AN INVESTIGATION OF OCCUPATIONAL STRESS IN NEW ZEALAND DENTISTS

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Abstract

The present study sought to identify the occupational stressors as well as the resultant psychological and physical stress outcomes for New Zealand dentists. Additionally, the direct and moderating effects of coping were explored in relation to the identified stress outcomes. To achieve this, quantitative data was collected in the form of self-report questionnaires, these being the Occupational Stress Inventory, the Suicide Probability Scale and the Dental Satisfaction Survey. A random, nationwide sample of 500 New Zealand dentists were sent these questionnaires, with 210 dentists returning completed questionnaires. The present study also sought to overcome recent criticisms of the methodology frequently used in stress research. As such, qualitative data was collected through interviews with twelve New Zealand general dentists in the Manawatu region. The interview questions were designed to elicit the job-specific stressors of dentistry in New Zealand as well as the coping responses of New Zealand dentists. Discussion with the New Zealand Dental Association confirmed that the quantitative sample in the present study is representative of the general New Zealand population. However, the representativeness of the qualitative sample could not be established due to the small sample size. The results of the present study showed that there was a consistent positive relationship between coping and job satisfaction, and a consistent negative relationship for coping and strain, and coping and suicide probability. Additionally, coping was found to be a moderator in the stressor-stress relationship, with dentists high in coping experiencing less distress (than dentists low in coping) in conditions of both high and low stress. Sex differences were found to be significant for the role overload stressor, with female

dentists reporting on average significantly higher levels of role overload. Significant group differences were also found between self-employed and employee dentists, with employee dentists experiencing significantly greater levels of physical environment stress as well as strain. Overall, low to moderate levels of stressors, coping, suicide probability, job satisfaction and physical/psychological distress were reported, indicating that New Zealand dentistry may not be any more stressful than other occupations in New Zealand. In terms of methodology, the present study indicates that the Occupational Stress Inventory, being a general stress self-report questionnaire, does not measure job-specific stressors. Therefore, it is suggested that future research utilises questionnaires that have been designed to measure specific occupational stressors as well as the frequency and the intensity of these stressors.

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Chapter One

INTRODUCTION

OVERVIEW

Occupational stress has been researched extensively, yet researchers continue to a large extent to focus only on particular facets of the stress process such as sources of stress, coping or the consequences of stress (Dewe & Guest, 1990; Lawrence, 1984). This is despite current models of stress proposing that an understanding of stress can only be gained from focusing on all of these components (Lazarus & Folkman, 1984).

Therefore, the present study is designed to overcome some of the limitations of previous research by investigating the stress process in relation to New Zealand dentists. To achieve this, three components will be investigated, these being occupational stressors, coping resources and the outcomes of such occupational stress. In this investigation, the nature of the stressors occurring in New Zealand dentistry and the coping resources of New Zealand dentists will be identified. The measures of stress outcomes were based upon a review of occupational stress research in dentistry, suggesting that prominent stress outcomes are psychological and physical strain, suicide rate and job satisfaction (Clifford, 1987; Cooper, Watts, Baglioni & Kelly, 1988; Hilliard-Lysen & Riemer, 1988; Wilson, 1984). Furthermore, the direct effects of stressors and coping on these three stress outcomes will be examined, in addition to the moderating effects of coping on the stressor-stress relationship.

Traditional occupational stress research has been criticised in relation to the discrepancy between measures of stress and the theoretical developments in the area of occupational stress. The result of this discrepancy is that current models of stress emphasise individual appraisal in the stress process, yet this focus has not been satisfactorily achieved in current measures of stress (Cohen, Karmarck & Mermelstein, 1983). In addition, traditional "global" self-report stress questionnaires are unable to elicit specific occupational stressors and therefore fail to examine fully the nature of the stressors occurring in a particular occupational group (Dewe & Guest, 1990). To investigate these criticisms, qualitative data was collected in the present study through interviews in addition to the quantitative data.

Therefore, Chapter One outlines the stress models as a rationale for the design of the present study. Chapter Two identifies sources of occupational stress in dentistry as well as the coping strategies and resources frequently used by dentists. Chapter Two also discusses the outcomes of such stressors, as well as the effects of coping on moderating the stress-strain relationship. Methodological issues in occupational stress research are also reviewed in Chapter Two. Support for the design and the measures used in the present study is presented in Chapter Three. The focus of the present study is then investigated, followed by a discussion of the results.

MODELS OF STRESS

While the term stress is now consistently used by researchers (Ivancevich & Matteson, 1984; Lazarus & Folkman, 1984) there is no such commonality among researchers in defining stress, with definitions of stress varying depending on the

model of stress used (Cooper, 1983; Cox, 1978; Dewe, 1989; Shouksmith, 1986). Therefore, a historical overview of the development of stress is presented in support of the transactional approach taken in the present study.

To fully understand the following models of stress it is necessary to appreciate that three broad areas of stress have been identified, these being physiological, psychological, and social (Lazarus & Folkman, 1984; Monat & Lazarus, 1977). Physiological stress involves organisms functioning, such as Selye's (1956) widely known general adaptation syndrome. Psychological stress involves cognitive factors leading to the evaluation of stress (Lazarus, 1966; Lazarus & Folkman, 1984), while social stress involves the disruption of a social unit or system (Lazarus & Folkman, 1984).

These three areas are important in that differing models of stress exist due to the varying conceptualisations of how these three areas interact with one another. As a result, four main models of stress are commonly used in the stress literature, these being stimulus, response, interaction and transactional models, each of which provides different definitions of stress.

Stimulus models of stress

Stimulus models of stress focus on the physiological aspects of stress, with researchers conceptualising stress as that which is capable of inducing a breaking strain in the homeostatic mechanism (Cox, 1987). Hence, this concept involves that of external forces creating internal disequilibrium. Consequently, stimulus-based

definitions incorporate the notion of stress being '... stimuli characteristics of environments which are recognised as being disturbing or disruptive in some way' (Cox, 1978, p.12) and which consequently results in strain within the person. Researchers using this theoretical approach have focused on identifying the common characteristics of environmental conditions which are seen to produce stress. For example, in occupational stress research stimulus based models have identified several types of stressful situations, these being:

1. Speeded information processing.
2. Noxious environment stimuli.
3. Sensory stimulation.
4. Extreme workload.

(Weitz, 1970, cited in Cox, 1978)

However, Cox (1978) and Lazaraus (1966) have criticised stimulus-based models of stress in that they attempt only to identify what is stressful about the environment without any consideration of psychological variables. The outcome of this narrow focus has been that stimulus-based stress research has been unable to explain individual differences in stress responses, even when the environmental stressors are consistently the same for all individuals (Cox, 1978). This is highlighted in Cox's comment that '... unless man functions both unconsciously and automatically, we have to accept some intervening psychological process which does mediate the outcome of that relationship' (p:15). Hence, stimulus-based stress models cannot

account for the type, amount, severity and duration of stress (Lazarus, 1966; Lazarus & Cohen, 1977).

Response-based models of stress

As in stimulus-based models, the response-based stress model views stress as the result of environmental stressors. However, response-based models differ from stimulus-based models in that stress is identified through the response patterns of individuals. This conceptualisation of stress became prominent through the work of Selye's (1956) general adaptation syndrome which consists of three stages. The first is the alarm reaction, where the individual is exposed to a stressor; the second stage, resistance, is where the individual attempts to adapt to the stressor and either successfully returns to a state of equilibrium, or his/her defence fails, leading to the third stage, that of exhaustion, where adaptive mechanisms collapse, resulting in diseases or death. While Selye's (1956) general adaptation syndrome is perhaps the most renowned response-based model, other researchers have created differing response-based models that have extended and diversified Selye's (1956) original model (Kagan & Levi, 1971, cited in Cox, 1978).

However, all response-based models of stress have been criticised in that:

1. A stimulus is seen as a stressor when a stress response is produced. However, under this definition, other stimuli which are generally accepted as not being "stressful" (i.e.. physical exercises, excitement) are incorrectly classified as stress (McGrath, 1970).

2. It is now recognised that the majority of physiological responses are not directly determined by the actual presence of a stressor, but by its psychological impact on the individual (Cox, 1978).

Monat and Lazarus (1977) have further criticised response-based models of stress in that they focus only on physiological responses to stressors while ignoring the role of psychological processes. Hence, both the stimulus and response-based models of stress treat the individual as being passive rather than interactive in the stress process. That is, whatever outcomes elicited on one occasion cannot be easily reproduced on a different occasion, with the same individual or a different individual, even though there has been no change in the nature of the stressor (Cox, 1978). This is a major weakness for both models as it is now believed that the majority of physiological responses are in fact not directly linked to the presence of a stressor, but instead are the result of the psychological impact of a stressor on the individual (Monat & Lazarus, 1977).

Interactional models of stress

Interactional models of stress were developed in an attempt to include psychological processes. As such, interactional-based models of stress are a social-psychological approach to stress, focusing on the individual's interaction with his/her environment. Cox (1978) defines stress within the framework of the interactional model as '... stress arises through the existence of a particular relationship between the person and his environment' (p.18). An example of a well known interactional model of stress is the Person-Environment (P-E) fit model, viewing the 'misfit' between the person

and the environment as producing psychological, physiological and behaviourial stress (Edwards & Harrison, 1993; French, Caplan & Harrison, 1982).

In terms of occupational stress, such interactional models propose that stress is due to a mismatch in either the extent to which rewards and supplies provided in the work setting match the needs and preferences of the worker, or the extent to which the demands and requirements of the environment match the skills and abilities of the individual (Edwards & Harrison, 1993). However, Lazarus and Cohen (1977), Levine and Scotch (1970) and Wolf (1977, cited in Cox, 1978) have all criticised this approach due to the lack of attention paid to the processes moderating between the environment and the response.

In summary, an overall critique of the above three stress models is that they all focus on only a part of the total stress process (Cox, 1978) in turn failing to integrate all the significant variables that occur within the stress process, such as coping and cognitive appraisal, '... the evaluative process that imbues a situational encounter with meaning' (Holroyd & Lazarus, 1982, p.22).

Transactional models of stress

To understand the transactional model of stress, it is necessary to appreciate the needs that stimulated its development. As such, Cox (1987) proposes that the transactional model of stress sought to incorporate:

1. The individuals perception of the demands on them.

2. Personal characteristics and coping resources.
3. Constraints upon the individual during coping.
4. Support received from others during coping.

Additionally, the transactional model of stress views the individual as being active in his/her interplay with the environment (Stern, Norman & Komm, 1993). Hence, physical, psychological and social factors are embedded within the transactional framework of stress.

As such, with its origins in cognitive theories, the transactional model of stress is defined as 'a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources as endangering his or her wellbeing' (Folkman, 1984, p.840). The transactional approach to stress views the individual as making two interdependent evaluations of stressful situations, the first, primary appraisal, refers to the extent that the individual believes a situation is threatening, and secondary appraisal, which describes what the individual believes he/she can do about the situation (Manzi, 1986). Consequently, such a model espouses coping as a critical factor as well as recognising the importance of the subjective perceptions and interpretations of the environment by the individual (Elliott, Chartrand & Harkins, 1994; Spaccarelli, 1994).

Hence, transactional stress models embrace three important themes:

1. Stress as a dynamic cognitive state.

2. Representing stress as an 'imbalance'.

3. Individuals requirement for resolution of that imbalance (Dewe, 1989).

In summary, the transactional model of stress is viewed as a comprehensive contemporary framework, accommodating a variety of significant variables within the stress process. For example, individual perception is a psychological variable included within this model which other models have been criticised for overlooking. Therefore, the transactional model allows for a greater understanding of the stress process and as such is the approach taken in the present study.

Summing up, the cause of definitional disagreement in the stress literature has been linked to the varying nature of the stress models, resulting in differing perspectives on the stress process. The four main models of stress have been reviewed in terms of their strengths and weaknesses, providing a rationale for the use of the transactional model of stress in the present study.

Chapter Two

OCCUPATIONAL STRESSORS

In this chapter, an examination of the sources of occupational stress will be conducted. Firstly, a brief overview of stressors that occur in varying occupations will be presented, followed by occupational stressors within the dentistry profession, allowing for a comparison of dentistry stressors and those in other occupations.

PREVALENT STRESSORS IN VARYING OCCUPATIONS

Role stressors are now established in the literature as being one of the most researched sources of occupational stress (Beehr, 1985, cited in Bhalla, Jones & Flynn, 1990; Jackson & Schuler, 1985). More specifically, role stress can be broken down into role conflict, role ambiguity, role load, role inefficiency and role responsibility (Newton & Keenan, 1987). Role conflict is seen as occurring from conflicting roles and/or unclear signals of what is expected of the worker (Nandram & Klandermans, 1993). Role load is the individuals perception that the work expected is incompatible with their abilities, and can be quantitative (the amount of work required) or qualitative (the nature of the work). Role load can occur not only from too much work, but also from too little. Role inefficiency is the failure of the occupation or organisation to make full use of an individual's abilities and training, whereas role responsibility can occur when an individual perceives that they have the responsibility for the performance and welfare of subordinates, clients, or the public.

Other occupational stressors aside from role stressors have also been identified, such as organisational structure and climate, career development, physical environment, organisational change and interpersonal work relationships (Cooper & Marshall, 1976; Ivancevich and Matteson, 1984; Jordan, 1990; Quick & Quick, 1984, cited in Burke, 1990; Schuler, 1982).

STRESSORS IN DENTISTRY

In the following review of occupational stressors within the dentistry profession, it is important to note that all results are from overseas studies, with the majority being from America. The implication of this is that some stressors and stress outcomes reported in these studies may differ from those occurring in New Zealand dentists, as well as New Zealand dentists perhaps experiencing stressors and stress outcomes that are not experienced by their overseas counterparts. The level of stress outcomes in relation to the same stressors may also differ between New Zealand dentists and overseas dentists. For example, the legal structure in which New Zealand dentists work differs from American dentists in that they are unlikely to be sued in a civil lawsuit (New Zealand Dental Act, 1988). With this in mind, the following review is presented.

Hilliard-Lysen and Riemer (1988) identified three main sources of occupational stress in dentistry. These were:

1. Economic costs of practicing dentistry.
2. Status dilemmas that face the dentist.

3. Problems in practitioner-patient relations.

Additionally, professional isolation was seen as a source of stress as, within the practice of dentistry, the dentist seldom comes into contact with other health professionals (aside from their auxiliary staff such as dental hygienists). This is in contrast to similar health professionals such as physicians, who are in constant contact with other physicians (Hilliard-Lysen *et al.*, 1988).

In terms of the stress that occurred from practioner-patient relations, three main factors were seen to contribute to the stress of the dentists in Hilliard-Lysen *et al's* study (1988). The first was where dentists reported being seen as inflictors of pain by their patients; the second involved treating patients who on the majority did not like to be at the dentists, while the third involved the physical closeness between the dentist and patient during the dental procedures. There is empirical support for large numbers of patients fearing receiving dental treatment (Curson & Coplans, 1970; Kleiknech, Klepac & Alexander, 1973; Wardle, 1982). This is relevant to the sources of stress that dentists face as this logically implies that a high number of his/her patients do not wish to be there and are also anxious and fearful. Therefore, dealing with such patients is a source of occupational stress to the dentist in that additional skills/demands are required in order to treat such patients. Interestingly, it is reported that studies have shown (Wardle, 1982) that a large number of dentists report becoming more anxious than the patients during dental procedures, with one explanation being that this was due to the dentists knowing what could go wrong. This supports DeFazio's (1984) finding that dentists' blood pressure increases more

than the patient's before giving an injection, especially if the patient has a great deal of anxiety about receiving the injection.

The employer-employee relationship between the dentist and his/her staff (i.e. dental hygienists, office staff) has been identified as a major source of occupational stress (Mueller, Boyer, Price & Iverson, 1994). Within this relationship, the dentist has control over employees level of participation, autonomy, workload, distribution of rewards, and variety of work. While dentists receive intensive training in the technical aspects of dentistry, no management training is provided at dental school in New Zealand (New Zealand Dental Association, 1995) or overseas (Cooper, Mallinger & Kahn, 1980). This is important as poor management can result in reduced employee job satisfaction and commitment (Mueller *et al.*, 1994), creating work stress not only for the staff, but also for the dentists in terms of management difficulties (Cooper, Mallinger & Kahn, 1980; Obuhoff, 1994).

In DiMatteo, Shugars and Hays (1993) study, the following were identified as significant stressors in dentistry.

1. Lack of contact with other dentists.
2. Long working hours.
3. Physical discomfort.
4. Financial pressures.
5. Heavy workloads.
6. Lack of free time.

7. Management of practice and staff.

8. Difficult patients.

These stressors have also been found to be significant in other studies involving dentists (Cooper, Watts, Baghoni & Kelly, 1988; St-Yves, Freeston, Godbout, Poulin, St-Amand & Verret, 1989).

DiMatteo *et al.*, (1993) found that stress was best predicted by dentists' perception of having little opportunity for upskilling, as well as a lack of contact with other health professionals. DiMatteo *et al.*, (1993) points out the 'catch 22' nature of many of the stressors. For example, a stressed dentist is likely to create more 'friction' with his/her staff, thereby inducing more management problems and its impending stress. Additionally, a stressed dentists is less likely to put a patient 'at ease', thereby experiencing less compliance and more difficult patients, again resulting in the generation of more stress.

Kaldenberg and Becker (1992) studied the extent to which dentists' psychological strain was related to the incongruence between workload preference and workload experience. The results indicated that self-employed dentists were able to achieve a much higher level of congruence between preferential and actual work hours than did their employee counterparts. As a result of this ability to better match preferred with actual workload, self-employed dentists were found to have lower levels of psychological strain than those who were employees (Kaldenberg *et al.*, 1992). However, no information was given as to whether the psychological strain of either

categories of dentists was higher than for other occupational groups or the general population. These results do however suggest that being self-employed allows more autonomy in controlling workload.

While over 90% of New Zealand dentists are self-employed (New Zealand Dental Association, 1995) incongruence between preferred and actual workload may still occur. That is, even though the majority of New Zealand dentists enjoy autonomy in relation to workload, the ability to manage time demands and workload to the desired level may vary among dentists. Hence, it may be that some dentists are able to reduce stress in this area due to being self-employed, while other dentists may still experience stress even though they are self-employed, by virtue of the fact that they are unable to satisfactorily manage their workloads. This is important in that Kaldenberg *et al.* (1992) report that along with reduced psychological strain, dentists who were able to match preferred workload with actual workload also experienced higher levels of job satisfaction and self-esteem.

A review of the dentists physical working conditions by Ćatović, Kosovel, Ćatović and Muftic (1989) revealed that two main issues have been addressed in research on ergonomics in dentistry. The first relates to the size of the dentist's operating field, while the second concerns the design of the dental equipment. Elaborating upon the first issue, concern arises over the difficulty of examining patients teeth, particularly the upper back teeth, even when lighting is optimal. Furthermore, a high level of concentration is often required from the dentist, involving frequent limited movements of the head, neck, trunk and limbs. Such prolonged muscle contractions

have been cited (Ćatović *et al.*, 1989) as impeding blood circulation, a contributing factor in fatigue and muscle pain. Equipment problems were seen to occur due to the existence of new and old machinery within a dentist's practice. Often such mixtures do not combine effectively and increase the physical strain of the dentists.

Another researcher in the field of ergonomics acknowledges that changes in the dentists working conditions have occurred in the last two decades (Murtomaa, 1983). For example, there has been a change to sitting down rather than standing when working, as well as having an assistant so that work occurs as a 'team' (four-handed dentistry). Despite this, Cooper *et al.* (1980) and Murtomaa (1983) contend that there are still many physical environment stressors in dentistry, such as poor posture, even in the seated position. Other demands such as the degree of concentration needed, long working hours, and the fast pace at which dentists work are still seen to exist current dental practices.

These physical problems are difficult to overcome in the dentistry profession as optimum working positions vary from dentist to dentist, making it ineffective to impose strict rules for the execution of dental work. Despite this, the International Organization for Standardization (1977, cited in Murtomaa, 1983) has produced an international standard for dental treatment in relation to ergonomic principles. These standards can be achieved by adopting a sitting position (avoiding fatigue of lower limbs and pelvis), keeping elbows as near as practical to the trunk and where possible to avoid twisting and lateral bending of the spine. While this has been

beneficial, the demands from new and old equipment and the nature of the work (prolonged concentration, fast-paced work etc) still exist.

The physical working environment has also been shown to be hazardous in that dentists are often exposed to mercury vapour during the preparation and use of amalgam in their work (Wilson & Wilson, 1982). Research in this area has shown dentists to have elevated levels of mercury in their body (Harris, Nicols, Stark & Hill, 1978). Frequent use of mercury and exposure to mercury vapours has been found to cause depression, irritability, insomnia and in some cases mental instability and brain damage (Joos, 1975). Hilliard-Lysen and Riemer (1988) propose that these effects of mercury poisoning could be a contributing factor in suicide amongst dentists, yet research in this area remains inconclusive (Wilson & Wilson, 1982).

Witteman and Currier (1976, cited in Cooper *et al.*, 1980) investigated student, practitioner and faculty motives in entering the dental profession. In terms of stress, the results suggested that there was a discrepancy between dental students' expectations of the profession and the real nature of the job. It is suggested by Witteman *et al.* (1976, cited in Cooper *et al.*, 1980) that this disparity may generate stress to the students once they are in practice.

OUTCOMES OF WORK STRESS IN VARYING OCCUPATIONS

The present study also seeks to identify the effects of stress on New Zealand dentists. Therefore, to guide the selection of appropriate outcome measures to be used in the present study, outcomes related to occupational stress in dentistry will be reviewed.

A brief review of stress outcomes in varying occupations will further allow for a comparison of outcomes to be made between dentistry and other occupations.

In the field of occupational stress, research has demonstrated that occupational stress is linked with incidence of coronary heart disease (Hendrix, Spencer & Gibson, 1994), mental strain (Frese, 1985), physical health (Steffy, Jones & Noe, 1990), job dissatisfaction (Decker & Borgen, 1993), non-work problems, i.e. marital disharmony (Jones & Fletcher, 1993) and burnout (Dawis & Lotquist, 1984, cited in Decker & Borgen, 1993). Furthermore, a review by Israel, House, Schurman, Heaney and Mero (1989) provided the following as significant occupational stress outcomes: depression, anxiety, psychosomatic complaints, physiological sleep disturbance, life dissatisfaction, job dissatisfaction, burnout, reduced productivity and performance, increased absenteeism and turnover.

The negative effects of role stressors on employees' attitudes, behaviours and wellbeing has been firmly established in the literature (Fisher & Gitelson, 1983; Hendrix, Spencer & Gibson, 1994; Jackson & Schuler, 1985; Steffy, Jones & Noe, 1990). In terms of specific outcomes, the majority of research has found that higher levels of role stress are associated with lower levels of job satisfaction (Abdel-Halim, 1978; Barling & MacIntyre, 1993; Nandram & Klanderman, 1993). Role overload, a role stressor, has also been associated with such stress-related symptoms as lowered self-esteem, low work motivation, and escapist drinking (Margolis, Kroes & Quinn, 1974, cited in Cooper, 1983).

However, the consequences of occupational stress are not experienced solely at the individual level, but also at the organisational level. As such, occupational stress is seen to significantly increase organisational costs and dysfunction through outcome variables such as turnover, absenteeism, job dissatisfaction and occupational accidents (Cooper & Cartwright, 1994). For instance, in United States industry it estimated that approximately 550 million working days are lost annually through absenteeism, with Elkin and Rosch (1990, cited in Cooper & Cartwright, 1994) estimating that 54% of these absences are stress-related. (No distinction was made between work and non-work stress.) The same trend has also been reported for the United Kingdom, with an estimated 360 million working days being lost in the United Kingdom industry annually, at a cost of eight billion pounds (Cooper & Cartwright, 1994). Again, an estimated 50% of these absences are stress-related (work and non-work stress) (Cooper & Cartwright, 1994).

In conclusion, occupational stress has been linked with a large number of negative outcomes. These outcomes have been documented as occurring at an individual level (i.e. mental and physical health, job satisfaction) and at an organisational level (i.e. absenteeism, turnover). Occupational stress has also been reported as having a spillover effect into non-work areas such as marital conflict (Jones & Fletcher, 1993).

OUTCOMES OF OCCUPATIONAL STRESS IN DENTISTRY

The focus now turns to the outcomes of occupational stress within the profession of dentistry to establish whether similar outcomes are reported. This review will also examine whether there are any occupational stress outcomes that are specifically or

more highly reported amongst dentists. A study conducted by Cooper, Watts, Baglioni and Kelly (1988) assessed the mental wellbeing and job satisfaction of 484 (399 males and 85 females) general practice dentists in Britain. The study involved self-report questionnaires, consisting of biographical details, sources of work stress, mental health, Type A behaviour and job satisfaction. The results indicated that time/scheduling pressures, pay-related stressors, patients' unfavourable perception of dentists, staff and technical problems and problems dealing with patients had direct effects on mental health and job satisfaction (however, causality could not be inferred). In addition, there was a positive relationship between length of time in the profession and reported mental ill-health. Sex differences were reported, with the researchers (Cooper *et al.,* 1988) commenting that male dentists scored higher than the general population on mental ill-health measures whereas female dentists scored the same or lower when compared to the general population. This result was explained by the researchers (Cooper *et al.,* 1988) as males overall had been in the profession longer than females and therefore the long-term effects of work-induced stressors may not have accumulated to the point of influencing mental distress. The researchers (Cooper *et al.,* 1988) also reported a moderate negative relationship between stressors and job satisfaction.

In another study that utilised job satisfaction measures it was concluded that higher levels of dentists' job satisfaction related to lower levels of dentists' negative emotional and physical symptoms (Lange, Loupe & Meskin, 1982). Furthermore, lower levels of stress, a financially-successful practice and regular exercise were all found to positively influence job satisfaction (Lange *et al.,* 1982). Shugars,

DiMatteo, Hays, Cretin and Johnson (1990) assessed professional satisfaction among American general dentists utilising the Dental Satisfaction Survey (n = 558). The results indicated that the most satisfied dentists were older (although no age group was given), reported higher incomes, attended more continuing education programmes and employed more dental auxiliaries than dentists who were dissatisfied.

Caution is needed in interpreting the results of the following studies as no comparisons were conducted between the reported levels of stress outcomes in dentistry with stress outcomes in other occupational groups or the general population. This lack of comparisons limits the usefulness of the presented studies percentages as it cannot be determined whether they are higher or lower than other occupational groups or the general population. With this in mind, the following studies are presented more in terms of identifying stress outcomes in dentistry, rather than as an argument for high or low incidence of stress outcomes in dentistry. For example, Wilson (1984) reports that a national study of American dentists revealed that 25% of the dentists had been diagnosed as having had a stress-related illness such as hypertension, cardiovascular disease, ulcers and gastrointestinal disturbances. Cutright, Carpenter, Tsaknis and Lyon (1977), in another American survey (n = 856), found that 27% of the dentists had diastolic hypertension and 22.6% had systolic hypertension. Cooper, Mallinger and Kahn (1980) found in their sample of American dentists that a high level of role conflict was a major predictor of abnormally high blood pressure. This role conflict was the result of the dentists' idealised role as that

of "caring/healing" and the actuality of being perceived by patients as an "inflictor of pain".

Stress-related alcohol and substance use has been reported amongst dentists, with Rankin and Harris (1990) reporting that an estimated 10% of all practising American dentists are chemically-dependent. Dunlow and Stewart (1987, cited in Rankin *et al.*, 1990), using a sample of 3,700 American dentists, found that 18% reported always or frequently needing an alcoholic drink at the end of the day. Rankin *et al.'s* (1990) study involving 300 male and 300 female American dentists produced results that suggested that over two thirds of the sample frequently drank alcoholic beverages in the evening, with 15% reporting daytime drinking and/or using other drugs. No sex differences were reported.

Rankin *et al.* (1990) also concluded that a third of the dentists reported suffering from colds or anxiety, 30% reported allergies, headaches and depression and 10% mentioned suicidal thoughts or sexual dysfunction. Approximately 10% suffered from a chronic illness, yet a very low mean of two days per year was found for the number of working days missed due to illness. Furthermore, the study found a positive correlation between the mean stress level experienced by the dentists and the occurrence of health problems.

Anxiety, tension and exhaustion have also been reported as stress outcomes amongst dentists, with Hastings (1982), using a sample of 59 American dentists summarising that 58% reported worrying, 54% and 53% reported anxiety and tension respectively,

while 64% reported muscle tension and 65% reported irritability. Exhaustion was reported to be more common among dentists under 45 (23.8%) than those aged over 45 (14.6%). Bernstein and Balle (1953, cited in Eccles & Powell, 1967), utilising a longitudinal study of 56 American dentists, found that anxiety was twice as common (42.1%) under the age of 45 than those aged 45 and over.

The effects of the physical work environment of dentists was the focus of Murtomma's (1983) study involving surveying 68 Finnish dentists about posture and muscle problems felt in 'sit-down' dentistry. The results suggest that postural and muscular problems are still prevalent within dentistry (48% shoulders, 43% back, 28% neck) despite the shift away from working in a standing position.

An outcome that appears to be relatively specific to the dentistry profession in terms of its frequency is the incidence of suicide. However, this finding is not universally supported. Research findings that do support this stance such as Owen's (1982, cited in Hilliard-Lysen & Riemer, 1988) report a high suicide rate for American dentists when compared to the general American population. Further support for this high suicide rate is gained from Labovitz and Hagedorn's (1971) American study on suicide rates among different occupations, as the results suggest that only police officers and two special categories of managers exceeded the suicide rate for dentists, with physicians having a lower reported suicide rate than for dentists. Additional research has also produced results that supported the proposal that dentists have a high rate of suicide (Maris, 1981; Rose & Rosow, 1973).

However, the American Dental Association (ADA) (1976, cited in Rankin & Harris, 1990) reported that ADA members had an overall mortality rate less than that of the general American white male population. Furthermore, the death rate from specific causes of ADA members was equal to or less than that of the general population. Another American study found that only 7% of dentists had seriously contemplated suicide during their career as a dentist (Wilson, 1984). Additionally, a number of the studies that have produced support for a high suicide rate amongst dentists have been contested on methodological grounds (Orner & Mumma, 1976, cited in Hilliard-Lysen *et al.*, 1988; Bedeian, 1982). Correspondence with the New Zealand Dental Association, a literature search, and a search of New Zealand's health statistics failed to produce any information on the rate of suicide amongst New Zealand dentists.

The Bureau of Economic Research and Statistics (1977, cited in Rankin *et al.*, 1990) takes a different approach to the issue of dentists' suicide rates, proposing that the most important issue is not the frequency, but the fact that suicide often occurs at the peak of a dentist's productivity. Another issue is that all of these studies on suicide rates have been based on American dentists, resulting in no comparisons with other nations dentists. In summary, evidence exists for and against American dentists experiencing a high suicide rate as an occupational group. Therefore, the suicide rate amongst dentists remains a key topic in relation to stress outcomes in the dentistry profession.

COPING

While there is a demonstrated link between occupational stress and various outcomes, individual differences still occur within these outcomes in terms of the degree that the individual is affected in response to a stressor. The following review provides empirical support for the moderating relationship of coping on the stress-strain relationship, helping to explain such individual differences. Therefore the following review is presented to provide an understanding of coping and its moderating effects as well as providing a rationale for the coping measures chosen in the present study.

The concept of coping in the area of stress has its origins in psychoanalytic ego psychology (Dewe, Cox & Ferguson, 1993; Lazarus & Folkman, 1984) which views coping as traits, referring to the properties of individuals that make them react in certain ways (Lazarus & Folkman, 1984). However, the concept of coping has developed from such beginnings as to now being conceptualised primarily in terms of being a process as opposed to a trait. Hence, the understanding of coping has moved away from ego-defensive mechanism and trait explanations of coping towards coping as a situation-specific response (Callan, 1993). Accordingly, Dewe *et al.* (1993) state that such current models of coping incorporate the following concepts:

1. Coping is relational in that it reflects the relationship between the individual and the environment.
2. Coping is a process as opposed to traditional trait-oriented approaches.
3. Coping is integrative in nature, linking the other components of the stress process.

An example of a contemporary definition of coping proposes that coping is '... a multidimensional construct; it involves a wide range of behavioral and cognitive strategies which may be directed towards altering, re-evaluating or avoiding stressful circumstances or alleviating their adverse effects' (Parkes, 1994, p.17). In the occupational setting, Dewe *et al.* (1993) defines coping as 'The response to work or work-related encounters that tax individuals abilities and resources' (p.7).

Within such process-oriented approaches, coping is seen as being largely influenced through an individual's cognitive appraisal, which is seen to determine the quality and intensity of an individual's reaction to stress (Lazarus, 1977). Lazarus and Folkman (1984) have identified three types of cognitive appraisal:

1. *Primary appraisal:* Judgement by the individual to determine if the situation/encounter is irrelevant or stressful.
2. *Secondary appraisal:* Judgement by the individual concerning what can be done about the situation/encounter. This includes an evaluation of whether a particular coping action would be effective.
3. *Reappraisal:* Refers to a changed appraisal based on new information from the environment and/or the individual.

Such cognitive appraisals are not always conscious decisions. Furthermore, primary appraisal, secondary appraisal, and coping are highly interdependent and as such influence each other during any encounter (Dewe *et al.*, 1993; Moos & Billings, 1982).

It has been shown that current models of coping are process-oriented and, as such, coping is seen to be largely affected by individuals' cognitive appraisal. The types of coping that have been identified in the literature will now be reviewed. Under such current models coping has largely been separated into either two or three categories, with Callan (1993) surmising that coping can be categorised into two areas:

1. Coping that is active in nature and oriented towards confronting the problem, and
2. Coping that seeks to reduce tension.

Moos and Billings (1982), propose three distinct areas of coping:

1. Active-cognitive strategies which involve efforts to manage the appraisal of the stressfulness of the situation.
2. Active behaviourial strategies, that is, behaviours that deal directly with the perceived problem.
3. Avoidance strategies, whereby there is an attempt to avoid the perceived problem.

Lazarus and Folkman (1984) divide coping into being either problem-focused (direct action) or emotion-focused (palliative). That is, coping is either directed at trying to deal with the problem (stressor) directly, or by attempting to deal with the emotional consequences of the stressor. In relation to which coping responses are used,

research indicates that most people use multiple responses (i.e. direct action and emotion focused) to deal with most stressful situations (Folkman & Lazarus, 1980, cited in Long & Flood, 1993). However, evidence suggests that in the occupational environments managing emotional responses is often the only approach available to the employee. This is seen to be due to the difficulty of dealing with a problem more directly in the workplace (i.e. an organisation's culture) (Folkman, Lazarus, Dunkel-Schetter, DeLong & Gruen, 1986; Long, Kahn & Schultz, 1992, cited in Long *et al.*, 1993; Pearin and Schooler 1978, cited in Schonfeld, 1990). This finding is important as research suggests that problem-focused coping has a positive affect on wellbeing (Folkman, Lazarus, Dunkel-Schetter, DeLong & Gruen, 1986, cited in Callan, 1993), while emotional-focused coping is often linked to poorer levels of psychological adjustment in the longer term (Moos & Billings, 1984; Terry, 1991; both cited in Callan, 1993).

Coping can be further broken down into two main categories; coping responses and coping resources (Long & Flood, 1993). Coping responses are defined as '... constantly changing cognitive and behaviourial efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (Lazarus & Folkman, 1984, p.14). Coping resources differ in that they are defined as '... beliefs about oneself (e.g. self esteem) and recognition of personal resources (e.g. financial resources, perceived social support, health) that one brings to every situation' (Long & Flood, 1993, p.110). Coping resources have also been defined as '... a set of personality, attitudinal and cognitive factors that provide the psychological context for coping' (Moos & Billings, 1982, p.215). Such resources

are viewed as being relatively stable dispositional characteristics which affect the coping process as well as being affected by the cumulative outcome of that process. In contrast, coping responses are seen to be behaviours that are specific to the situation. Callan (1993) emphasises that the coping response utilised by an individual is often influenced by their coping resources (internal and external). As such, coping resources can be used either as a problem-focused coping function or an emotion-focused coping function. Thus, coping resources are moderators in the stress process because they interact with other conditions to influence outcomes such as health and wellbeing, whereas coping responses are seen to be generated in the stressful encounter/situation and as such are considered to be mediators, that is, they are seen to affect the relationship between the antecedent and outcome variables (Folkman & Lazarus, 1988). Furthermore, both coping responses and resources differ from coping styles which refers to the 'trend' of coping responses an individual has over a long period of time.

In summary, coping is seen to serve two overlapping purposes, managing or altering the problem that is causing the distress (problem-focused coping) and regulating the emotional response to the problem (emotion-focused coping). Coping is also conceptualised as being either a resource, a response or a style. Now an understanding of coping has been established, the focus moves toward reviewing the effects of coping on the stressor-stress relationship.

EFFECTS OF COPING IN VARYING OCCUPATIONS

Decker and Borgen's (1993) study found significant relationships between stress, strain, coping and job satisfaction in that higher stress predicted higher strain and lower job satisfaction. When coping was examined in this relationship, it was found that higher levels of coping resources predicted lower strain and higher job satisfaction. Ashford (1988, cited in Shaw, Fields, Thacker & Fisher, 1993) measured personal coping resources such as self-efficacy, personal control, self-esteem, freedom from self-degradation, and tolerance of ambiguity in discovering that coping resources moderated the stressor-strain relationship. Coping resources were again found to be significant with Moos and Billings (1982) finding that individuals with high feelings of self-efficacy tended to persist longer in trying to deal with stressful situations, while Anderson, Hellreigel and Slocum (1977) produced results which suggest that a sense of personal control reduces the feelings of threat experienced during stress. Self-esteem has also been identified as a significant coping resource as it represents an individual's overall level of self-acceptance despite major changes occurring in the environment (Moos & Billings, 1982; Pearkin & Schooler, 1978, cited in Shaw *et al.*, 1993). Furthermore, Tetrick and LaRocco's (1987) study indicates that personal understanding and control moderated the negative relationship between role stressors and job satisfaction.

It is important to note that all these coping resources are examples of internal coping resources, that is, resources residing within the individual's personality, attitudes, or cognitive structure. In contrast, external coping resources are those resources available to the individual from the external environment. One well researched

external coping resource is that of social support, which refers to the availability of helping relationships and the quality of such relationships that an individual has (Leavy, 1983). More specifically, Cobb (1976, cited in Kirmeyer & Dougherty, 1988) views social support as information that leads an individual to believe that they are cared for, esteemed, valued, and belong to a network of communication and mutual obligation. Daniels and Guppy (1994) view social support as communication between individuals that involves emotional concern, caring, information and instrumental help. Additionally, Kaufmann and Beehr (1986) have distinguished between two types of social support, these being:

1. *Emotional* - empathy and caring, and
2. *Tangible* - such as being provided with relevant information to help deal with a particular stressor.

Hence, it appears that social support can be used as either a direct action or emotion focused approach in coping with stress. However, there is some contention as to whether social support has a direct effect upon stressors or whether it is a moderator in the relationship between stressors and stress. Hence, empirical evidence on social support is divided, with some studies indicating social support as a buffering effect (Abdel-Halim, 1982; Etzion, 1984; Kobasa & Puccetti, 1983; Seers, McGee, Serey & Graen, 1983), while other research points toward social support as a moderating variable (Fisher, 1985; Kaufman & Beehr, 1986). Despite this, there is a demonstrable link between social support and reduction in psychological distress (LaRocco, House & French, 1980; Lowenthal & Haven, 1968; Norbeck & Tilden,

1983; Williams, Ware & Donald, 1981; Shinn, Lehmann & Wong, 1984). Additionally, social support can come from a variety of areas such as a supervisor, co-workers, family and friends.

EFFECTS OF COPING IN DENTISTRY

While there is a large body of knowledge in terms of coping responses and their effects on outcome variables in a number of occupations, research on occupational stress in the dentistry profession has neglected the importance of coping (Brand & Chalmers, 1987; Coster, Carstens & Harris, 1987; Freeman, Main & Burke, 1995; Hastings, 1982; Katz, 1987; Litchfield, 1989; Mallinger, Broussea & Cooper, 1978; Paul, 1969; Rankin & Harris, 1990; Sebor, 1984). Instead, such studies have tended to focus on identifying sources of stress and linking these to outcome variables without accounting for the moderating effects of coping on this relationship. This is important as coping becomes by inference the by-product of any relationship that cannot be easily explained, rather than being empirically established (Dewe, 1989). Hence, research should actually seek to measure coping instead of relying on such empirically weak inferences. One study did however investigate exercise as a coping response, concluding that dentists who did not exercise were unable to reduce the effects of stress to the degree of exercising dentists (Cooper *et al.*, 1980). Nevertheless, Cooper *et al.* (1980) focused only on exercise, and thus other coping strategies that may have been an influencing factor in the results were not accounted for. Despite the fact that coping has not been measured in the research on dental stress, coping techniques have been advanced for dentists in terms of managing stress. Such stress management techniques are espoused as exercise, utilising and

maintaining a social support system, relaxation techniques, time management, reducing patient load, seeking support from colleagues, and the elimination of physical fatigue through correct posture (Dunlap & Stewart, 1982; Freeman, Burke & Main, 1995; Hastings, 1982; Litchfield, 1989; Paul, 1969). Although these suggested coping techniques are aimed at identified sources of stressors in dentistry (i.e. time pressure) and/or based on coping resources that are identified in the wider stress literature (i.e. social support), there is no empirical evidence to show whether these techniques are used by dentists, nor whether they are effective for dentists who employ them or whether other coping strategies are being used and to what degree they reduce negative outcomes of stressors. Furthermore, Murphy and Schoenborn (1989) argue that stress management programmes currently employed to reduce the effects of work stress in various occupations are relatively ineffective as the changes in behaviour are often short term. As such, Murphy *et al.,* (1989) strongly urge a redirection of stress management programmes towards more comprehensive actions that target the organisation as well as the individual.

In a response to the lack of research into the effects of coping on occupational stress in dentistry, the present study examines the moderating effects of coping on the stressor-stress relationship for New Zealand dentists.

METHODOLOGICAL PROBLEMS IN OCCUPATIONAL STRESS RESEARCH

The theoretical and empirical relationships between stress, coping and their outcomes have been presented in support of the design of the present study. However, another issue needs consideration, and that is addressing the methodological problems within stress research. Therefore, the following review will highlight these issues in order to justify the methodological approach taken in the present study.

Problems with measures used in stress research

In the following review the term stress includes the concept of coping. Within occupational stress research the self-report questionnaire has been the most common method employed. Several factors have influenced this trend, these being:

1. Self-report questionnaires are efficient in large sample studies, whereas other measures such as interviews and observations are not.
2. Self-report questionnaires are time and cost effective.
3. Self-report questionnaires are able to measure individuals' perception of situations.
4. The nature of occupational stress research makes controlled experimental research designs difficult.

(Schaubroek, Ganster & Fox, 1992)

However, there are also disadvantages with this approach, with self-report measures having to rely on the individual to accurately describe his/her experiences and behaviours, a reliance which is ill-founded as factors such as response bias have been shown to affect the accuracy of self-report data (Latack, 1986). Self-report measures have received additional criticism in that they utilise rating scales in an effort to measure the individual's response. However, rating scales often imply that respondents are experiencing stress as the individual has noted that the pre-selected stressors do occur in their work, although in reality while these stressors may be occurring the individual may not perceive them as being stressful to him/herself (Dewe, 1991). Payne, Jick and Burke (1982) describes this as the "oversimplification assumption", that is, the belief that by reporting the presence of a demanding situation necessarily results in those situations being experienced as demanding. As such, Dewe (1991) argues that occupational stress measures should be designed in an effort to measure the intensity as well as the frequency of stressful events.

In addition, such self-report measures do not guarantee that stressors specific to a particular occupation are being captured (Crump, Cooper & Smith, 1980; Derogatis, 1982; Dewe, 1991). This problem refers to 'global' measures of stress, such as occupational stress questionnaires which are intended to be used for a wide range of occupations. The problems of this is that '... scales that are general in nature and not job-specific may at best be only somewhat inappropriate and at worst completely at odds with what is typically experienced on the job' (DeFrank, 1988, p.56). For example, Dewe (1991) believes that problems occur when a global stress measure is given to an occupational group without any consideration of their particular stressors,

or when stress measures are founded on situations which the researcher (instead of the workers) perceives to be stressful for a specific occupational group. Such designs can lead to some stressors being distorted while others are ignored. To overcome such problems, Dewe (1991) proposes that researchers ensure that the occupational stress measures being used are:

1. Appropriate to the population being considered.
2. Reflect those sorts of events that individuals experience as placing demands on them.
3. Capture the transactional nature of the relationships between the individual and the environment.

For example, Dewe (1991) proposes the following approach in identifying stressors. This approach involves subjects writing a short narrative (or being interviewed) explaining the most stressful encounter they have experienced at work during a specified time period. This identifies stressors as perceived by the workers. Following this, categories of stressors are formed by conducting a content analysis on the subjects narratives. From this, questionnaires can then be developed that incorporate psychometric properties which are seen as necessary (i.e. reliability and validity). Such an approach has advantages over pre-conceived measures of stress, such as being able to account for socio-economic and social changes, as well as identifying stressors that are specific to an occupational group. This is supported by Fisher (1988) who believes that the change towards emphasis on individual perceptions in the area of stress implies that work environments should be studied

in terms of the problems experienced by individuals rather than what the researcher thinks is happening in a work environment. Fisher (1988) also notes that sources of stress are not stable variables, and can and do change as a result of economic, technological and social changes. As such, measures need to be based on the worker's perceptions of their environment as opposed to continually using the same set of general measures of stress which can become outdated in terms of not being able to identify these new sources of occupational stress. For example, the introduction of computer technology brought with it new stressors such as repetitive strain injury (Fisher, 1988).

Needs for comparisons between occupational groups

DeFrank (1988) points out that while job-specific measures are useful in identifying specific occupational stressors, they are unable to be used for comparisons with other occupational groups. The importance of such comparisons as identified by Fisher (1988) is that an occupational group needs to be able to be compared with other occupational groups in order to identify those occupations which are highly stressful. Furthermore, such comparisons are needed as a major problem in occupational stress is that the results are often in terms of correlations which do not imply causation (Fisher, 1988). Hence, if a causal link can be hypothesised, the direction of the link tends to remain unknown. These problems occur due to the difficulties and ethics of manipulating workers and their environment in order to control the variables, as utilised by experimental techniques (Laux & Vossel, 1982). As such, comparative data is proposed as an alternative.

DeFrank (1988) believes that it is possible to accommodate the need for comparative data as well as identifying the specific work stressors. To accomplish this, DeFrank (1988) suggests that questionnaires be developed which contain items on issues potentially relevant to most jobs (e.g. work overload, role ambiguity), while still incorporating job-specific items that address the unique stressors in an occupation.

Quantitative versus qualitative measures

In the area of stress research, it has been proposed that both qualitative and quantitative measures need to be used (Monroe & McQuaid, 1994). For example, it is proposed that interviews (a qualitative measure) be used to identify the sources of stress and coping strategies in a particular occupation. Furthermore, qualitative measures provide an in-depth analysis, a very useful tool considering the proposed individualistic nature of stress in the transactional stress model (Lazarus & Folkman, 1984). That is, qualitative research approaches allow for the measurement of an individual's perception and appraisal of a situations/events. In addition to these strengths, qualitative data allows for the development of questionnaires (quantitative measures) allowing for large sample research designs that are able to measure job-specific stressors (Monroe & McQuaid, 1994).

Van-Sell, Brief and Schuler (1981) criticise occupational stress research for the paucity of studies utilising multiple measures (i.e. questionnaires and interviews). Instead, the majority of occupational stress research has relied on global questionnaires which Van-Sell *et al.* (1981) argue are unable to capture the variations and uniqueness of stressor and coping responses that can be accomplished through

the use of questionnaires developed from qualitative data. Likewise, Laux and Vossel (1982) propose that '... each available strategy - laboratory experiment, field experiment, field study - can solve only some aims of research well' (p.204). As such, Laux *et al.* (1982) propose that researchers should consider combined strategies as a way of achieving methodological "tightness".

Support for the use of qualitative techniques combined with quantitative measure is given in Dewe's (1989) statement that '... the reliance on quantitative techniques have for some become "so ritualised" that there is no longer any obvious link between construct and measurement. Furthermore, this focus on quantitative research has reduced, if not excluded, the ability of researchers to gain greater insights into the personal meanings of stress that a qualitative methodology would allow' (p.996).

An occupational stress research issue in the dentistry profession.

The majority of occupational stress research in dentistry has focused on American dentists, a factor that is important considering that many countries differ in the working environment experienced by dentists. For example, many British dentists operate within a more Governmental/bureaucratic structure (such as the UK National Health Service) than American or New Zealand dentists. Additionally, American dentists are more likely to face civil lawsuits of malpractice than New Zealand dentists because of the legislative differences between the two countries (New Zealand Dental Act, 1988). Therefore, it will be interesting to see whether future research in other countries raises additional stressors to those found in American dentists, or perhaps the stressors may be different among varying countries. Thus

more research is needed to generate answers to these questions. This implication is seen to arise that in trying to determine if the stressors vary, a methodology is needed that is capable of eliciting specific occupational stressors in addition to having the ability to measure the effects of socio-economic, legislative and technical changes on occupational stressors. As such, "static", global measures of occupational stress will be unable to accommodate this need. The importance of accurate measures is apparent in that when trying to reduce work stress and increase job satisfaction in the dentistry profession, success will be dependent upon the accurate diagnosis of the nature of occupational stressors and successful coping responses.

The present study in terms of methodology

Due to time constraints upon the present study, the preferred alternative of designing a questionnaire from interviews with New Zealand dentists was not feasible. However, the methodological issues in occupational stress were still seen as needing to be addressed, and as such interviews were conducted to elicit specific occupational stressors. These stressors will then be compared with the stressors elicited from the quantitative data to identify any discrepancies. Quantitative measures will be used in the present study in terms of allowing for a large sample design, in turn providing statistical power in determining the moderating effects of coping on the stressor-stress relationship, as well in the examination of the stressor-stress relationship itself. Therefore, the present study is designed to allow for these relationships to be examined in New Zealand dentists while attempting to overcome the limitations of using questionnaires. Both the selection of the questionnaires and the design of the interview questions were guided by the previous literature reviews.

To view the questionnaires and the interview questions used in the present study see Appendix I.

HYPOTHESES OF THE PRESENT STUDY

The reviews on stress, outcomes, coping and methodology have allowed for hypotheses to be developed that are based on the theoretical and empirical literature. The hypotheses for the present study are:

1. There will be a significant positive relationship between stressors and stress, stressors and suicide probability, and a significant negative relationship between stressors and job satisfaction.

2. There will be a significant positive relationship between coping and job satisfaction, and significant negative relationships between coping and suicide probability, and coping and strain.

3. Coping will have a significant moderating effect on the stressor-stress relationship in that dentists with higher levels of coping will experience less strain, less suicide probability, and greater job satisfaction than dentists with lower levels of coping.

4. Occupational stressors will be identified through the interviews that are not included in the quantitative measures.

Chapter Three

METHOD

The subjects in the present study were nationally distributed, being randomly-selected from a mailing list supplied by the New Zealand Dental Association.

Of the 500 mailed questionnaires, 210 were returned, representing a response rate of 42%. This sample consisted of 180 general dentists, 18 orthodontists, 7 hospital dentists, two oral surgeons, two periodontists and one oral and maxillofacial surgeon. All nine age groups used in the present study were represented, with the mean age group being 41-45 years. The majority of subjects were Pakeha (191), with the remaining being Asian (14), Indian (3), Sri Lankan (1), while one was unknown. One hunddred and seventy seven subjects were male, while 33 were female. Of these dentists, 176 were self-employed, 33 worked as an employee, and one was unknown.

The number of hours worked ranged from 7 to 57 hours per week, the mean being 35.9 hours per week. The mean overtime hours were 11.9 hours per month, and ranged from 0 to 52 hours per month. The mean years worked in the profession was 20.3 years, ranging from 1 to 48 years. The mean number of patients seen per week was 74.5, with the mean number of chairside assistants being 1.3, while 1.4 was the mean number of office staff available to the dentists. The mean time taken for lunch per day was 49.4 minutes, ranging from 2 to 90 minutes.

A non-random convenience sample of 11 male and one female dentist located in the Manawatu region were interviewed. Seven of these males were aged between 46 and 50, while two were aged between 41 and 45 years, with the remaining two males were aged between 51 and 55 years old. The female was aged between 31 and 35 years old. Two of the 12 dentists worked for the New Zealand Army as general dentists, while the remaining ten were self-employed as general dentists. All 12 dentists identified as being Pakeha.

Correspondence with the New Zealand Dental Association (1995) has established that the sample from which the quantitative data was collected in the present study is representative of the general population of New Zealand dentists. The sample for which the qualitative data was collected is too small (n = 12) for it to be representative of the general population of New Zealand dentists.

QUANTITATIVE MEASURES

Three questionnaires were used to collect the quantitative data; these were the Occupational Stress Inventory (OSI) (Osipow & Spokane, 1987), the Suicide Probability Scale (SPS) (Cull & Gill, 1982), and the Dental Satisfaction Survey (DSS) (Shugars, Hays, DiMatteo & Cretin, 1991). Questions concerning the demographic variables age, sex, race, practice type, years worked in the profession, hours worked per week, amount of overtime, number of assistants (chairside and office staff), time taken for lunch and the number of patients attended to per week were included in the postings of the questionnaires. (The demographic questions and questionnaires can be seen in full in Appendix I.)

Occupational Stress Inventory

The first questionnaire was the Occupational Stress Inventory (OSI) (Osipow & Spokane, 1987), with the stress scales role ambiguity and role boundary excluded due to their inappropriateness to the situation of New Zealand dentists. This decision was in relation to over 90% of New Zealand dentists being self-employed (New Zealand Dental Association, 1995) in conjunction with the focus of the two scales (role ambiguity and role boundary) being upon stress resulting from interactions with the individuals employer (i.e. 'My supervisors have conflicting ideas about what I should be doing', 'The work I do has as much payoff for me as for my employer' (Osipow & Spokane, 1987). Hence, these two scales would not benefit the results of the present study, and in fact could reduce the response rate through dentists seeing such questions as irrelevant and time wasting. Therefore, 120 of the 140 OSI questions were used in the present study.

The OSI as used in the present study consisted of four stressor scales (Role Overload, Role Insufficiency, Responsibility, Physical Environment), four outcome scales (Vocational Strain, Psychological Strain, Interpersonal Strain, Physical Strain), and four coping resource scales (Recreation, Self-care, Social Support, Rational/Cognitive Coping). However, only the total score of strain for the outcome scales was used in the present study in response to criticisms of the outcome scales psychometric problems as documented at a later stage in the present study. Each scale consists of ten questions, with participants responding using a Likert scale from 1 (rarely or never) to 5 (most of the time) provided for each question. The revised OSI in the present study takes approximately 15 minutes to complete.

The OSI was chosen as it was developed upon the concept that occupational stress can occur when the work environment places 'individuals in roles that potentially create the perception of stress, that people use various methods to resolve (cope with) these stresses, and the degree of success of these methods in combination with the intensity of the stress, as well as a number of personal variables interact to produce a level of strain' (Osipow, 1991, p.234). Furthermore, Decker and Borgen (1993) believe that the OSI's approach to coping is consistent with Lazarus and Folkman's (1984) general definition of coping. This is valuable to stress research as Richard and Krieshok (1989) critique current stress-related measures in that the majority of available measures do not examine the interactive effects of stressors, stress and coping.

While the OSI was also purposefully designed to be used for many occupations to allow for comparisons between occupational groups, it neglects the ability to measure occupationally specific stressors. Therefore, while this allows for the present study to produce comparative data with other countries and professions, interviews were also conducted to identify specific stressors and coping strategies that may occur within New Zealand dentistry.

Development of the OSI

The development of the OSI scales and items began at a conceptual level, with 14 facets of stress, strain and coping resources being identified and defined 'with reference to the literature and consultation with colleagues' (Osipow & Spokane, 1987, p.8). The resulting items were then tested for reliability (test-retest of a two-week duration) and internal consistency (n = 201 employed adults) (Osipow &

Spokane, 1987). Following this, the necessary changes were conducted such as the rewording and deletion of some items. This resulted in the final version of the OSI on which the following reliability and validity results are based on. The reading level of the OSI items was established (Osipow & Spokane, 1987) as being at a seventh grade level, and as such no difficulties were envisaged with item interpretation and understanding in the present study's sample of dentists.

Reliability of the OSI

A two-week test-retest was reported for the three main OSI scales and their subscales (Osipow & Spokane, 1987). The alpha coefficients were as follows: .89 (Occupational Roles scale, ORQ) and .94 (Personal Strain scale, PSQ), .99 (Personal Resources scale, PRQ). Alpha coefficients for the subscales are reported as ranging from .71 to .94 (Osipow & Spokane, 1987). This indicates moderate to strong reliability of the OSI (Kline, 1993). Further support for the reliability of the OSI has been produced through independent research on the OSI (Bunda, 1992; Decker & Borgen, 1993; Richard & Krieshok, 1989).

Validity of the OSI

The normative data for the validation of the OSI was reported as consisting of 989 adult participants in 130 occupations (Osipow & Spokane, 1987). The results indicate that the ORQ correlated .52 with the PSQ and -.22 with the PRQ, which is consistent with the prediction that occupational roles (stressors) are correlated positively with personal strain and negatively with personal coping resources. The PSQ correlated -.50 with the PRQ, again confirming the hypothesis that strain will

be negatively correlated with personal coping resources. It is further reported that evidence of the validity for the OSI has also been produced in a number of unpublished studies (Osipow & Spokane, 1987). Additionally, the relationship between the scales of the OSI and measures of job satisfaction are in the predicted direction and are reported as being quite respectable (Bunda, 1992). Cochran (1992) states that research involving the OSI has strengthened the confidence in the test and as such reports that several studies (not including those reported by Osipow and Spokane, 1987) have indicated good concurrent validity between various OSI subscales and other variables such as job satisfaction and burnout. However, confirmatory factor analyses produced good results for the ORQ and the PRQ, but not for the PSQ. As a result, Osipow and Spokane (1987) recommend using the total PSQ score as a measure of strain (as in the present study) rather than using the separate subscales scores of the PSQ scale.

In summary, Bunda (1992) states that the evidence of the technical quality of the OSI supports its use as a research tool, but not in a clinical setting. 'The evidence for the validity of most of the scales is sufficient to recommend this instrument for use in a wide range of research studies' (Bunda, 1992, p.623). Additionally, Cochran (1992) states that '... overall, it (the OSI) is a well conceived, well developed and worthwhile instrument for research and practice' (p.624). Lastly, Powell (1991) concludes that 'The OSI is well grounded in theory, has psychometric support sufficiently strong for research purposes, and seems practical in terms of administration requirements' (p.129). Therefore, the OSI was chosen as a quantitative measure of stress in the present study because of its established

psychometric properties in conjunction with being designed to measure sources of stress, coping resources and stress outcomes

Dental Satisfaction Survey (DSS)

The DSS (Shugars, Hays, DiMatteo & Cretin, 1991) is a 54-item self-report questionnaire, utilising a five-point Likert scale, with 1 = strongly disagree and 5 = strongly agree. The DSS takes approximately 10-12 minutes to complete. This measure has 12 scales in addition to producing an overall score of job satisfaction. The scales are:

1. Staff (3 items).
2. Income (7 items).
3. Professional relations (3 items).
4. Professional time (7 items).
5. Delivery of care (5 items).
6. Patient relations (5 items).
7. Practice management (4 items).
8. Personal time (3 items).
9. Professional environment (2 items).
10. Respect (3 items).
11. Stress (2 items).
12. Overall professional satisfaction (10 items).

However, in the present study, the Professional Environment scale was omitted due to its inapplicability to New Zealand dentists due to New Zealand's legislative laws (New Zealand Dental Act, 1988). That is, the items 'Malpractice litigation has not affected my treatment decisions' and 'The threat of malpractice has caused me to significantly alter the way I practice' do not apply to New Zealand dentists as for American dentists. Furthermore, only the total score of the 12 scales was used in the present study in an attempt to keep the analyses within manageable proportions.

Development of the DSS

In developing the Dental Satisfaction Survey (DSS), Shugars, Hays, DiMatteo and Cretin (1991) sought to design a measure of job satisfaction with:

1. measures designed specifically for dentists, including assessments of the numerous facets of the job of the dentist;
2. an overall job satisfaction scale in order to determine the potential determinants and consequences of variation in job satisfaction.

In the development of the DSS, the theoretical and empirical job satisfaction literature was drawn upon, of which 13 scales of job satisfaction as well as an overall satisfaction dimension was the resultant product. After refinement (assessment with colleagues), the number of dimensions had been reduced to 11, with the retainment of the overall satisfaction scale (Shugars *et al.*, 1991). Following this, 80 items representing the twelve scales were either adapted from existing measures or were newly-devised. These 80 items were then evaluated by dental faculty, practising

rural and urban Californian dentists (n = 408) and several psychologists. This resulted in a reduction of items to 75, which were then randomly-ordered. Of these 75 items, approximately half were stated in a positive form, with the remainder worded in a negative form. This structure of the items was an attempt to limit Acquiescent Response Set (ARS), the tendency to agree with items regardless of their content (Shugars *et al.*, 1991). The resulting 75 item questionnaire was then pre-tested on 92 general dentists. Internal reliability ranged from .65 to .92, with 16 items being dropped either due to being identified as confusing or because they reduced the scale's reliability (Shugars *et al.*,1991). Of these 59 items, five were further dropped due to findings of consistently-low correlations with all scales (.14 to .22) (Shugars *et al.*, 1991).

For all the scales except job stress, the higher the score in turn represents higher satisfaction experienced in the area that the scale is measuring (i.e. income). For the job stress scale, high scores reflect higher stress levels. It is suggested that an overall job satisfaction score can be determined by summing the items of each scale (Shugars *et al.*, 1991). This is suggested as 'The single summation scoring approach assumes that the items within each scale have similar variances and correlate about equally with the total scale (i.e. provide approximately the same amount of information about the construct). Both assumptions were generally achieved for the DSS scales' (Shugars *et al.*, 1991, p.736).

Reliability of the DSS

Internal consistency ranges from .60 to .92 for the DSS scales. Specifically, all reliability coefficients were .70 or higher for all DSS scales except for the respect and delivery of care scales (Shugars *et al.*, 1991).

Validity of the DSS

Three validity studies were conducted.

1. Evaluated the overall satisfaction dimension through examining its association with an alternative satisfaction measure.
2. Dentists' satisfaction as measured by the DSS was compared with peer-reported satisfaction.
3. A 'known groups' validation strategy was used, in that dentists who were in leadership positions would have higher satisfaction levels than those who were not in leadership positions (Shugars *et al.*, 1991).

The results indicate that item-scale correlations for hypothesised related scales ranged from .41 to .85, with item discrimination across all scales also being generally supported (Shugars *et al.*, 1991). Methods two and three also produced support for the validity of the DSS (Shugars *et al.*, 1991).

In summary, the DSS was chosen because of its moderate to strong reliability and validity, as well as its development being tailored to dentists. However, caution is

proposed in that the DSS's development was of a select sample (i.e. only Californian dentists).

The Suicide Probability Scale (SPS)

The SPS (Cull & Gill, 1982) was designed to aid in the assessment of suicide risk in both males and females aged 14 years and older. As such, the Suicide Probability Scale (SPS) is a 36-item self-report measure that has four scales:

1. Hopelessness (12 items).
2. Suicide ideation (8 items).
3. Negative self-evaluation (9 items).
4. Hostility (7 items).

A total weighted score is also produced (Cull & Gill, 1982). Time required to complete is approximately 5-10 minutes.

Development of the SPS

These final 36 items were produced through the theoretical generation of over 200 items based on what Cull and Gill (1982) believed were the four most important explanations of suicide. These were:

1. Anomic
2. Introjected rage
3. Lethality, perturbation and inimicality

4. Impulsitivity

The final 36 items were selected based on their ability to discriminate suicide attemptors (n = 336) from both non-attemptors in both psychiatric inpatients (n = 260) and 'normals' (n = 562) (Cull & Gill, 1982).

Reliability of the SPS

The reliability of the SPS scales range from high to moderate, with the internal consistencies being reported as Total Score .93, Hopelessness .85, Suicide Ideation .88, Hostility .78, and Negative Self-evaluation .58 (Cull & Gill, 1982). A high test-retest reliability for a ten-day period was reported as .94 for a sample size of 478 for the total score. In fact, it has been stated that 'Indicators of reliability in addition to the established content, criterion-related and construct validity are excellent' (D'Attilio & Campbell, 1990, p.976). 'Both the full scale and the individual subscales have evidenced sound psychometric properties across clinical and nonclinical populations' (Rudd, Dahm & Rajab, 1993).

However Golding (1985) critiques the SPS reliability data for not supplying test-retest reliabilities for subscales or for clinical subpopulations. Concern is also expressed over the four-scale structure of the SPS in that Hostility correlates with Hopelessness (.73) and Negative Self-evaluation (.70). Hopelessness and Negative Self-evaluation also correlated with each other (.75) (Golding, 1985). Only the total score of the SPS will be utilised in the present study, again to keep the data analyses

within reason. Hence, by only using the total score, the problems of high correlations between the subscales has also been avoided.

Validity of the SPS

The validity of the SPS is supported by item-scale correlations with the MMPI-based suicide threat scale. The correlations ranged from .51 to .75 for the four scales (Cull & Gill, 1982). Golding (1985) also critiques the SPS in that it is questionable as to its lack of incremental validity in relation to a comprehensive clinical interview.

While the SPS has been criticised because it does not offer additional information than that provided by a clinical interview (of which Cull and Gill (1982) believed was still necessary in conjunction with the SPS), it is still seen as beneficial to the present study in that it allows for an indication of suicide probability of New Zealand dentists to be gained through a postal survey design. Hence, the use of the SPS was not to determine who was a suicide risk in terms of clinical treatment, but rather was used to gain an appreciation of the general level of suicide risk among New Zealand dentists.

Qualitative Measure: Interviews

Demographic factors of the participants were obtained, followed by asking a set of questions based on the dental stress literature (see Appendix II), taking approximately thirty minutes. Responses were recorded on paper as well as audio tape, transcribed, and tabulated into categories based upon the dental stress literature, as well as categories of responses that were previously unelicited in past research.

ETHICAL CONSIDERATIONS

Questionnaire participants were informed of their right to refuse to participate, the nature of the study, the use of the data, guaranteed confidentiality, and access to the results. Participants were further informed that by completing and returning the questionnaire they were agreeing to take part, as well as their decision to do so being under informed consent. The researcher also included a contact address and phone number should participants have any queries about the study. For those who were interviewed, informed consent was gained through their signing an informed consent sheet after reading an information sheet which included the same issues as for those who were sent questionnaires. Furthermore, those interviewed were informed that they did not have to have their responses recorded on audio tape, or that if they chose to allow recording then they, not the researcher, were in charge of the audio tape recorder, and as such could turn it off at their discretion. These considerations allowed for ethical approval for the present study to be granted by the Massey University Human Ethics Committee.

Chapter Four

QUALITATIVE RESULTS

In identifying work stressors in the interviews, dentists were asked to list the work pressures affecting them from 'most' to 'least'. The identified stressors were:

Time

Five dentists saw this as causing the most pressure, two saw it as being the second to most pressure, while one dentist perceived this to be the fourth greatest pressure that occurred within their experiences of dentistry. Time pressure was seen as occurring from trying to keep to a schedule, and the stress of running late. Time pressure also occurred due to scheduling less patients in order to keep them from waiting, consequently reducing the dentists income (dentists believed they were unable to increase fees due to other factors to be discussed further on).

Time pressure was seen as a constant, everyday pressure. For example, one dentist said '... it's not an enormous pressure, but it seldom varies apart from the last patient in the morning or the afternoon'. In terms of the source of this time pressure, another dentist believed that '... the greatest immediate pressure would be having to work to a time schedule and not keep the next patient waiting'. Another dentist believed that time pressure resulted from '... fitting everything into the day'.

Patient interactions

Patient interactions were another identified work stressor, occurring from either the patient being extremely anxious and difficult to work with (especially children), and/or the unwillingness of the patient to be kept waiting. Three dentists saw this stressor as causing the most pressure, while three saw it as the second to most pressure. For instance, one dentist, when relating a stressful work experience within the last six months, revealed that '... a twelve-year-old who needed pre-molar teeth removed orthodontically was struggling. They had to come out and he was unable to have a general anaesthetic ... he was very stressful for me. His responses were difficult to handle ... it rubs off on you'. This stress was twofold, as the dentist also mentioned that this difficult procedure made the length of the appointment go over time, resulting in time pressure due to the anxiety over keeping patients waiting.

Another dentist attributed patient-related stressors to the patients inability to cope, 'I think some people [patients] are unable to cope with what you're doing. Some people are just unable to cope'. Dentists further commented that patient anxiety is frequently noticed, such as 'They [the patients] do all sorts of things. They pinch their fingers, they clasp them very tightly. The "white knuckle" syndrome really is true'. The result of this awareness of patient anxiety were reported '... they're apprehensive and stressed before they come in. When you get the patients, especially one that hasn't been for a long time and perhaps is more difficult, more complex, more unpleasant than otherwise would be the case, then they're wound up before they start. They can make life difficult all round'. Another believed that '... if a patient is extremely stressed or extremely tense then that communicates itself to the

dentist ... then the dentist becomes frustrated because of the difficulties in that patient'.

Patient expectations were also noted as stressors, 'The patient comes in expecting a miracle ... and they still don't really accept my assessment of their problem because the person over the back fence has had something similar done and in their view that worked all right'. The resultant feelings of stress were seen as occurring when the patient would not accept the dentist's explanation of the situation and how it varies among people. In dealing with this situation, one dentist commented that if they did not accept his explanation and continued to have unrealistic expectations, he would say 'Look, I'm sorry. I don't think I can fulfil your expectations. If you can find somebody else who can, good luck. To me you're not worth the hassle'. The dentist did comment that he could only do this due to his secure financial position.

On the whole it was reported that such stressors occur weekly and can result in being 'Upset' which lasts for '... about half a day'.

Work duties

Two dentists reported the actual work tasks involved in dentistry as the number one work pressure, while another perceived this as the fifth highest work pressure. However, these pressures were the result of specific dental procedures rather than the daily procedures that are required by dentists. This is illustrated by one dentist who believed that the tasks of a dentist are not stressful to any dentist that is 'well-trained

and halfway competent'. Another reiterated this point by saying 'What you're physically doing, the dental procedure, I don't find that difficult'.

Hence, stress from work duties occurs from specific situations. For example 'some extractions look straightforward ... and then we find that they're much more difficult than we anticipated. I find that the annoyance I suffer from with myself quite stressful'. Other dentists believed difficult extractions also to be stressful, but believed that there were specialists to whom they can refer the patients. Therefore, it appears that the stress really originates from poor appraisal of the nature of the extract and then being 'caught out and I find that partway through the procedure that it is more difficult than I anticipated, then that is stressful'.

Additionally, this stressor seems to decline with experience. 'As I get older I become more astute at judging where there's a possibility of complications and I avoid that situation'. In terms of frequency, this stressor appears to be relatively infrequent, about 'once every few weeks', although it can sometimes occur twice within one week. Dentists experiencing these stressors tended to believe that their reactions to such stress are largely physiological, such as 'I am sure my blood pressure goes up', 'I become tense', 'short-tempered, but I never show that to the patient'. In terms of coping with this stressor, dentists tried largely to avoid it, but where it does occur comments were such as '... just control it, self-discipline. It's part of being professional', as well as 'If things get too difficult there's always a way out. There's always some way out and a time when maybe you have to swallow your pride and say yeah, it's beyond me. But I'm not afraid to say that'.

Legislation

Changes within New Zealand legislation were reported as causing the most pressure for one dentist, while two dentists reported it as being the second most work pressure. The pressure was seen to be due to the increasing number of different legislations. For example, '... we've got everything from the Consumer Guarantees Act to OSH. There's nine Acts which can impinge on people's practice. And trying to comply with everything is virtually impossible. Whatever you do you've got to be able to justify it'. Another dentist commented that '... the rules and regulations under which we labour now are far more intricate and complex and harder to live with than the rules and regulations that we did work under, where it was largely down to common sense and decent ethics and more to do with your job'. There also seemed to be stress resulting from perceptions of the actual regulations. 'They encompass dentistry probably without really meaning to. It's never entered the heads of legislators that dentistry might be affected by this'.

These legislative changes have also created more administrative work, 'There is quite a lot of it, ACC and just keeping your own affairs in order. Like any small business, it takes time to run'. Another dentist also commented on the extra administration work generated through ACC forms.

This area was seen as being a constant, underlying pressure in which direct (action-focused) coping was perceived to be an unrealistic option.

Socio-economic Factors

Two dentists reported this as causing the most pressure, one saw it as the third while another dentist reported it as the fourth most pressure. Areas of stress were '... the increasing costs of running a practice, yet being unable to increase fees because of patients resentment towards paying extra due to the current economic climate'. Additionally, the economic climate of New Zealand was seen to cause patient-related stress due to the time pressure of having to hurry back to work. This time pressure was believed to be due to the increased accountability on employees due to attempts to increase organisational efficiency. This factor was reported by dentists as resulting in having to increase the length of the average appointment time to avoid patients waiting, yet as mentioned earlier this also reduces the dentist's income, i.e. dentists see less patients and hence receive less money. These pressures were seen as constant and the dentists believed that they were unable to change the situation apart from increasing appointment times. It was also reported that dentistry is becoming much more competitive in terms of attracting clients in turn reducing the dentists ability to increase fees to cover factors such as increased appointment times. Hence, having to absorb these extra costs is perceived as a stressor by dentists.

Perfection of technical procedures

Two dentists reported this as the top stressor, while one reported it as the third most stressor. For example, '... the pressure of the fact that we are trying to do for every patient a 100% perfect job, and by definition you can't do it'. Another dentist commenting on this issue said 'You've got to balance the aim of doing a perfect job with the reality that you can't achieve that. But you've got to try and, professionally

you've got to get as close to 100% as possible'. This was seen as a highly frequent stressor, occurring daily.

The varying nature of the stressors

There appears to be a change and/or reduction in some of the work pressures with increased experience in the dentistry profession, as highlighted in the comment 'When I first graduated it was always the feeling of the next patient exposing your ignorance and make you make a fool of yourself. I don't have that any more'. Sources of stress also seem to vary in terms of their impact (or whether they are experienced at all) over periods of time. 'It varies from time to time. For example, I've got a very good nurse now and I've got no worries, whereas twelve months ago I would have listed as number three the pressure of trying to keep my nurse up to scratch'.

It also appears that the dentists are largely unaware or largely unaffected by their work stressors due to only the few stressors given by each dentist (about two or three) and by statements such as 'If you gave me two hours I could come up with a list [of stressors]'. However, an insightful comment in relation to the present study was '... 99% of what we do is pretty straightforward and there are very few problems. But the 1% can completely overshadow the 99% if it's bad enough. If it's bad enough 1% can ruin your entire week and you tend to forget the good things and concentrate on the bad or whatever upset you'. Most reported that their reactions to stressors lasted no longer than a day.

There was a difference between self-employed and employee (Army) dentists in that the army dentists were not concerned about socio-economic factors or number of patients needed to be seen, but did find patient interactions as a source of stress. No stressors were reported by the army dentists that were not reported by the self-employed dentists.

Coping

In terms of coping with general feelings of stress from practising dentistry, common coping techniques were:

1. Relaxing through non-work activities, 'I think the best thing's getting away, skiing up the mountain', 'Going out with friends', 'Reading'.

2. Mentally "shutting off" from the day's work, with many dentists reporting that this strategy was self-taught; 'I found this difficult but I've taught myself.' Other dentists commented that 'Basically you just switch off. When I walk out at night and I close the door and I lock it and that's it. I never take work home'. Another dentist reported that 'You do your best all day and close your mind. You walk out. You've done everything as much as you can. Lock the door'. Additionally, this coping technique was also combined with others, for instance, 'It's essential that not only do I train myself mentally, but that I change my environment too'. 'When I shut the door here at five o'clock I leave everything behind. When I shut the door I shut my mind and have my mind on other things'.

3. Taking a quick break between patients, a 'step back and recover' approach, for example one dentist reported that 'I catch my breath. Put my neurons into gear as it were, and take a breather. Both physically and mentally'.

4. Exercise such as jogging, doing stretching and deep-breathing exercises on the job, and walking. 'Whether I've had a stressful day or not, I try to go for some sort of a walk. And I find that pretty satisfying actually. And it's not just physical, it's a mental refresher'.

5. Talking, either with staff and/or partner.

Furthermore, the majority of the dentists believed that they were successful in coping with feelings of stress and stressors, except one dentist who believed he was ill-suited to dentistry due to his personality, describing himself as a 'reactive-type personality'. No coping differences were reported between self-employed and employee dentists.

Job Satisfaction

All the dentists took longer to give examples of this as opposed to stressors, with one having extreme trouble. 'I keep thinking of pressures but no specific satisfying events,' settling in the end for occasional positive feedback from patients, although 'nothing stands out'.

Interestingly, many dentists reported satisfiers from situations and interactions that were also reported as stressors, suggesting that successfully coping with stressors can result in job satisfaction. This can be seen in the following listing of satisfiers.

1. Patient interaction, such as positive feedback and successfully dealing with fearful patients. This is well illustrated in the following comment. 'A very satisfying moment is a patient who comes in exceedingly nervous and is very worried. When they go out it's with a smile on their face and with the realisation that not just have I not hurt them too badly but also that what had been done is good, and well, they've been looked after. The patient goes away with the feeling that they've been looked after well, and professionally that gives me a tremendous amount of satisfaction. However, dentists also commented that positive comments were less frequent than negative ones.

2. Keeping on schedule, for example 'I keep to my schedule during the day and it is very satisfying'.

3. Work duties, in particular successfully using their dental skills. For example, a dentist referring to crown and bridge work reported that 'It's very exacting work, requires reasonable skill, considerable skill from both myself and from the technician. When I do a very satisfactory crown, a crown that I'm pleased with, that's enormously pleasing. If it fills my criteria of a good job then it's exceedingly satisfying'. Other dentists also reported using their expertise as satisfying. '... it deals with my speciality. A patient who came

in with an appearance that she was very unhappy with, which mainly centered around her upper front teeth, which were I think you'd say were disfigured. Two weeks ago I put in what we call veneers, which are coverings of the teeth, which requires quite a bit of skill to get them right. And the actual insertion of them is a tricky procedure which took about three quarters of an hour of fairly concentrated work. At the end of that time the appearance was very good. I was very pleased with it. And the greatest pleasure was twofold I guess. Firstly from a technical point of view and also the joy of the patient when I gave her a mirror and she had a look. And that was tremendous.' Furthermore, another dentist commented that 'I find aesthetic work very satisfying, somebody coming in with a misshaped and ugly mouth ... and you do something that is aesthetically pleasing and you know will stand up to the rigours of normal use. And you put one of those in and sit back and think that looks bloody good. That is probably the most satisfying thing. Basically it's the difficult stuff that you get the most pleasure out of doing'.

Frequency of job satisfiers

In terms of frequency, it was commented that '...most of what we do is terribly humdrum and there's no great highs'. Additionally, '... there's an ongoing satisfaction. But it's not something that sort of sticks in your mind'. Hence, it was reported that 'the highs are special, such as more complex situations, which however are not very common, occurring about once a month'. As one dentist said, '... the

98% of it is sort of that middle ground where there's no great highs and no great lows, it's just another day's work'.

Would they still choose dentistry?

Eight dentists said that they would, with reasons for this decision being 'Because I'm a people sort of person. I enjoy people'. Another dentist also liked helping people in addition to the constant hours that dentistry allows. 'I see people under stress and I am ready to help them, and that's very satisfying. Medical practitioners do that, but by and large my job is an eight to five job, and that's quite nice because I've got a definite time when I can be with my family and so on'. Others believed that dentistry was relatively easy and not too demanding in terms of their skills. 'I enjoy what I do and I don't find it too difficult, therefore I would go back and do it again'.

However, four dentists would not wish to start again in dentistry, 'The chief reasons being that we now work under nine different hats [due to the new legislative regulations] and the unrealistic demands [from patients].' These dentists did not think that the financial rewards would be the same in dentistry in the future, especially when taking into account the continually rising cost of dentistry training and the resultant debt that new dentistry graduates have incurred. Another dentist who had commented on the change in patient attitudes due to the socio-economic changes occurring in New Zealand would not chose dentistry again as '... certainly the difficulty you're going to have with a demanding public is going to be a great deal worse in the future than it is today'.

Quantitative Results

Prior to the analyses, all variables were examined using the Statistical Package for the Social Science (SPSSPC) for accuracy of data entry.

ANALYSIS 1

The means, standard deviations and alpha reliability coefficients were calculated using SPSSPC, of which the results are presented Table 1. The possible range for the Occupational Stress Inventory (OSI) means were 1 (rarely or occasionally true) to 5 (true most of the time), with the OSI means for the present study ranging from 1.99 to 2.60 (OSI stress), 2.72 to 4.17 (OSI coping) and a mean of 1.80 for the total OSI strain score. The possible range for the mean score of Suicide Probability Scale (SPS) was 1 (none or a little of the time) to 4 (most or all of the time). The mean for the total SPS score in the present study was 1.31. 1 (strongly disagree) to 5 (strongly agree) was the possible range for the mean of the total mean Dental Satisfaction Survey (DSS) score which was 3.42 in the present study.

Kline (1993) states that desirable reliability coefficients should be above 0.80. The reliabilities of the present study are thus described as ranging from adequate (.66), to good (.88). On the whole, all three questionnaires produced satisfactory reliabilities, ranging from .66 to .88 for the Occupational Stress Inventory, and .73, .82 for the Suicide Probability scale and Dental Satisfaction Survey respectively. Additionally, for the OSI, four alphas were above .80, four were between .70 and .79, while only one alpha was lower, .66.

Table 1

Means, Standard Deviations and alpha reliability coefficients for the Occupational Stress Inventory (OSI), Suicide Probability Scale (SPS) and Dental Satisfaction Survey (DSS)

Scale	n	M	SD	Alpha
OSI Stress				
Role overload	199	2.39	0.58	0.72
Role insufficiency	206	1.99	0.59	0.81
Responsibility	206	2.60	0.55	0.66
Physical environment	204	2.10	0.68	0.79
OSI Coping				
Recreation	208	2.98	0.65	0.88
Self-care	205	2.72	0.66	0.75
Social support	204	4.17	0.72	0.86
Rational/cognitive coping	205	3.47	0.63	0.79
OSI Strain				
Total score	181	1.80	0.49	0.86
SPS				
Total score	169	1.31	0.29	0.73
DSS				
Total score	178	3.42	0.49	0.82

ANALYSIS 2

Correlations using SPSSPC were conducted between the demographic, stressors, coping resources and outcomes variables, the results being presented in Table 2. However, the demographic variables sex and nature of employment (self-employed or employee) were not part of these correlations as *t*-test analyses are more appropriate for a variable that has two distinct groups. Correlations were used to determine if a systematic relationship exists between the mentioned variables as well as the direction of such relationships.

The resulting correlations were that the stress variables Role Overload, Role Insufficiency and Physical Environment were correlated with the three outcome variables strain, suicide probability and job satisfaction. These correlations were such that as these stressors increased so did the outcome variables, with the exception of job satisfaction which decreased as stressors increased. However, the stressor responsibility was only significantly correlated to one outcome variable which was strain. All of the coping variables (Recreation, Social Support, Self-care, Rational/cognitive coping) were significantly correlated with all three of the outcome variables. The relationship between coping and outcome variables was that higher coping was associated with lower strain and suicide probability and with higher job satisfaction.

Age and years worked as a dentist were significantly correlated with strain in that higher levels of age and years worked were associated with lower levels of strain. Age and years worked were also significantly correlated to job satisfaction, with higher levels of age and years worked associated with higher levels of job satisfaction. In terms of coping, age and years worked were positively related at varying levels of significance with Recreation, Self-care and Rational/cognitive coping. Age and years worked were significantly correlated with the stress variables Role Overload and Physical Environment in that higher levels of age and years worked were associated with lower levels of these two stressors.

Table 2

Intercorrelations between demographic characteristics, stress, coping and outcome variables for New Zealand dentists (n = 210)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Demographic	-	.97***	-.22	-.08	-.05	-.20**	.31***	.15*	.05	.14*	-.32***	-.09	.21**
2. Years worked in dentistry		-	-.26*	-.06	-.09	-.23**	.31***	.16*	.08	.14*	-.32***	-.11	.21**
3. Role overload			-	.28***	.43***	.36***	-.30***	-.17*	-.05	-.15*	.52***	.35***	-.29***
4. Role insufficiency				-	.08	.31***	-.26***	-.16*	-.29***	-.28***	.51***	.41***	-.48***
5. Responsibility					-	.31***	-.08	.04	-.07	-.02	.28***	.14	-.12
6. Physical environment						-	-.15*	.02	-.17*	-.22**	.39***	.29***	-.32***
7. Recreation							-	.53***	.32***	.34***	-.49***	-.39***	.28***
8. Self-care								-	.32***	.36***	-.30***	-.28***	.22**
9. Social support									-	.46***	-.38***	-.54***	.31***
10. Rational/cognitive coping										-	-.45***	-.47***	.50***
11. Strain											-	.69***	-.51***
12. Suicide probability												-	-.43***
13. Job satisfaction													-

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

To investigate group differences in levels of stress, coping and stress outcomes, *t*-tests were performed for the two demographic variables (male, female) and nature of employment (self-employed, employee). In these analyses, an *F* test of sample variances was conducted for each comparison. Consequently, if the probability of *F* was > .05, then it was assumed that the sample variances were equal and *t* statistics based on pooled variances were used. If the probability of *F* was < .05 then it was assumed that the sample variances were unequal and *t* statistics based on separate variance estimates were used (Snedecor & Cochran, 1980, cited in Flett, Harcourt & Alpass, 1994)

Results of the *t*-tests are presented in Tables 3 and 4. Sex differences for the stressor Role Overload were found to exist as well as nature of employment differences being found for the stressor physical environment and the outcome variable strain. These significant differences were all two-tailed, with the sample variances being equal.

Table 3

Sex Differences in Ratings on Items within each of the Components on the Stress, Coping and Outcome Scales

Component	Male			Female				
	n	M	SD	n	M	SD	df	t-value
Stress								
Role overload	167	2.35	0.58	32	2.60	0.54	197	-2.23*
Role insufficiency	174	1.98	0.60	32	2.00	0.56	204	-.11
Responsibility	174	2.60	0.56	32	2.63	0.55	204	-.25
Physical environment	173	2.07	0.68	31	2.27	0.70	202	-1.44
Coping								
Recreation	175	3.01	0.63	33	2.79	0.69	206	1.78
Self-care	174	2.72	0.67	31	2.70	0.58	203	.15
Social support	171	4.20	0.68	33	4.00	0.87	202	1.45
Rational/cognitive coping outcomes	172	3.51	0.63	33	3.28	0.62	203	1.89
Outcomes								
Strain	156	1.77	0.49	25	1.98	0.42	179	-1.97
Suicide probability	149	1.30	0.27	20	1.38	0.37	167	-1.23
Job satisfaction	152	3.58	0.51	26	3.38	0.45	176	1.88

Note. *$p < .05$, two-tailed sample variances equal. + $p < .05$ two-tailed sample variances unequal.

Table 4

Nature of Employment Differences in Ratings on Items within each of the Components of the Stress, Coping and Outcome Scales

Component	Self-employed			Employee				
	n	M	SD	n	M	SD	df	t-value
Stress								
Role overload	165	2.40	0.58	33	2.37	0.60	196	.27
Role insufficiency	172	1.97	0.60	33	2.10	0.55	203	-1.17
Responsibility	172	2.62	0.55	33	2.51	0.60	203	1.04
Physical environment	171	2.06	0.66	32	2.35	0.76	201	-2.19*
Coping								
Recreation	175	3.00	0.65	32	2.86	0.64	205	1.07
Self-care	172	2.71	0.67	33	2.76	0.62	203	-.42
Social support	170	4.18	0.74	33	4.08	0.62	201	.73
Rational/cognitive coping	172	3.49	0.64	32	3.38	0.60	202	.83
Outcomes								
Strain	156	1.76	0.47	24	2.06	0.53	178	-2.84*
Suicide probability	142	1.31	0.30	26	1.30	0.23	166	.08
Job satisfaction	151	3.57	0.51	26	3.42	0.44	175	1.40

Note. * $p < .05$, two-tailed, sample variances equal. + $p < .05$, two-tailed, sample variances unequal.

In an effort to provide greater understanding for the reported sex differences, *t*-tests were conducted to investigate sex differences in age, years worked in dentistry, the number of hours worked on average per week, and the average number of patients seen per week. Again, *F* tests were conducted on the samples variances to determine whether pooled or separate variance estimates were recorded (Snedecor *et al.,* 1980, cited in Flett, Harcourt & Alpass, 1994). The results are presented in Table 5. The results show that female were significantly younger, worked less hours per week, saw fewer patients per week and had worked fewer years as a dentist than the males.

Table 5

Sex differences in age, hours worked per week, average number of patients seen per week and years worked in dentistry

Variable	Male			Female				
	n	M	SD	n	M	SD	df	t-value
Age	177	5.49	2.29	33	2.91	1.40	68.65	8.64+
Hours worked per week	176	37.11	11.35	33	32.30	10.86	207	2.25*
Number of patients per week	170	79.88	39.02	32	62.16	33.53	200	2.41*
Years worked in dentistry	176	22.14	11.58	32	9.81	6.52	72.50	8.53+

Note. Age is represented in terms of the age categories used in the present study (see Appendix I).
* $p < 0.5$, two-tailed, sample variances equal. + $p < .05$, two-tailed, sample variances unequal.

ANALYSIS 3

Hierarchical multiple regression analyses were conducted to identify those stressors and coping factors that are associated with the three outcome variables strain, suicide probability and job satisfaction. The demographic variables age, sex, years worked in dentistry, and the nature of employment were controlled for by entering them in step one, with the predictor variables being entered in step two. In all, six hierarchical multiple regressions were conducted, the results being presented in Tables 6, 7, 8, 9, 10 and 11. The results show that the addition of the stress variables to the equations of all the outcome variables (strain, suicide probability and job satisfaction) resulted in significance in the change of the R^2. The same was found for the coping variables, which when entered into each of the equations with

the dependent variables alternatively being strain, suicide probability and job satisfaction, the change in R^2 was found to be significant for all three outcome variables. The stress and coping variables found to be significant in the hierarchical regression analysis of the dependent variable were stressors:Role Overload and Role Insufficiency, coping:Recreation, Social Support and Rational/cognitive coping. The significant stress and coping variables in the Hierarchical Regression Analysis with suicide probability as the dependent variable were Role Overload, Role Insufficiency and Physical Environment (stressors) and Recreation, Social Support and Rational/cognitive coping (coping resources).

In the Hierarchical Regression Analyses with job satisfaction as the dependent variable, the significant stressor was Physical Environment while the significant coping resource was Rational/Cognitive coping. These significant stressors and coping variables were then used to arrive at cross-product terms so that multiple Hierarchical Regression Analysis could be conducted to determine the moderating effects of coping on the stressor-strain relationship, the stressor-suicide probability relationship, and the stressor-job satisfaction relationship. The results of these three analyses are presented in Tables 12, 13 and 14.

Table 6

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Strain

Variable	B	SEB	β
Step 1			
Age	0.01	0.07	0.04
Sex	0.04	0.12	0.03
Years Worked	-0.01	0.01	-0.32
Nature of employment	0.12	0.12	0.08
Step 2			
Role overload	0.03	0.01	0.32***
Role insufficiency	0.03	0.00	0.39***
Responsibility	0.01	0.01	0.09
Physical environment	0.01	0.00	0.12

Note. R^2 = .12 for Step 1; ΔR^2 = .41 for Step 2 ($p < .001$). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Suicide Probability

Variable	B	SEB	β
Step 1			
Age	2.42	1.73	0.52
Sex	3.17	2.90	0.10
Years Worked	-0.60	0.36	-0.62
Nature of employment	-2.52	2.80	-0.09
Step 2			
Role overload	0.53	0.16	0.27**
Role insufficiency	0.60	0.14	0.32***
Responsibility	-0.17	0.16	-0.01
Physical environment	0.29	0.13	0.18*

Note. R^2 = .03 for Step 1; ΔR^2 = .26 for Step 2 ($p < .001$). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8

Summary of Hierarchical Regression Analysis for Stress Variables Predicting Job Satisfaction

Variable	B	SEB	β
Step 1			
Age	-2.51	3.95	-0.22
Sex	-6.85	6.36	-0.09
Years Worked	0.85	0.80	0.36
Nature of employment	-1.77	6.82	-0.02
Step 2			
Role overload	-0.38	0.37	-0.08
Role insufficiency	-1.96	0.32	0.09
Responsibility	0.41	0.38	0.09
Physical environment	-0.79	0.30	-0.21**

Note. $R^2 = 0.05$ for Step 1; $\Delta R^2 = .28$ for Step 2 ($p < .001$). * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 9

Summary of Hierarchical Regression Analysis for Coping Variables Predicting Strain

Variable	B	SEB	β
Step 1			
Age	-0.05	0.06	-0.21
Sex	-0.01	0.12	-0.01
Years Worked	-0.01	0.01	-0.08
Nature of employment	0.11	0.12	0.07
Step 2			
Recreation	-0.02	0.01	-0.31***
Self-care	0.01	0.01	-0.02
Social support	-0.01	0.01	-0.15*
Rational/cognitive coping	-0.02	0.01	-0.26***

Note. $R^2 = 0.11$ for Step 1; $\Delta R^2 = .28$ for Step 2 ($p < .001$). *$p < .05$. ** $p < .01$. *** $p < .001$.

Table 10

Summary of Hierarchical Regression Analysis for Coping Variables Predicting Suicide Probability

Variable	B	SEB	β
Step 1			
Age	0.80	1.51	0.17
Sex	1.61	3.00	0.05
Years Worked	-0.29	0.30	-0.30
Nature of employment	-2.61	2.76	-0.09
Step 2			
Recreation	-0.39	0.14	-0.24**
Self-care	0.09	0.13	0.06
Social support	-0.52	0.12	-0.34***
Rational/cognitive coping	-0.43	0.14	-0.28**

Note. R^2 = 0.2 for Step 1; ΔR^2 = .37 for Step 2 ($p < .001$). *$p < .05$. ** $p < .01$. *** $p < .001$.

Table 11

Summary of Hierarchical Regression Analysis for Coping Variables Predicting Job Satisfaction

Variable	B	SEB	β
Step 1			
Age	0.77	3.45	0.07
Sex	-6.17	6.18	-0.09
Years Worked	0.14	0.68	0.06
Nature of employment	-1.68	6.61	-0.02
Step 2			
Recreation	0.42	0.34	0.10
Self-care	-0.22	0.32	-0.06
Social support	0.13	.29	0.03
Rational/cognitive coping	2.04	0.32	0.50***

Note. R^2 = .04 for Step 1; ΔR^2 = .29 for Step 2 ($p < .001$). *$p < .05$. ** $p < .01$. *** $p < .001$.

ANALYSIS 5

This analysis was conducted to identify any moderating effects of coping on the stressor-stress relationship. This was achieved by entering the significant stressor and coping variables (identified in analysis 4) into step one in three separate hierarchical regression analyses. There were three separate hierarchical regression analyses conducted in order to identify the moderating effects on each of the three independent variable (strain, suicide probability and job satisfaction). A vector formed by calculating the cross product term of the variables deviation scores was then added at step two. Hence, the variance accounted for by the interaction term was assessed after controlling for the main effects of the significant stressors and coping factors. The first of these three hierarchical regression analyses involved strain as the dependent variable. After step one, with RO, RI, RE, SS, and RC in the equation, R_2 =.53,F(5,154)=35.31, p<.0001. After step two, with the addition of the stress x coping interaction terms to the equation, R^2 =.60,F(11,148)=19.97, p<.0001. The addition of the interaction terms to the equation resulted in a significant increment in R^2 (R^2 change =.06, p<.01). The second multiple hierarchical regression analysis involved suicide probability as the independent variable. After step one with RO, RI, PE, RE, SS and RC in the equation, R^2 =.47,F(6,137)=20.54, p<.0001. After step one with the addition of the stress x coping interaction terms to the equation, R^2 =.57,F(15,128)=11.28, p<.0001. The addition of the interaction terms to the equation resulted in a significant increment in R^2 (R^2 change =.10, p<.01). Job satisfaction was the independent variable in the third multiple hierarchical regression analysis. After step one with RI, PE and RC in the equation, R^2 =.39,F(3,161)=34.37, p<.0001. After step two with the addition of the stress x coping interaction terms to the

equation, R^2 =.40,F(5,159)=21.00, p<.0001. However, the addition of the interaction terms to the equation did not result in a significant increment in R^2 (R^2 change =.01, p>.05).

Three moderating effects were found to be significant, these being Social Support x Role Overload, and Recreation x Role Insufficiency, with strain as the dependent variable. Coping x Role Insufficiency was a significant probability as the dependent variable. No significant moderating effects were found with job satisfaction ad the dependent variable. The significant moderating effects are displayed in Figures 1, 2 and 3. The data for these figures were produced by conducting a median split on the stressor and coping measures. This classification was for the purposes of illustration.

Table 12

Summary of Hierarchical Regression Analysis for Interaction Variables Predicting Strain

Variable	B	SEB	B
Step 1			
Recreation (RE)	-0.02	0.01	-.23***
Social support (SS)	-0.01	0.01	-.12*
Rational/cognitive coping (RC)	-0.01	0.01	-.13*
Role overload (RO)	0.03	0.01	.33***
Role insufficiency (RI)	0.03	0.01	.31***
Step 2			
SS x RI	.01	7.66	.49
SS x RO	-.01	8.23	-1.18**
RC x RI	-.01	7.81	-.43
RC x RO	5.51	9.07	.23
RE x RI	-.01	7.96	-.75**
RE x RO	-5.62	8.88	-1.9

Note. R^2 = .53, F (5,154) = 35.31, p < .001 for Step 1; R^2 = .60 F (11,148) = 19.97, p < .001 for Step 2. ΔR^2 = .06, p < .01. * p < .05. ** p < .01. ***p < .001.

Table 13

Summary of Hierarchical Regression Analysis for Interaction Variables Predicting Suicide Probability

Variable	B	SEB	B
Step 1			
Social support (SS)	-0.54	0.11	-.35***
Recreation (RE)	-0.13	0.12	-.08
Rational/cognitive coping (RC)	-0.30	0.13	-.17*
Role overload (RO)	0.43	0.13	.22**
Role insufficiency (RI)	0.34	0.13	.18**
Physical environment (PE)	0.12	0.11	.07
Step 2			
RE x RO	-0.03	0.02	-.39
RE x RI	-0.02	0.02	-.30
RE x PE	0.01	0.02	.03
SS x RO	0.01	0.02	.03
SS x RI	0.02	0.02	.42
SS x PE	-0.03	0.02	-.81
RC x RO	-5.09	0.02	-.01
RC x RI	-0.06	0.02	-1.01**
RC x PE	-0.01	0.02	-.13

Note. $R^2 = .47$, F (6,137) = 20.54. $p < .001$ for Step 1; $R^2 = .57$, F (15,128) = 11.28, $p < .001$ for Step 2. $\Delta R^2 = .10$, $p < .01$. *$p < .05$. ** $p < .01$. *** $p < .001$.

Table 14

Summary of Hierarchical Regression Analysis for Interaction Variables Predicting Job Satisfaction

Variable	B	SEB	B
Step 1			
Rational/Cognitive coping (RC)	1.58	0.28	0.38***
Role insufficiency (RI)	-1.47	0.29	-.33***
Physical environment (PE)	-0.45	0.25	-.12
Step 2			
RC x RI	0.06	0.04	.43
RC x PE	-0.01	0.03	-.05

Note. $R^2 = .39$, F (3,161) = 34.37, $p < .001$ for Step 1; $R^2 = .40$, F (5,159) = 21.00, $p < .001$ for Step 2. $\Delta R^2 = .01$ $p > .05$. *$p < .05$. ** $p < .01$. *** $p < .001$.

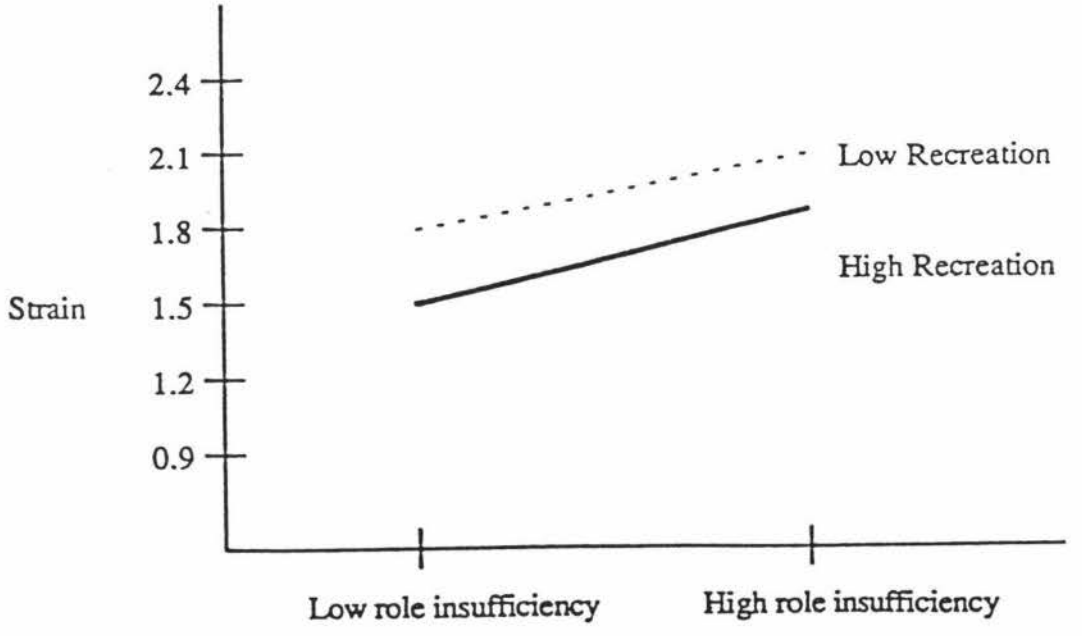

Figure 1. The moderating effects of Recreation on the role insufficiency-strain relationship.

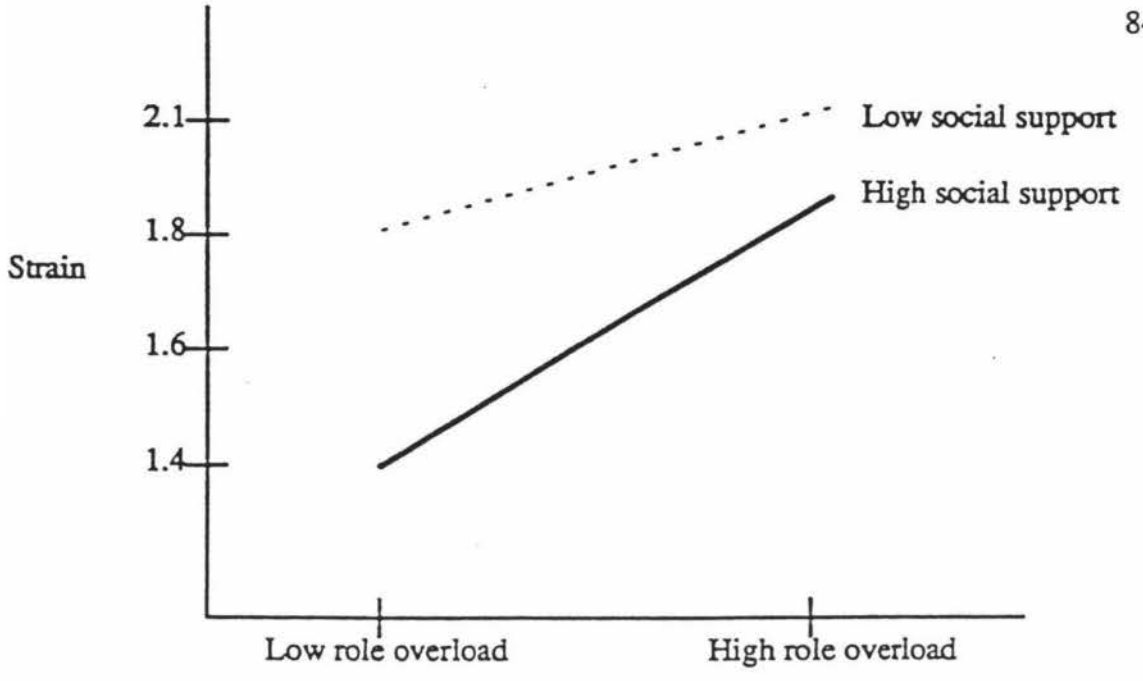

Figure 2. The moderating effects of social support on the role overload-strain relationship.

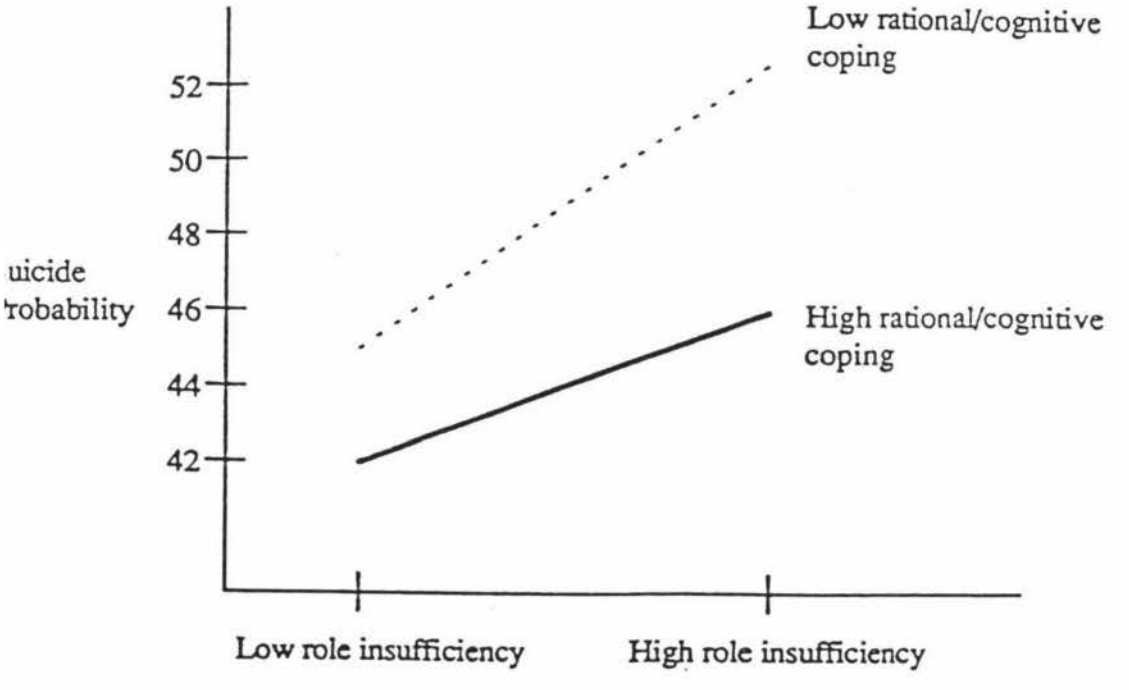

Figure 3. The moderating effects of rational/cognitive coping on the role insufficiency-suicide probability relationship.

Chapter Five

DISCUSSION

This chapter discusses the findings of this research under three main headings. The first section discusses the empirical data from both the quantitative and qualitative research highlighting cultural and gender differences in the practice of dentistry in different countries and the differences in reported coping strategies and stress levels which may result. The second section discusses the strengths and weaknesses of the different methodologies used in the present study and uses the findings of this research to draw some general conclusions concerning methodological issues within stress research. The final section raises a potentially serious criticism of occupational stress research in general, arguing that there is a pervasive tendency within the literature for researchers to interpret their data as revealing high levels of occupational stress even though this interpretation may not be warranted by the data itself.

Quantitative and qualitative data of the present study

The small number of females (n = 33) and employee dentists (n = 33) in the present study is a reflection of the small number of females and employee dentists within the profession (New Zealand Dental Association, 1995) as opposed to a sampling error. There was a significant sex difference for the stressor role overload, with females experiencing more role overload than males. No sex differences were reported for coping or stress outcomes, therefore implying that the higher levels of role overload

for female dentists could not be explained by differences in coping. Further analyses using *t* tests revealed that there were significant sex differences for age, hours worked per week, number of patients seen per week and years worked in dentistry. In these findings, females were found to be younger, worked less hours, saw less patients and had worked less years in dentistry than their male counterparts.

Research in other occupations suggests that females have higher levels of role overload than their male counterparts due to the interaction of work and non-work stressors (Behram, 1982; Smith & Reid, 1986) for example, where the female worker is also a mother. Interactions between work and non-work may therefore explain the higher levels of role overload in females in the present study. Comments to this effect were written by several female dentists on their questionnaire forms explaining that they were experiencing higher levels stress created from work and non-work interactions due to having young children. The comments were such that these female dentists were finding the role of being a mother as well as fulfilling their duties as a dentists extremely taxing.

Two significant group differences were found to occur between employee and self-employed dentists, with employee dentists experiencing greater physical environment stress and greater levels of strain. Again, no differences were found for coping between these two groups. Therefore, higher levels of physical environment stress for employee dentists may be the result of these dentists having less control over their work environment and less ability to change their physical work conditions to their satisfaction. Furthermore, higher levels of physical environment stressors would

likely result in higher levels of stress related outcomes, especially physical strain. There may also be other factors influencing these relationships, such as the differences in perception of the work environment between self-employed and employee dentists.

Increases in age and years worked as a dentist were found to have a negative relationship with role overload and responsibility in that as dentists become older (and had more experience in dentistry) these two stressors were reduced. This supports DiMatteo, Hays, Cretin and Johnson's (1990) research in which experience/age enables the dentist to learn to better organise and plan their work. No relationship was found for age and the other two stressors, role insufficiency and physical environment. Furthermore, as age and years worked as a dentist increased, so did the coping resources recreation, self-care and rational-cognitive coping. In terms of recreation and self-care, it is possible that once the dentist has established his or her practice (which would take some time), then they would have greater amounts of non-work time in which to participate in activities. The increase in rational/cognitive coping suggests that this is more of a skill, and that this skill increases with experience.

In terms of outcomes, age and years worked in the dentistry profession were such that as these factors increase, so does job satisfaction while strain decreases. This may possibly be explained by the fact that coping resources increase with age in turn reducing the effects and/or the stressors themselves. This assumed relationship can be supported in that if the stressors themselves decreased with age (i.e. due to less

clients needed because of financial security), then coping would remain the same or decrease, and hence, outcomes would be the result of this environmental change (i.e. less stressors occurring) rather than coping. However, the observed relationship was one that saw increased coping and decreased stress, suggesting that coping is a very important moderating factor in the stress-outcome relationship.

There was a strong relationship between stressors and the three stress related outcome variables, as well as for coping and the stress related outcomes. The relationships were in the same direction as for the majority of studies on dental stress as well as stress research in other occupational groups (i.e. Steffy, Jones & Noe, 1990; Wilson, 1984). That is, as stress increases, job satisfaction decreases while suicide probability and strain increase. In terms of coping, as coping increases, strain and suicide probability decrease while job satisfaction increases.

The mean responses by the sample of New Zealand dentists in the present study indicates that while such stressor-stress and coping-stress relationships exist, the degree of the stress, coping, strain, suicide probability and job satisfaction were low to moderate. These results differ from the majority of stress studies on dentists which report high levels of stressors, stress-related illness and job dissatisfaction in dentistry (i.e. DiMatteo, Shugars & Hays, 1993; Hastings, 1982; Rankin & Harris, 1990). Hence, this finding suggests that New Zealand dentists experience lower levels of stressors and stress-related illnesses than their overseas counterparts. However, an alternative explanation is that this finding may be the result of cultural differences in the expression of levels of stress and stress-related illnesses between

New Zealand and American/British dentists. That is, perhaps New Zealand dentists are less likely to "complain" than American or British dentists, or perhaps American/British dentists "complain" to a greater extent. This cultural difference would then see higher levels of stress and stress-related illnesses being reported among overseas dentists than by New Zealand dentists.

There was a greater degree of variation in terms of the different coping resources used by New Zealand dentists, with recreation and self-care being reported as occasionally to often true, while rational/cognitive coping was reported (on average) as often to usually true. The most frequent coping resource was social support being used (on average), usually to most of the time. This is interesting as the American literature has shown that dentists lack professional contact, so it would appear that social support utilised by American dentists would be largely from friends and family. However, communication with the New Zealand Dental Association has established that a large proportion of New Zealand dentists work in group practices even though they are self-employed. This means that New Zealand dentists would have a greater amount of professional contact than American dentists who work in isolation from other dentists. This is of importance as Kaufmann and Beehr (1986) propose that social support can either be used to cope with the feelings/emotions produced by the stress, or as a source of information that allows for the individual to deal directly with the stressor. As such, New Zealand dentists would be able to utilise both types of social support whereas American dentists would have to rely upon social support that deals with emotions. Therefore, the high level of social support being reported by the New Zealand dentists in the present study, in

combination with the types of social support available to them as compared to American dentists may explain why lower levels of stress and stress-related illnesses were reported in the present study.

Hierarchical multiple regressions were conducted controlling for all of the demographic variables by entering them on step one to identify those stressors that were predictors of stress-related outcomes. With strain being the dependent variable, the addition of the four stressors as a set of predictors resulted in accounting for a significant variance in strain. Specifically, role overload and role insufficiency were significant predictors of strain. This is similar to findings in other research (Bhalla, Jones & Flynn, 1990) where role stressors, in this case role load, are significant predictors of stress-related outcome variables. More specifically, this is further supported by stress research in dentistry in which factors such as time-pressure (role overload) and management stressors (role insufficiency) were frequently occurring in dentistry (DiMatteo, Shugars & Hays, 1993).

With suicide probability as the dependent variable, the four stressors as a set of predictors accounted for a significant variance in suicide probability. Of the stressors, role overload, role insufficiency and physical environment were significant individual predictors of suicide probability.

While the four stressors as a set of predictors were significant in accounting for variance in job satisfaction, physical environment was the only significant individual factor in predicting job satisfaction. This suggests that extrinsic factors are more

important to New Zealand dentists in achieving job satisfaction than intrinsic factors, suggesting that job satisfaction can be increased in New Zealand dentists by improving their work environment.

Further hierarchical multiple regressions were conducted, again controlling for all of the demographic variables by entering them in step one, with coping resources being entered in step two. This was conducted to determine whether coping was significantly related to the stress related outcomes. The four coping resources as a set of predictors accounted for significant variance in strain, suicide probability and job satisfaction.

In relation to strain and suicide probability, the significant individual coping resources were recreation, social support and rational/cognitive coping, all coping resources that have been identified as effective in reducing strain (i.e. Bhalla, Jones & Flynn, 1990). Only rational/cognitive coping was significantly related to job satisfaction, suggesting other factors apart from stress and coping contribute to a large proportion of the variance in job satisfaction.

Hierarchical multiple regression analyses were also conducted to determine whether coping would significantly moderate between the stressor-stress relationship such that coping would reduce the negative effects of stressors on strain, suicide probability and job satisfaction. This was evidenced for strain and suicide probability, but not for job satisfaction. As such, high coping was found to reduce levels of strain and suicide probability in conditions of both high and low stress. In terms of the specific

significant moderating effects, high use of the coping resource recreation significantly reduced the effects of role insufficiency on strain for both high and low levels of role insufficiency. However, even with this effect, high role insufficiency still resulted in an increase in strain even for those dentists who were high in recreation.

Dentists high in social support experienced less strain as a result of role overload than did dentists low in social support, for both high and low levels of role overload. Dentists who reported high rational/cognitive coping also reported lower levels of suicide probability than dentists low in rational/cognitive coping in conditions of both low and high role insufficiency. Furthermore, this difference in suicide probability was at its greatest for high role insufficiency, as dentists high in rational/cognitive coping increased only marginally in suicide probability as role insufficiency increased, yet dentists low in rational/cognitive coping increased in suicide probability at a greater rate when role insufficiency increased.

Methodological issues in the present study and within the stress research literature

The present study has a number of limitations which must be acknowledged. The results of the present study may have possibly been biased in a positive direction because dentists who had left the profession were not surveyed. Also, while the anonymous design of the present study was aimed at encouraging honest responses, there is no way to ensure that the self-report data was accurate, due to two primary concerns.

1. Some dentists may have been unaware of all the stressors and health problems affecting them, as well as their coping resources.
2. Some dentists may have been reluctant to report suicidal thoughts, depression, or an inability to cope with stress.

No other occupational groups were involved in the present study, and as such informative group comparisons were unable to be performed. Also, the small sample size of employee and female dentists raises issues of statistical power in the comparison of these group differences.

The interviews provided support for time pressures, patient interactions and work duties, which have been found in previous studies to be significant occupational stressors to dentists. However, these studies all used questionnaires, and as such Dewe (1991) argues that such measures may be too general to pick up specific occupational stressors. While only 12 dentists were interviewed, these criticisms seem justified as additional stressors were identified that were not identified through the Occupational Stress Inventory questionnaire. These stressors were legislative changes in New Zealand, as well as New Zealand's socio-economic factors, and striving for perfection in dental procedures.

Hence, support is gained for the proposition that stress measures need to include the ability to measure job-specific stressors, such as accommodating for the differing societal climates among nations. Therefore, while factors such as patient interactions and time pressure appear to be consistent between New Zealand and American

dentists, New Zealand dentists are also encountering stressors that originate due to and as a reflection of both legislative and socio-economic changes in New Zealand. Thus, it seems plausible that such stressors would differ among countries, resulting in both similar (i.e. time pressure) and dissimilar (i.e. legislation) stressors for dentists.

The correlations of the quantitative data in the present study support the qualitative data that levels of stress and stress-related illnesses decrease as experience (years worked in the dentistry profession) increases. Furthermore, the qualitative data also identified that consistent stressors (i.e. time pressure) vary in terms of degree over time. For example, while time pressure has been shown to be experienced by the majority of dentists, the level of this stressor varies over time for each individual dentist. This can occur as factors such as inefficient staff may increase time pressure, but when more effective staff members are employed the level of this stressor is reduced. Hence, studies using a cross-sectional design may differ with longitudinal research in terms of which is the most significant stressor to dentists. This difference is apparent in the research on dentists, with the same stressors being identified, but the order of significance differing among studies (DiMatteo, Shugars & Hays, 1993; Hillard-Lysen & Riemer, 1988).

The interviews identified coping techniques such as non-work activities (similar to recreation in the OSI), mentally shutting off (a type of rational/cognitive coping as measured in the OSI), "refresher" breaks between patients, exercise and talking with staff and partner. All of the interviewed dentist believed they coped well, but this

cannot be confirmed as no other measures were used i.e. appraisals by others, due to time constraints.

Interestingly, the qualitative data identified that job satisfaction was achieved through factors that also created stressors, indicating that successful coping may result in higher job satisfaction than poor coping, especially when considering that the sources of job satisfaction and stress appear to be the same.

Implications of the present studies findings

The area of occupational stress research has been criticised in that there is a tendency to imply high levels of stress, even if the results do not fully corroborate such conclusions (Newton, 1995). For example, many of the dental studies have produced percentages of stress-related outcomes, concluding that dentistry is a stressful occupation (i.e. Hastings, 1982). However, such conclusions are ill founded as comparisons with other occupational groups and the general population need to be made before arriving at such conclusions. As such, there is a tendency of occupational stress researchers to expect that their research will show high levels of stress, and therefore are not completely objective in terms of interpreting the results (Newton, 1995). For example, one dental stress study (Rankin & Harris, 1990) gives a figure of 18% of dentists who always or frequently have an alcoholic drink in the evening, and then conclude that this is evidence for a high rate alcoholism among dentists. Therefore, the lack of low or average levels of stress in occupational stress research is questioned on these grounds and on the basis of the present study, which being well designed did not report high levels of stress amongst an occupational

group that other research has signalled as being one of the most stressful professions, with high levels of stress-related illness and even suicide rates.

Conclusion

The results of the present study identified significant consistent positive relationship between coping and job satisfaction, and significant consistent negative relationships between coping and strain, and coping and suicide probability. Significant consistent positive relationships were found between stressors and strain and stressors and suicide probability. A significant, consistent negative relationship was identified between stressors and job satisfaction. Additionally, coping was found to be a significant moderator between the stressor-stress relationship, in that coping reduced the negative effects of stressors on New Zealand dentists. However, while these relationships were identified, the levels of stressors and stress were reported as being between low and moderate. Levels of coping resources were also reported as being low to moderate, with the exception of social support, which was reported as being frequently used. While the identified stressor, coping and stress relationships in the present study were as reported in the majority of dental and other occupational stress research, the low levels of stressors and stress in New Zealand dentists conflicts with previous research on stress in dentistry. This finding is suggested as being the result of structural differences in New Zealand dental practices which allow for all sources of social support to be utilised. Additionally, it was also suggested that this finding may be more of an accurate report of stress in dentistry due to criticisms of occupational stress research tending to interpret all results as evidence of high stress levels. The addition of the qualitative data in the present study supports the previous

identification of stressors in dentistry, as well as having identified previously unreported stressors in dentistry. This finding supports recent recommendations in the occupational stress literature that stress measures need to include occupationally specific stressors to produce an accurate reflection of the stressors in a particular occupation.

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Appendix One

Please tick the appropriate box:

Age:
☐ 20-25 ☐ 26-30 ☐ 31-35
☐ 36-40 ☐ 41-45 ☐ 46-50
☐ 51-55 ☐ 56-60 ☐ 60+

Sex:
☐ Male
☐ Female

What ethnic group to you identify with? (i.e. Maori, Pakeha, Pacific Island etc)

_____

How long have you worked in the dental profession (years) _____

How many patients do you attend to weekly (on average): _____

What is the average number of hours you work per week? _____

How many dental assistants do you have? _____

How many other staff members do you have (i.e. office staff)? _____

On average, how long do you take for lunch each day? _____

What are the average hours per month you work in the evenings and/or weekends?

_____

Are you in general or specialised practice?

☐ General
☐ Specialised. In which area? _____

Do you work in a private practice:

☐ For yourself
☐ As an employee

or, does your work occur in a setting other than private practice?

Please specify: _____

DIRECTIONS: Please read each statement carefully. For each statement, circle the number which fits you best.

Circle 1 if the statement is *rarely* or *never* true.
Circle 2 if the statement is *occasionally* true.
Circle 3 if the statement is *often* true.
Circle 4 if the statement is *usually* true.
Circle 5 if the statement is true *most of the time.*

For example, if you believe that a statement if often true about you, you would circle 3 for that statement on your rating sheet.

Example

1. 1 2 3 4 5

Please circle only one number for each statement. Be sure to rate all of the statements for each section you are asked to complete. If you need to change an answer, make an "X" through the incorrect response and then circle the correct number.

1.	At work I am expected to do too many difficult tasks in too little time.	1	2	3	4	5
2.	I feel that my job responsibilities are increasing.	1	2	3	4	5
3.	I am expected to perform tasks on my job for which I have never been trained.	1	2	3	4	5
4.	I have to take work home with me.	1	2	3	4	5
5.	I have the resources I need to get my job done.	1	2	3	4	5
6.	I feel competent in what I do.	1	2	3	4	5
7.	I work under tight time deadlines.	1	2	3	4	5
8.	I wish that I had more help to deal with the demands placed upon me at work.	1	2	3	4	5
9.	My job requires me to work in several equally important areas at once.	1	2	3	4	5

10.	I am expected to do more work than is reasonable.	1	2	3	4	5
11.	I feel that my career is progressing about as I hoped it would.	1	2	3	4	5
12.	I feel that my job fits my skills and interests.	1	2	3	4	5
13.	I am bored with my job.	1	2	3	4	5
14.	I feel I have enough responsibility on my job.	1	2	3	4	5
15.	I feel my talents are being used on my job.	1	2	3	4	5
16.	I feel my job has a good future.	1	2	3	4	5
17.	I am able to satisfy my needs for success and recognition in my job.	1	2	3	4	5
18.	I feel overqualified for my job.	1	2	3	4	5
19.	I learn new skills in my work.	1	2	3	4	5
20.	I have to perform tasks that are beneath my ability.	1	2	3	4	5
21.	I feel I deal with more people during the day than I prefer.	1	2	3	4	5
22.	I spend time concerned with the problems others at work bring to me.	1	2	3	4	5
23.	I am responsible for the welfare of subordinates.	1	2	3	4	5
24.	People on the job look to me for leadership.	1	2	3	4	5
25.	I have on the job responsibility for the activities of others.	1	2	3	4	5
26.	I worry about whether the people who work for/with me will get things done properly.	1	2	3	4	5

27.	People who work for/with me are really hard to deal with.	1	2	3	4	5
28.	If I make a mistake in my work, the consequences for others can be pretty bad.	1	2	3	4	5
29.	My job demands that I handle an angry public.	1	2	3	4	5
30.	I like the people I work with.	1	2	3	4	5
31.	On my job I am exposed to high levels of noise.	1	2	3	4	5
32.	On my job I am exposed to high levels of wetness.	1	2	3	4	5
33.	On my job I am exposed to high levels of dust.	1	2	3	4	5
34.	On my job I am exposed to high temperatures.	1	2	3	4	5
35.	On my job I am exposed to bright lights.	1	2	3	4	5
36.	On my job I am exposed to low temperatures.	1	2	3	4	5
37.	I have an erratic work schedule.	1	2	3	4	5
38.	On my job I am exposed to personal isolation.	1	2	3	4	5
39.	On my job I am exposed to unpleasant odours.	1	2	3	4	5
40.	On my job I am exposed to poisonous substances.	1	2	3	4	5
41.	I don't seem to be able to get much done at work.	1	2	3	4	5
42.	I dread going to work, lately.	1	2	3	4	5
43.	I am bored with my work.	1	2	3	4	5
44.	I find myself getting behind in my work, lately.	1	2	3	4	5

45.	I have accidents on the job of late.	1	2	3	4	5
46.	The quality of my work is good.	1	2	3	4	5
47.	Recently, I have been absent from work.	1	2	3	4	5
48.	I find my work interesting and/or exciting.	1	2	3	4	5
49.	I can concentrate on the things I need to at work.	1	2	3	4	5
50.	I make errors or mistakes in my work.	1	2	3	4	5
51.	Lately, I am easily irritated.	1	2	3	4	5
52.	Lately, I have been depressed.	1	2	3	4	5
53.	Lately, I have been feeling anxious.	1	2	3	4	5
54.	I have been happy, lately.	1	2	3	4	5
55.	So many thoughts run through my head at night that I have trouble falling asleep.	1	2	3	4	5
56.	Lately, I respond badly in situations that normally wouldn't bother me.	1	2	3	4	5
57.	I find myself complaining about little things.	1	2	3	4	5
58.	Lately, I have been worrying.	1	2	3	4	5
59.	I have a good sense of humour.	1	2	3	4	5
60.	Things are going about as they should.	1	2	3	4	5
61.	I wish I had more time to spend with close friends.	1	2	3	4	5
62.	I quarrel with my spouse.	1	2	3	4	5
63.	I quarrel with friends.	1	2	3	4	5
64.	My spouse and I are happy together.	1	2	3	4	5
65.	Lately, I do things by myself instead of with other people.	1	2	3	4	5

66.	I quarrel with members of the family.	1	2	3	4	5
67.	Lately, my relationships with people are good.	1	2	3	4	5
68.	I find that I need time to myself to work out my problems.	1	2	3	4	5
69.	I wish I had more time to spend by myself.	1	2	3	4	5
70.	I have been withdrawing from people lately.	1	2	3	4	5
71.	I have unplanned weight gains.	1	2	3	4	5
72.	My eating habits are erratic.	1	2	3	4	5
73.	I find myself drinking a lot lately.	1	2	3	4	5
74.	Lately, I have been tired.	1	2	3	4	5
75.	I have been feeling tense.	1	2	3	4	5
76.	I have trouble falling and staying asleep.	1	2	3	4	5
77.	I have aches and pains I can not explain.	1	2	3	4	5
78.	I eat the wrong foods.	1	2	3	4	5
79.	I feel apathetic.	1	2	3	4	5
80.	I feel lethargic.	1	2	3	4	5
81.	When I need a vacation I take one.	1	2	3	4	5
82.	I am able to do what I want to do in my free time.	1	2	3	4	5
83.	On weekends I spend time doing the things I enjoy most.	1	2	3	4	5
84.	Lately, my main recreational activity is watching television.	1	2	3	4	5
85.	A lot of my free time is spent attending performances (e.g., sporting events, theatre, movies, concert, etc).	1	2	3	4	5

86.	I spend a lot of my free time in participant activities (e.g., sports, music, painting, woodworking, sewing, etc).	1	2	3	4	5
87.	I spend a lot of my time in community activities (e.g., scouts, religious, school, local, government, etc).	1	2	3	4	5
88.	I find engaging in recreational activities relaxing.	1	2	3	4	5
89.	I spend enough time in recreational activities to satisfy my needs.	1	2	3	4	5
90.	I spend a lot of my free time on hobbies (e.g., collections of various kinds, etc).	1	2	3	4	5
91.	I am careful about my diet (e.g., eating regularly, moderately, and with good nutrition in mind).	1	2	3	4	5
92.	I get regular physical checkups.	1	2	3	4	5
93.	I avoid excessive use of alcohol.	1	2	3	4	5
94.	I exercise regularly (at least 20 minutes most days).	1	2	3	4	5
95.	I practice "relaxation" techniques.	1	2	3	4	5
96.	I get the sleep I need.	1	2	3	4	5
97.	I avoid eating or drinking things I know are unhealthy (e.g., coffee, tea, cigarettes, etc).	1	2	3	4	5
98.	I engage in meditation.	1	2	3	4	5
99.	I practice deep breathing exercises a few minutes several times each day.	1	2	3	4	5
100.	I set aside time to do the things I really enjoy.	1	2	3	4	5
101.	There is at least one person important to me who values me.	1	2	3	4	5
102.	I have help with tasks around the house.	1	2	3	4	5

103.	I have help with the important things that have to be done.	1	2	3	4	5
104.	There is at least one sympathetic person with whom I can discuss my concerns.	1	2	3	4	5
105.	There is at least one sympathetic person with whom I can discuss my work problems.	1	2	3	4	5
106.	I feel I have at least one good friend I can count on.	1	2	3	4	5
107.	I feel loved.	1	2	3	4	5
108.	There is a person with whom I feel really close.	1	2	3	4	5
109.	I have a circle of friends who value me.	1	2	3	4	5
110.	I gain personal benefit from participation in formal social groups (e.g., religious, political, professional organizations, etc).	1	2	3	4	5
111.	I am able to put my job out of my mind when I go home.	1	2	3	4	5
112.	I feel that there are other jobs I could do besides my current one.	1	2	3	4	5
113.	I periodically re-examine or reorganize my work style and schedule.	1	2	3	4	5
114.	I can establish priorities for the use of my time.	1	2	3	4	5
115.	Once they are set, I am able to stick to my priorities.	1	2	3	4	5
116.	I have techniques to help avoid being distracted.	1	2	3	4	5
117.	I can identify important elements of problems I encounter.	1	2	3	4	5
118.	When faced with a problem I use a systematic approach.	1	2	3	4	5

119.	When faced with the need to make a decision I try to think through the consequences of choices I might make.	1	2	3	4	5
120.	I try to keep aware of important ways I behave and things I do.	1	2	3	4	5

DIRECTIONS: Listed below are a series of statements that some people might use to describe their feelings and behaviours. Please read each statement and determine how often the statement is true for you. Then circle the letter T in the appropriate area to indicate how often you feel the statement applies to you.

EXAMPLE:

	None or a little of the time	Some of the time	Good part of the the time	Most of all of the time
1. I feel anxious.	T	T	T	T

	None or a little of the time	Some of the time	Good part of the the time	Most of all of the time
1. When I get mad I throw things.	T	T	T	T
2. I feel many people care for me deeply.	T	T	T	T
3. I feel I tend to be impulsive.	T	T	T	T
4. I think of things too bad to share with others.	T	T	T	T
5. I think I have too much responsibility.	T	T	T	T
6. I feel there is much I can do which is worthwhile.	T	T	T	T
7. In order to punish others I think of suicide.	T	T	T	T
8. I feel hostile toward others.	T	T	T	T
9. I feel isolated from people.	T	T	T	T
10. I feel people appreciate the real me.	T	T	T	T

	None or a little of the time	Some of the time	Good part of the the time	Most of all of the time
11. I feel many people will be sorry if I die.	T	T	T	T
12. I feel so lonely I cannot stand it.	T	T	T	T
13. Others feel hostile toward me.	T	T	T	T
14. I feel, if I could start over, I would make many changes in my life.	T	T	T	T
15. I feel I am not able to do many things well.	T	T	T	T
16. I have trouble finding and keeping a job I like.	T	T	T	T
17. I think that no one will miss me when I am gone.	T	T	T	T
18. Things seem to go well for me.	T	T	T	T
19. I feel people expect too much of me.	T	T	T	T
20. I feel I need to punish myself for things I have done and thought.	T	T	T	T
21. I feel the world is not worth continuing to live in.	T	T	T	T
22. I plan for the future very carefully.	T	T	T	T
23. I feel I don't have many friends I can count on.	T	T	T	T
24. I feel people would be better off if I were dead.	T	T	T	T

	None or a little of the time	Some of the time	Good part of the the time	Most of all of the time
25. I feel it would be less painful to die than to keep living the way things are.	T	T	T	T
26. I feel/felt close to my mother.	T	T	T	T
27. I feel/felt close to my mate.	T	T	T	T
28. I feel hopeless that things will get better.	T	T	T	T
29. I feel people do not approve of me or what I do.	T	T	T	T
30. I have thought of how to do myself in.	T	T	T	T
31. I worry about money.	T	T	T	T
32. I think of suicide.	T	T	T	T
33. I feel tired and listless.	T	T	T	T
34. When I get mad I break things.	T	T	T	T
35. I feel/felt close to my father.	T	T	T	T
36. I feel I can't be happy no matter where I am.	T	T	T	T

Directions: For each statement listed below, please circle the *one* number that represents your level of agreement. Use the following Scale:

5 = (SA) Strongly agree
4 = (A) Agree
3 = (N) Neither agree or disagree
2 = (D) Disagree
1 = (SD) Strongly disagree

1.	I have very little time to keep abreast of advances in the field of dentistry.	1	2	3	4	5
2.	I do not get the respect that I deserve.	1	2	3	4	5
3.	My income allows me to provide very well for my family.	1	2	3	4	5
4.	I am skilled at dealing with my patients' dental problems.	1	2	3	4	5
5.	Dentistry fulfils my earliest career aspirations.	1	2	3	4	5
6.	I have enough time to improve my clinical skills.	1	2	3	4	5
7.	I am able to practice dentistry the way I want to.	1	2	3	4	5
8.	The quality of specialists to whom I can refer patients is low.	1	2	3	4	5
9.	I find my relationships with patients satisfying.	1	2	3	4	5
10.	Dentistry fulfils my current career aspirations.	1	2	3	4	5
11.	Dentistry is a very stressful profession.	1	2	3	4	5
12.	The income I receive from this practice is much too low.	1	2	3	4	5
13.	I wish I could drop my job to do something else.	1	2	3	4	5
14.	I manage the business aspects of my job quite well.	1	2	3	4	5

15.	I have been able to incorporate into my practice the technological changes occurring in dentistry.	1	2	3	4	5
16.	I have enough personal time available for my personal life.	1	2	3	4	5
17.	If my child were interested in dentistry, I would encourage him/her to pursue a dental career.	1	2	3	4	5
18.	I enjoy the business side of the practice.	1	2	3	4	5
19.	The quality of my auxiliary personnel is lacking.	1	2	3	4	5
20.	I feel quite proud to be a dentist.	1	2	3	4	5
21.	I appear more satisfied with my job than I really am.	1	2	3	4	5
22.	Compared to other dentists my total earnings are much lower than I desire.	1	2	3	4	5
23.	I do not have enough time to improve my clinical skills.	1	2	3	4	5
24.	Relating to patients is very frustrating for me.	1	2	3	4	5
25.	Knowing what I know now, I would make the same decision to go into dentistry again.	1	2	3	4	5
26.	I am very likely to change careers in the next 5 years.	1	2	3	4	5
27.	There is an insufficient number of specialists to whom I can refer patients.	1	2	3	4	5
28.	I lack opportunities to provide quality care.	1	2	3	4	5
29.	Dentistry is the place where I can make my best contribution.	1	2	3	4	5
30.	There is very little prestige associated with my work.	1	2	3	4	5
31.	I have sufficient time available for leisure activities.	1	2	3	4	5
32.	Doing dentistry is very stressful for me.	1	2	3	4	5
33.	I do not enjoy interacting with my patients.	1	2	3	4	5

34.	Overall, I am extremely satisfied with my career.	1	2	3	4	5
35.	The work performance of my auxiliaries is outstanding.	1	2	3	4	5
36.	The business side of the practice is in a shambles.	1	2	3	4	5
37.	The office staff works well together.	1	2	3	4	5
38.	I feel trapped in my current position.	1	2	3	4	5
39.	The income that I receive from my practice is most satisfactory for my desire.	1	2	3	4	5
40.	I manage the business aspect of the office very well.	1	2	3	4	5
41.	I have enough time to devote to my patients dental needs.	1	2	3	4	5
42.	I have high quality specialists to whom I can refer patients.	1	2	3	4	5
43.	I have sufficient time for professional contacts with colleagues.	1	2	3	4	5
44.	My income is not nearly as high as that of other dentists.	1	2	3	4	5
45.	The quality of interpersonal care I provide is very high.	1	2	3	4	5
46.	I find the diagnostic and treatment planning components of practice to be the most satisfying.	1	2	3	4	5
47.	I am very pleased with my income compared to other dentists.	1	2	3	4	5
48.	I have very limited opportunity to discuss difficult cases with colleagues.	1	2	3	4	5
49.	I enjoy helping patients.	1	2	3	4	5
50.	I am extremely pleased with the technical quality of my work.	1	2	3	4	5
51.	My income compares favourably to that of other professionals.	1	2	3	4	5
52.	I have too little time available for leisure.	1	2	3	4	5

Appendix Two

1. Can you please describe (from 'most' to 'least') the pressures that you see as occurring in your work.
2. Can you please describe (from 'most' to 'least') the satisfying aspects that occur in your work.
3. Can you please describe a work situation/event in the last 6 months that you felt was stressful.
4. Can you please explain what it is about this situation/event that made/makes it stressful for you.
5. How did this situation/event make you feel? How long did this feeling last?
6. Would you describe the situation/event as a 'one off' experience, or is it recurring/constant?
7. How did you attempt to cope (if at all) with this situation/experience?
8. Can you please explain why you chose this approach to cope.
9. Do you believe that you were successful in coping with the situation/event? Why/why not?
10. How did you attempt to cope (if at all) with the way the situation/event made you feel?
11. Can you please explain why you chose this approach.
12. Do you believe that you were successful in coping with these feelings? Why/why not?
13. Can you please describe a work situation/event in the last 6 months that you felt was satisfying.

14. Can you please explain what it is about this situation/event that made/makes it satisfying for you.

15. How did this situation/event make you feel? How long did this feeling last?

16. Would you describe the situation/event as a 'one off' experience, or is it recurring/constant?

17. Knowing what you know now, would you still make the same decision to go into dentistry again? Why/why not?