **(25 min)**	Other Internal Strategies **(20 min)**	Tips to Maximise Memory and Thinking **(30 min)**
MCI and memory **(20 min)**	**10 min break**	**10 min break**	**10 min break**	**10 min break**
What else affects memory? **(20 min)**	Daily Calendar and Things to Do **(30 min)**	Names and Faces: Internal strategies **(35 min)**	Internal Strategies continued **(30 min)**	Overview of all sessions **(30 min)**
Homework exercise **(10 min)**	Homework exercise **(10 min)**	Homework exercise **(10 min)**	Homework exercise **(10 min)**	Lifestyle Sessions & Assessments **(10 min)**

Session Guidelines

Session 1 – Introduction to MCI and Memory

Materials: Session 1 handout, Folders

1. Introduction to group and explanation of MCI memory programme

(30 minutes)

Brief introduction to facilitator and co-facilitator

Briefly describe the programme's rationale, structure, and content

Establish ground rules for group

Introduction to members in group and what memory difficulties they experience

Overview of this session and the next 4 sessions.

10 minute Break

2. MCI and Memory

(20 minutes)

How are thinking and memory affected by the normal aging process?

How much forgetfulness is too much?

The continuum of normal aging to MCI to dementia.

Compensating for memory difficulties: Internal and External strategies

3. What else affects memory?

(20 minutes)

Other factors contributing towards memory loss

4. Homework exercise

(10 minutes)

Introducing the Memory Notebook next session

Bring your own Notebooks or Calendars if you already use them

Session 2 – Notebook: Introduction

Materials: Session 2 handout, Selection of Memory notebooks

1. Last session and homework

(5 minutes)

Brief recap of last week's session. Questions?

2. Orientation to the Memory Notebook

(35 minutes)

Memory Notebook as External Memory strategy. Rationale and Content.

Explore external memory strategies already used by group. How useful?

Three sections: Daily calendar, Things to-do, and Contacts

Purpose and method of each section

10 minute Break

3. Notebook Sections: Daily Calendar and Things To-Do

(30 minutes)

What and how to write in the Daily Calendar and Things To-Do sections

Other things to consider when using Memory Notebook: process of using the Notebook, where to put it, what and how to write in it, and when to look at it

4. Homework exercise

(10 minutes)

Attempt to carry Notebook everywhere

Start using Daily Calendar and Things to Do

Quick phone call during the week to see how Notebook use is going

Next session: Contacts Section. Write down names of people during the week that you have forgotten, and we will look at how to enter them into the Contacts section to better remember them

Session 3 – Names and Faces

Materials: Session 3 handout

1. Last session and homework

(10 minutes)

Brief recap of last week's session

Discussions around Memory Notebook use over the week

Discussions about names of people forgotten during the week. Examples shared.

2. Contacts & Internal Strategies

(25 minutes)

Set up Contacts section under different categories and headings

Introduction to Internal memory strategies

10 minute Break

3. Names and Faces: Internal Strategies

(35 minutes)

Go over different internal strategies to better remember names and faces

Exercise: Create an internal strategy to remember a name of someone they know

4. Homework exercise

(10 minutes)

Practice carrying Notebook everywhere

Practice using all three sections

Create the Contacts section by organising into categories, using photos if you want etc

Practice using ONE internal strategy for remembering a name at least once this week

Quick phone call during the week to see how Notebook use is going

Next session: More internal strategies you can use to help with your memory.

Session 4 – Internal Memory Strategies

Materials: Session 4 handout, Notebook Quiz

1. Last session and homework & Quiz

(20 minutes)

Brief recap of last week's session.

Discussions around use of internal strategies for remembering names and faces

Discussions around Notebook use and development of a Contacts section

QUIZ (see page 8): Can you remember the function of each section of the Memory Notebook that we have previously covered?

2. Internal Memory Strategies

(20 minutes)

Introduce 5Ws and Pegword Method as internal strategies. Use exercises to demonstrate examples.

10 minute Break

3. Internal Strategies

(30 minutes)

Discussions around whether exercises done before the break can be remembered now. How were they remembered? What strategies were used?

Introduce the Method of Loci using exercises as examples

4. Homework exercise

(10 minutes)

Continue using the Notebook and carrying it around everywhere

Practice at least ONE internal strategy discussed today, over the following week

Quick phone call during the week to see how Notebook use is going

Next session: Overview of Memory sessions. Think about and write down anything else about memory you would like to be covered next week.

Session 4 Quiz[2]

NAME:

How many sections in the Memory Notebook? What are they?

_____

_____

How will you know if you've completed a task or appointment?

_____

Where would you write things that are scheduled at a specific time?

_____

How will you record things that are scheduled at a specific time?

_____

_____

What is the section called where you would otherwise write things that are not scheduled at a specific time?_____

What is the purpose of the section in Question 5?

_____

_____

When will you look at your Notebook?

_____

Where will you keep your Notebook?

_____

[2] Quiz adapted from Greenaway et al., (2008). *A behavioral rehabilitation intervention for amnestic mild cognitive impairment.*

Session 5 – Overview

Materials: Session 5 handout, Memory Sessions Feedback Questionnaire

1. Last session and homework

(10 minutes)

Brief recap of last week's session

Discussion around internal strategy use over the week

Discussions around Notebook use

2. Tips to Maximise Memory and Thinking

(30 minutes)

Introduce Errorless Learning as an internal strategy

Tips around problems with language and memory

Cover techniques to maximise memory and thinking abilities

10 minute Break

3. Overview of Sessions

(30 minutes)

Overview of key points from Sessions 1-5

Chance for questions and to bring up anything that has not been covered

4. Lifestyle sessions & Assessments

(10 minutes)

There will be a one week break from group sessions before commencing Lifestyle Education sessions

Next week: Follow-up with individual assessments. Make appointments for these

The following block of 5 weeks will cover Lifestyle Education strategies

Please continue using Internal Memory strategies and Notebooks. Contact me if you have any questions at any stage about anything that you're doing, especially if it's not working for you

Hand out anonymous Feedback Questionnaires about Memory sessions for participants to send back by mail

Session 1 Handout: Aging and Memory

We are all likely to notice some mild changes to our memory and thinking as a normal part of the aging process.

Memory lapses can be frustrating but age-related memory changes are not the same thing as dementia.

<u>Some common memory lapses that are a normal part of the aging process:</u>

- Forgetting where you left things you use regularly (e.g. keys or glasses);
- Forgetting names of people;
- Occasionally forgetting an appointment;
- Having trouble remembering what you've just read or the details of a conversation;
- Walking into a room and forgetting why you entered;
- Becoming easily distracted;
- Not quite being able to retrieve information you have on the "tip of your tongue"

Continuum of Memory Loss

Normal Aging Mild Cognitive Impairment (MCI) Dementia

Normal aging = See common memory lapses on Page 1

Mild cognitive impairment (MCI) = People are more forgetful than they used to be and more forgetful than they ought to be. Have a risk of developing dementia.

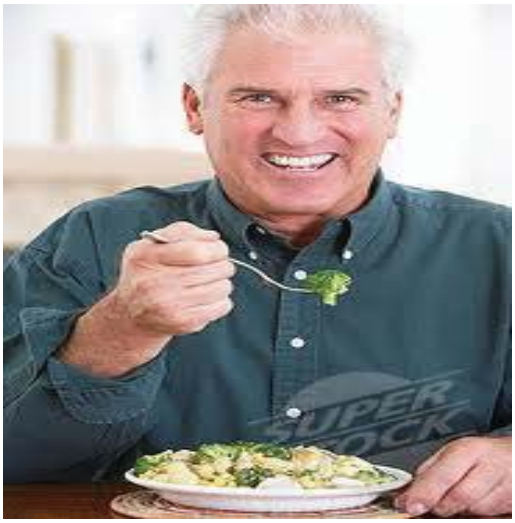
Dementia = Result of physical changes in the structure of the brain. It's progressive. Alzheimer's disease is the most common.

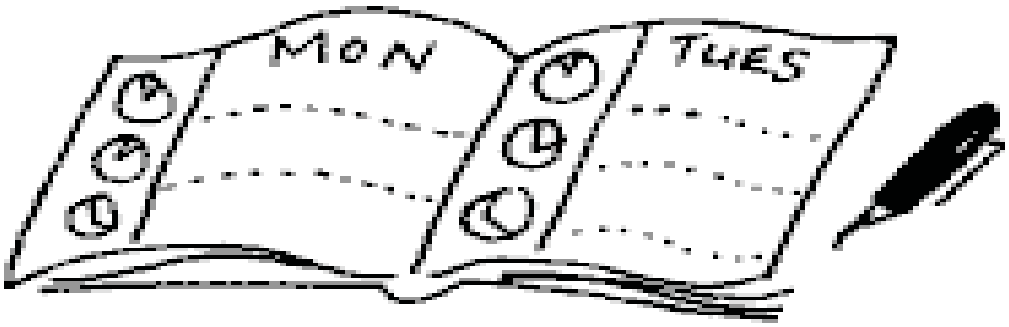
Whatever your age, there are many ways you can **improve your cognitive/ mental skills and reduce memory loss**.

It's important not to lose confidence and give up too early!

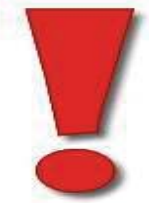
What else affects memory?

- Side effects of medications
- Stress
- Depression and anxiety
- Alcohol and drug use
- Lack of quality sleep
- Nutritional deficiencies: Vitamins B1 and B12
- Smoking
- Poor diet and sedentary lifestyle
- Medical conditions/ illness: Type II diabetes, heart disease, stroke, high blood pressure
- Visual and auditory impairments





Using an **external** memory strategy such as a Memory Notebook will help reduce the number of memory mistakes you make in daily life.



- Write things down immediately
- Check your Memory Notebook at regular times each day
- Carry your Memory Notebook with you wherever you go
- Keep the Memory Notebook in the same place

Sections of the Memory Notebook:

DAILY CALENDAR

Purpose: To record and keep track of all important dates, events, and meetings that are coming up in the future.

Method: Enter on the correct date every appointment, meeting, and important date as you hear about it or make the arrangement. Refer every day for today and future.

THINGS-TO-DO

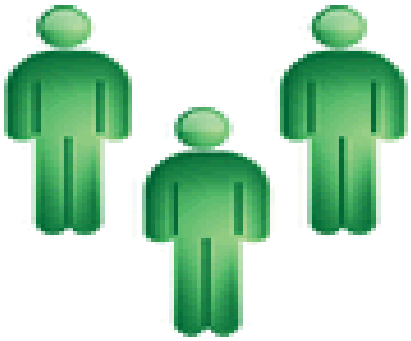
Purpose: To remind yourself of all the special things that you plan to do each day.

Method: Write down things that you want to remember to do (today, tomorrow, and even the next day) as they occur to you.

CONTACTS

Purpose: To recall the names and contact details of people.

Method: When you meet someone who's name should be remembered, enter in the alphabetical section and in "where I would see this person mostly" section. Enter the name immediately/as soon as possible.



Is there a way to better remember names and faces?

WHAT ARE INTERNAL MEMORY STRATEGIES?

Things that you do 'inside your head' to try to remember things.

These are mental strategies which require using mnemonic techniques.

A very simple example is "30 days hath September" for remembering the number of days in each calendar month.

HOW TO REMEMBER NAMES

1. **REPETITION** enhances learning and engraves the name in your memory.

2. When you are **INTRODUCED** to someone new:

    a. Use the name immediately

    b. Use it occasionally in the conversation without overdoing it

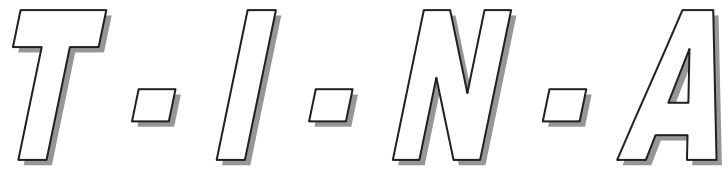
    c. Use it when leaving

    d. Repeat it silently to yourself.

    e. Comment on the name, if possible

    f. Write it down afterwards

3. Practice seeing **EACH LETTER** clearly in your mind. Sound out each letter as you see them.

E.g. 

4. Use **SOUND TRICKS**. Exaggerate the sounds. Prolong the syllables.

E.g.

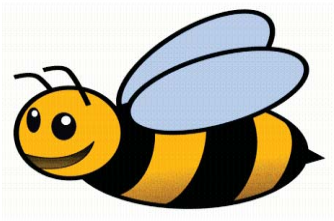
"Teee Naaa" = Tina

5. CHUNKING: Break the name into several distinguishable parts/words.

E.g.

Graham = Gray + Ham

6. This is similar to establishing **NAMETURES (name-picture substitutes).**



E.g. ABBY = A BEE

E.g. KEITH = KEYS

7. Pick out **UNUSUAL FACIAL FEATURES**

E.g. Bushy eyebrows exaggerated as hedges on the person's forehead.

8. Try creating a **RHYME** or **STORY**

E.g. Long-hair Claire

9. LINK to names of friends, relatives or famous people.

E.g. Diana from book club = Princess Diana.

10. Use **VISUAL IMAGERY**

E.g. See margarine melting through Margaret's curly, blond hair.

11. **Write down** the NAME and any DISTINGUISHING CHARACTERISTIC. Then cover up the name and just look at the characteristic and see if you can remember it.

12. **FIRST-LETTER CUEING:** Go through the letters of the alphabet slowly to try prompt recall of the name.

13. **SITUATIONAL CUEING:** Try "seeing" the person in a few different situations where you might have some across them

14. **VISUALISATION:** Create a bizarre visual image of the name and then include the person in the image.

    As with other visualisation strategies the **more striking/weird/unusual that a visual image is**, the more likely it will be remembered.

    The **more links** you make with the name, the deeper it is processed and the easier it is to remember.

Imagine you need to remember the name **Dominique Webster**. You may come up with the following visualisations:

Dominique 

Webster 

Dominique Webster

So…

Domin (domino) + Eek (frightened of mouse) = Dominique

And…

Web (spiders web) + Star = Webster (Webstar…close enough!)

5 Ws

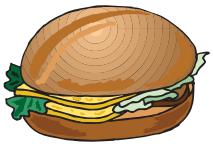
Useful if you're trying to remember something such as a news item. Break down the information into smaller chunks. Try to cue yourself by asking yourself the 5W question:

- WHAT happened?
- WHY?
- WHO was involved?
- WHERE?
- WHEN?

Pegword Method

Useful to remember lists or things you need to do. You will need to learn a nonsense rhyme off by heart. Take a little time to memorise this:

• One is a bun	• Six is sticks
• Two is a shoe	• Seven is heaven
• Three is a tree	• Eight is a gate
• Four is a door	• Nine is wine
• Five is a hive	• Ten is a hen

Pegwords	**What you want to remember**	**Image in your head**
One is a bun 	Get rid of the weeds in your garden 	Imagine weeds in a crème bun  
Two is a shoe 	Buy milk 	Imagine favourite shoe about to stamp on a milk carton 

Three is a tree 	Book plane tickets 	Imagine lots of plane tickets hanging from a tree like fruit 
Four is a door	Get new tyres for car	Imagine a door with four wheels attached to it like a car
Five is a hive	Meet bank manager	Imagine the bank manager is attacked by bees

And so forth....

Method of Loci

Bring to mind a set of steps that are familiar to you, such as a pathway through your house or a sequence of familiar shops. Pay attention to important steps along the way. These steps or loci will need to be well defined. This might be the contents of your house or landmarks. These **steps in this sequence** will be what you link things/items you want to remember.

Example of three loci in my house:

1) Entrance door to the house
2) My favourite armchair
3) Guest bed in the study

While I am out walking the dog, I receive a call. I'm not able to take down notes. The caller asks me to do three things:

1) Buy the Spiderman DVD for the nephew's birthday party
2) Arrange for the car to be fixed
3) Get some red wine for Saturday night

I could easily make the following visualisations **during or shortly** after the call is finished:

- Spiderman is waiting for me behind the entrance door to attack me...


- The mechanic who usually fixes our car is asleep in my favourite armchair. Here, it's best to actually visualise him asleep IN the chair.


- A lot of red wine has spilled all over the freshly made bed.


Errorless Learning: Learn it once, learn it right!

A technique where your objective is to prevent yourself from making errors when initially learning information.

When learning a new task or skill:

a) Ask an expert/ someone who knows it well to explain to you how to do it

b) Read about it before you try it out

c) Write down the sequence of steps involved in the new skill / task

d) Do not guess!

Word-finding difficulties

a) Try to help your brain search for the word. Think of another word with a similar meaning; describe the word that is difficult to retrieve (e.g. its use, size, shape and colour). Picture the object in your mind.

b) Try allowing yourself some time to come up with the word on your own. Often it does. Try going through the letters of the alphabet to help.

c) Writing a list of words or names that often cause problems in your Notebook to jog your memory

Simple Things to Maximise your Thinking and Memory Abilities

a) Follow a regular weekly routine to improve your focus and attention. This can help to free up your mental resources to focus on remembering and doing some new things.

b) Choose your best time of day to plan your activities.

c) Focus on one task at a time. Set priorities. It may help to break large tasks into small achievable tasks.

d) Minimise distractions and avoid interruptions if you need to focus.

e) Use strategies to help with your difficulties – take notes in situations where it is difficult to keep everything in mind at once. Repeat information and clarify it at the time you hear it.

f) Be aware of your limitations – if your thinking is slow, allow yourself plenty of time to complete tasks. To improve concentration, it may be helpful to take breaks.

g) Carefully manage any anxiety you have – being panicky and anxious can worsen your ability to concentrate.

Mild Cognitive Impairment (MCI) Lifestyle Education Programme:

A lifestyle programme to enhance everyday memory performance for individuals with mild cognitive impairment

Guidelines for programme facilitators

For further information about the MCI Lifestyle Psychoeducation Programme, write to:

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PO Box 756
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v.sothieson@hotmail.com

Lifestyle Programme Contents

Structure of the MCI Lifestyle Psychoeducation Programme

The Lifestyle Psychoeducation programme involves five sessions in total, once a week for 90 minutes in duration. Ideally, there will be 6-9 participants in each group. The format of the programme is structured and presentation of the information will be in a didactic style. There will be opportunity for some discussion. Programme handouts are attached to the end of the manual. Content of sessions and details are provided on the following pages.

Session 1 – Coping with Age-Related Changes

Introduction to Lifestyle Psychoeducation programme

Topic 1: Dementia

Topic 2: Grief

Topic 3: Healthy/positive aging

Session 2 – Anxiety, Stress and Relaxation

What is stress and anxiety?

Introduction to several relaxation techniques to counteract stress and anxiety

The Mindfulness technique

Session 3 – Diet and Exercise

Building an exercise plan using 4 building blocks of fitness

Nutrition

Session 4 – Keeping Mentally and Socially Active

Introduction to keeping mentally active, and tips for staying socially active

Other lifestyle factors to consider

Session 5 – Lifestyle Psychoeducation Overview

Overview and summary of lifestyle sessions

Overview of MCI Lifestyle Psychoeducation Programme structure

Session 1: Coping with Age-Related Changes	**Session 2: Anxiety, Stress and Relaxation**	**Session 3: Diet and Exercise**	**Session 4: Keeping Mentally & Socially Active**	**Session 5: Lifestyle Psychoeducation Overview**
Introduction to programme Topic 1: Dementia **(20 min)**	Discuss last session Stress and anxiety **(10 min)**	Discuss last session Introduction to exercising **(15 min)**	Discuss last session Introduction to keeping mentally active **(20 min)**	Discuss last session **(5 min)**
Topic 2: Grief **(20 min)**	Relaxation techniques **(30 min)**	Building an exercise plan – 4 different types of exercise **(30 min)**	Tips for staying socially engaged **(25 min)**	Harnessing the power of your brain **(30 min)**
10 min break	**10 min break**	**10 min break**	**10 min break**	**10 min break**
Topic 3: Healthy/Positive Aging **(30 min)**	Incorporating relaxation into your life & the Mindfulness Technique **(30 min)**	Preventing injury & tips for greater activity Nutrition **(30 min)**	Some things to consider and Driving with age **(25 min)**	Additional lifestyle tips Questions/ Discussion **(30 min)**
Tips for coping with change **(10 min)**	Mindfulness exercise Homework exercise **(10 min)**	Homework exercise **(5 min)**	Homework exercise **(5 min)**	Certificates of attendance Assessments **(15 min)**

Session Guidelines

Session 1 – Coping with Age-Related Changes

Materials: Session 1 handout

1. Introduction to programme & Topic 1: Dementia

(20 minutes)

Briefly describe the lifestyle psychoeducation programme structure and content

Talk about coping with age-related changes such as physical, social, and cognitive changes, and coping with a number of life changes and transitions

Introduce Topic 1: Dementia. What does dementia look like? Typical aging vs. symptoms of dementia. The importance of talking about dementia. Can dementia be prevented or delayed?

2. Topic 2: Grief

(20 minutes)

Introduce Topic 2: Grief. What is grief? The 5 stages of grief. What to do?

10 minute Break

3. Topic 3: Healthy/Positive Aging

(30 minutes)

Introduce Topic 3: Healthy/Positive Aging. What is it? The concept of aging positively. Myths about healthy aging.

4. Tips for coping with change

(10 minutes)

Coping with change as part of healthy/positive aging: Focus on the things you are grateful for, acknowledge and express your feelings, accept the things you can't change, look for the silver lining, and take daily action to deal with life's challenges

Next week: Anxiety, stress and relaxation

Session 2 – Anxiety, Stress and Relaxation

Materials: Session 2 handout

1. Last session & Introduce stress and anxiety

(10 minutes)

Brief recap of last week's session. Questions?

Introduce this week's session. What is stress and anxiety?

Signs of stress

2. Relaxation Techniques

(30 minutes)

Introduce the concept of relaxation techniques to counteract stress and anxiety.

Discussion: What relaxation techniques do you currently use or have used in the past? Talk in detail about each of the following relaxation techniques and how to use them.

Relaxation technique 1: Breathing meditation for stress relief

Relaxation technique 2: Progressive muscle relaxation for stress relief

Relaxation technique 3: Body scan meditation for stress relief

Relaxation technique 4: Visualization meditation for stress relief

Relaxation technique 5: Yoga and Tai Chi for stress relief

10 minute Break

3. Incorporating relaxation into your life & the Mindfulness technique

(30 minutes)

Tips for fitting relaxation techniques into your life

Relaxation technique 6: Mindfulness. The concept and importance of mindfulness: go with the flow, pay attention, stay with it, practice acceptance

4. Mindfulness Exercise & Homework exercise

(10 minutes)

Practice a brief mindfulness exercise with the group, with the facilitator's guidance

How did you find that exercise? Some tips to keep in mind: gently redirect, and try and try again.

Homework: Practice a relaxation technique discussed today and incorporate it into your routine

Next week: diet and exercise

Session 3 – Diet and Exercise

Materials: Session 3 handout

1. Last session & Introduction to exercising

(15 minutes)

Brief recap of last week's session. Questions?

Introduction to this week's session and exercising. What are the benefits of exercising on memory? What physical activities do you currently take part in?

Myths about exercising

2. Building an exercise plan

(30 minutes)

There are 4 building blocks of fitness to incorporate into your exercise plan for maximum benefit: Endurance exercise, Strength training, Flexibility, and Balance. Describe what these 4 building blocks are and why each of them is good for the older adult.

Talk about fitness tips for those who are chair-bound (if applicable) and what sorts of exercises they can do

Think of at least one physical activity you can carry out most days a week from each of the 4 building blocks of fitness.

10 minute Break

3. Preventing injury, tips for greater activity & Nutrition

(30 minutes)

How to prevent injury when exercising and when to stop exercising (symptoms of pain, dizziness, cramps etc)

Some things to consider when exercising: warming up and cooling down, incorporate stretching exercises towards the end, light endurance activity first is best etc.

Tips for getting more active and liking it

Introduce the topic of Nutrition. Why does the body require important nutrients? What are the important nutrition tips? Get your Omega-3s. Limit saturated fat, eat more fruit and vegetables, drink wine in moderation, and choose complex carbohydrates

Talk about meal options in rest homes and choosing the healthier options at meal times

4. Homework

(5 minutes)

Practice increasing the amount of physical activity you take part in every day, over the following week. Be mindful of what you are eating

Next week: Mental and social activities

Session 4 – Keeping Mentally & Socially Active

Materials: Session 4 handout

1. Last session & Introduction to mental activities

(20 minutes)

Discuss last session. Questions?

Introduce the concept of mental stimulation and mental activities. The activity can be virtually anything as long as it's new, it's challenging, and it's fun.

Provide suggestion of mental activities to do everyday to challenge memory. Any other suggestions? Also try variations on what you know, work something new in each day and take on a completely new subject.

2. Tips for staying socially engaged

(25 minutes)

Introduce the importance of staying socially connected. What do you currently do? Talk about some ways to do so. Join a club, volunteer in your community, offer family assistance, and nurture your social network.

10 minute Break

3. Some things to consider & Driving with age

(25 minutes)

Some additional things to consider with lifestyle and memory: healthy relationship may be the ultimate booster, and laughter is good for your brain.

(If applicable) A note about driving as you get older and what to consider and look out for.

4. Homework exercise

(5 minutes)

Take up at least one new activity we have talked about in this session during the week

Next week: Final session and overview

Session 5 – Lifestyle Psychoeducation Overview

Session 5: Lifestyle Psychoeducation Overview

Materials: Certificates of attendance, Lifestyle Sessions Feedback Questionnaire

1. Last session

(5 minutes)

Discuss last session. Questions?

2. Harnessing the power of your brain

(30 minutes)

Provide an overview of all the sessions of the programme within the context of highlighting that with the right stimulation, the brain is capable of learning new information, which will help with memory. It is important to stay mentally, physically and socially active and to find new and challenging ways to do so.

10 minute Break

3. Additional lifestyle tips & Questions/Discussion

(25 minutes)

Additional lifestyle tips: improve your memory by sleeping on it, make time for friends and fun, keep stress in check and get depression in check

Any questions about what has been covered in sessions so far? Comments/feedback?

4. Certificates of attendance & Assessments

(15 minutes)

Provide certificates of attendance and thank participants for their time over the 10 weeks in total. Provide reflections about the group and what the facilitator has learned over this time. Talk about post Lifestyle Education assessments and organise appointments. Provide a Feedback Questionnaire about the Lifestyle Education programme that individuals can mail back anonymously.

Session One Handout: Lifestyle Education

Coping with Age-Related Changes

DEMENTIA

- Dementia can be delayed or prevented if caught in time
- Different people have different reactions to being told they have dementia
- It is very important to talk about it to get the care and support needed
- Exercising your mind and memory can help you stay mentally sharp no matter how old you are!!

GRIEF

Grief is a reaction to loss

It is a natural response to loss

It is part of coping and healing

The grieving process takes time

Acknowledging and learning to accept the many feelings of grief enables people to begin the process of letting go of the grief and pain and to begin healing

Continually reinvent yourself

Find new things to enjoy

Learn to adapt to change

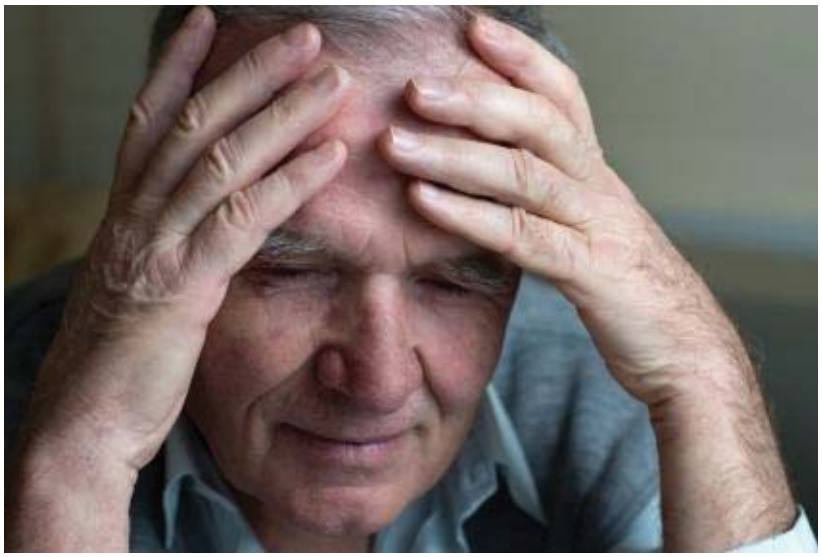
Stay physically, socially and mentally active

Feel connected to your community and loved ones

The idea of Positive Aging is not about how to live longer

Nor is it about how to avoid growing old

It is about making the most benefits of being older!!



Stress and anxiety are *fight-and-flight* instincts that are your body's way of responding to emergencies

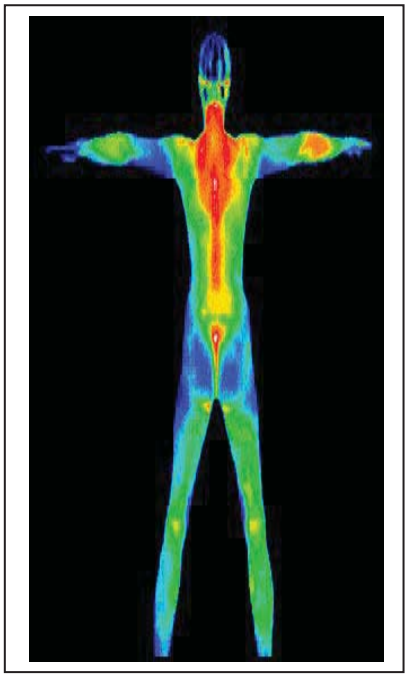
When constantly activated by the stresses of everyday life, it wears your body down quickly

The *relaxation response* brings your body and mind back into a state of equilibrium

Technique 1: Breathing meditation = deep breathing

Technique 2: Body scan meditation = moving focus to each and every part of your body, starting from your toes to the very top of your head.

Technique 3: Progressive muscle relaxation



1. Right foot, Left foot
2. Right calf, Left calf
3. Right thigh, Left thigh
4. Hips and buttocks
5. Stomach
6. Chest
7. Back
8. Right arm and hand, Left arm and hand
9. Neck and shoulders
10. Face

Technique 4: Visualization mediation = imagine a scene using your senses of taste, touch, smell and sound.

Technique 5: Yoga and Tai Chi for stress relief

Technique 6: Mindfulness = purposely focusing your attention on the present moment, and accepting it without judgment.

Mindfulness meditation builds upon concentration practices. Observe flow of inner thoughts, emotions, and bodily sensations without judging them as good or bad

Practice acceptance

By practising accepting your experience during meditation, it becomes easier to accept whatever comes your way during the rest of your day.

Building an exercise plan

1. **Endurance** exercise includes brisk walking, dancing, jogging, swimming, and climbing stairs or hills.
   These activities get your heart pumping.

2. **Strength training** includes lifting weights and using a resistance band. It helps prevent loss of bone mass, builds muscle, and improves balance – both important in staying active and preventing risk of falling.

3. **Flexibility** includes shoulder and upper arm stretches, calf stretches, yoga and Tai Chi.

It helps the body stay limber and increases range of movement for ordinary physical activities.

4. **Balance** includes standing on one foot, heel-to-toe walk, and yoga and Tai Chi.

These improve balance, posture, and quality of walking. Also reduces risk of falling and fear of falls.

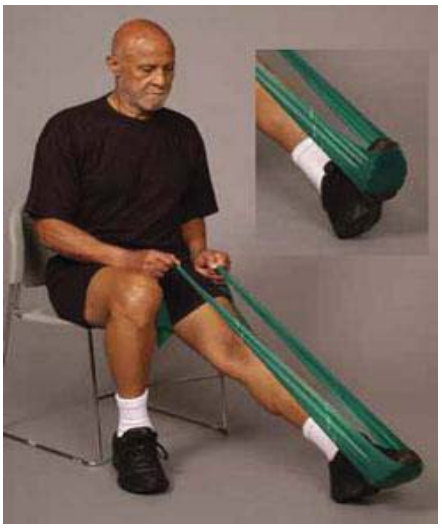
Building an exercise plan

1. **Endurance** exercise includes repetitive movements like rapid leg lifts or arm movements.
   These activities get your heart pumping.

2. **Strength training:** Use free weights (known as "dumbbells") to do repetitive sets of lifting. Don't have weights? Use anything that is weighted and fits in your hand, like soup cans.
   It helps prevent loss of bone mass and builds muscle.

3. **Flexibility** includes practicing mindful breathing and slowly stretching, bending, and twisting, you can limber up and improve your range of motion. It helps the body stay limber and increases range of movement for ordinary physical activities.

4. **Resistance bands** are like giant rubber bands designed to give your muscles a good workout when stretched and pulled. Resistance bands can be attached to furniture, a doorknob, or even your chair. Use these for pull-downs, shoulder rotations, and arm and leg-extensions.



Nutrition

Get your omega-3s: E.g. fish, walnuts, ground flaxseed, flaxseed oil, pumpkin seeds, and soybeans.

Limit saturated fat: E.g. red meat, whole milk, butter, cheese, sour cream, and ice cream.

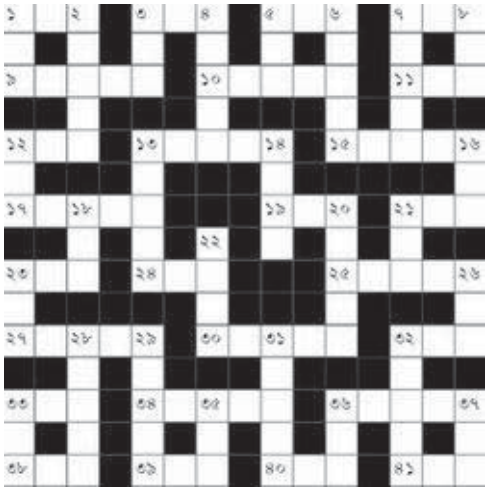
Eat more fruit and vegetables: E.g. produce packed with antioxidants, colourful fruits and vegetables, leafy green vegetables

Drink wine (or grape juice) in moderation: E.g. around 1 glass a day for women; 2 glasses for men

Choose complex carbohydrates: E.g. whole-wheat bread, brown rice, oatmeal, high-fibre cereal, lentils, and whole beans for mental energy

Also, remember:

1. Healthy Fats - Build Your Brain
2. Antioxidants - Protect Your Brain
3. High Proteins - Spark Your Brain
4. Water - Hydrates Your Brain
5. Vitamins & Minerals - Brains Building Blocks
6. Fibre – Regulates Your Fuel Supply



Best brain exercising activities should be:

NEW – unfamiliar and out of your comfort zone

CHALLENGING – requires mental effort and expands knowledge

FUN – pleasant activities that are challenging

Try variations on what you know

Work something new in each day

Take on a completely new subject

E.g. Crosswords, Sudoku, Chess, Musical Instrument, New Language, Reading on New Topics, Volunteer Activities, Arts and Crafts

Stay Socially Engaged

Join a club – contact your local community centre

Volunteer in your community

Offer family assistance

Nurture your social network (i.e., friends and family)

<u>Also Important:</u>

Healthy Relationships

Laughter