THERAPEUTIC EFFECTS OF MASSAGE ON COPING WITH STRESS AND MIGRAINE:
A SELF-REGULATORY PERSPECTIVE

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ABSTRACT

Massage therapy, now considered a complementary therapy has seen growing interest and popularity in both research and use by the general population. Firstly, this thesis aimed to extend the research investigating the beneficial effects of massage therapy by developing and assessing an integrative model of massage effects on stress, coping, and physiological processes by using Leventhal's Common Sense Model (CSM) of the self-regulation of behaviour. Secondly, this thesis aimed to investigate the duration of massage effects by including assessment periods past the last day of intervention and measures of coping efficacy and perceived stress. The first study investigated the effects of massage therapy (compared to a television activity) on perceived stress, coping efficacy, sleep, and health variables in students leading up to final examinations. Results revealed that massage was more effective than the television activity in reducing perceived stress and improving coping efficacy. The second study extended the first study by investigating the effects of massage (compared to a daily diary control group) for migraine sufferers, as migraine is exacerbated by stress and a stressful condition to manage. Results revealed that the massage group exhibited a reduction in migraine frequency, fatigue, and improved sleep quality, compared to the daily diary control group. The integrated CSM was further extended in the second study to investigate how the physiological processes of migraine may interact with migraine mechanisms. In both studies, the massage group revealed a significant decrease in immediate measures of heart rate and state anxiety from pre- to post-massage. The migraine massage group also exhibited decreases in salivary cortisol from pre-to post-massage. The findings are consistent with the integrated CSM of massage and self-regulation of behaviour, highlighting that massage can be a useful emotional regulation strategy through its influence on perceived stress, coping efficacy, and physiological processes. Immediate massage effects revealed reductions in state anxiety, and other physiological stress processes (heart rate and cortisol), and these changes may lead to alterations in cognitive appraisals of stressors, thus impacting on coping efficacy. Given the potential benefits identified in these two studies as well as previous massage research, an anonymous survey was conducted with general practitioners (GPs) and patients in the Auckland area to explore their attitudes, beliefs, and use of massage therapy and other complementary therapies. Results revealed that GPs regularly recommend patients see a massage therapist, and the majority of patients reported using massage in the previous year, most commonly for stress and musculoskeletal problems. The majority of GPs would like to see regulatory standards implemented for complementary medicine.

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CHAPTER 1
RATIONALE

There is growing interest in massage therapy and other forms of complementary/alternative medicine (CAM), as reflected in their increasing coverage in the popular media and in medical and psychological literature (Ong *et al.*, 2002). Massage is defined as the conscious manipulation of soft tissue (muscles, fat, connective tissue, and skin) of the body for therapeutic purposes (Westland, 1993) to bring about generalised improvements in health. Examples of these improvements are relaxation, improved sleep, and specific physical benefits such as relief of muscular aches and pains (Vickers & Zollman, 1999). Research has demonstrated that use of massage therapy and other forms of CAM is increasing dramatically in many countries (National Centre for Complementary and Alternative Medicine, 2000; Wootton & Sparber, 2001). National surveys in the United States found that the proportion of individuals using some form of CAM rose from 34% in 1990 to 42% in 1997 (Eisenberg et al., 1998). Other national surveys in the United States have found that massage therapy use increased from 8% to 21% during the six years between 1997 and 2003. The most commonly cited reasons for using massage therapy were stress management and relaxation (American Massage Therapy Association, 2003).

There is an increasing amount of research investigating the effect of massage therapy on health, with promising evidence of its effects on mood, energy levels, alertness, and physiology (Field, 1998; Moyer *et al.*, 2004). These findings suggest that there may be massage therapy effects on a variety of cognitive, emotional, and physiological processes that are involved in stress experiences. To date though, these effects have been assessed in a non-integrative, piecemeal fashion.

The aims of the present research are, firstly, to develop and assess an integrative model of massage therapy effects on stress, coping, and physiological processes by using Leventhal's Common Sense Model (CSM) of the self-regulation of behaviour (Leventhal *et al.*, 1980). The CSM was chosen as it incorporates the relevant aspects of emotional and cognitive processes as they relate to stress and coping. The CSM delineates ways in which a person regulates his/her own behaviour by developing cognitive and emotional representations of events, formulating and enacting goals and plans, and appraising feedback and outcomes (Cameron & Leventhal, 2003). Moreover, it can be expanded to incorporate the physiological processes involved in stress responses, such as the autonomic nervous system and neuroendocrine responses. Massage therapy can be considered as an

emotional regulation technique that affects physiological processes, emotional states, and cognitions.

Secondly, with this model as the theoretical framework, this thesis will explore the effects of massage therapy on self-regulation processes in two contexts: 1) Coping with examination stress in healthy individuals; and 2) Coping with the stress-related illness condition of migraines. Stress can be considered as a pattern of responses to external stimuli (actions, situations, or events) that place physical or psychological demands on a person (Sapolsky, 1998). Stress is not a simple variable; rather, it is a system of interdependent processes in which appraisal and coping responses mediate the frequency, intensity, duration, and type of emotional, cognitive, and somatic responses (DeLongis *et al.*, 1988). The first study will consider the stressor of examinations. Student stress has been the focus of research for many years, as students face predictable periods of stress, such as final examinations throughout a semester. Student health and well-being is often investigated, as students often present with health-related disorders and psychological distress, such as high anxiety (Farnill & Robertson, 1990; Hudd *et al.*, 2000; Rawson *et al.*, 1994; S. M. Stewart *et al.*, 1995; Trockel *et al.*, 2000). Massage research indicates promising findings for a number of processes involved in the stress and coping process.

Migraine is a highly prevalent and distressing disorder that can be exacerbated by stress and also a stressful condition to manage. Migraine has a profound effect on a person's well-being and general functioning in terms of work performance, school achievements, and social relationships (Warshaw & Burton, 1998; Warshaw *et al.*, 1998). Migraine attacks are extremely variable, ranging in frequency (from less than one a year to several attacks per week) and in intensity (from mild to excruciating and disabling) (Warshaw et al., 1998). Migraine has several classifications, with the most common type usually involving only one side of the head and accompanied by nausea, vomiting and/or aversion to light (Headache Classification Committee of the International Headache Society, 1988). One previous study has investigated the effects of massage on migraine, with promising results; however its impact on stress and coping was not investigated directly (Hernandez-Reif *et al.*, 1998). Issues specific to migraine will be outlined more fully in Chapter 8.

Lastly, given the evidence regarding the benefits of massage therapy (Field, 1998; Moyer et al., 2004), it is important to consider its acceptance in the medical community and the potential barriers to its effective use. Possible barriers could include lack of awareness and knowledge of massage therapy amongst doctors and patients, and a poor understanding of

massage therapy training standards and current policy for complementary therapies and medicines. An exploratory survey was conducted to examine the attitudes, beliefs, and use of massage therapy and other complementary therapies in general practitioners and patients in Auckland, New Zealand.

Organisation of Thesis

The thesis begins with an overview of self-regulation theory of stress and coping, with particular focus on the CSM of self-regulation (Leventhal *et al.*, 2003). This chapter also discusses the autonomic and neuroendocrine processes involved in the stress response. Other systems affected by stress, such as the musculoskeletal system, sleep patterns, and health behaviours are also covered. The next theoretical chapter reviews massage research to date and the psychophysiological mechanisms that have been proposed to be responsible for its effects. The thesis then focuses on each of the three studies in turn. A lead-in chapter that integrates relevant literature with self-regulation and massage mechanisms precedes each study. The first study assesses the effects of massage therapy on stress and coping processes in a population of healthy students preparing for final examinations. The second study builds on this first study by investigating the effects of massage therapy on a disorder that is both exacerbated by stress and a source of ongoing stress: Migraines. The final study shifts focus by investigating general practitioners' and patients' attitudes, beliefs, and use of massage therapy and other forms of complementary and alternative medicine. The last chapter of this thesis provides a general discussion of the findings in relation to the development of the proposed integrated CSM of massage influences on stress and coping processes.

CHAPTER 2
THEORETICAL OVERVIEW: SELF-REGULATION OF STRESS, COPING, AND PHYSICAL HEALTH

Overview

A number of different self-regulation models are used across a variety of disciplines, such as education, organisational psychology, developmental psychology, and social cognition (Cameron & Leventhal, 2003). These theories are marked by differences in specifications and focus, but there are common themes. The basic premise of all self-regulation theories of human behaviour is that there is a systematic process involving conscious efforts in modulating emotional, cognitive, and behavioural components. These components are involved in setting goals, appraising progress, achieving goals, revising goals, and perceiving and responding to experiences within an ever-changing environment (Cameron & Leventhal, 2003; Cameron & Nicholls, 1998; Zeidner *et al.*, 2000). One of the fundamental aspects of the self-regulation system is that emotional processes are integrally linked with cognitive processes in problem solving, goal setting, and efforts towards achieving goals (Cameron & Nicholls, 1998; Carver & Scheier, 1998). Leventhal's CSM of self-regulation (Leventhal et al., 1980) will be the basic theoretical framework used in the thesis, as it delineates both cognitive and emotional aspects of regulation, affected by stress processes. In addition, no psychological model has ever been applied to the effects demonstrated from massage.

Leventhal's Common Sense Model of Self-Regulation

Leventhal's (1980) CSM (Figure 1) framework for self-regulation has been used primarily to understand coping with health threats, but is applicable as a general model of coping with any sort of threat or stressor. The original CSM will be elaborated further in this thesis to include physiological stress responses and their role in the self-regulation process. According to the CSM, stressful experiences or threats elicit the activation of two motivational systems: one involving cognitive processes for regulating the threat or stressor, and the other involving emotional processes for regulating fear and anxiety (Cameron, 2004). The cognitive, problem-focused system involves the activation and development of a representation of a stressor (e.g., final examinations, migraine headaches), which guides the selection and use of coping strategies for controlling the stressor. Appraisals of coping success or failure can lead to revised outcome criteria, the

selection of new procedures or goals, changes in the representation and/or changes in the eliciting stimuli (Leventhal *et al.*, 1997; Leventhal *et al.*, 1992). The emotional system involves the elicitation of emotional responses, commonly anxiety and fear, which motivate behaviours to cope with and control the emotional distress. Like the cognitive system, appraisals of the success or failure of these efforts are used to guide further regulation efforts (Cameron, 2004). The emotional system responds to cues of threat with the activation of anxiety and its associated perceptual, goal activation, and behavioural readiness patterns: narrowing of attention, increased vigilance of stressor-related stimuli, and preparedness of physiological stress responses for action. The specific strategies chosen to cope with a threat or stressor are defined by the properties of that threat/stressor, the resources available to the individual, and the social context and culture (Leventhal et al., 1992). The CSM has previously been used to examine coping and adjustment in response to stressful experiences. For example, Cameron and Nicholls (1998) used the CSM to assess the effects of a guided emotional disclosure writing task as a stress management technique.
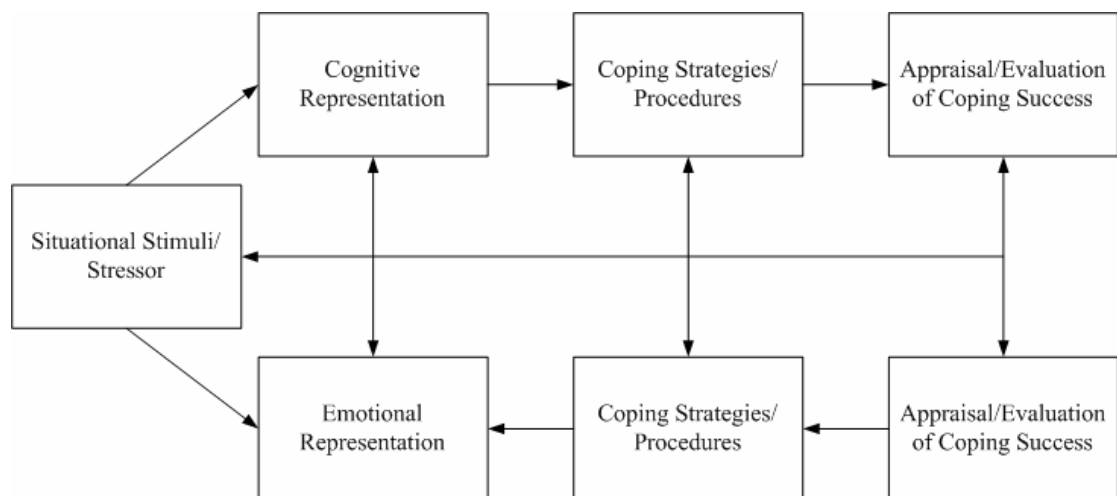
Figure 1. Common Sense Model of Stress and Coping (Leventhal, Meyer & Nerenz, 1980).

Representation, Coping, and Appraisal in the CSM

The management of stressful experiences involves the representation of the stressor/threat and the emotional responses accompanying them, procedures for coping, and outcome appraisals. Situational stimuli (both internal and external) create both cognitive and emotional representations in response to the stressor or threat (Leventhal et al., 1997) and the representation helps to define the meaning and appropriateness of coping procedures. Thus, the representation shapes the selection of and outcome expectations for available coping procedures. As meaning is dynamic and specific to the situation, representations will change in response to changes in the eliciting stimuli, leading to adjustments in coping behaviours.

Both cognitive (problem-focused) and emotion-focused representations of a stressor operate at an abstract, conceptual level and a concrete, perceptual level. For example, stressor representations and emotion representations will incorporate both abstract knowledge and concrete imagery (Cameron, 2003). For students facing the stressor of examinations, abstract content may include the perceived consequences of failure and how long the stressful period will last, while the concrete content may include memories of anxiety experienced prior to previous examinations. The experience of a migraine will influence the formation of key attributes of migraine representations that incorporate both abstract and concrete content. Abstract content may relate to perceived causes and consequences of an attack, and concrete content will relate to the symptoms and anxiety about how long an attack is going to last. Representations and threat appraisals can shape anxiety and fear responses; in turn, these responses can affect perceptions of threat cues, representation development, and selections of coping strategies (Cameron, 2003).

Emotional distress can influence self-regulation in a number of ways. Anxiety can be considered as a vague unpleasant emotion that is experienced in anticipation of some event, or after the perception of a stressful stimuli (Sapolsky, 1998). Firstly, anxiety arousal is likely to influence the formation of representations through perceptual processes, which may enhance detection of and attention to stressor-related cues. Secondly, anxiety may also elicit more subtle information-processing effects, such as priming anxiety-related memories and amplifying concrete-experiential processing. For migraine sufferers, the anxiety elicited when the first symptoms of an impending attack occur may prime memories relating to previous attacks, which in turn heightens the anxiety. Lastly, this anxious distress may influence evaluations of the threat-related experiences. For example, students who feel anxious about taking an examination may interpret the anxiety as a gut-

level indicator that they are going to fail. In contrast, students facing examinations who experience a reduction in anxiety through the use of relaxation techniques such as massage therapy may evaluate examinations as more controllable and less stressful.

Anxiety may further enhance perceptual processing of threat cues by inhibiting the disengagement of attention. This failure to disengage is highlighted by evidence showing that individuals who are induced to feel anxious are less able than non-anxious individuals to remove their attention from threatening cues, in order to attend to non-threatening cues (Fox *et al.*, 2001). By reducing one's ability to disengage from threatening information (such as worrying about failure and when the next migraine attack is coming), one can stay focused on the stressor, which may undermine functioning and well-being (Cameron, 2003). Massage therapy may promote the ability to disengage, by bringing the person's attention to the calming effects of relaxation, thus reducing distress.

The coping stage at the problem-focused level entails strategies and behaviours to reduce threat, while the coping stage of emotional regulation involves the selection and use of strategies to reduce distress and facilitate problem solving (Cameron, 2004). The coping procedures that a person could use are numerous, and the specific beliefs/representations of the stressor's cause and controllability will guide the coping strategies employed.

Gross (1999) identified specific categories for emotional regulation strategies. The first of these categories is situation selection or modification, where situation selection refers to approaching or avoiding certain people or situations based on their likely emotional impact, while situation modification strategies are aimed at changing the local environment in order to influence the emotional impact. Both of these strategies focus on changing the magnitude of the threat itself. The second category involves attentional strategies used to direct an individual's attention in a given situation, in order to regulate emotional arousal. These strategies include directing attention away from the stressor or threat through distraction, avoidance, or focusing directly on the situation (e.g., through rumination). The third category is cognitive change strategies, which involve changing how one thinks about either the situation (i.e., finding meaning or identifying benefits) or one's capacity to manage the demands of the situation. The fourth category is response modulation, which includes strategies for altering the expression or experience of emotions once they arise; for example, suppression, relaxation, or substance use (Cameron, 2004; Gross, 1999). Students faced with final examinations may control their anxiety by increasing the amount of time they study (attentional strategy) while balancing it with some relaxation activity

(response modulation). Massage therapy can be considered as an emotional modulation strategy, where state anxiety levels can be altered after a massage (Field, 1998). The issue of response modulation through the use of relaxation techniques such as massage therapy will be discussed further in Chapter 3.

According to the CSM (Leventhal et al., 1980), the individual will evaluate the effectiveness of his/her coping strategies. The student who regulated anxiety through an effective balance of studying and relaxation and who received a high grade on the examination would conclude that the strategies employed are effective. However, the student who tried to control anxiety through alcohol consumption and distraction and failed the examination is likely to realise that these coping strategies employed were ineffective, and he or she may try alternatives when faced with examinations in the future.

The CSM is consistent with the transactional model of stress and coping (Lazarus & Folkman, 1984) in a number of respects. Firstly, it acknowledges that almost any event, however unpleasant or distressing, may produce different responses in two people, or even in the same person on different occasions (Steptoe, 1997). Secondly, the person is conceptualised as an active problem-solver, who either attends to, or avoids attending to cues related to the stressful experience/threat. Thirdly, the person assigns meaning to and responds emotionally to these cues (Cioffi, 1991), copes with the objective environment (as it is perceived) and his/her emotional reactions, and appraises the outcome of coping responses (Benyamini & Leventhal, 1997). Fourthly, problem-focused and emotion-focused coping processes are congruent with those identified by Lazarus and Folkman's (1984) transactional model of stress and coping, in which problem-focused responses aim to reduce threat and emotion and emotion-focused responses aim to reduce emotion to facilitate problem solving. For example, students will regulate their behaviour in ways to attain desired outcomes in examinations, such as by studying on a Friday night rather than going out with friends. The CSM is being used as the theoretical framework for the present research because cognitive and emotional processes are integrally linked and it can be extended to include physiological stress processes, and how these influence cognitive and emotional processes.

Physiological Stress Responses and Health

The idea that stress influences physical health is a major theme in health psychology. The stress response itself is multidimensional, and is made up of a complex interaction among physiological activities, cognitive processes, affective changes, and behavioural responses

(Kaplan *et al.*, 1993). The cognitive and emotional processes identified by the CSM interface with an array of physiological processes including the neuroendocrine system, autonomic nervous system, immune system (Steptoe, 1997), musculoskeletal system (Payne, 2000), and sleep system (Herbert, 1997), all of which may alter the health of the individual. For example, stressors (both minor and major) have been associated with increased somatic symptomatology (Brantley & Jones, 1993; S. Cohen *et al.*, 1991; S. Cohen & Williamson, 1991) and altered immune function (J. Kiecolt-Glaser *et al.*, 2002). Figure 2 highlights some of the key links between the CSM factors and the physiological processes related to stress. The appraisal of a stressor as a threat can activate physiological stress responses, where activation of the hypothalamus and pituitary glands activates autonomic arousal through neuroendocrine responses. These physiological processes interface with cognitive and emotional representations of the CSM and together may influence behaviours, responses, and strategies employed to reduce the threat. Behaviours such as relaxation and health behaviours may be altered which, in turn, can also influence immune functioning, sleep patterns, and musculoskeletal responses.
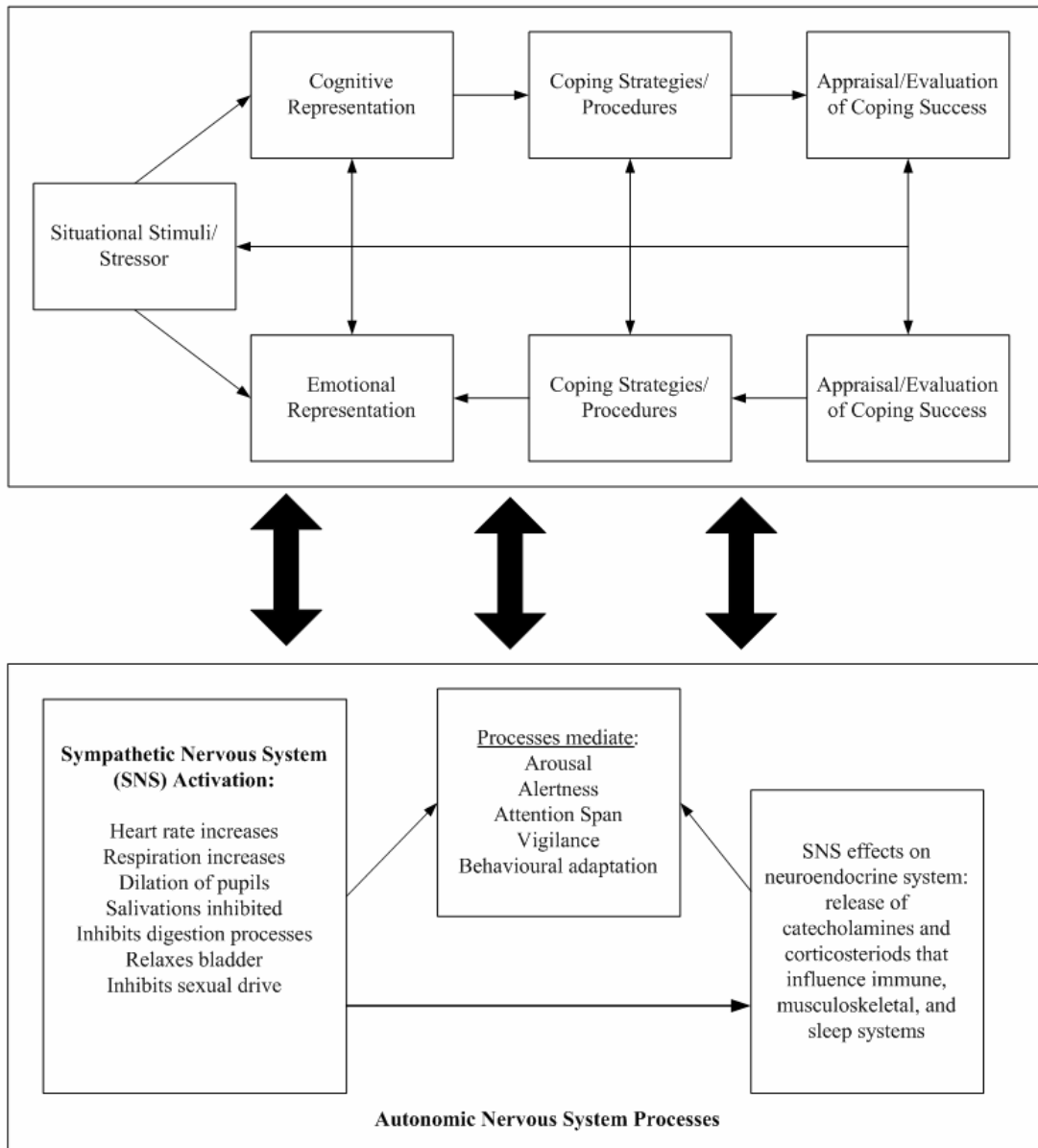
Figure 2. CSM with physiological stress processes, showing the dynamic relationships between emotional and cognitive processes and physiological processes.

The following sections review the key physiological systems involved in stress responses, as well as the research on the influence of stress on these systems, with particular attention to research on stress in students and those with migraines.

Autonomic Nervous System

Distress resulting from psychological, environmental, or physiologic stressors induce the "flight or fight reaction", both centrally and peripherally (Cannon, 1927). One half of the autonomic nervous system, the sympathetic nervous system, is activated in response to stress, and the other half, the parasympathetic system, is suppressed (Sapolsky, 1998). The

central neural pathways of the sympathetic nervous system elicit arousal, alertness, attention span, vigilance, and mobilisation, while the parasympathetic nervous system mediates calm, vegetative activities and promotes growth, energy storage, sexual behaviour, and reproduction (Black, 1994; Sapolsky, 1998). Sympathetic nervous system activation is initiated with the release of catecholamines (epinephrine and norepinephrine) by the adrenal medulla. Norepinephrine release is associated with increases in aggression, alertness, and arousal. Epinephrine is associated with anxiety, flight behaviour, and reductions in mental abilities (Dienstbier, 1989; Payne, 2000). Sympathetic nervous system activation prepares an individual to respond to the stressor with increases in heart rate, blood pressure, respiration, and a reduction in vagal activity. The parasympathetic nervous system stimulates salivation, slows the heartbeat, and stimulates digestion. Sympathetic nervous system arousal can be protective because it mobilises the organism to confront or flee the threatening stimulus. However, repeated or prolonged activation may produce health problems over time (Sapolsky, 1998). Both epinephrine and norepinephrine are produced under conditions of challenge, but it appears that it is the person's appraisal of the situation that determines their relative production levels (Dienstbier, 1989; Payne, 2000). For example, a person facing a challenge which he/she perceives as enjoyable will produce more norepinephrine than epinephrine, whereas a person who views that same challenge as a threat is likely to produce more epinephrine than norepinephrine (Dienstbier, 1989).

Neuroendocrine System

The neuroendocrine and autonomic nervous systems work in conjunction with each other. It is impossible to consider one without considering the other. The hypothalamic-pituitary-adrenal gland (HPA) axis is the major part of the neuroendocrine system that controls reactions to stress (Sapolsky, 1998). The hypothalamus is a major conjuncture for this axis, containing a huge array of releasing and inhibiting hormones directing the pituitary gland, which, in turn, regulates the secretion of peripheral glands (Sapolsky, 1998). The hypothalamus releases corticotropin-releasing factor (CRF) and beta-endorphins in response to a perceived stressor. CRF activates the anterior pituitary gland, which triggers the release of adrenocorticotropic hormone (ACTH). ACTH triggers the adrenal gland to release corticosteriods (e.g., cortisol) that impact on tissues and muscles. The activation of the HPA axis pathways through this process influences other physiological systems such as metabolic processes, the immune system, sleep, and the musculoskeletal system (Smyth et al., 1998).

Cortisol is a stress hormone that can be easily measured through saliva, and it is considered to be a standard physiological marker of stress (Smyth et al., 1998). Cortisol levels are influenced by intense emotional responses such as anxiety, fear, and depression (Kirschbaum & Hellhammer, 1989). Cortisol has many functions in the body: (1) It increases glucose storage in the liver to supplement energy reserves, while decreasing glucose uptake in muscles and skin; (2) It causes fat cells to release lipids into the bloodstream, which causes fatty acids to be used as an energy source instead of glucose; (3) It redistributes immune cells out of peripheral blood vessels and into lymphoid tissue; and (4) It suppresses immune function by decreasing the uptake of glucose and other nutrients in immune cells (Mayne, 1999).

Several recent studies have measured salivary cortisol in students during an examination period, in order to determine the relationship between these two variables. Ng and colleagues (2003a) measured perceived stress and salivary cortisol in graduate students before and after participation in a written final examination. As expected, students reported higher stress before the examination and these ratings were associated with increases in salivary cortisol. Students with higher cortisol levels before the examination tended to have significantly lower examination scores, and the authors suggested that cortisol may be associated with impaired task performance (V. Ng et al., 2003a). However, there may be other aspects of the stress response that relates to task performance. In another study, dental students who had reported higher levels of stress prior to the test also had raised salivary cortisol. Students who perceived higher levels of stress after the test (i.e., the test was hard and they felt they had done poorly) generally had poorer results (V. Ng *et al.*, 2003b). While these studies show that cortisol is elevated when students are faced with a stressor, it does not show what happens in the case of chronic stressors.

One study has assessed the impact of positive and negative affect, and past, current, and anticipated naturalistic daily stressors on salivary cortisol levels (Smyth et al., 1998). Participants ($N = 120$) reported on stressors, positive affect, and negative affect six times per day for two consecutive days, as prompted by a pre-programmed wristwatch. Experiencing a current stressor and anticipating a stressor were both related to elevated cortisol levels. As expected, both types of stressors were related to lower positive affect and higher negative affect. Negative affect was associated with elevated cortisol levels and positive affect was associated with lowered cortisol levels. Interestingly, when affect was controlled, daily stressors were not significant predictors of cortisol secretion (Smyth et al., 1998), suggesting that affect mediates the pathway of stressor to cortisol secretion.

Many other studies have shown that corticosteroids (e.g., cortisol) are elevated by stress and, furthermore, they can have immunosuppressive effects on the immune system (Black, 1994). In particular, corticosteroids inhibit many functions of lymphocytes, macrophages, and leukocytes, and they also decrease the production of many cytokines and anti-inflammatory molecules on various tissues (Black, 1994). In effect, coping appraisals may act as a moderator between potentially stressful situations and physical outcomes. In Chapter 4 the impact of stress on health and immune function in students will be discussed.

Muscle Tension and Stress

The muscular system is a highly responsive aspect of the stress response, particularly in relation to psychological stress involving mental effort. A considerable amount of research has highlighted that psychological stress is accompanied by increases in muscle tension in various bodily areas, such as forearms, foreheads, jaw, neck, shoulders (trapezius), and the lower back (B. H. Cohen *et al.*, 1992; Lundberg, 2002; McNulty *et al.*, 1994; Moon & Sauter, 1996). There have been a number of psychobiological mechanisms proposed for why this occurs, including: (1) Insufficient blood circulation caused by high intramuscular pressure during contraction (Maeda, 1977); (2) The continuous activation of low-threshold motor units, which elicit muscle contractions (Waersted *et al.*, 1996); (3) Increased firing of peripheral neurotransmitters (M. J. Smith & Carayon, 1996); and (4) The possible interaction of catecholamines and cortisol secretions causing muscle activation (Holey & Cook, 2003).

It has also been demonstrated that mental stress may contribute to increased muscle tension, although there is individual variability (B. H. Cohen et al., 1992; Lundberg et al., 2002; McNulty et al., 1994). Electromyography (EMG) research shows that it is not only physical demands, but also cognitive factors and mental stress, that may induce muscle tension (Lundberg, 2002). Commonly, research has focused on the trapezius muscle, as this is where people often contract musculoskeletal disorders and, apart from the facial muscles, this muscle appears to be more sensitive than other muscles to emotional stimuli (Lundberg, 2002). Increasing research demonstrates that psychosocial factors are involved in the etiology of musculoskeletal disorders arising in the workplace (Melin & Lundberg, 1997; Sauter & Swanson, 1996). For example, stress is associated with the incidence of shoulder, neck, and low back pain, headaches, and the increased amount of time that people spend at computer workstations. This has implications for many people, especially students, as computer workstations are increasingly the primary place for work and study.

After a large review, Sauter and Swanson (1996) concluded that monotonous work, perceived high workload, time pressure, low control, and social support were related to musculoskeletal symptoms among workers in the workplace. Many of these factors, especially high workload and time pressures, are stressors for students. Computer work for four or more hours per day doubles the risk of musculoskeletal disorders (Sauter & Swanson, 1996), and students typically spend more time than this at computer work. Moreover, evidence suggests college students exhibit many of the symptoms relating to the onset of musculoskeletal disorders (J. N. Katz et al., 2000).

A lack of rest and relaxation are important risk factors for the development of muscular pain (Melin & Lundberg, 1997). Stressful conditions, such as examinations and living with migraine, are likely to contribute to elevated muscle tension. Psychosocial stress is often long lasting and does not allow the individual to "take a break" in order to obtain relaxation (Lundberg, 2002). Relaxation and muscle tension relief is therefore necessary to lesson the impact of the stress response, thus acting as a buffer for developing musculoskeletal disorders and illness. Research has shown that relaxation techniques such as progressive muscle relaxation, stretching, and yoga have reduced muscle tension and muscle activation in healthy populations (Carlson & Curran, 1994), in employees in workplace contexts (Gura, 2002), and in people with pain conditions such as fibromylagia (Keel *et al.*, 1998). This research suggests that regular relaxation is important in preventing injury at work, as well as the development of other musculoskeletal disorders.

Sleep and Stress

On average, individuals need seven and a half to eight hours of sleep per night and will often complain if this perceived need goes unmet. There is some variation around this average, with some people needing as much as 10 or 11 hours per day and others needing only around three hours(Herbert, 1997). Sleep is critical for health. Although the role of sleep in health is not fully determined, it appears to be important in restoration (of cell and tissue damage) and growth (Herbert, 1997).

The relationship between sleep and stress is dynamic. Stress is often associated with sleep disturbances, and sleep disturbances are a stressor. When stress arousal is sufficiently intense and persists into the usual sleep period, it may lead to sleep disturbances such as insomnia, waking through the night, and trouble waking in the mornings (Partinen, 1994). Disturbances in sleep can impact on concentration and alertness and lead to fatigue, which are all stressful for an individual and being anxious about sleep disturbances can promote

further difficulties with sleep patterns. As previously discussed, perceived stressors leads to sympathetic nervous system arousal, which can impact on sleep patterns. Massage may induce arousal of the parasympathetic nervous system (dominant during sleep), resulting in better sleep quality.

Intense mental activity such as studying can delay the onset of sleep in otherwise healthy people (Herbert, 1997). University students are noted for their tendencies to obtain insufficient amounts of sleep (Brown *et al.*, 2002). Research has shown that twice as many students as compared to the general population report symptoms consistent with sleep disturbances (Brown et al., 2002; Lack, 1986).

Sleep disturbances are also a factor in migraines, in that both perceived stress and sleep disturbances (sleep loss and changes in sleeping pattern due to stress or medication) by the person can act as a trigger to the onset of migraines (Holmes *et al.*, 2001; Rains & Penzien, 2002). Investigating sleep patterns in students and migraineurs is important, given their relationships with stress, health, and the onset of migraines.

Stress and Health Behaviours

One of the pathways through which stress leads to poor health is through altering the frequency or pattern of health behaviours (Steptoe, 1997). Health-related behaviours include diet, exercise, smoking, alcohol use, health care seeking, and medication use (Carmody, 1997). Stress can have an indirect effect on health by disrupting health–protective lifestyle behaviours (exercise or healthy eating), or by motivating harmful health behaviours such as alcohol consumption or drug-taking (Carmody, 1997). One of the proposed reasons for this change in behaviours is that aversive states such as stress and anxiety may motivate people to engage in unhealthy behaviours that bring them pleasure (D. M. Ng & Jeffery, 2003).

A number of studies have investigated the relationship between stress and health behaviours. Several studies have reported positive associations between stress and altered eating habits, such as increased fat intake (Hellerstedt & Jeffrey, 1997) and higher consumption of snacks, caffeine, and fast food (Conner *et al.*, 1999; Pak *et al.*, 2000). Positive associations between stress and alcohol intake have also been reported (de Wit *et al.*, 2003; Steptoe *et al.*, 1998), although one study has found no association (D. M. Ng & Jeffery, 2003).

Another health behaviour that is often linked to stress is the seeking of health care. Stress can lead to increased care-seeking behaviours via a number of different pathways: increased incidence of illness, increased somatic symptoms exacerbated by stress, lowered tolerance for symptoms, and increased worry about health. The experience of physical symptoms is the key factor related to the cognitive representation of a health threat. When a person experiences a bodily symptom, attention is drawn in and a label is sought for the symptom and corresponding illness, which often leads to a visit to a health care professional. In addition, the experience of stress may exacerbate symptoms, and poor health behaviours can enhance dis-regulation of body processes, thus exacerbating symptoms further (Leventhal et al., 1997). Cameron and colleagues (1993) found that, in a sample of middle-aged and older adults, health care utilisation was predicted by higher levels of life stress, in addition to developed representations of a health threat, perceived inability to cope with threat, and advice from others to seek care. Research has shown that college students who write about their thoughts and feelings about stressful experiences, report improvements in physical health and reductions in health clinic visits (Pennebaker & Beall, 1986; Pennebaker et al., 1990; Pennebaker & Francis, 1996).

Taking medication for symptoms is another common health behaviour, especially for people who have migraine and other types of headaches. Non-adherence with prescribed medication and overuse of analgesics can both exacerbate headache symptoms and potentially result in medication rebound headaches (Lipchik et al., 2002). Relaxation or behavioural therapies are often the preferred treatment option for many migraine and headache sufferers. This may also be due to: (1) A preference for nonpharmacological interventions; (2) Poor tolerance of pharmacological treatments (side effects, hassle of daily medication use); (3) The experience of no relief from pharmacological treatments; and (4) Wanting to decrease long term excessive medication use (Holroyd et al., 2001b).

Summary

In summary, the CSM delineates both cognitive and emotional coping processes involved in the regulation of stress. The cognitive system involves the development of a representation of a stressor, which guides the selection and use of coping strategies, and appraisal of success or failure of these coping efforts (Leventhal et al., 1997; Leventhal et al., 1992). The emotional system involves the elicitation of emotional responses, which motivate behaviours to cope with and control the emotional distress, these behaviours are also appraised as successful or not (Cameron, 2004). The appraisals in both systems can lead to changes in outcome criteria, the selection of new goals or strategies, or changes in

the representation or eliciting stimuli (Leventhal et al., 2003). One of the key attributes of the CSM is that cognitive processes and emotional processes are integrally linked. The CSM can be extended to incorporate physiological stress responses and their influence on cognitive and emotional regulation. The autonomic nervous system, neuroendocrine system, musculoskeletal system, immune system, and sleep system can all be altered in the stress response, and these alterations may affect physical health. In addition, health behaviours may also be altered during periods of stress in ways that impact on health. This extended model provides the scaffolding on which to build a theoretical framework for delineating the potential effects of massage therapy as a stress management technique. Specifically, it can help to identify how massage therapy may act as an emotional regulation strategy to influence cognitions, affective processes, and physiological processes involved in stressful situations. Chapter 3 will focus on massage therapy, the proposed mechanisms for its effects, and how they relate to the physiological systems outlined in this chapter.

CHAPTER 3
TOUCH AND MASSAGE THERAPY RESEARCH

Although interest in massage therapy has arisen relatively recently in Western cultures, its use dates back thousands of years and it continues to be a routine practice in a number of Indian, Asian, Pacific, and other cultures. These cultures consider massage therapy an integral part of their culture, and consider it important for their children's development and for its beneficial health effects.

The Importance Of Touch

The potential therapeutic effects of massage can be best appreciated when one considers that touch is our largest sensory system and one of the most fundamental means of contact with our environment and other people (Barnett, 1972). Touch through skin is our first medium of communication; our whole body is covered by skin, and touch is the earliest sensory system to develop in humans (Montagu, 1978). Millions of touch receptors in the skin detect pressure, temperature, and painful stimuli, enabling us to respond our environment (Weiten, 2004). Touch therapy is listed in medical text (Ayur–Veda) from India dating back to around 1800 BC as one of the primary healing practices of that time. Hippocrates, in 400 BC, defined medicine as the art of rubbing (Field, 2000). European massage (commonly known as Swedish massage) was systemised in the 18th Century by Per Hendrik Ling (Vickers & Zollman, 1999). Massage is an integral part of many cultures. Maori mothers massage ("mirimiri") their children to give them strength and to help make them strong members of their whanau (Older, 1982). In Samoa, massage is used for disorders ranging from diarrhoea to migraine headache, with massage involving lotions made with coconut milk, flowers, plants, and roots of grasses (Older, 1982). A study on normative child-rearing practices in New Zealand found that Pacific caregivers, in comparison with Pakeha caregivers, placed more importance on abdominal rubbing during pregnancy and on baby massage (Abel *et al.*, 2001). Massage therapy disappeared from the Western medical world at approximately the beginning of the pharmaceutical revolution of the 1940s (Field, 2000). It has however, begun to be explored more widely in the last 25 years as part of the complementary and alternative medicine movement, and there is a growing body of empirical support for its use as an intervention across a variety of conditions and illnesses (Field, 2000). An overview of the research on these illnesses and conditions will be outlined further in this chapter.

Touch Deprivation and Development

Case studies of touch deprivation in humans have highlighted the importance of touch in development. "Experiments in nature" have allowed the study of touch deprivation in children who have been victims of neglect, such as infants and young children in Romanian orphanages (MacLean, 2003). The children in these orphanages (up to 5 years of age) spent most of their time in cribs with little stimulation, and they were touched and held only during infrequent caregiving activities. A team of massage therapists spent several months in one Romanian orphanage, where the children were barely able to walk and winced at any touch from the massage therapists. Yet after several months of regular nutrition and massage therapy, the children were walking, running, and exploring their environment (Field, 2001). Research has shown that children in orphanages who have been adopted continue to show greater problems in a number of sensory-processing domains such as touch, movement, vision, and hearing, which highlights the importance of the environment for the development of sensory integration processes (Cermak & Daunhauer, 1997). These child deprivation studies are problematic, though, as there were no comparison groups of children who were raised in a sensory rich environment.

Animal models have also been used to investigate the effects of touch deprivation, as well as the potential therapeutic effects of touch on development. One of the most famous studies is the experiment of touch deprivation in Rhesus monkeys conducted by Harry Harlow (Harlow, 1958). These monkeys were raised alone without their mothers, living in cages with two stationary figures. One figure was built of wire with a nipple that provided food; the other was made of soft terry cloth with no nipple. The monkeys spent more time on the terry cloth figure (which provided contact comfort) than on the one providing food, demonstrating that infant monkeys valued tactile stimulation/contact comfort more than they did nourishment (Harlow, 1958).

Schanberg, Kuhn and colleagues have conducted many animal studies of touch deprivation using rat pups. When rat pups were deprived of their mothers, they experienced a significant decline in growth hormone (ornothine decarboxylase, ODC), in all body organs (Bartolome *et al.*, 1994). These levels returned to normal when the pups were stimulated using techniques that approximated the mother's behaviour, including licking, carrying, and pinching. However, it was found that only the repetitive licking stimulation (simulated using a wet paintbrush) restored the growth hormone values to their normal levels (Bartolome et al., 1994; Schanberg & Field, 1995). More recently, Schanberg and his

colleagues discovered a gene underlying protein synthesis that responds to tactile stimulation, suggesting that there could be a genetic component to the touch-growth relationship (Schanberg & Field, 1995).

Meaney and colleagues have investigated the impact of handling on the modulation of cortisol production (Francis *et al.*, 2002; Meaney *et al.*, 1990; Weaver *et al.*, 2002; Weaver *et al.*, 2001). They found rats that were handled more as pups showed less corticosteriod production. Moreover, they exhibited more elaborate development (dendritic arborization) in the hippocampal region and better maze performance, suggesting that early handling may improve cognitive and memory function (Weaver et al., 2002).

Further observational research with humans has assessed cross-cultural differences in touch rates and their associations with cultural differences in aggression. These observational studies were conducted at McDonald's restaurants in Paris and Miami. One study observing touch rates between mothers and preschoolers (Field, 1999b) found that French mother-preschooler dyads touched each other on average 19% more than did their American counterparts. It was also observed that French children were less aggressive towards other children on the McDonald's restaurants' playground compared to American children (Field, 1999b). Another study (Field, 1999a) observed touch rates between adolescents in McDonald's restaurants. Results showed that French adolescents spent more time leaning on, stroking, kissing, and hugging their peers than did the American adolescents, while the American adolescents spent relatively more time touching their own hair and hands. The authors suggest that the low levels of touching in the American children and adolescents may be associated with the high levels of violence and aggression in American schools (Field, 1999a), although this observation is speculative and no firm conclusions can be drawn. The research is also limited by the observations being made only in McDonald's restaurants and in no other contexts or situations. Nevertheless, this research highlights the cultural differences in touch and further comparisons between other cultures is warranted.

The touch deprivation research to date highlights the potential importance of touch in development and has provided strong impetus for empirical research on massage therapy. Tiffany Field, a leading researcher in the area, has set up Touch Research Institutes at universities in Miami, California, the Philippines, and Paris. These Touch Research Institutes investigate the effects of massage therapy in many conditions and illnesses.

Numerous studies have investigated the effects of massage on preterm infants, including those exposed to cocaine and HIV. Results from these studies show that infants receiving massage, in comparison to those receiving standard medical care, consistently show greater weight gain, better performance on developmental measures, and better sleep wake patterns (Field, 1996a; Field et al., 1986; Goldstein-Ferber, 1998; Jinon, 1996; Kuhn et al., 1991; Scafidi & Field, 1996; Scafidi et al., 1990). Further research has demonstrated that massage has promising therapeutic effects on a number of other health outcomes, including: (1) Reducing pain in a number of conditions, such as rheumatoid arthritis, migraine, back pain, and burn debridement (Field *et al.*, 1998a; Hernandez-Reif et al., 1998; Hernandez-Reif *et al.*, 2001); (2) Increasing alertness in autistic children and employees in workplaces (Field *et al.*, 1996a; Field *et al.*, 1998b); (3) Enhancing immune function in HIV and breast cancer patients (Hernandez-Reif *et al.*, 1999; Ironson *et al.*, 1996); and (4) Diminishing stress, depression, and anxiety across a number of different populations (Field, 1998; Field et al., 1996a; Field *et al.*, 1997; Field *et al.*, 1996b; Moyer et al., 2004). The underlying mechanisms for this impact of massage on stress are not well understood, although a number of findings point to some potential mediators, which will be outlined more fully in Chapter 4. The following section is an overview of mechanisms that have been proposed to date.

Underlying Mechanisms For The Effects Of Massage

As highlighted in the research discussed, massage therapy holds considerable promise as a technique for stress reduction. The mechanisms that have been proposed as mediators of massage on stress include: (1) Promotion of parasympathetic activity; (2) Influences on the neuroendocrine system; and (3) Effects on the musculoskeletal, pain, and sleep systems. In addition to these direct physiological effects, massage therapy may influence the cognitive appraisals involved in the self-regulation of stress. A proposed integrated massage and self-regulation model will follow the physiological effects section.

Physiological Effects of Massage

Parasympathetic Activity

Many of the benefits that have been measured in massage therapy may be explained by a shift in the autonomic nervous system from a state of sympathetic activation to a state of parasympathetic activation (Moyer et al., 2004). As discussed in Chapter 2, sympathetic activation occurs when the body is under threat or challenge, and it involves increases in heart rate, respiration, stress hormones, and feelings of tension. The parasympathetic

nervous system, which is dominant when the body is not faced with threat, involves decreases in heart rate, respiration, and stress hormones (Sapolsky, 1998). The pressure applied during massage therapy may stimulate vagal activity (Field, 1998; Field et al., 1992) which, in turn, leads to a reduction in stress hormones and the physiological arousal associated with the sympathetic nervous system, thus activating the parasympathetic nervous system (Field, 1998; Moyer et al., 2004). It is suggested that stimulating a parasympathetic response through physiological means, such as massage, may reduce anxiety, depression, and other emotional states associated with stress (Moyer et al., 2004).

Neuroendocrine Effects

Two studies have also linked massage therapy with increased levels of serotonin (Field, 2000; Hernandez-Reif et al., 1999; Ironson et al., 1996). Serotonin may possibly inhibit the pain nerve signals to the brain and has also been implicated in the experience of mood (Field, 1998). Massage may provide feelings of well-being by enhancing serotonin levels. In addition, massage has shown to reduce Substance P, which is also implicated in the experience of pain (Field et al., 2002). One study has measured urinary catecholamines in children and adolescents hospitalised for depression; the massage group demonstrated decreases in norepinephrine whereas the video-attention group did not (Field et al., 1992). Cortisol has often been assessed as a physiological marker of the stress response in massage research, and studies have found that massage reduces cortisol levels (Field et al., 1996a; these effects are discussed fully in Chapter 4; Field et al., 1992; Field et al., 1996b; Hernandez-Reif et al., 1998); these effects are discussed fully in Chapter 4). However, this line of reasoning in the massage literature is very limited and more research is needed to fully explore these potential mechanisms.

Musculoskeletal Effects

Research on massage and recovery from sports injuries (Cheung *et al.*, 2003) highlights the potential for massage therapy to aid healing and reduce pain. When muscles are tight, a great deal of sensory input goes back to the central nervous system from the muscular tissues (Lowe, 2003). Ischemia, resistance to stretch, and irritation of nociceptors in the body are likely to bombard the nervous system with excessive sensory information. In turn, this bombardment of sensory information will often cause tightness in the associated muscles, leading to pain and more tension (Travell, 1983). The manipulations and pressure of massage therapy are thought to break down subcutaneous adhesions and prevent fibrosis (Cheung et al., 2003) and promote circulation of blood and lymph (Fritz, 2000), all of which may reduce pain. Also, when pressure is applied to muscle tissue the entire fibre is

put under a greater amount of tensile stress which will stretch the muscle tissue (Lowe, 2003).

Soft tissue manipulation improves circulation by dilating superficial blood vessels and increasing the rate of blood flow (Hovind & Nielson, 1974). Such effects on blood flow suggest that massage should improve the performance of fatigued and tense muscle. Massaged muscle fibres display less spasm, increased force of contraction, and enhanced endurance compared with simply rested muscle (Goats, 1994). Some massage techniques promote blood flow more effectively than others. For example, tapotement (a stimulating and fast massage stroke) was found to be more effective than moderate exercise in improving blood flow in large muscle groups, yet petrissage (a kneading type of massage stroke) had little effect on blood flow (Hovind & Nielson, 1974). Other physiologic effects of massage include the drainage of lymph, which is has been found to be effective for reducing oedema and lymphodema (Board & Harlow, 2002; Casley-Smith, 1992), increasing mobility, and relieving pain (Westland, 1993).

Pain effects

Massage has been shown to improve the experience of pain, and the primary theory used to explain this effect is Melzack & Wall's (1965) gate control theory of pain. Melzack & Wall (1965) theorised that the experience of pain can be reduced by competing stimuli, such as pressure or cold, because pain stimuli travel along slower nerve pathways than other stimuli. Therefore, pressure or cold stimuli are received by the brain before pain stimuli. Theoretically, massage therapy performed with sufficient pressure would create stimuli that interferes with the transmission of the pain stimuli to the brain, effectively "closing the gate" to the reception of pain before it can be processed (Field, 1998; Moyer et al., 2004; Wall, 2000), thus having an overall effect of lowering the experience of pain. It is also possible that massage may influence endorphin release, although the scarce evidence to date in healthy populations does not support this (Day *et al.*, 1987; Kaada & Torsteinbo, 1989) and more research investigating endorphins in pain conditions is needed

Promotion of Restorative Sleep and Pain Reduction

Individuals who experience considerable stress and pain often have disrupted sleep (Wall, 2000). Individuals deprived of deep sleep may experience changes in body chemistry that lead to increases in pain. Somatostatin is normally released during deep sleep, and low somatostatin levels have been associated with increased pain (Sunshine et al., 1996). In addition, Substance P, a neurotransmitter involved in relaying pain stimulation through the

central nervous system is released when an individual is deprived of deep sleep (Field et al., 2002; Sunshine et al., 1996). In sum, people who are deprived of deep sleep may have less somatostatin and increased Substance P, resulting in greater pain.

Sunshine and colleagues (1996) conducted a study investigating the effect of massage on fibromyalgia, a chronic condition of musculoskeletal pain of unknown cause and multiple tender points. A total of 30 adults were randomly assigned to a massage group, a transcutaneous electrical stimulation group (TENS - machines emitting an electrical current that are placed on the body), or a sham TENS group (where the machine emits no electrical current). The massage group showed greater improvements on the dolorimeter measure of pain (an instrument that distributes pressure over a specific area to gain information about a person's tolerance for pressure/pain), as well as decreases in self-reported pain, stiffness, and fatigue in relation to the other groups. Importantly, they also reported a greater reduction in the number of nights that they had difficulty sleeping in comparison to the other groups, which suggests that massage may reduce pain indirectly by promoting restorative sleep (Moyer et al., 2004; Sunshine et al., 1996). A more recent study showed that fibromyalgia patients, receiving massage twice-weekly for five-weeks, in comparison to those receiving relaxation training, demonstrated improved mood and sleep, as well as decreases in their salivary levels of Substance P and the number of tender spots throughout their bodies (Field et al., 2002). The results also revealed that the massage group, as compared with the relaxation group, experienced decreases in depression, pain, fatigue, and stiffness and improvements in physician assessments over the course of the study (Field et al., 2002).

A number of other studies have investigated the effect of massage on sleep. A study (Richards, 1998) was conducted comparing three groups of patients with critical cardiovascular illnesses, who were randomly assigned to receive either back massage, relaxation training, or standard care. Results showed that the massage group reported greater quality and quantity of sleep compared to the other groups. However this study did not investigate whether the massage group actually experienced faster recovery, fewer complications, or earlier discharge from hospital. A further evaluative study was conducted in a large university hospital, that implemented a pilot massage programme in the rehabilitation and oncology units (M. C. Smith *et al.*, 1999). The participants reported increased relaxation and well-being, enhanced mobility, less pain, more sleep, and faster recovery. This study utilised qualitative evaluations and so the reliability of these effects across patients remains to be determined, these findings are, however consistent with the

theory that massage promotes sleep and reduces pain. Further research investigating the exact mechanisms by which massage may promote restorative sleep is needed, particularly studies using participant report, physiological measures (such as Substance P and somatostatin), and EEG measurement of sleep.

<u>Cognitive Aspects of Relaxation</u>

The relaxation response is a state of low sympathetic arousal that corresponds with an increase in parasympathetic nervous activity. Other aspects of relaxation, particularly cognitive factors, are also important to consider. Three cognitive aspects of relaxation are focusing, passivity and receptivity (J. C. Smith *et al.*, 1996). Firstly, focusing is the ability to identify, differentiate, maintain attention on, and return attention to simple stimuli for an extended period. Massage may enhance focusing by inducing the person to attend to the part of the body being massaged and the pressure and sensation that is experienced. That is, touch focuses the person's attention to the point of contact. Secondly, passivity is the ability to stop unnecessary goal-directed and analytic activity. By drawing attention to the body, massage may enhance passivity by distracting attention away from current goals and concerns. Thirdly, receptivity is the ability to tolerate and accept experiences that may be uncertain or unfamiliar (J. C. Smith et al., 1996). For individuals who have not experienced massage or a great deal of touch, the massage may be an unfamiliar yet positive experience that serves to enhance receptivity. Despite the important cognitive aspects of relaxation, there has been little empirical attention on the influence of massage on cognitions.

Integrating Massage Processes into the CSM of Self-Regulation

As discussed in Chapter 2, the self-regulatory system can be considered as the way in which a person regulates his/her own behaviour by developing cognitive and emotional representations of events, formulating and enacting goals and plans, and appraising feedback and outcomes (Cameron & Nicholls, 1998; Carver & Scheier, 1998). Anxiety and distress are emotional responses to stress, and anxiety plays an important role in self-regulation in motivating goal-related behaviours, delegating and selecting physiological and psychological resources, and appraising progress towards goals (Cameron, 2003; Mayne, 1999). Anxiety also alters perceptual, cognitive, and behavioural tendencies in forming representations of the stressor and selecting coping strategies to reduce emotional distress, and whether or not these are conducive to well-being will depend on both the situation and the individual's ability to regulate them (Cameron, 2003).

Research investigating the effects of massage therapy has shown that it can impact on facets of both emotional processes, such as reduction of anxiety, depression, and stress (Field, 1998; Field et al., 1996a; Field et al., 1997; Field et al., 1996b) and cognitive processes, such as enhanced attention (Field et al., 1996a) and improvements in EEG readings (Diego *et al.*, 2004; Field et al., 1996a). Massage therapy can be considered as an emotional regulation technique that impacts on cognitive processes.

Given the interrelatedness of the CSM with the psychological and physiological stress processes affected by massage, it is important to discuss the pathways through which these effects may occur. Individuals facing a stressful experience have two parallel and potentially conflicting tasks: Problem-focused management of the external environment and management of their emotions and thoughts. Massage may enhance stress regulation through two pathways: A cognitive regulation pathway and an emotion regulation pathway. Massage may also alter cognitive aspects of relaxation through focusing, passivity, and receptivity. It is hypothesised that massage will enhance stress regulation by influencing coping processes and enhance appraisals of coping efficacy. Massage may enhance one's ability to disengage from threat-related information, and reduce anxiety, thereby altering the severity of stressor representations, and enhancing confidence in one's ability to cope.

Another pathway through which massage may enhance emotion regulation is through the reduction of physiological processes that are activated by stress. Massage therapy, by reducing physiological arousal, may induce a relaxation response and reduce anxiety arousal in response to a stressor. Massage may also enhance coping resources, such as energy and positive mood. Figure 3 highlights these potential pathways through which massage therapy may impact on the self-regulation process. The proposed and measured pathways in this thesis relate firstly to the key physiological systems affected by massage: the autonomic nervous system (heart rate and blood pressure), neuroendocrine responses (cortisol secretion), pain (headache, symptoms), and sleep (measures of sleep amount, insomnia, and trouble waking); secondly, the impact of massage on emotional processes, such as anxiety and stress; and thirdly, the impact of massage on cognitive processes through the measurement of coping efficacy.

Theoretical Implications for Migraine

Given the proposed mechanisms for the therapeutic effects of massage, it seems plausible that the above implications would also apply to those who suffer from migraines, a

condition that is exacerbated by stress and is also a stressful condition. Massage therapy could reduce perceived stress by improving physiological responses to stress and reducing the exacerbation that relates to migraine onset. Alternatively, massage therapy's effects of improved sleep or increases in serotonin levels could reduce the incidence of migraines. If a person experiences fewer migraines with less intensity, he or she may start to feel more in control, and able to cope effectively with stressors. The mechanisms of pathophysiology relating to migraine will be outlined fully in Chapter 8.
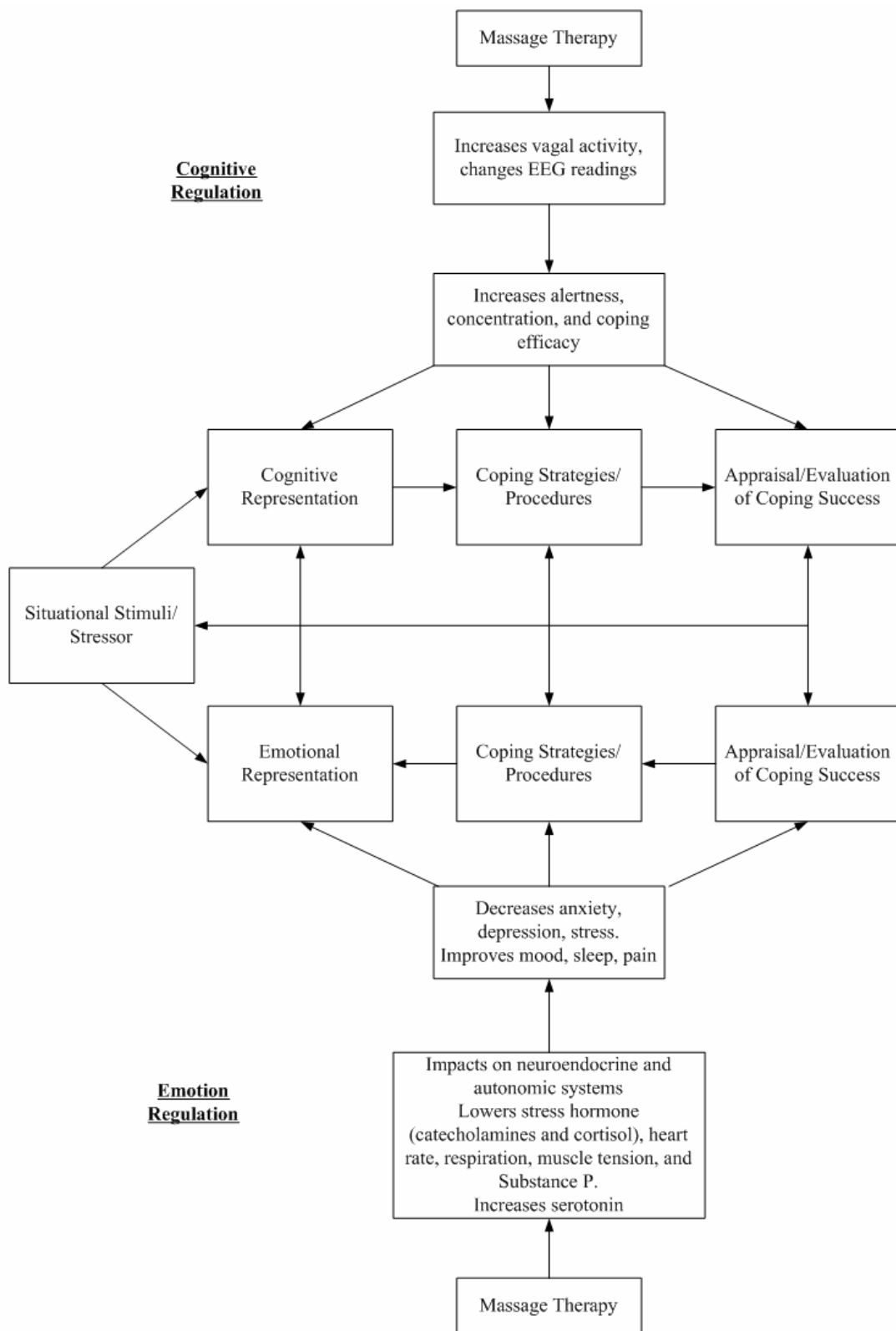
Figure 3. Massage therapy effects and the CSM (Leventhal, Meyer & Nerenz, 1980).

General Aims of Study 1 and Study 2

The overall aim for both studies was to investigate the effects of massage therapy on stress and a stress-exacerbated condition using the integrated self-regulation model of stress and therapeutic massage. For Study One, the general aim was to explore the effects of massage on the stress and coping process for students approaching an inherently stressful time: final examinations. Measures of heart rate and blood pressure were included in this study in order to assess the impact of massage on these physiological aspects of stress (see Figure 2). In addition, coping efficacy was measured in order to evaluate the effects of massage on the cognitive appraisal process, and measures of state anxiety and stress will be measured in order to evaluate the effects on the emotional processes.

The second study investigated the impact of massage on migraines from a self-regulatory perspective. For Study Two, the general aim was to extend the research in massage therapy for a stress-related health condition such as migraine, which is a stressful condition to live with and which can be exacerbated by stress. This study aimed to extend the preliminary research in this area by assessing the longer-term effects of massage on migraine experiences, and by assessing perceived stress, coping efficacy, and quality of life in order to evaluate the effects on these cognitive appraisals and emotional processes.

CHAPTER 4
MASSAGE THERAPY AND STRESS

The first section of this chapter gives an overview of the massage paradigm. The following sections focus on self-report and physiological measures of stress that have been used in research to date, followed by a discussion of the limitations related to massage research. The effects of stress on students will be the last main section of this chapter, followed by the rationale and hypotheses.

Massage Paradigm

The modern practice of massage therapy is not a single technique; rather, it can be considered as an umbrella term for a range of approaches that share common characteristics (Moyer et al., 2004). These characteristics include touch through soft tissue manipulation, holding, causing movement, and/or applying pressure to the body (American Massage Therapy Association, 2004). The massage treatment time and context can also vary quite considerably. For example, one treatment could last an hour or more, with longitudinal, firm strokes applied to numerous sites of the body while the client lies partially disrobed with towels draped on a specifically designed massage table in a private clinic. Alternatively, it could be a short treatment in which the client receives ten minutes of kneading with a focus on the shoulders while seated fully clothed in a specially designed chair in a public space such as a workplace or shopping mall. Desired treatment outcomes also vary considerably from one client to the next. One client may want a relaxation massage, while another seeks relief for the pain in his or her trapezius. The one factor that all massage therapy treatments have in common is the intention to promote health and well-being. This diversity in treatment duration, context, and outcomes is reflected in the paradigms used in the research literature on massage therapy for stress. The majority of the research utilise a similar massage paradigm to that used in these studies (Diego et al., 2004; Field et al., 1996a; Field et al., 1997; D. I. Glaser, 1991; Hernandez-Reif *et al.*, 2004; J. Katz *et al.*, 1999; Link, 1986; Zeitlin *et al.*, 2000), although there are some exceptions (Cady & Jones, 1997; Shulman & Jones, 1996). Field (1998) states that the massage therapy technique used throughout much of her research involved deep tissue manipulation with presumed stimulation of pressure receptors, where adults received eight sessions of 30-minute massage. Other studies have used one hour body massages (Link, 1986; Zeitlin et al., 2000) or chair massages in the workplace (Cady & Jones, 1997; Field et al., 1997; Shulman & Jones, 1996). The massage paradigm used for the first two studies

of this thesis was a 45-minute massage of the upper body. The first study used techniques for promoting relaxation and the migraine study used techniques that work on muscles that have been implicated in the experience of migraines.

Most studies on massage therapy and stress have been conducted in four domains: (1) in the workplace; (2) with children; (3) with students; and (4) with some illnesses (e.g., rheumatoid arthritis, fibromyalgia, HIV, and breast cancer). These studies have used differing massage durations as well as different contexts and doses (single-dose versus multiple-dose). The results of these studies provide insights regarding the mechanisms involved in stress reduction and these will be discussed later in this chapter.

Massage and Psychological Measures of Stress

Research assessing the effects of massage on the stress process has used a variety of measures: including psychological reactions, perceived physiological responses, and objective physiological biomarkers. Psychological self-report measures used in massage research include mood measures, particularly anxiety and stress, as well as cognitive measures, such as EEG waves and alertness.

<u>Mood</u>

Massage studies have often used anxiety to measure current emotional states as responses to stress, and sympathetic arousal (heart rate) as a physiological marker of anxiety. At least seven studies have measured anxiety using the State Trait Anxiety Inventory (STAI) before and after a massage session. Results of these studies have shown decreases in state anxiety from pre to post-massage regardless of the number of massages, the length of the massage, or the context in which the massage was conducted (Field et al., 1996a; Field et al., 1997; D. I. Glaser, 1991; Shulman & Jones, 1996; Zeitlin et al., 2000). In addition, massage appears to be just as effective for children as for adults in reducing state anxiety (Field et al., 1992; Field et al., 1996b). Recently, a study (Diego et al., 2004) was conducted on 36 healthy medical school faculty and staff to compare light pressure massage, moderate pressure massage, and vibratory stimulation effects on anxiety and other measures. Results showed that, regardless of the massage procedure received, the participants reported feeling less anxious after the massages (Diego et al., 2004).

The immediate effect of massage on other mood states has also been measured across a variety of populations, commonly using the Profile of Mood States (POMS) or depression measures. Katz and colleagues found that overall mood state (POMS) improved

significantly after treatments (J. Katz et al., 1999). Another study compared various types of relaxation therapies among healthcare workers (Field et al., 1997). The immediate effects of brief massage therapy, music relaxation with visual imagery, music relaxation, and social support group sessions were assessed in 100 hospital employees. All of the groups reported decreases in anxiety, depression, fatigue, and confusion as well as increases in vigour following the brief sessions. The authors concluded that the particular therapies, when applied for short periods of time, were equally effective in reducing stress-related moods among hospital employees. However, they were concerned with the degree to which there was a social desirability mindset of the hospital staff in wanting the therapies to work. Other studies have also shown improvements in mood following a massage. Field and colleagues (1996a) conducted a study with medical faculty and staff members, where 26 adults were given a chair massage and 24 control group adults were asked to relax in the massage chair for 15 minutes, two times per week for five weeks. Results showed that mood state was less depressed immediately following the session for both groups, and at the end of the five-week period depression scores were lower for both groups. However, the chair relaxation group did not show improvements on some of the other measures (i.e., cortisol levels, job stress, alertness, and math computation accuracy), while the massage group did.

Massage therapy has also shown to improve mood in children and adolescents who were hospitalised for depression and adjustment disorders (Field et al., 1992), and children who had been in Hurricane Andrew (Field et al., 1996b). The children in these studies were randomly assigned to either a massage group or a video-attention control group (Field et al., 1996b). Compared with the control group, the massaged participants were less depressed and anxious after the massage.

Cognitive Changes

A number of studies have also investigated cognitive changes as reflected by changes in EEG readings and improvements on mental tasks. A recent study (Diego et al., 2004) comparing different massage pressures found that the EEG readings for the moderate massage therapy group exhibited an increase in frontal EEG delta (slow wave) during the massage. Increases in frontal EEG delta are associated with relaxation (Jacobs, 2001).

Field and colleagues (1996a) conducted EEG readings and math computation tasks before, during, and after intervention sessions of massage and taking a break (comparison group). Results showed that frontal delta power increased for both groups, suggesting that both

groups experienced increased relaxation. The massage group showed decreases in frontal alpha and beta power, suggesting enhanced alertness, whereas the control group showed increased alpha and beta power. The massage group showed increased speed and accuracy on math computations, whereas the control group did not change. The researchers suggested that the superior math performance of the massage therapy group might be due to the tactile and pressure stimulation enhancing parasympathetic activity which induces a more relaxed and alert state. The promotion of relaxation could lead to other cognitive changes, such as heightened perceptual skills, although these effects require further investigation.

<u>**Stress**</u>

Despite the focus on massage as a stress reduction technique, only a handful of the studies have actually included self-report measures of stress. Job stress was measured by Field and colleagues (1996a) in their study of medical faculty and staff members randomly assigned to a massage group or to chair relaxation group. Only the massage group showed improvements in job stress scores by the end of the study (five weeks after). Diego and colleagues (2004) found in their study of different massage pressures that participants in all three groups, reported post-session decreases in stress on a visual analogue scale (0 = *very tense*, 10 = *very relaxed*); with the moderate pressure group reporting the largest decrease. A pilot study (Zeitlin et al., 2000) investigated stress in students and found that scores on the perceived stress analogue scale decreased significantly from pre- to post-massage. Although these findings are promising, the stress measures are of limited validity. There is limited validity of a one-item visual analogue measure. The job stress scale asks respondents about their stress in relation to their job over the last month, and given stress is dynamic and ever-changing this may not give accurate assessments of the person's current stress, and is very specific to job stress. In sum, there is a paucity of research that has used more comprehensive and valid measures of perceived stress. In addition, a scale needs to be used that assesses both cognitive appraisals and emotional responses, such as the perceived stress scale.

Massage Research and Physiological Measures of Stress

<u>Autonomic Nervous System Activity and Relaxation</u>

The previous section highlights some of the psychological variables measured in massage therapy research. As discussed in previous chapters, the stress response involves autonomic and neuroendocrine responses that influence a number of physiological systems

including immune processes, the musculoskeletal system, and sleep patterns. Many of the mechanisms proposed for the effects of massage also include various aspects of the systems involved in the stress response. The following section will examine physiological variables in relation to these systems that have been measured in the massage therapy and stress literature to date.

Blood pressure and heart rate are often used as measures of the autonomic response to stress in massage research. Cady & Jones (1997) conducted a study where 52 participants had a single 15-minute chair massage and found that participants had a significant reduction in systolic and diastolic blood pressure; importantly, however, there was no comparison group in the study. Zeitlin and colleagues (2000) found no significant differences in pre to post-measures of blood pressure and heart rate, although they did find a significant decrease in respiratory rate from pre- to post-massage. In a recent study, heart rate was shown to decrease during three different types of massage techniques, but only the moderate massage pressure group experienced a decrease that persisted until after the massage (Diego et al., 2004).

A recent meta-analysis of massage research (Moyer et al., 2004) found that massage therapy was more effective than comparison treatments in reducing blood pressure and heart rate. The meta-analysis included many studies from many different populations. Given the positive findings from the meta-analysis (Diego et al., 2004), blood pressure and heart rate appear to be reliable physiological markers of stress that need to be included in studies of massage on stress processes.

Neuroendocrine Effects

Cortisol is also considered a marker of the stress response. Several studies have shown that massage therapy decreases salivary cortisol in medical faculty and staff members (Field et al., 1996a), children and adolescents hospitalised for depression and adjustment disorders (Field et al., 1992), and children who had been in Hurricane Andrew and subsequently referred to school counsellors for classroom behaviour problems (Field et al., 1996b). A meta-analysis of seven studies showed that massage has tended to reduce cortisol levels but not significantly overall (Moyer et al., 2004). This lack of statistical significance could be due to the heterogeneity of the samples in the analyses and the variety of measurement procedures (saliva, urine, or blood). Only two of the studies were with healthy individuals.

To date, only one study has assessed the effects of massage therapy on catecholamines. Children and adolescents hospitalised for depression and adjustment disorders (Field et al., 1992) were assessed for urine samples of epinephrine, norephinephrine, and dopamine. Compared with the control group, the massage group had lower norepinephrine levels after the massage. In addition, those children and adolescents who were depressed but who did not have an adjustment disorder had the greatest decreases in norepinephrine in response to massage.

Three further studies deserve mention in this section. These studies focused on populations who were coping with stressful conditions: women with breast cancer (Field, 2000; Hernandez-Reif et al., 2004) and men who are HIV positive (Ironson et al., 1996). In both studies, massage therapy was found to increase serotonin levels, in addition to reducing self-reports in anxiety and depression relative to a control group.

Musculoskeletal Effects

Muscle tension is commonly related to stress, and given that massage involves the manipulation of soft tissue (muscles, fat, connective tissue, and skin), a number of massage studies have looked at the effect of massage on muscle tension. One study (J. Katz et al., 1999) used a series of eight 15-minute chair massages for 12 hospital staff and found that self-reports of pain intensity and muscular tension levels were significantly lower after each massage session. Link (1986) also found that a massage group in comparison to a stress management group and isolation chamber group reported significant reductions in muscular tension.

Promotion of Restorative Sleep

A number of other studies of massage with ill populations have shown improvements in sleep, as outlined in chapter three (Richards, 1998; M. C. Smith et al., 1999; Sunshine et al., 1996). In the study on the effects of massage on children and adolescents hospitalised for depression and adjustment disorders (Field et al., 1992), sleep was assessed using time-lapse videotaping of night time sleep sessions. These measures revealed more organised sleep patterns in the massage group; that is, they spent more time asleep than awake while in bed (Field et al., 1992). These studies were all conducted with hospitalised populations, and the effect of massage on sleep in healthy individuals is yet to be determined. Therefore, considerably more research is needed investigating the effect of massage on stress and sleep.

<u>**Immune System**</u>

Only a few studies have assessed the effects of therapeutic massage on immune function in relation to stress. In their pilot study investigating stress and immune function, Zeitlin and colleagues (2000) provided nine healthy female medical students with a one-hour full body massage one day before an academic examination that was causing them considerable anxiety. Blood samples obtained immediately before and after the massage treatment revealed an increase in the total number of white blood cells (WBC), and a decrease in the percentage of T cells from pre to post-massage. However, there were no significant differences from pre- to post-massage in the percentages or absolute numbers of other circulating lymphocyte subsets, and no significant effects were found for any of the mitogen assays. A significant pre-post effect was found for natural killer cell activity, indicating a significant increase in killing activity after the massage. The increased WBC's after massage suggest that massage may have brought more WBC's into circulation (Zeitlin et al., 2000).

A study assessing massage effects on immune function in breast cancer patients found that the massage group, in comparison to a standard care group, had increases in total lymphocytes and in particular, Natural Killer cells which have been implicated in tumour reduction for cancer patients (Hernandez-Reif et al., 2004). These immune changes have been identified as potential outcomes of stress (J. Kiecolt-Glaser et al., 2002). Cortisol plays a role in these immune changes, and these findings contribute to evidence that massage can reduce the autonomic activation, and potentially the pituitary and adrenal activity that alters the immune function. While the first study of this thesis did not measure any immune system parameters, it is important to consider that massage may play a role in altering immune parameters associated with cortisol secretion and stress.

Limitations of Massage Therapy and Stress Research

There are a number of methodological limitations in the studies assessing massage therapy and stress to date. These include: (1) absences of a control or comparison group; (2) failure to include a self-report measure of stress; (3) failure to include a measure of coping; (4) small sample sizes; and (5) absence of post-intervention assessments in order to evaluate any durable effects of massage.

Firstly, some studies fail to include a control or comparison group, and instead have participants serve as their own controls (Cady & Jones, 1997; J. Katz et al., 1999; Zeitlin et

al., 2000). Ideally, the control group would be an attention control or comparison treatment control to avoid the possibility that the therapist's attention alone is causing the observed effects. More recent studies have included comparison or control groups, and the massage group consistently report greater improvements in outcome variables measured (Diego et al., 2004; Field et al., 1996a; Field et al., 1992; Field et al., 1996b; Shulman & Jones, 1996). Two studies, both conducted with children, employed a video-watching task for a comparison group (Field et al., 1996a; Field et al., 1992). This comparison task is appealing in that it is an attention control task and people often report watching television or watching videos as a way to relax (Lewis, 2001; Wachter & Kelly, 1998). Also, only one type of television programme was used in these studies and there is the possibility that different types of shows may be more appealing to some people than to others. Study One included a control condition in which participants watched a comedy show, a cooking show, and a travel show. These three different programmes were chosen as they were expected to hold the attention of most people, and enhance the potential for one or more sessions to be enjoyable for all participants.

Secondly, a number of studies purport to be investigating stress but fail to include a self-report measure of stress (Cady & Jones, 1997; Field et al., 1992; Field et al., 1997; D. I. Glaser, 1991; Shulman & Jones, 1996). These studies instead use mood and physiological measures that are indicative of stress, such as anxiety, muscle tension, blood pressure, and heart rate. It is therefore important to include a reliable and valid self-report measure of perceived stress. The perceived stress self-report scale taps into aspects of stress other than anxiety. It assesses cognitive appraisals of how stressful events in one's life are, and also affective responses of irritation, anger, and feeling upset in response to situations that arise. In addition, a number of other self-report measures that are commonly associated with stress, such as sleep behaviour, fatigue, and health will be included in this study.

Thirdly, one important aspect of stress regulation that has not been assessed is perceived coping efficacy. Research is needed to determine whether cognitive processes are affected. Given that stress responses and the CSM both have affective and cognitive regulation factors such as perceived coping efficacy are improved by massage. Therefore, the first study for this thesis included a measure of coping efficacy, which assesses how well people perceive themselves to be coping with problems and challenges.

Fourthly, many studies have small sample sizes (Field, 1998; J. Katz et al., 1999; Zeitlin et al., 2000), and consequently, they carry the associated risk of insufficient power to detect

massage effects. Although many of the studies have found large size effects, there may be some variables that are not reported due to small or moderate effects that failed to achieve statistical significance.

Lastly, only one study has investigated the duration of the effects of massage on pain relief, muscle tension reduction, and general feelings of relaxation. In this study nurses received one massage a week for eight consecutive weeks. At the beginning of each subsequent session, participants completed measures assessing the duration of pain relief, muscle tension reduction, and relaxation that resulted from the previous session. Results indicated that half of the participants reported effects lasting more than 24 hours. However, with no comparison group included, it is hard to draw any substantial conclusions. All the other studies failed to include any post intervention follow-up. The first two studies included follow-up periods past the last day of massage in order to investigate the duration of massage effects. It is important to establish the duration parameters of massage therapy; firstly, to see if there are any lasting effects, and secondly, to determine when future massage sessions need to scheduled.

Lastly, few studies have assessed the effects of massage therapy on stress using a university population. University students are an important target group as they generally report high levels of stress, physical symptoms associated with stress and sleep disturbances.

University Students and Stress

Academic stress among university and college students has been a topic of interest for many years, especially in relation to health. University students experience high levels of stress at predictable times each semester due to academic commitments, financial pressures, and lack of time management skills (Misra *et al.*, 2000). In addition to these predictable times of stress, there is a relatively constant pressure to complete upcoming assignments or assessments. College students must learn to balance the competing demands of completing academic work, forming new social contacts, and responsibility for their own daily needs (Hudd et al., 2000).

One study ($N = 457$) investigated perceived levels of stress in undergraduate college students (R. L. Campbell *et al.*, 1992). Over 70% of the respondents reported that their lives were either stressful or very stressful, with females being significantly more likely to report their lives as stressful in comparison to males. Students reported that limiting

commitments, exercising, and worrying less were good strategies to limit or manage stress. The reasons listed for not reducing stress were lack of time and lack of self-discipline. The researchers commented that even though the students were able to identify strategies for reducing their stress, they were not always acting on this knowledge, suggesting the need to work with such students to enable them to act on their knowledge and intentions.

A further study has assessed academic stress as well as physiological, emotional, behavioural, and cognitive reactions to stressors in 249 college students (Misra et al., 2000). Results showed that students experienced highest stress levels due to pressure resulting from self-imposed stress. Females experienced higher stress than males due to frustration, self-imposed stress, and pressure. The most common reaction to stress among the students appeared to be emotional (fear, anxiety, worry, anger, guilt, or depression) and cognitive reactions (i.e., appraisals of stressful situations and strategies). Other reactions that occurred less frequently were behavioural (crying, abuse of self and others, and smoking) and physiological (sweating, trembling, stuttering, headaches, weight changes, or body aches.

<u>Students, Stress, and Sleep</u>

Intense mental activity such as studying can delay the onset of sleep considerably in otherwise healthy people (Herbert, 1997), which can impact on the average hours of sleep needed. College/university students are noted for insufficient sleep during the week and long periods of sleep on the weekend (Brown et al., 2002). Research has shown that students often report disturbances in sleep, such as difficulty falling asleep and waking during the night. In one study, these sleep disturbances were strongly associated with stressful life experiences (Farnill & Robertson, 1990). Students' sleep schedules are so variable that twice as many students compared to the general population report symptoms consistent with delayed sleep phase syndrome (Brown et al., 2002; Lack, 1986). This syndrome is characterised by progressively later wake-up times on non-work or non-school days, relating to poor academic performance and excessive sleepiness during the day.

Importantly, sleep loss has been shown to detrimentally affect academic performance and mental health in students (Ellis & Fox, 2004; Trockel et al., 2000). Periods of total sleep loss are associated with lower arousal levels during the following day, which are manifested in periods of inability to maintain concentration interspersed between periods of normal functioning. The inability to sustain concentration is more evident during the morning hours than the late afternoon hours, probably because of naturally increasing

arousal levels as the day progresses. Sleep loss may also be accompanied by an increase in "microsleeps", which are brief periods when the individual seems incapable of registering input or focusing attention (Herbert, 1997).

In student populations, sleep patterns can be altered further during periods of high stress, such as prior to and during examination periods. One study found that stress levels increase leading up to final examinations, and that students often go to bed later and worry about their sleep loss during this period (Ellis & Fox, 2004). Interventions that can help reduce stress and maintain good sleep patterns during this period may be beneficial. As discussed in Chapter 3, massage has been hypothesised to impact on sleep, although to date, evidence for this exists only for patients with chronic pain conditions (Field, 1996b).

Students, Stress, and Health

Students' health behaviours are important to consider when looking at their stress levels, as it has been proposed that stress can lead to changes in health behaviours, which can increase illness susceptibility (Steptoe, 1997). As discussed in Chapter 2, stress can alter health behaviours and health care seeking. In addition to the numerous studies that have found associations between stress and physical health complaints (DeLongis et al., 1988; Rawson et al., 1994), there has been considerable research that has shown that immune function in students can be altered during times of high academic stress (R. Glaser *et al.*, 1994; J. Kiecolt-Glaser et al., 2002; J. K. Kiecolt-Glaser *et al.*, 1984a; J. K. Kiecolt-Glaser *et al.*, 1984b).

Another study has investigated the relationships between perceived stress, health habits, health status, and self-esteem in university students (Hudd et al., 2000). The results indicated that students with high levels of stress perceived themselves as less healthy, possessed lower levels of self-esteem, and practiced a greater number of unhealthy habits in comparison to those students with lower levels of stress. Measuring health behaviours is important in stress research, as they could be potential mediators between stress and disease.

Headaches, particularly, tension headaches, are often reported by students during times of stress. In one study, 193 students completed headache diaries as well as measures of mood and stress, for a period of four-weeks. The study found that both level of emotional functioning and perceived stress were predictive of headache frequency, intensity, and duration (Labbe *et al.*, 1997). Headaches as well as a number of commonly reported

symptoms (DeLongis et al., 1988; Neitzert *et al.*, 1997) such as digestive and appetite problems, backaches, ulcers, and panic attacks, were measured in the first study of this thesis.

Rationale and Hypotheses

The research reviewed in the previous section highlight the promising effects of massage on psychological processes (reducing stress, anxiety, and depression), and physiological processes (lower cortisol levels, blood pressure, and heart rate) associated with stress.

Importantly, massage research has not attempted to apply a psychological model of stress and coping of self-regulation. The CSM may help to explain how massage as an emotional regulation technique may lead to changes in cognitive appraisals, which will be highlighted from coping efficacy findings. The first study of this thesis assessed some of the key aspects (heart rate, blood pressure, perceived stress, coping efficacy, sleep, physical symptoms and health care visits) identified in the model.

Moreover, this first study of this thesis is aimed at extending research on the effects of therapeutic massage for healthy individuals who are experiencing a stressful time in their lives by focusing on university students facing academic examinations.

University students leading up to final examinations were randomly assigned to a massage condition or an attention control comparison condition of watching television programmes. The participants will attend three sessions once a week for three consecutive weeks. Assessments of state anxiety, heart rate, blood pressure and fatigue will be taken immediately before and after each massage session. Longer–term assessments of perceived stress, coping efficacy, sleep behaviour, fatigue, physical health, and doctor visits will be at baseline, one-day and one-week after the last intervention session.

<u>Predictions</u>

The study predictions are as follows. First, it is predicted that massage treatment will be more effective than the television activity in reducing heart rate, blood pressure, fatigue, and state anxiety from pre- to post-session. Secondly, it is predicted that the massage therapy intervention will be more effective than the television activity in improving perceived stress and coping efficacy from Time 1 (one-day before first massage session) to Time 2 (one-day after the last massage session). Thirdly, it is predicted that the massage therapy intervention will be more effective than the television activity in improving sleep behaviour, fatigue (longer term), physical symptoms, self-reported illness, and doctor visits

from Time 1 (one-day before first massage session) to Time 2 (one-day after the last massage session). Longer-term effects of massage therapy on the stress and health factors will also be explored by assessing group differences in changes from Time 1 (one-day before first massage session) to Time 3 (one-week post the last massage session).

CHAPTER 5
STUDY 1: METHODOLOGY

Study Design

A mixed 3 x 2 design included the within-subjects factor of assessment time-points (Time 1 = one-day prior to first session, Time 2 = one-day after the last session, and Time 3 = one-week post the last session) and the between-subjects variable of intervention condition (massage therapy or television watching activity). The longer-term dependent measures were perceived stress, coping efficacy, sleep behavior, fatigue, physical symptoms, self-reported illness, and doctor visits. The pre-post dependent measures were taken immediately before and after each of the three experimental sessions and included heart rate, blood pressure, fatigue, and state anxiety.

Participants

Participants were volunteers recruited from undergraduate and postgraduate classes at the University of Auckland during the first semester of the year. There were 34 participants, 27 females and 7 males, recruited in total; all participants completed all three sessions and all assessments. No exclusion criteria were set for this study. The mean age was 22.9 years ($SD = 3.92$) with a range of 18 to 34 years. Of the sample, 71% identified with a New Zealand European/Pakeha ethnicity and 29% identified with an other ethnicity; specifically Asian or Indian (see Table 1).

Table 1
Demographics for Massage and Television Watching Experimental Groups

| | | Experimental Condition | | |
		Massage Therapy (*n = 18*)	Television (*n* = 16)	Total (*N* =34)
Gender				
	Male	3	4	7
	Female	15	12	27
Age				
	M	23.11	22.62	22.82
	SD	4.42	3.28	3.88
Ethnicity				
	New Zealand/ European	14	10	24
	Other	3	6	9
Years in University				
	M	3.00	3.06	3.02
	SD	1.68	1.57	1.60

Materials

Massage Therapy Condition

The massage sessions were conducted in identical clinic spaces at the New Zealand
College of Massage in Newmarket, Auckland. The massages were conducted by massage
therapists from the New Zealand College of Massage who received training in the
relaxation massage sequence used in this study. The therapists practiced the sequence until
it was standardised across all of the therapists, as determined by the head tutor at the New
Zealand College of Massage. Materials needed included towels, massage table, and scent-
free oil (almond oil).

Massage Routine

A 30-minute relaxation massage was developed by the New Zealand College of Massage
specifically for this study. The sequence consisted of:

Starting in the prone position, with rocking and holistic pulsing:

1. Full back effleurage, starting light increasing pressure to firm
2. Divided effleurage finish with running thumbs up either side of spine
3. Two-handed rotation of sacrum
4. Wringing and full handed figure eight of lower back
5. Two times snake on one side of back
6. Double handed effleurage on one side
7. Crossovers, starting large reducing to small over one side of back
8. Firm (not deep) longitudinal up erector spinae on one side of back

9. Two times snake on one side of back
10. Full effleurage working round to other side
11. Repeat 5 – 9 on other side
12. Pull-ups to both sides
13. Full effleurage from head to lower back, including neck in return stroke finishing at lower back
14. Focus on one side of lower back with kneading and crossovers and pull-ups
15. Repeat 14 on other side
16. Focus on upper back and shoulder on one side with kneading, crossover, and longitudinal (not deep) strokes
17. Repeat 16 on other side
18. Kneading and crossovers on upper trapezium and neck finishing with effleurage from head to lower back
19. Effleurage from deep to light

Turning to supine position:
20. Full neck stretch (including upper pectorals working them from seated at clients head)
21. One side of neck and upper trapezius
22. Repeat 21 on other side
23. Full neck stretch to finish

Television Watching Activity

The television watching activity sessions were conducted in small rooms at Tamaki Campus, University of Auckland. Materials included a television, video, room, and comfortable chairs. Three different types of television programmes were used: a travel documentary ("Michael Palin – Full Circle"), a cooking show ("The Naked Chef"), and a comedy ("Friends").

The order of the television programmes across sessions was counter-balanced to control for order effects. After the participants had completed the immediate pre measures for the first session, they were asked to rank the three types (cooking show, comedy, travel documentary) of television programmes in order of preference (1 - *most preferred* and 3 - *least preferred*). No indication of the actual programme title or description was given. The comedy was ranked first by 87%, the travel documentary was ranked second by 80% and the cooking show third by 93%. There were no significant Programme x Pre-Post change interaction effects on state anxiety, heart rate, blood pressure, or fatigue. That is, the changes in these variables from pre- to post-session were equivalent across the three programmes.

Measures

Demographic Characteristics

Demographic and background information regarding age, gender, ethnic group, and years at university were collected in the first questionnaire. An additional question assessed the types of techniques/activities that the participants regularly used for relaxation, in which a list of common activities (e.g., reading, walking, watching television) was provided and participants ticked the ones they used (see Appendix A).

Longer-Term Measures

Perceived Stress

The Perceived Stress Scale (S. Cohen *et al.*, 1983) is a 14-item measure assessing the "degrees to which situations in one's life are appraised as stressful" (see Appendix B). The items are scored on a scale ranging from 0 (*never*) to 4 (*very often*). The scores can range from 0 to 56. PSS scores are obtained by reversing the scores on the seven positively worded items and then summing the 14 items. A survey of a random community sample of 2,387 people revealed a mean score of 19.62 and a $SD = 7.49$ (S. Cohen & Williamson, 1988). The mean for the current study's sample was slightly higher ($M = 26.38$, $SD = 7.78$), and was similar to that obtained in a previous study investigating stress in students ($M = 29.85$, $SD = 8.46$;(Deckro *et al.*, 2002). Internal consistencies have been found to be fairly high, with Cronbach's α ranging from .75 to .86 (S. Cohen et al., 1983; S. Cohen & Williamson, 1988). The internal consistency of the PSS was also high in the current study, Cronbach's α = .86. The PSS has been shown to have test-retest reliability of $r = .85$, over a two day period (S. Cohen et al., 1983). It has moderate predictive validity in that it has been found to predict future physical symptoms better than life event measures in studies of college students. It was predictive of future use of health services both in college students and in the general population (S. Cohen et al., 1983).

Coping Efficacy

The coping efficacy measure (see Appendix C) was developed for use in a previous study of stress and coping in university students (Lawler, 1999). It assesses how well people perceive themselves to be coping with and controlling their current problems over the last three days, with seven items that are rated on a scale ranging from 0 (*not at all*) to 4 (*extremely*). The scores can range from 0 to 28. Coping efficacy scores are obtained by reversing the scores on the three negatively-phrased items and then summing the seven

items. Summed scores in this study ranged from 6 to 25. The internal consistency in the previous study was high, Cronbach's α = .78 (Lawler, 1999). The means and standard deviations for the previous study (Lawler, 1999) and the current study are comparable (M = 17.55, SD = 4.61, and M = 16.08, SD = 4.68, respectively).

Fatigue

The fatigue scale (see Appendix D) measures general feelings of energy and fatigue over the past three days (Lawler, 1999). This scale consists of seven items rated from 0 (*not at all*) to 4 (*extremely*). Item ratings are summed to produce scores ranging from 0 to 28. Fatigue scores are obtained by reversing the scores on the three positively-worded items and then summing the seven items. The mean and standard deviation of fatigue for this study (M = 13.72, SD = 5.53) are comparable to a previous stress and coping study (M = 12.04, SD = 6.71 (Lawler, 1999). The internal consistencies for the current study and the stress and coping study (Lawler, 1999) are identical Cronbach's α = .89.

Sleep Behaviour

Respondents reported the average number of hours they had slept each night over the previous week (M = 6.95, SD = 0.91). The specific question was "How many hours of sleep did you get each night for the past seven nights?" The average hours reported were similar to those reported by samples in previous studies (M = 7.00, and M = 6.93, respectively; (Trockel et al., 2000; Tsai & Li, 2004). In addition, two other items relating to sleep (insomnia and trouble waking) were included in the symptom checklist.

Symptom Checklist

Seven physical symptoms were selected for inclusion on a symptom checklist on the basis of their strong association with stress: headaches, digestive problems, backaches, urges to eat, loss of appetite, insomnia, and trouble waking (Lawler, 1999). For each individual symptom, participants were asked to report on "how many days over the last week did you experience the symptom". The items are rated on an eight-point scale from 0-*days* to *7-days*.

Illness Measures

Three items relating to illness experiences included: 1. "In the past four weeks, how many illnesses have you had?" 2. "In the past four weeks how many days have you been sick?" 3. "In the past four weeks how many times have you gone to see a doctor or used a health

clinic?" The time frames for these questions were the last four-weeks (Time 1), three-weeks (Time 2), and one-week (Time 2), so that there was no overlap in the period of time being measured. These questions were used in previous studies examining stress and coping in students (Cameron & Nicholls, 1998; Lawler, 1999). The mean number of baseline illnesses ($M = 1.00$, $SD = 1.20$), days sick ($M = 2.55$, $SD = 3.09$), and doctor visits ($M = 0.59$, $SD = 1.27$) were similar to those reported by a sample in a previous study (Lawler, 1999).

Immediate Pre- and Post-Session Measures

State Anxiety

The STAI-sf (Marteau & Bekker, 1992) is a six-item measure (see Appendix E), which is a shortened version of the 20-item state anxiety scale of the State Trait Anxiety Inventory (STAI). The respondents rate the items on a scale ranging from 0 (*not at all*) to 4 (*extremely*) in response to how they are feeling "at the moment". Item ratings are summed to produce scores ranging from 0 to 24. STAI-sf scores are obtained by reversing the scores on the three positively-phrased items and then summing the six items. This short version has been found to have good internal consistency; Cronbach's α = .82 (Marteau & Bekker, 1992). Internal consistency for the present sample was high, Cronbach's α = .82.

Fatigue

The same fatigue scale used in the stress and coping study (Lawler, 1999) was used to assess fatigue immediately pre- and post-sessions. However, the instructions were altered so participants responded to "how they are feeling at the moment".

Heart Rate and Blood Pressure

The participant's pulse was taken at his/her wrist for a period of 60 seconds by trained assistants using a stopwatch. Blood pressure measurements were obtained by trained assistants using a sphygmomanometer. After the participant sat quietly for five-minutes, the assistant measured blood pressure in the right arm with an appropriately sized cuff. The normal blood pressure range for young, healthy adults is 120 systolic over 70 diastolic (N. A. Campbell *et al.*, 1999).

Evaluation Questionnaire

An eight-item questionnaire was used to assess the perceived effectiveness of the massage and television watching activities in reducing stress. Items were rated on a seven-point

scale ranging from 1 (n*ot at all*) to 7 (a *great deal;* see Appendix F). The items related to how effective the participants thought the intervention was in helping them relax and cope with their problems more effectively. Similar questionnaires have been used in emotional disclosure research (Cameron & Nicholls, 1998; Lawler, 1999), where it was found to be effective in discriminating differences in perceived benefits between the experimental and control conditions. An additional, open-ended question was included asking participants for any further comments.

Procedure

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee. The researcher visited classes during the sixth and seventh week of the semester to recruit participants. The students were invited to participate in a study of relaxation techniques for stress management, and they were informed that they would be randomly assigned to one of two groups: a massage therapy group or a television watching activity group. It was explained that the massage therapy and television watching activity groups would require three sessions over a three-week period lasting for no more than 45-minutes per session. Participants were invited to sign up at the end of class, at which time each potential participant was given a packet containing a participant information sheet (see Appendix G), a consent form (see Appendix H), and a baseline questionnaire. Participants were contacted by phone, asked if they were willing to take part in the study, and scheduled for a session time during the following week.

The participants were randomly assigned to either the massage therapy or television watching activity using random number tables. The participants attended the same time and day for each of the weekly intervention sessions. They were also asked to bring along the completed baseline questionnaire and consent form to the first session. Participants chose a pseudonym by which their questionnaires and data would be identified to ensure confidentiality. Reminder calls were made the night before the scheduled session to minimize attrition due to participants forgetting about their session time.

The participants were asked to complete pre- and post-session measures of heart rate (HR), blood pressure (BP), state anxiety, and fatigue. The intervention session consisted of either having a 30-minute massage or watching a 30-minute video.

All massage sessions took place in nine identical clinic spaces at the New Zealand College of Massage in Newmarket, Auckland. When the participants arrived for their first massage

session, the researcher introduced them to the massage therapist and explained what was involved in the massage. The researcher then administered the appropriate pre-session measures. With the female participants, the researcher discussed whether they would prefer to wear a sports bra top (which would be provided), or have a towel draped over them during the massage. No participants chose to wear the sports bra. They were left in the room alone to lie down on the massage table face down with a towel wrapped around themselves. After a few minutes had passed, the massage therapist knocked on the door and entered the room. After completion of the massage, the therapist advised the participant that they could now get changed and then left the room. When the participant was dressed, he or she came to a waiting room, where the researcher administered the appropriate immediate post-session measures.

The television watching activity sessions were held in small rooms at the Tamaki Campus at the University of Auckland. The researcher was there to greet the participant, explain the session requirements, and administer the pre-session assessments. The researcher was present in the room with the participant for the duration of the programme. The participant was asked to remain quiet throughout the 30-minute programme. At the end of the half-hour programme the researcher administered the appropriate immediate post-session measures.

At the end of the third session, participants in both conditions were asked to complete the evaluation questionnaire. The follow-up questionnaires were administered one day after the last intervention session (Time 2) and one week after the last intervention session (Time 3). The follow-up questionnaires were given out at the end of the participants' classes and collected before their next class. Reminder calls were made to notify them that the researcher would be outside their class with the follow-up questionnaire. At the completion of the study, participants were extensively debriefed about the study's aims and design. The participants were also offered the opportunity to attend an informal gathering to learn about the role of massage in stress management.

Analysis

Statistical analyses were carried out using version 12.1 of the Statistical Package for Social Science (SPSS). Normality plots, skewness statistics and the Levene's test were conducted to test ANOVA and t-test assumptions of normal distribution and homogeneity of variances. There were no violations of the assumptions. Associations between variables were determined using Pearson correlation coefficients. To assess group differences on the

demographic, psychosocial, and health variables at baseline, independent samples t-tests were used. Pearson Chi-square analysis was used to assess differences in gender and use of relaxation activities between the two experimental groups. A series of repeated measures ANOVA's were conducted to assess group differences on the immediate pre-post measures of heart rate, blood pressure, state anxiety, and fatigue. To assess group differences on the items from the evaluation questionnaire, t-tests were conducted. A second set of repeated measures ANOVA's were conducted to assess group differences in changes in the psychosocial and health variables, where firstly all three time-points were included in the analysis. These analyses were followed up by simple effects analyses assessing two planned comparisons: one comparing group differences in changes in scores from Time 1 to Time 2 scores and the second comparing group differences in changes in scores from Time 1 to Time 3. Planned comparisons were conducted because Time 2 effects were predicted, and Time 3 effects were being explored to assess the duration of massage effects.

CHAPTER 6
STUDY 1: RESULTS

Group Comparisons at Baseline

Comparisons were made between the two experimental groups (massage therapy and television watching activity) to determine if there were any differences in age, gender, ethnicity, and year in university. T-tests showed no significant differences between the groups on age, t (32) = 0.36, ns; or years at university; t (32) = 0.11, ns. There were no significant group differences in gender (χ^2 (1, N = 34) = 0.55, ns) or ethnicity ($p = 0.25$, Fisher's exact test).[1]

Activities participants regularly used for relaxation included watching television (79.41%), listening to music (73%), reading for relaxation (53%), walking (41%), and aerobic exercise (38%). Only one participant reported using massage as a relaxation technique, and upon further questioning this participant reported having only one massage in the previous year. Pearson chi-squared analyses revealed no significant differences between the groups in the use of relaxation activities.

Correlations

Correlational analyses were used to assess zero-order relationships of demographic, psychosocial and health measures administered at Time 1. Age, gender, and sleep were not significantly correlated with any other variable. Table 2 shows the correlations for the psychosocial measures (perceived stress, coping efficacy, and health measures (symptoms, fatigue, days sick, and doctor visits). Coping efficacy and perceived stress were highly correlated, and they were both associated with fatigue and a number of symptoms. Coping efficacy and perceived stress did not, however, significantly correlate with the number of days sick, doctor visits, or number of illnesses. Contrary to expectations, perceived stress was not correlated with headaches.

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[1]There were insufficient numbers of different ethnicities in each group, so it was regrouped New Zealand European/Pakeha and Other.

Table 2
Simple Correlations among Individual Difference Psychosocial and Health Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Coping efficacy	--												
2. Stress	-.84**	--											
3.Fatigue	-.71**	.73**	--										
4.Headache	-.33	.33	.44*	--									
5.Digestive problems	-.46**	.41*	.60**	.28	--								
6.Backache	-.50**	.45**	.61**	.21	.64**	--							
7.Urges to eat	-.25	.31	.24	.11	.29	.21	--						
8.Loss of appetite	-.41*	.39*	.29	.31	.08	.12	.17	--					
9.Insomnia	.32	.42*	.43*	.42*	.02	.36*	-.13	.25	--				
10.Trouble waking	-.57**	.47**	.71**	.49**	.46**	.50**	.19	.43*	.38*	--			
11.No. of illnesses	-.38*	.29	.45*	.35*	.52**	.48**	-.02	.07	.34	.30	--		
12.No. days sick	-.22	.20	.44*	.35*	.36*	.43*	-.08	-.08	.36*	.36*	.57**	--	
13. Doctor visits	.08	-.04	-.05	.15	.36*	.03	-.01	-.18	-.04	.00	.48**	.28	--

Note. $N= 34$. * $p < .05$, ** $p < .01$.

Means and Standard Deviations

Table 3 presents the means and standard deviations of all the measures across the three time-points. Preliminary analyses of the pre-test measures revealed no significant differences between the two conditions except for two variables. The massage group reported more headaches ($M = 2.12$, $SD = 1.37$) in comparison to the television watching activity group ($M = 1.06$, $SD = 1.12$); $F (1, 31) = 5.84$, $p < .05$. The massage group also experienced significantly more problems with insomnia/trouble falling asleep ($M = 2.52$, $SD = 1.77$) in comparison to the television watching activity group ($M = 0.94$, $SD = 1.39$); $F (1, 31) = 8.18$, $p < .01$.

Table 3
Means and Standard Deviations of the Dependent Measures

	Experimental Condition					
	Massage (*n* = 18)			Television (*n* = 16)		
Variable	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Coping Efficacy						
M	15.65	18.06	15.13	16.50	16.07	14.29
SD	4.88	4.86	6.15	4.47	4.91	7.43
Perceived Stress						
M	26.71	22.38	26.44	26.00	26.00	25.36
SD	9.07	8.23	9.74	6.29	6.79	10.42
Fatigue						
M	14.88	15.06	12.94	12.56	13.63	14.86
SD	6.25	6.37	5.31	4.60	7.22	7.68
Headaches						
M	2.12	1.50	1.31	1.06	1.38	1.43
SD	1.36	1.04	1.30	1.12	1.89	1.95
Digestion Problems						
M	1.35	1.39	1.50	1.69	1.38	1.93
SD	1.77	1.79	2.13	1.70	1.86	2.27
Backaches						
M	2.06	2.28	2.13	1.25	0.94	1.57
SD	2.54	1.67	2.06	2.05	1.44	1.60
Urges to Eat						
M	2.00	1.78	1.81	2.06	2.31	2.64
SD	2.37	2.07	2.34	2.08	2.57	2.53
Loss of Appetite						
M	0.82	1.17	0.88	0.88	1.00	1.42
SD	1.24	1.47	1.20	1.20	1.32	1.99
Insomnia						
M	2.53	2.17	2.63	0.94	1.44	1.14
SD	1.77	1.82	1.75	1.39	1.59	1.29
Trouble Waking						
M	3.71	2.89	2.94	2.81	3.19	3.71
SD	1.93	1.94	2.02	1.91	2.20	2.02
Hours of Sleep						
M	6.66	6.95	7.23	7.24	6.90	7.49
SD	0.92	1.31	1.22	0.90	1.00	1.30
No. of Illnesses						
M	1.12	0.78	0.75	0.88	0.50	0.50
SD	1.05	0.73	1.00	1.36	0.63	0.94
Days Sick						
M	3.24	2.00	1.63	1.81	1.81	1.50
SD	3.77	2.83	2.06	0.94	2.04	2.59
Doctor Visits						
M	0.76	0.50	0.13	0.40	0.25	0.14
SD	1.56	0.92	0.34	0.83	0.58	0.36

Note. Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post

the last session.

Immediate Pre-to Post-Session Changes in Heart Rate, Blood Pressure, State Anxiety, and Fatigue

Table 4 presents scores for heart rate, blood pressure, state anxiety, and fatigue from pre- to post-sessions. Preliminary analyses of the first pre-session measures of heart rate, blood pressure, state anxiety, and fatigue revealed that there were no significant condition differences in fatigue and state anxiety, but there were significant differences between the conditions in pre-session levels of heart rate and blood pressure. The television watching activity group had lower heart rates ($M = 69.25$, $SD = 14.38$) relative to the massage group ($M = 82.59$, $SD = 10.29$); $F(1, 34) = 13.73$, $p < .01$. The television watching activity group also had lower diastolic blood pressure ($M = 65.63$, $SD = 9.64$) relative to the massage group ($M = 76.11$, $SD = 6.08$); $F(1, 34) = 14.74$, $p < .01$. The television watching activity group had lower systolic blood pressure ($M = 110.00$, $SD = 9.66$) compared to the massage group ($M = 117.22$, $SD = 5.75$); $F(1, 34) = 7.21$, $p < .05$. Two participants in the television watching activity group had outlying values; both had pre-session resting heart rates of 56, systolic blood pressures of 90, and diastolic blood pressures of 50. Analyses with the data for these two participants omitted revealed no condition differences, confirming that they accounted for the differences between the two groups. These two participants demonstrated no major changes in heart rate and blood pressure from pre- to post-session. All analyses included their data.

Table 4

Change Scores for Heart Rate, Blood Pressure, State Anxiety, and Fatigue from Pre- to Post-Sessions

		Session 1	Session 2	Session 3
Heart Rate (BPM)				
Massage				
	Pre	82.58	82.35	75.29
	Post	73.42	73.41	68.47
	Change	-9.16*	-8.94**	-6.82*
TV				
	Pre	69.25	66.50	74.00
	Post	65.50	66.00	72.25
	Change	0.35	-0.50	-1.75
Diastolic Blood Pressure				
Massage				
	Pre	76.11	74.71	71.67
	Post	73.89	74.71	74.44
	Change	-2.22	0	2.77
TV				
	Pre	65.62	66.25	64.38
	Post	64.38	63.13	62.50
	Change	-1.24	-3.12	-1.88
Systolic Blood Pressure				
Massage				
	Pre	117.22	114.12	111.67
	Post	116.11	112.35	111.11
	Change	-1.11	-1.77	-0.56
TV				
	Pre	110.00	106.25	106.88
	Post	109.38	101.88	105.00
	Change	-0.62	-4.37	-1.88
State Anxiety				
Massage				
	Pre	7.11	9.71	7.06
	Post	3.17	5.65	3.00
	Change	-3.94	-4.06*	-4.06*
TV				
	Pre	7.19	7.81	8.19
	Post	4.69	5.38	5.94
	Change	-2.50	-2.43	-2.25
Fatigue				
Massage				
	Pre	13.94	13.53	12.61
	Post	14.17	14.88	15.06
	Change	0.23	1.35	2.45
TV				
	Pre	13.19	11.31	13.81
	Post	13.44	13.69	13.63
	Change	0.25	2.38	-0.18

Note. A negative change value denotes a decrease in the scores from pre- to post-session. TV refers to television watching activity. BPM refers to beats per minute. $* p < .01$, $** p < .05$ for group differences in pre- to post-measures.

Heart Rate

Repeated measures ANOVA's of heart rate revealed significant Time effects for each of the three sessions (Session 1; $F (1, 32) = 31.30$, $p < .001$, Session 2; $F (1, 32) = 12.40$, $p < .005$, Session 3; $F (1, 32) = 18.72$, $p < .001$). Repeated measures ANOVA's of heart rate revealed significant Group x Time effects for all three sessions: Session 1, $F (1, 32) = 4.91$, $p < .05$; Session 2, $F (1, 32) = 9.91$, $p < .005$; and Session 3, $F (1, 32) = 6.85$, $p < .05$. Simple effects analyses revealed that the massage group exhibited decreases in mean heart rates from pre to post-session for each of the three sessions (Session 1; $F (1, 32) = 39.27$, $p < .001$, Session 2; $F (1, 32) = 22.94$, $p < .001$, Session 3, $F (1, 32) = 25.62$, $p < .001$). In contrast, the television watching activity group exhibited no significant change (Session 1; $F (1, 32) = 3.20$, $p = .08$, Session 2; $F (1, 32) = 0.68$, $p = .80$, Session 3; $F (1, 32) = 1.38$, $p = .25$).

Diastolic and Systolic Blood Pressure

There were no significant Time or Group x Time interaction effects for either diastolic or systolic blood pressure for any of the three sessions.

State Anxiety

Repeated measures ANOVA's of heart rate revealed significant Time effects for each of the three sessions (Session 1; $F (1, 32) = 27.66$, $p < .001$, Session 2; $F (1, 32) = 73.42$, $p < .001$, Session 3; $F (1, 32) = 32.31$, $p < .001$). Significant Group x Time interaction effects on state anxiety emerged for Sessions 2 and 3, but not for Session 1; Session 2: $F (1, 32) = 4.57$, $p < .05$; and Session 3: $F (1, 32) = 4.65$, $p <. 05$. Simple effects analyses revealed that the massage and television watching activity groups exhibited decreases in state anxiety from pre- to post-session for each of the three sessions (Massage: Session 1; $F (1, 32) = 22.02$, $p < .001$, Session 2; $F (1, 32) = 59.11$, $p < .001$, Session 3; $F (1, 32) = 32.65$, $p < .001$; Television: Session 1; $F (1, 32) = 7.86$, $p < .01$, Session 2; $F (1, 32) = 20.06$, $p < .001$, Session 3; $F (1, 32) = 5.88$, $p < .05$).

Fatigue

There were no significant Time or Group x Time differences or simple effects for fatigue for any of the three sessions.

Longer-Term Measures

Repeated measures ANOVA's were conducted with two planned comparisons: experimental group differences in changes from Time 1 to Time 2 and experimental group differences in changes from Time 1 to Time 3 for all main outcome measures of psychosocial and health variables.

Perceived Stress

Figure 4 depicts the mean perceived stress scores for each group across the three time-points. A repeated measures ANOVA revealed no significant time effect. There was a trend for a Group x Time interaction effect, although it did not reach statistical significance; $F (2, 27) = 2.78$, $p <.10$. The planned comparisons of group differences in changes from Time 1 to Time 2 revealed a significant Time x Group effect; $F (1, 28) = 4.21$, $p < .05$. Simple effects analyses revealed that the massage group exhibited decreases in perceived stress from Time 1 to Time 2 ($F (1, 30) = 7.24$, $p < .01$), whereas the television watching activity group reported no change ($F (1, 30) = .08$, $p = .78$). The planned comparisons of group differences from Time 1 to Time 3 revealed no significant Time or Group x Time interaction effects.
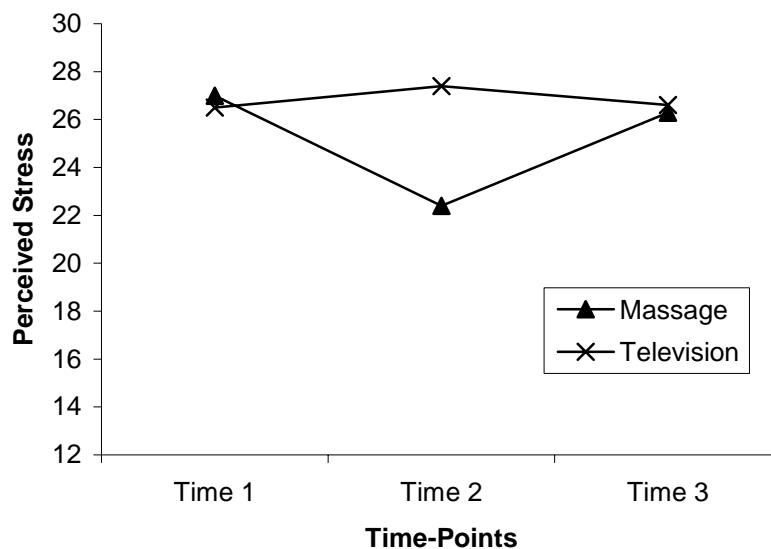
Figure 4. Perceived stress scores for the massage group and television watching activity group across the three time-points (Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post the last session).

Coping Efficacy

As shown in Figure 5, coping efficacy scores increased from Time 1 to Time 2 for the massage group, but decreased from Time 1 to Time 2 for the television watching activity group. All three time-points (Time 1, Time 2, and Time 3) were included in a repeated measures ANOVA. There was an overall significant time effect; $F (2, 27) = 3.41$, $p <. 05$. Overall, coping efficacy scores increased ($M = 16.76$, $SE = 0.89$) then decreased ($M = 14.71$, $SE = 1.24$). There was a significant Group x Time interaction effect; $F (2, 27) = 3.72$, $p <. 05$. Planned comparisons of group differences in changes from Time 1 to Time 2 revealed a significant Group x Time interaction effect; $F (1, 28) = 7.64$, $p <. 05$. Simple

effects analyses revealed that the massage group exhibited increases in coping efficacy from Time 1 to Time 2 ($F_{(1, 30)} = 12.87$, $p < .005$), whereas the television watching activity group reported no change ($F_{(1, 30)} = 0.75$, $p = .39$). Planned comparisons of group differences in changes from Time 1 to Time 3 revealed no significant Group x Time interaction effects.
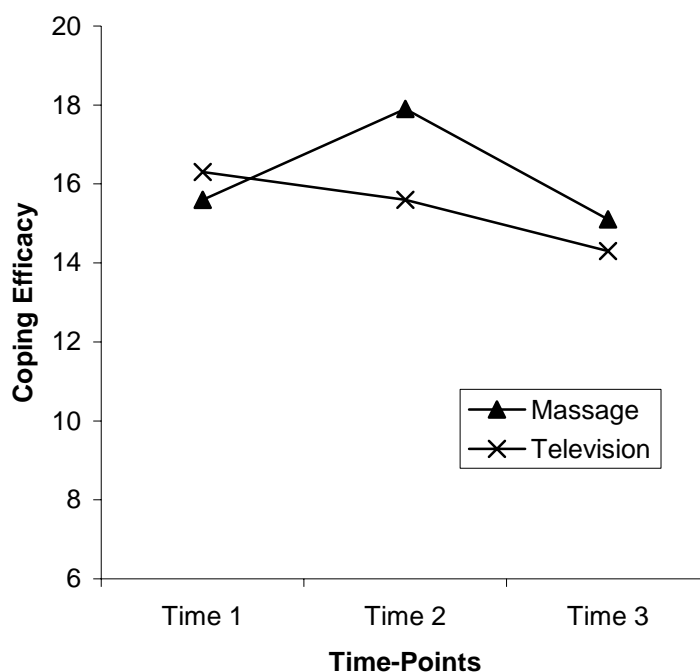
Figure 5. Coping efficacy scores for the massage group and television watching activity group across the three time-points (Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post the last session).

Health Measure Variables

Fatigue

A repeated measures ANOVA assessing group differences in changes in fatigue over Time 1, Time 2, and Time 3 revealed no significant Time or Group x Time effects. Planned comparisons of group differences in changes from Time 1 to Time 2, and from Time 1 to Time 3 were not significant.

Sleep Behaviour Measures

Figure 6 depicts the average hours of sleep for each group across the three time-points. A repeated measures ANOVA revealed no significant Time or Group x Time effects. Planned comparisons of group differences in changes from Time 1 to Time 2 were not significant,

but a trend emerged; $F_{(1, 27)} = 3.60$, $p <. 10$. Simple effects analyses revealed no significant findings for massage group from Time 1 to Time 2 ($F_{(1, 30)} = 1.68$, $p = .20$), or the television watching activity group ($F_{(1, 30)} = 1.87$, $p = .18$). Planned comparisons of group differences in changes from Time 1 to Time 3 were not significant.

Figure 7 depicts the changes in insomnia scores for both groups across the three time-points. A repeated measures ANOVA revealed no significant Time effects; however there was a significant Group x Time interaction effect; $F_{(2, 27)} = 4.04$, $p <. 05$. However, caution needs to be taken when evaluating these results, as there was a significant difference between the massage and television watching activity group at baseline. The planned comparisons of group differences in changes from Time 1 to Time 2 and from Time 1 to Time 3 were not significant.

Figure 8 depicts the trouble waking scores for both groups across the three time-points. A repeated measures ANOVA revealed no significant Time or Group x Time effects. Planned comparisons from Time 1 to Time 2 were not significant, but a trend emerged; $F_{(1, 28)} = 4.08$, $p < .10$. Simple effects analyses revealed no significant findings for massage group from Time 1 to Time 2 ($F_{(1, 30)} = 1.76$, $p = .19$), or the television watching activity group ($F_{(1, 30)} = 1.74$, $p = .20$). Planned comparisons of group differences in changes from Time 1 to Time 3 were not significant.
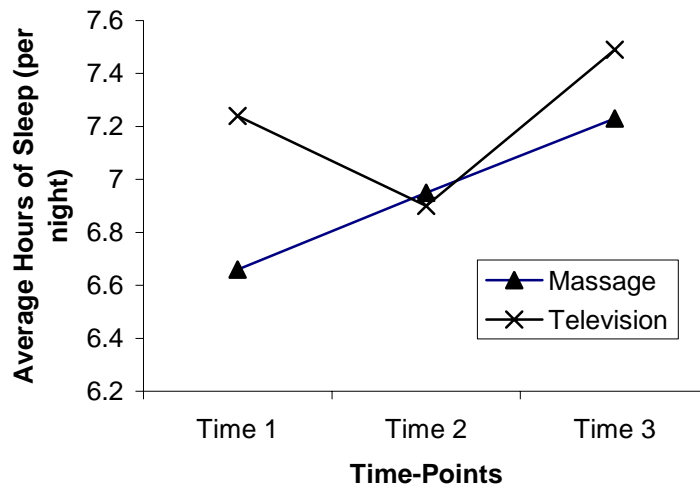
Figure 6. Average hours of sleep (per night) scores for the massage group and television watching activity group across the three time-points (Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post the last session).
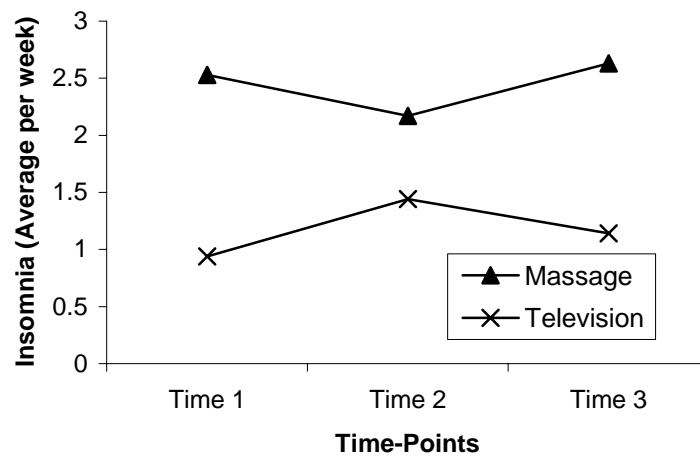
Figure 7. Insomnia (average per week) scores for the massage group and television watching activity group across the three time-points (Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post the last session).
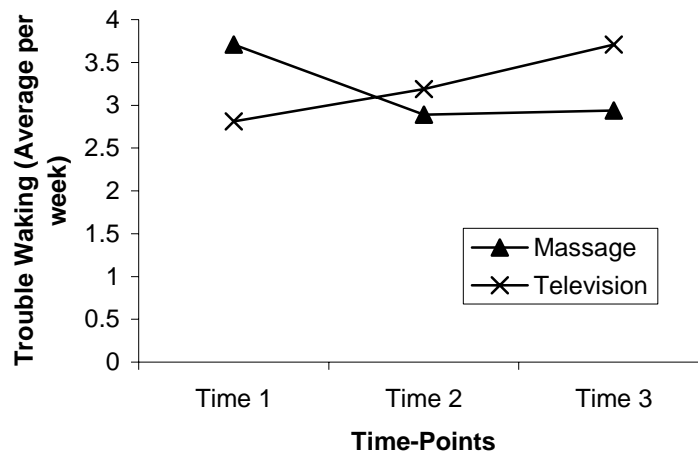
Figure 8. Trouble waking (average per week) scores for the massage group and television watching activity group across the three time-points (Time 1 = Baseline, Time 2 = one-day post the last session, Time 3 = one-week post the last session).

Individual Symptoms and Illness Measures

Repeated measures ANOVA's were conducted for each of the individual symptom measures (headaches, ulcers, digestive problems, panic attacks, backaches, urges to eat, loss of appetite) and for the overall health measures (number of illnesses, days sick and doctor visits). No significant Time or Group x Time effects emerged in either analyses including all three time-points or analyses assessing the planned comparisons.

Evaluation Measure

One way ANOVA's of the post-experimental evaluation items revealed significant Group differences on all but one item (it is important to relax); see Table 5. For all of the other items, the massage group gave more favourable ratings of their intervention than the television watching activity group. Table 6 summarises the comments made in the open-ended section of the evaluation questionnaire. Comments reveal more positive appraisals of massage in helping with stress and relaxation.

Table 5

Summary of ANOVA's for Massage and Television Watching Activity Group Differences of Session Evaluation Ratings

Variable	Massage Therapy	Television Watching Activity	F (1,31)	p
Relax and feel less stressed				
M	5.71	3.63	25.56	.001
SD	0.99	1.36		
Effective way to manage stress levels				
M	5.88	3.81	27.23	.001
SD	0.99	1.28		
Deal effectively with problems				
M	4.18	2.56	14.99	.001
SD	1.38	0.96		
Was participation a valuable experience				
M	5.94	4.13	16.00	.001
SD	1.25	1.36		
More control over challenges/problems				
M	4.18	2.38	15.88	.001
SD	1.55	0.96		
Important to relax				
M	6.71	6.88	1.00	.324
SD	0.47	0.50		
Continue to use this technique for stress				
M	5.35	4.13	6.25	.018
SD	1.32	1.50		
Enjoy participating				
M	6.82	5.94	11.52	.002
SD	0.39	1.00		

Table 6

Summary of Comments made for Open-Ended Section of the Evaluation Questionnaire

Responses from participants in the massage group

I slept like a baby the night of the massage.

Felt really relaxed during sessions – to the extent that my mind wandered and I thought like I haven't done since I was a child. It made me feel carefree, even though I was often thinking about my problems that I faced, somehow they felt easier to deal with.

At the time after the massage I feel really good and if stressed I feel generally more content. Massage does help clear the mind and helps you see things in perspective.

Massage has definitely helped as I looked forward to them every week, particularly when stressed out and feel much better afterwards.

The feeling after each massage was fantastic completely different to how I felt prior to it.

After massage I was left feeling good and healthy, able to see things a little more clearly and put things in perspective.

Responses from participants in the television watching activity group

I don't deal with problems through thinking about them specifically while watching TV, I think TV watching allows for relaxation that initiates dealing with the issues subconsciously

I watch TV when stressed

I think this technique may be good for some people to deal with stress, but I find I deal better with stress by doing exercise.

CHAPTER 7
STUDY 1: DISCUSSION

University students experience high stress at predictable times each semester due to academic commitments (Misra et al., 2000). Research has revealed that stress in university students is related to sleep disturbances and changes in health (Hudd et al., 2000). Given that students report higher levels of stress and health problems, they are an important target for stress management interventions. This study is the first to assess massage therapy's effects on both perceived stress and coping efficacy and to integrate psychological and physiological effects of massage into the CSM of self-regulation for stress and coping.

Leventhal's CSM (Leventhal et al., 2003) provides a useful theoretical framework for the process of managing, evaluating, and coping with stressful experiences on two parallel, yet relatively independent levels: cognitive and emotional (Leventhal et al., 2003). Although research investigating the effects of massage therapy has demonstrated that it can reduce anxiety, depression, and stress (Field, 1998; Field et al., 1996a; Field et al., 1997; Field et al., 1996b), enhance attention (Field et al., 1996a), and alter EEG readings (Diego et al., 2004; Field et al., 1996a), it is still unclear why these changes occur. It could be that cognitive and physiological changes are responsible for these mood and attentional effects. The direct effects of massage on physiological concomitants of stress, such as reduction in muscle tension, heart rate, and cortisol, may feed back to reduce or alter perceptions of stress and emotional arousal.

The CSM of self-regulation helps to delineate the complexity and variability of stress and coping between individuals and across situations by accounting for the multiple possible representations, coping procedures, and evaluations that can occur (Leventhal et al., 2003). No previous massage research has attempted to integrate the findings into a stress and coping model. Using a theoretical model of stress and coping for massage effects can assist in identifying psychological processes leading to observed reductions in stress, depression, anxiety, and coping efficacy, as well as the effects on autonomic, neuroendocrine, and somatic processes. A self-regulation model provides scope for identifying the dynamic relationships between these processes.

Short-Term Massage Effects (Heart Rate, Blood Pressure, State Anxiety, and Fatigue)

It was hypothesised that massage would be more effective than watching television in reducing heart rate, blood pressure, state anxiety, and fatigue. As predicted, the massage group experienced a significant decrease in heart rate after each of the 3 sessions, whereas the television watching activity group showed minimal change. There were no significant effects or trends for blood pressure or fatigue. Both groups experienced decreases in state anxiety, where the massage group reported greater decreases than the television watching activity group did. These group differences were statistically significant for sessions two and three.

The reductions in heart rate and anxiety from before to after each of the massage sessions are indicative of a relaxation response, which corresponds with increases in parasympathetic nervous system activity. The television watching activity group also exhibited reductions in state anxiety, although not to the same degree as the massage group. Interestingly, while the television watching activity group also experienced a decrease in state anxiety, they did not report the longer-term reductions in perceived stress and coping efficacy as did the massage group. The non-significant findings for blood pressure could be due to either the generally low blood pressure levels or the healthy participants. In addition, there may have been measurement error, due to variations in accuracy in the readings taken by the research assistant.

Stress, Coping, and Self-Regulation

As hypothesised, the participants in the massage group experienced a decrease in perceived stress while the television watching activity group experienced little change. This result is similar to the limited research findings that massage therapy reduces perceived stress in medical faculty staff and students (Diego et al., 2004; Field et al., 1996a; Link, 1986; Zeitlin et al., 2000). Interestingly, these few studies have used different measures of stress and yet all have found decreases in stress levels among participants receiving massage. The perceived stress scale (measure used in the current study) assessed both cognitive and affective aspects, and so highlights that massage may influence both of these processes. Taken together these findings suggest that massage can impact on stress responses and processes and, as such, can serve as an effective emotional regulation technique. The immediate effects shown by the massage group in heart rate and state anxiety suggest that massage is impacting on both physiological and emotional processes. The state of

relaxation promoted by the massage therapy through the activation of the parasympathetic nervous system, possible neuroendocrine changes, and affective changes, may have led to changes or re-appraisals of stressors. These stressors may be perceived as less stressful or as more manageable, as revealed in the findings for perceived stress and coping efficacy.

No previous research has included a measure of coping efficacy or cognitive appraisals of one's success in handling stressful experiences. As hypothesised, the massage group demonstrated a significant increase in coping efficacy, while the television watching activity group experienced a small decline. These findings suggest that the beneficial effects of massage on stress reduction may be due in part to changes in cognitive appraisals of coping efforts, which helps to elucidate the effect of massage on the stress and coping process. In order to explore these findings further, future research should include measures of coping efficacy and other cognitive appraisals, to see if massage does translate into improved problem-focused regulation. These two findings of decreased perceived stress and increased coping efficacy in the massage group are promising in attempting to integrate the effects of massage into the CSM of self-regulation. Massage, probably through multiple pathways, is helping a person to regulate their appraisal of stress, and/or their ability to cope with their stress, which may lead to changes in the way a person regulates his/her own behaviour.

The beneficial effects of massage on appraisals of coping efficacy may have occurred because of changes in representations of the stressor (it was no longer perceived as stressful), or the participants felt more in control of the stressor, or alternative coping strategies were employed. Whichever the outcome, it is clear that the stress and coping effects resulting from the massage are integral to self-regulation processes and are consistent with the pathways highlighted in the proposed model (see Figure 3). In essence, the findings from this study support the use of a psychological model in helping to explain the effects of massage therapy.

No previous research has investigated the effects of massage on stress past the last day of the massage intervention. The results revealed that the stress and coping changes were no longer evident at the one-week follow-up assessment. As this is the first study to include a longer-term follow-up assessment, however, a firm conclusion about the short duration of effects of massage cannot be drawn. By the one-week follow-up assessment these students were in the final week of lectures and about to start study break for examinations, and the examination pressure may have been high enough to over-ride any lingering effects of

massage on their anxiety and stress levels. As Field (1998) suggested, however, one might not expect massage therapy to have sustained effects any more than one would expect long-term effects of temporary drugs, dietary changes, or exercise. Future studies need to include follow-up assessments to fully address this question, as other populations could experience lasting effects past the last day of intervention. It may be that massage therapy needs to be continued during periods of prolonged stress.

The immediate effects of massage on heart rate and state anxiety suggest reduction in autonomic activation, although other autonomic responses such as respiration rate and catecholamine/cortisol were not directly measured in this study. These changes could possibly lead to decreases in anxiety. This affective response could possibly alter perceptions of perceived stress and coping efficacy by either affective changes and/or cognitive re-appraisals (see Figure 3). Further research is needed to explore the role of activation, and components of the autonomic and neuroendocrine systems on cognitive and emotional processes relating to coping with stressful experiences.

It appears that massage therapy is influencing the expression and/or experience of emotions, possibly through activation of the autonomic system. The students in this study faced with final examinations, assignment deadlines, and other stressors, experienced lower anxiety after the massage (decreased negative emotion), which possibly impacted on perceived stress and led to an enhanced sense of control over their stressors. Massage appears to be an effective response modulation strategy in helping to regulate emotional distress (reducing anxiety and perceived stress) and problem-focused coping (reducing cognitive appraisals of the threat of failing exams).

One of the fundamental questions is: How exactly does massage translate into these findings of improved perceived stress and coping efficacy? There are a number of other aspects of relaxation that are important to consider, particularly focusing and passivity. Massage may enhance focusing by inducing the person to attend to the part of the body being massaged and the pressure and sensation that is experienced, thus away from ruminating about stressors. Massage may enhance passivity by distracting attention away from current goals and concerns. Responses from the open-ended question of the intervention evaluation highlighted some of these cognitive aspects of relaxation, such as "massage helped clear my mind", "keep things in perspective", and "see things more clearly". Future research, may consider developing an assessment that measures the cognitive processes experienced during a massage.

Lastly, the improvements revealed for the self-regulation processes involved in stress and coping could have added to the students overall success with dealing with the pressures of examinations (where study was more effective), which may have led to improved overall academic performance. Hence, academic performance should be considered as a potentially important outcome to measure in future research.

Sleep Behaviour, Fatigue, and Physical Health

Sleep behaviours (quantity, insomnia, and trouble waking) were measured in this study as sleep is often disrupted in students, especially during times of stress (Brown et al., 2002; Hudd et al., 2000; Misra et al., 2000), and research has shown that massage can help improve sleep in chronic pain and hospitalised populations (Richards, 1998; M. C. Smith et al., 1999; Sunshine et al., 1996). However, no research has investigated the impact of massage on sleep in healthy individuals. Contrary to expectations, no significant differences between the groups were found for quantity of sleep, although a trend emerged with the massage group experiencing a slight increase in the number of hours of sleep and the television watching activity group experiencing a decrease in the number of hours of sleep from baseline to the assessment one-week later. The decrease in quantity of sleep would generally be expected during this time leading up to final examinations. Similar trends were observed for insomnia and trouble waking: The massage group experienced slight improvements on these two variables, whereas the television watching activity group experienced slight decreases. Future investigation of the impact of sleep in healthy individuals is warranted. It may also be important to assess the perceived quality, as well as the quantity of sleep.

It was hypothesised that massage would be more effective than the television watching activity in reducing fatigue levels, as previous research has reported improvements in vigour, alertness, and fatigue after a massage intervention (Field et al., 1996a; Field et al., 1997). However, no significant group differences in fatigue levels were observed over the duration of the study. As this is only one study, future research should include measures of fatigue, since previous research had positive findings.

It was predicted that massage would be more effective than the television watching activity in improving physical symptoms and reducing illnesses and doctor visits, as the symptoms assessed were related to stress, and students experience poorer health and visit the doctor more during stressful periods. Results however, indicated that there were no significant differences between the groups on any of the individual physical symptoms included in the

study (headaches, ulcers, digestions problems, panic attacks, backaches, urges to eat, and loss of appetite). There were no significant differences between the groups for the number of illnesses experienced or the number of days sick. Both groups demonstrated decreases in these variables across time, which may have been related to a seasonal change from winter to spring. Given that massage has beneficial effects on stress processes, it was thought these effects would carry over to physical health. However, it may be that the sample size is too small to have enough statistical power to detect an effect, or that a low incidence of symptoms in the sample makes it difficult to detect any effects. Previous massage research has never directly assessed self-reported physical symptoms and illness, despite the beneficial effects of massage on fatigue, sleep, heart rate, cortisol, and blood pressure found in both healthy and ill populations (Field, 1998; Moyer et al., 2004).

Given that there were no significant changes in physical symptoms, it is not surprising to find no significant differences between the groups in the number of doctor visits, although both groups' means tended to decrease over time. The timeframe of the study may have been too short to detect any changes in illnesses experiences, particularly for a healthy sample – although other studies of undergraduates have detected stress intervention effects on illness experiences over similar time spans (Cameron & Nicholls, 1998; Pennebaker & Beall, 1986; Pennebaker et al., 1990). Future research with larger samples may consider including measures of physical symptoms and illness. Health care visits are important to assess in relation to massage effects, as reductions in health care visits reduce health related costs.

Evaluation of the Interventions

The intervention evaluations showed that participants in the massage group, in comparison to the television watching activity group, felt more relaxed and less stressed, thought that it was a more effective technique for managing their stress levels and helping them to deal effectively with their problems, and felt they had more control over their challenges and problems. Firstly, this highlights that while the assessments revealed findings that were indicative of a relaxation response, participants also reported it was an effective technique for relaxing and feeling less stressed. Secondly, the evaluations highlighted aspects that are relevant to the CSM of stress and coping, in that they measured perceptions of participants after massage in relation to feelings of control and stress.

The open-ended section of the evaluation questionnaire yielded some interesting comments highlighting the relaxation these individuals experienced after the massage. Several

comments reflected how the massage may have influenced the cognitive appraisals of stress and coping efficacy; for example, "even though I was often thinking about problems that I faced, somehow they felt easier to deal with", " if stressed I feel generally more content after the massage", and "massage does help clear the mind and helps you see things in perspective". These evaluations provide indications that participants perceived the massage intervention as valuable and practical and they are likely to use it again in the future.

Conclusion and Limitations

This study has extended theory and research in massage therapy for stress and coping in healthy individuals who are facing a stressful period in their lives by developing an expanded CSM that integrates psychological and physiological mechanisms underlying stress regulation that are potentially influenced by massage. Key strengths of this research, relative to earlier research include the use of a comparison group, and inclusion of measures of perceived stress, coping efficacy, fatigue and physical symptoms. In addition, there was no attrition from either the massage or television watching activity conditions.

There are some limitations with this research: The results of this study are essentially only generalisable to other tertiary students. In addition, due to the small sample size there may have been insufficient power to detect significant effects for some of the variables (such as the physical health measures), warranting larger sample sizes in replication studies. Although the findings support the use of massage for coping with stress a practical consideration is the cost of massage. While the students in this study received free massages, the usual cost may inhibit students from accessing this type of treatment for stress. In addition, this study failed to include a longer-term measure of anxiety, which would have been useful in helping to determine if massage had any lasting effects on anxiety.

Future Directions and Implications

Further research is needed to comprehensively assess how massage impacts on self-regulation processes. Researchers might consider including measures of physical health symptoms, sleep behaviour, and immune markers to investigate further the impact of massage therapy on the immune and sleep systems and to determine whether massage can act as a buffer against illness for students confronting stressful experiences. Future research may also investigate the usefulness of including therapist ratings of muscle tension before and after massage.

This study highlights that students experience predictable stressful times throughout their academic careers, and providing relaxation training or stress awareness could be an important consideration of health professionals working in student health clinics. Other areas where stress is a contributing factor are job satisfaction and chronic illnesses, and the potential effects of massage on these experiences warrant further investigation. The second study will attempt to address the question of whether massage therapy impacts on a chronic condition by investigating the impact of massage therapy on migraines.

CHAPTER 8
MIGRAINE HEADACHES

Migraine is a highly prevalent and distressing disorder that has a profound effect on a person's well-being and general functioning – not only during the period of the attack, but also in between attacks (Field, 2000; P. J. Goadsby *et al.*, 2002; Lance, 1998). Migraine attacks are extremely variable, ranging in frequency from less than one a year to several attacks per week and varying in intensity from mild to excruciating and disabling (MacGregor, 1999). These attacks not only vary from individual to individual, but from attack to attack as well (Lance, 1998).

Prevalence

There have been a number of prevalence studies conducted using the diagnostic criteria defined by the International Headache Society (Headache Classification Committee of the International Headache Society, 1988). All studies were community-based samples. A recent study in the USA reported a one-year prevalence rate of 18.2% among women and 6.5% among men (R. B. Lipton *et al.*, 2001b), which is similar to USA prevalence rates of 17.7% in women and 6% in men, reported nine years earlier (W. F. Stewart *et al.*, 1992). In the United Kingdom, prevalence rates were similar with 18.3% of women and 7.6% of men reporting migraine with or without aura within the last year (Steiner et al., 2003). In France, prevalence for migraine was 11.2% for women and 4.0% for men (Henry et al., 2002). In Australia, a lifetime prevalence was found in 22% of women and 10% of men (Mitchell *et al.*, 1998). A recent study in New Zealand reported one-year prevalence rates of 8%, where both men and women were included together (Waldie & Poulton, 2002). The samples in the above studies were all over the age of 18 years and covered the incidence of migraine for at least the last year, with the Australian sample being lifetime prevalence. The one common factor across all of the epidemiological studies was that migraine was two to three times more common in women than in men. The higher prevalence for women may be explained in part by hormonal factors, although other factors such as triggers and genetics may also play a role.

Costs

Migraine attacks usually are more prevalent between the ages of 25 and 55, which are often considered to be an individual's most productive years (R. B. Lipton et al., 2001b). Data from the American Migraine Study II (R. B. Lipton et al., 2001b), revealed that over

half (53%) of the respondents reported that their migraines caused substantial impairment in day-to-day activities and required bed rest during an attack. In addition, approximately 30% reported missing at least one day of work or school in the previous three months because of migraine attacks, and 50% reported that school or work activity was reduced.

A USA study (Hu *et al.*, 1999) investigating the burden of migraine with respect to disability and economic costs found that men with migraines required on average four bed-rest days per year, and woman with migraines required on average six bed-rest days per year; importantly, these incur costs to both the individual and employers. The cost to employers in 1998 because of missed work days and impaired work function was $13 billion dollars a year. Health care costs were about $1 billion, with approximately $100 spent per migraine patient.

A study conducted in Baltimore County, MD (VonKorff *et al.*, 1998) investigated the cost of migraine on work performance in a sample of 174 participants. Results showed that over a three-month period, participants reported migraine headaches on eight work days. On average, participants missed one and a half days of work due to headache, and when at work with a migraine headache their work effectiveness was reduced by 41%. Over the three-month period, the migraineurs experienced an average of three lost work days. Migraine represents a large cost not only to society and employers in terms of lost productivity, but also to the individual who suffers significant impact on work performance, school achievements, social and family relationships (Warshaw & Burton, 1998). In essence, quality of life can be severely impaired.

Quality of Life

Quality of life refers to individuals' perceptions of their general well-being and life position, in the context of their culture and value systems and in relation to their goals, standards, and concerns (R. B. Lipton *et al.*, 2001a). Health-related quality of life is one component of overall quality of life, with the fundamental domains including physical, psychological, and social areas, role functioning, and general well-being (Cavallini *et al.*, 1995; R. B. Lipton et al., 2001a). Migraine poses a significant burden to patients, their families, and society. One study (R. B. Lipton et al., 2001b) revealed that 91% of migraineurs reported functional impairment, and 53% reported that their headaches caused severe impairments in activities or required bed rest.

A population-based study assessed health-related quality of life (HRQOL) in migraineurs and non-migraineurs (Terwindt et al., 2000). Across all eight domains of the HRQOL (physical functioning, social functioning, physical role limitations, emotional role limitations, mental health, pain, vitality, and general health perception), migraineurs reported diminished functioning and well-being in comparison to non-migraineurs. Other studies have reported restriction of daily activities and poor function in mental health and social aspects of daily life (Cavallini et al., 1995; Holmes et al., 2001). Given the significant levels of migraine-related disability in all aspects of daily living, effective management and treatment is crucial.

Etiology

The International Headache Society (IHS) developed a classification system that has become a standard tool for headache diagnosis and research (Headache Classification Committee of the International Headache Society, 1988; Headache Classification Subcommittee of the International Headache Society, 2004). The 1988 and 2004[2] classifications divide all headache disorders into primary[3] and secondary headaches[4].

The two main types of migraine are migraine without aura and migraine with aura. Migraine without aura is harder to diagnose due to the lack of visual disturbances, but is the most common type. Migraine without aura is an idiopathic, recurring headache disorder manifesting in attacks that last 4 to 72 hours. Typical characteristics of the headache are a unilateral location, pulsating quality, moderate or severe intensity, aggravation by physical activity, association with nausea or vomiting, and photo- and phonophobia.[5]

Migraine with aura is defined with respect to onset and duration of the aura. It is classified as an idiopathic, recurring disorder manifesting with attacks of neurological symptoms that are localised in the cerebral cortex or brain stem, usually developing gradually over 5-20 minutes and lasting less than 60 minutes (migraine with aura has several other subtype classifications, but these distinctions are outside the scope of this thesis). The aura can be recognised from visual, motor and/or speech disturbances, with visual aura being the most common disturbance. The person may experience flashing lights, jagged outlines, or blind spots, as well as numbness and tingling in the arm or the side of the face. Headache,

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2 Updated criteria were released in 2004, with little change to the classification of migraine headaches.
3 Migraine, tension type headache, cluster headache and other trigeminal autonomic cephalalgias
4 Headaches attributed to trauma, or physiological abnormalities
5 The 2004 classifications had minimal modifications, where if the person did not have nausea or vomiting but photophobia and phonophobia they could still be diagnosed with migraine without aura.

nausea, and/or photophobia usually follow neurological aura symptoms, directly or after a headache free interval of less than an hour (Headache Classification Committee of the International Headache Society, 1988).

Data from the American Migraine Study II (R. B. Lipton et al., 2001b) revealed that of those who had reported suffering from migraine, 85% had pulsating pain, 80% had photophobia, 76% phonophobia, 73% nausea, 59% unilateral pain, 44% blurred vision, 36% aura, 29% vomiting, and 11% had other neurological signs. Frequency of attacks varied considerably with 14% reporting two to six per week, 11% 1 per week, 37% 1 to 3 per month, and 38% 1 to 12 per year (R. B. Lipton et al., 2001b). The relatively high frequency of attacks and the common symptoms experienced, severely impacts on a person's life. A migraine attack can pass through up to five phases; however, not all migraineurs will experience all phases (Blau, 1992; MacGregor, 1999).

Phases Of Migraine Attack

The first phase is the prodrome, which can begin hours or days before phases two and three, and the symptoms are less dramatic than those that follow. Typical symptoms include: mood changes, clumsiness, slurred speech, tiredness, yawning, food craving, loss of appetite, diuresis, and hypersensitivity to light, sound, touch, and even odour. These premonitory symptoms are often mistakenly lumped together with auras and referred to as "warning signs". Although both do warn of an impending attack they are distinctly different (Blau, 1992; MacGregor, 1999).

The second phase is the aura. The aura usually begins 10 to 60 minutes before the headache in about 20% of migraineurs. Visual disturbances may be experienced with the eyes open or closed. There are also sensory changes during this stage, such as areas of tingling or numbness, and focal motor weaknesses (most commonly in the hands and lower face). A headache will not necessarily follow an aura (Blau, 1992; MacGregor, 1999).

The third phase is the actual headache, which comes on gradually, and if not treated successfully early, may last from several hours to several days. It is characteristically unilateral and pulsating, and varies in intensity from mild to excruciating. It is almost invariably accompanied with one of the following symptoms: nausea, vomiting, diarrhoea, phonophobia, photophobia, blurred vision, inability to concentrate, and tenderness of the scalp and face. The pain can be exacerbated by ordinary physical activity such as walking or climbing stairs. During this phase the individual will nearly always want to lie down in a dark quiet room (Blau, 1992; MacGregor, 1999).

The last phases are resolution and recovery, where the person knows the migraine attack is almost over (this phase can last for days). During this recovery period the person feels fatigued, worn out, weak, and generally "washed out" and will often experience symptoms such as scalp tenderness, drowsiness, and mood changes. Some people though find they have extra energy immediately after an attack, which may be related to relief that the attack is over (Blau, 1992; MacGregor, 1999).

Pathophysiology

Migraine is best understood as a primary disorder of the brain (P J Goadsby, 2001), the consensus being that both neuronal and vascular components are relevant and probably inter-related (Schoenen & Sandor, 1999). The specific cause of migraine headache remains unknown. Current theories suggest that the initiation of a migraine attack involves a primary central nervous system (CNS) dysfunction with subsequent activation of the trigeminovascular system. There are however, a number of different migraine models or theories, and there have been a number of phenomena found in migraineurs: A number of different triggers can bring on an attack (for example, diet, sleep, and hormonal changes), and circadian rhythms may also play a role in migraines (MacGregor, 1999). Moreover, sleep can be effective in aborting migraines (Rains & Penzien, 2002). Decreases in cerebral flow during aura, the release of serotonin during a migraine attack and elevations in levels of Substance P (a key mediator of inflammation) and calcitonin gene-related peptide (CGRP – a vasodilator) are other physiological mechanisms identified (Blau, 1992; P J Goadsby, 2001; Rains *et al.*, 2002; Schoenen & Sandor, 1999; Waeber & Moskowitz, 2003).

The following section covers processes that are involved in migraine pathophysiology. These processes are not mutually exclusive, but may instead reflect different aspects of the complex nature of migraine physiology.

Genetic Influences

First-degree relatives of migraine sufferers have been found to have an increased risk of migraine, with genetic involvement being supported by recent genetic mapping studies (Kors et al., 2004). However, the weight of genetic factors appears to be greater in migraine with aura than in migraine without aura, and to date the overall number of people who have found to have genetic components is small (Schoenen & Sandor, 1999). A gene for familial hemiplegic migraine (FHM – a rare inherited subtype of migraine) has been mapped to chromosome 19 in most cases, although in other FHM families it has been

linked to a locus on chromosome 1 (Kors et al., 2004; Schoenen & Sandor, 1999). Other genetic components that may play a role in migraine susceptibility are the dopamine receptor gene (Peroutka, 1997), the serotonin receptor gene (Ogilvie et al., 1998), or a locus on the X chromosome (Nyholt *et al.*, 2000; Nyholt *et al.*, 1998). The identification of several migraine susceptibility loci underline its genetic and overall complex nature (Kors et al., 2004).

Vascular Processes

The vascular theory was developed in the 1940s by Wolff (P J Goadsby, 2001; P. J. Goadsby et al., 2002), who theorised that attacks started with vasoconstriction followed by vasodilation in the intracranial and extracranial blood vessels. While most of the brain is insensitive to pain, meningeal blood vessels show a high level of innervation from the trigeminal sensory nerves, and pain is caused when these dilate (Blau, 1992). Activation of the trigeminal nerves also causes the release of vasoactive neuropeptides that cause further dilation and hence more pain (P J Goadsby, 2001). In considering this theory in relation to massage therapy, the sympathetic nervous system dilates blood vessels during activation (Sapolsky, 1998), and one of the proposed mechanisms for massage is the activation of the parasympathetic nervous system. The vascular theory is also used to explain the effectiveness of biofeedback, particularly thermal biofeedback, in the management of migraines (Holroyd et al., 2001b). The vascular theory has now been extended and it is thought that the trigeminovascular system is the common pathway where all migraine is generated.

Neurovascular Processes

The pathophysiology of migraine is generally agreed to involve trigeminal innervation (P J Goadsby, 2001; Schoenen & Sandor, 1999). The trigeminal nerve is the largest cranial nerve and the main sensory nerve of the head and face, and motor nerve for the muscles of mastication. These nerve fibres from the trigeminal nerve contain nociceptors that are capable of generating pain impulses. Nociceptors are receptors for noxious stimuli and are involved in pain detection. The endings of these nerve fibres contain peptide neurotransmitters. The neurovascular theory proposes that migraine triggers can activate trigeminal nerve axons, which release these neuropeptides (for example, Substance P, neurokinin A, and CGRP). Substance P and neurokinin A cause vasodilation and promote extravasation of plasma proteins and fluid from nearby meningeal blood vessels. CGRP does not promote plasma extravasation, but it is a potent dilator (Buzzi & Moskowitz,

1991; P J Goadsby, 2001; Schoenen & Sandor, 1999). The outcome of these neurotransmitters is to produce an inflammatory response in the area around the innervated blood vessels (P J Goadsby, 2001). According to the neurovascular theory, vasodilation is not the cause of migraines; rather it is a secondary phenomenon related to trigeminal nerve activation. It is thought that migraine triggers activate the trigeminal nerve in some way, possibly through nitric oxide or serotonin, although the exact mechanism is unclear. However, if activation of the triggers is the case, then decreasing the impact or incidence of triggers for the migraineur could alter the incidence of migraine attacks. As will be discussed in a later section, massage therapy may reduce the activation of such triggers.

The Role of Nitric Oxide and Serotonin in Migraine

Nitric Oxide (NO) has been implicated in the genesis of headache by playing a role in the activation of the trigeminovascular system, as it is a short-lived vasodilator and has also been implicated in pain generation (Luo & Cizkova, 2000; Schoenen & Sandor, 1999; Waeber & Moskowitz, 2003). Research has shown that nitroglycerine (NO donor substance) is a well known trigger of migraine attacks (as it dilates the middle cerebral artery), but the migraine attack does not start until some 6 hours after nitroglycerine is administered. It is thought that serotonin plays an inter-mediatory role in this process (Olesen *et al.*, 1993).

Serotonin is thought to be pivotal in the pathophysiology of migraine; both plasma and platelet levels of serotonin fluctuate during a migraine attack (Rains et al., 2002). During an acute migraine metabolites of serotonin increase, resulting in serotonin depletion. Serotonin receptors are found on the dural blood vessels, the peripheral trigeminal nerve, and second-order neurons in the brainstem. It seems unlikely that changes in blood serotonin levels are solely responsible for the development of migraine, although serotonin levels may remain depressed in patients long after the migraine attack has resolved.

Another possible pathway through which massage may impact on migraine, then, is through its influence on serotonin. Research has revealed increases in serotonin levels after massage (Hernandez-Reif et al., 1998; Hernandez-Reif et al., 2004). Massage may help maintain homeostasis of serotonin in migraineurs or inhibit reductions in serotonin levels during an attack.

<u>**Hypersensitivity to Sensory Stimuli**</u>

It is thought that initial activation of intracranial sensory fibres supplying the dura mater is caused by exposure to endogenous (brain generated or blood-borne) algogenic chemicals. Activation of meningeal nociceptors causes these sensory fibres to release neuropeptides, including Substance P and calcitonin gene-related peptide. This initiates neurogenic inflammation in the dura mater, leading to further secretion of inflammatory agents such as histamine, bradykinin, and prostaglandins, colloquially known as the "inflammatory soup" (Waeber & Moskowitz, 2003). This "soup" can cause central trigeminal neurons that receive input from the dura mater and the skin to lower thresholds to pressure stimulation, resulting in increased sensitivity to sensory stimuli (Waeber & Moskowitz, 2003). Burstein (2001) proposed a hypersensitivity theory, where sensitisation of both peripheral and central trigeminovascular neurons accounts for the intracranial hypersensitivity observed in migraineurs (e.g. worsening of pain during coughing, bending over, rapid head movement, and the throbbing nature of migraine pain). The sensitisation of central but not peripheral trigeminal neurons is responsible for the extracranial sensitivity (i.e., sensitivity of the head and face to touch). It has been hypothesised that migraineurs are hyper-responsive to a variety of internal and external stimuli (Silberstein *et al.*, 2001). The pressure stimulation received through massage could decrease sensitivity, as pressure stimulation travels faster to the brain than pain signals (Field *et al.*, 1998c; Hernandez-Reif et al., 2004; Sunshine et al., 1996).

Triggers for Migraines

The systems discussed in the previous sections describe the physiological processes underlying the pathophysiology of migraine. There are also a wide variety of emotional and environmental agents that act as triggers for migraines, potentially via their influence on these physiological systems. Many migraineurs can identify "triggers", which include a wide variety of external or internal stimuli that precipitate a migraine attack by a short time interval. Possible triggers include certain types of food, changes in sleeping pattern (lack of sleep, excessive sleep), travel, and head and neck pain (muscle tension), as well as visual, auditory, olfactory, or somatosensory stimulation (Burstein, 2001). Hormonal changes (such as changes in estrogen during menstruation, pregnancy, and menopause) have also been identified as a trigger by some women (Rains et al., 2002). Stress is a commonly recognised trigger, but the headache may not occur until the stressor has been removed or dealt with and the individual has relaxed. Headaches that occur during sleep, on weekends,

or while on vacation have been attributed to such relaxation (MacGregor, 1999). The potential for any of these factors to trigger a migraine attack appears to vary, due to complex interactions with the physiological and psychological milieu (Burstein, 2001). Not all triggers have the propensity to precipitate a migraine attack, and they can change from attack to attack (Silberstein et al., 2001).

A theoretical model developed by Anne MacGregor (1999; MacGregor, 1996) proposes that combinations of triggers are required for an attack to occur. That is, each individual has a threshold or level of resilience and it is a combination of these triggers that pushes one over the threshold for a migraine attack to occur (see Figure 9). This threshold can be raised or lowered depending on internal and external factors. Possible internal factors include coping skills and relaxation skills, and external factors include medication, environment, and social support. Massage may help prevent migraines by raising this threshold through the induction of a relaxation response and promotion of perceptions of coping efficacy – both which reduce psycho-physiological stress responses. Therapeutic massage may reduce migraines indirectly through reducing stress as well as through direct physiological effects such as reducing muscle tension and alterations in the autonomic nervous system, or through neuroendocrine changes (serotonin and Substance P).
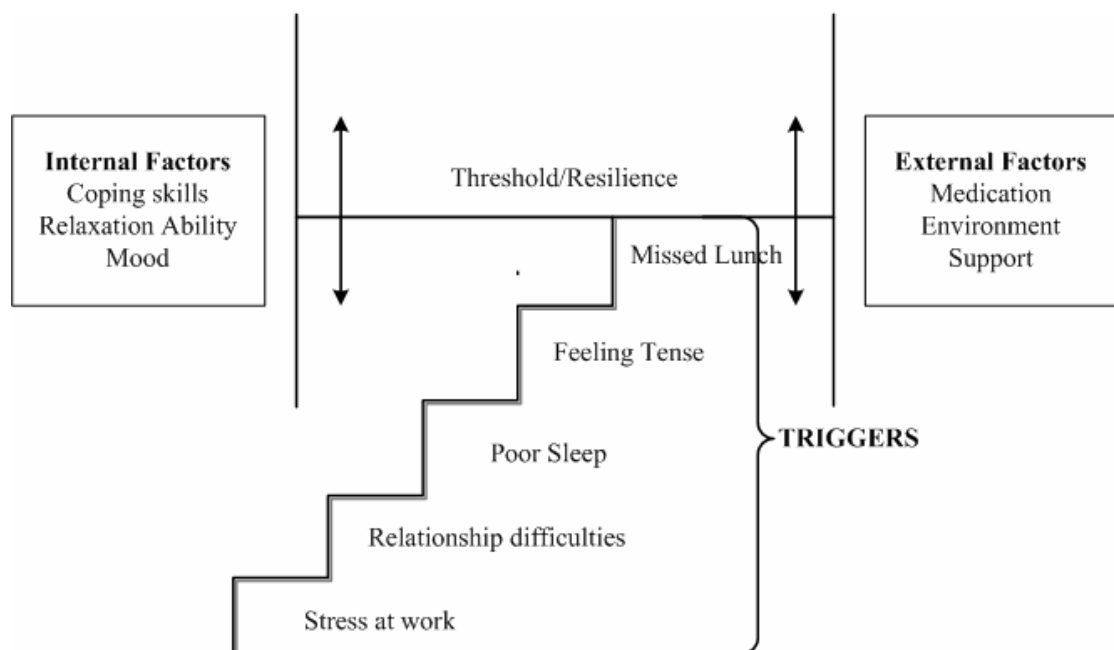
Figure 9. The Migraine Threshold Model (MacGregor, 1996).

Management and Treatment of Migraines

There is no cure for migraines; rather, they can be managed by reducing the frequency and severity of headaches, and shortening any attack that starts to develop. Approaches for treatment and management of migraine can be divided into pharmacologic and non-pharmacologic, and in many cases, their combination.

Pharmacologic Treatment

There are a large number of acute and preventative medications available to treat migraine (Rains et al., 2002). However, many of these medications can have contraindications and/or side effects that limit their use in individual patients. In addition, there is a significant rate of non-response to oral drugs, the issue of developing tolerance, and possible medication overuse (resulting in more headache) (P. J. Goadsby et al., 2002). When considering treatment for the migraineur, personal preferences, severity of the migraine attacks, and associated symptoms need to be taken into account. In addition, conceptualising headache within a psychobiological model that emphasises the joint influences of environmental, biological, and psychological factors can help establish the most effective treatment (Holroyd et al., 2001b). In many studies, only non-pharmacologic or pharmacologic treatments are researched to establish efficacy of one treatment over the other, whereas a combination may be more effective. In addition to behavioural treatments for migraine, complementary therapies may also be used in the management of migraine (Eisenberg et al., 1998; Long *et al.*, 2001; Mauskop, 2001), particularly massage therapy (Hernandez-Reif et al., 1998).

Non-Pharmacologic Treatment

A migraine sufferer may choose non-pharmacologic treatments because of a preference for such treatments, or because they do not benefit from or are unable to take specific pharmacologic treatments, due to poor tolerability, medical contraindications, pregnancy, or breastfeeding. Migraineurs with significant stress, poor coping skills, or a history of excessive use of medications (which can aggravate headache problems) may also benefit from non-pharmacologic therapy (Landy, 2004). Other possible factors include the cost and interference with daily routines of taking medication. A number of behavioural techniques for migraine treatment have been studied including biofeedback training, stress management, and cognitive-behavioural therapy (CBT; Landy, 2004; Magnusson *et al.*, 2004).

The most common types of relaxation treatments include progressive muscle relaxation, autogenic training, and meditation (Holroyd et al., 2001b). Relaxation treatments are typically used as preventive therapy, as these enable the headache sufferer to exert control over headache-related physiological responses, such as lowering sympathetic arousal (Holroyd et al., 2001b). Biofeedback includes procedures that provide information about physiological processes in the form of an observable display; when the patient uses the "feedback" to self-regulate the response being monitored, it has been found to improve relaxation (Blanchard, Talyor, & Dentinger, 1992; (Holroyd et al., 2001b). CBT and stress management training are aimed at helping the individual become aware of the role their thoughts play in generating stress responses and the relationships between stress, coping efforts, and headaches, as they have shown to reduce stress, headache frequency, and related disability (Holroyd et al., 2001b); MacGregor, 1999). A meta-analysis comparing behavioural treatments (relaxation training, thermal biofeedback, stress management training, and CBT) to no-treatment controls revealed that the average percentage of improvement from pre-to post-treatment yielded a 32% to 49% reduction in migraine, whereas the no-treatment control yielded a 5% reduction (Penzien, Rains, & Andrasik, 2002). As massage therapy can be an effective relaxation technique, it is plausible that it could lead to similar rates of reduction in migraine through its elicitation of relaxation responses.

Massage therapy for Migraine and other Headaches

Research investigating the therapeutic effects of massage therapy for migraine headaches is scarce. An early study (S. A. Lipton, 1986) found that vigorous compression and massage to the head at the onset of a migraine reduces future headaches. However, the study was limited by the absence of a control group, no standardized protocol for the length or type of massage, and no reports of statistical analyses.

Hernandez-Reif, Dieter and Field (1998) conducted a randomised, controlled trial of massage therapy as a treatment for migraine headaches. Twenty-six adults with migraine headaches were randomly assigned to either a wait-list control group or a massage therapy group, in which they received two 30-minute massages per week for five consecutive weeks. Compared to control participants, massage therapy participants reported fewer somatic symptoms, lower anxiety levels, and more headache-free days over the five-week period. When experiencing a migraine, massage therapy participants (relative to control participants) rated the pain as milder, used fewer analgesics, and reported having slept a

greater number of hours and experienced fewer sleep disturbances. The measure used to assess headache pain intensity was a 10-point scale (0 = *no pain* and 10 = *extreme pain*), along the same scale were psychological descriptors (such as happy, content or distressed), which could confound the findings as participants are rating two variables on one scale. The massage group also exhibited lower salivary cortisol and increased serotonin levels relative to the control group from before the first session to after the last session. Although the study produced promising results, the authors noted the need for further research in order to assess the duration of the effects of the massage, and to explore whether more frequent massage to the head and neck over a longer time span has a greater impact on both serotonin levels and head pain severity. A larger sample is also warranted. The second study in this thesis builds on this study by including a larger sample, measures of stress and coping, and a follow-up period past the last day of intervention.

Supplementing this research on massage therapy effects on migraine headaches are two studies assessing the impact of massage on the experience of chronic tension headaches. In one study (Puustjarvi *et al.*, 1990), 21 women with chronic tension headaches received 10 one-hour sessions of upper body massage in a two-week period; when trigger points were found, they were given focused massage treatment. Results showed improvements in the range of cervical (neck) movements. In addition, mean pain scores all decreased significantly from baseline to the end of the 10 massage sessions. Also, depression scores and number of days with neck pain decreased from baseline to the end of the massage sessions. Follow-up measurements were also completed at three and six months after the cessation of the massage treatments. Scores of neck pain increased at follow-up, but remained below levels recorded at baseline. There were a number of methodological limitations with this study, including: (1) the absence of a control or comparison group; (2) the massage sequence was individualised and not standardised; and (3) the high number of sessions in such a short period is probably unrealistic for most people.

A recent single-subject study investigated the effects of massage therapy on chronic tension headache (Quinn *et al.*, 2002). Of the 10 people who were eligible for the study, only four completed all of the massage sessions and measures. Participants received two 30-minute structured treatments over a four-week period, during which specific trigger points were targeted. Participants completed headache diaries during the four-week baseline and four-week intervention periods. All four participants reported significant decreases in weekly headache frequency. A trend also emerged indicating a decrease in

average headache duration. This study demonstrated a meaningful reduction in headache frequency and duration; however, a larger study with a control group is clearly warranted.

In summary, preliminary studies of the impact of massage therapy on migraine and other types of headaches show promising results. However, they suffer from a number of methodological limitations including lack of a control group, small sample sizes, and non-standardized massage protocols. Replication is also required in other laboratories to verify the efficacy of the treatment and improve generalisability (Chambless & Hollon, 1998).

Rationale for Study 2

The proposed mechanisms for the beneficial effects of massage on migraine experiences include parasympathetic arousal, enhanced relaxation effects due to changes in cognitive appraisals, neuroendocrine effects, musculoskeletal effects, and changes in the experience of pain through reductions in Substance P (due to the promotion of restorative sleep, as reviewed in Chapter 3). The mechanisms are clearly identified in processes delineated by the integrated CSM of self-regulation of stress (see Figure 3)

Findings from the first study revealed that massage decreased perceived stress and increased coping efficacy, and it had immediate effects on state anxiety and heart rate (suggesting a relaxation response). Massage can be considered as an emotional regulation strategy, where enhanced relaxation and reduction in anxiety translates into altered cognitive re-appraisals of the stressor or alterations of coping efforts (see Figure 3).

As previously discussed, massage can reduce stress and muscle tension, and improve sleep which are common triggers for migraine. Massage may impact on the experience of these triggers by reducing physiological arousal associated with the stress response (e.g., heart rate and blood pressure). These beneficial effects, in addition to impacting on the cognitive processes and affective responses of the CSM of self-regulation, also effectively raise the threshold referred to in the migraine trigger threshold model (MacGregor, 1996). Taken together, the effects of massage on cognitive processes and affective responses of the CSM, thereby raising the threshold for a migraine attack, could result in fewer migraines being experienced.

There are a number of other possible pathways through which massage may influence migraine mechanisms in ways that lead to decreases in headache frequency. As noted by the vascular theory of migraines, dilation of the blood vessels may be triggered by stress-induced sympathetic arousal. Massage may reduce this arousal by enhancing activation of

the parasympathetic nervous system, thereby reducing vasodilation (see autonomic nervous system part of Figure 2). In addition, serotonin and Substance P play a role in migraines, and massage has been shown to increase serotonin levels and reduce Substance P. Massage may work on reducing Substance P levels by promoting restorative sleep, thereby reducing the experience of pain (see Figure 3).

Aims and Hypotheses

The present study aims to extend the research in massage therapy on migraine. In particular, it uses a self-regulatory stress and coping perspective that integrates massage and migraine mechanisms within the CSM of self-regulation. It is hypothesised that the massage group will be more effective than the daily diary control group in improving perceived stress, coping efficacy and quality of life. In addition, it is hypothesised that the massage group will be more effective in reducing migraine frequency than the daily diary control group. Migraine sufferers will be randomly assigned to a massage condition or to a daily diary control comparison condition. Both groups will complete daily diaries of headache frequency, intensity, medication use, and sleep patterns for four weeks prior to the massage sessions starting, for the duration of the intervention period, and for three weeks post-intervention. The massage condition participants will attend six sessions, once a week for six consecutive weeks. Assessments of state anxiety, heart rate, blood pressure, and fatigue will be taken immediately before and after each massage session. In addition, measures of salivary cortisol will be taken before and after the first and last massage session. For control participants cortisol was not assessed because there were no comparable times in which to do a pre- to post- measure. Longer-term assessments of perceived stress, coping efficacy, fatigue, and quality of life will be taken at baseline, one-day, and one-month post the last intervention session. Notably this study design improves on designs of previous studies by including measures of stress and coping efficacy, quality of life, and a daily diary control group as a comparison. In addition, assessments past the last day of intervention will be included.

Predictions

The primary predictions are as follows. Firstly, it is predicted that the massage therapy intervention will be more effective than the daily diary control group in improving perceived stress, coping efficacy, quality of life, and fatigue from Time 1 (one-day before the first massage session) to Time 2 (one-day after the last massage session). Secondly, it is predicted that the massage therapy intervention will be more effective than the daily

diary control group in reducing migraine frequency, intensity, and medication use, and improving sleep behaviour from baseline (four-weeks before massage sessions started) to the intervention period (six-weeks of massage sessions). Thirdly, it is predicted that the massage group will demonstrate improvements in the immediate pre-and post-session measures of heart rate, blood pressure, state anxiety, and fatigue. Finally, it is predicted that the massage group will show significant decreases in cortisol from immediate pre- to post-session in week one and week six of the massage sessions. Longer-term effects of massage therapy on the stress, coping, and health factors will also be explored by assessing group differences in changes from Time 1 (one-day before first massage session) to Time 3 (one-month post the last massage session).

CHAPTER 9
STUDY 2: METHODOLOGY

Study Design

A randomised, controlled trial with mixed 3 x 2 design included the within subjects factor of assessment time-points (Longer-term measures: Time 1 –one-day before massage sessions, Time 2 – one-day after the last session and, Time 3 one-month post the last session; Daily Diary Measures: Baseline, Intervention, and Follow- up phases; and immediate pre-post measures of heart, rate, blood pressure, state anxiety, fatigue and cortisol) and the between-subjects variable of intervention condition (massage therapy or daily diary control). The longer-term dependent measures were perceived stress, coping efficacy, migraine related quality of life, and fatigue. The daily dependent measures were headache, medication, and sleep behaviour. The immediate pre- and post- dependent measures were taken before and after each of the massage sessions and included heart rate, blood pressure, fatigue, and state anxiety. Cortisol was measured pre- and post-session for the first and last massage session for massage therapy participants.

Participants

Participants were volunteers recruited from the University of Auckland and the New Zealand Migraine support group network. There were 48 participants, 40 females and 8 males, recruited in total. Participants were included in the study if they met the diagnostic criteria for migraine set by the International Headache Society (Headache Classification Committee of the International Headache Society, 1988; see Appendix I). The mean age was 41.3 years ($SD = 13.45$) with a range of 12 to 69 years. Of the sample 87% identified with New Zealand/European, and 13% identified with other (Indian, South African and English; Table 7). One person (female) did not complete the study due to a change in employment conditions.

Table 7

Demographics for Massage and Daily Diary Control Experimental Groups

| | Experimental Condition | | |
	Massage therapy (*n* = 23)	Daily Diary (*n* = 24)	Total (*N* = 47)
Gender			
Male	3	5	8
Female	20	19	39
Age			
M	38.13	46.00	41.69
SD	11.81	14.24	13.40
Ethnicity			
New Zealand/ European	21	20	41
Other	2	4	6
Marital Status			
Married/Defacto	14	13	27
Single	9	8	17
Missing			3

Migraine History

Table 5 shows the frequency of responses to the statements that reflect migraine classification (Headache Classification Committee of the International Headache Society, 1988). Most of the participants had either been diagnosed with migraines or had a relative who had been diagnosed with migraines. Almost half of the participants also experienced nausea or vomiting, and had preceding changes in vision, sensations, speech, or muscle weakness. Table 9 shows the frequencies of migraine attacks and headaches other then migraines over a period of one year.

Table 8
Frequency (%) of Responses to Migraine Classification Statements

Item	Responses Yes (%)
My headache usually begins on one side of my head only.	83
My headache is usually accompanied by nausea and vomiting.	48.9
One or more of my first degree relatives have been diagnosed as having migraine headaches.	70.2
I have been diagnosed as having migraine or vascular headaches.	72.3
My headache is usually preceded by (1) visual changes such as seeing lights, lines, stars or having blind spots; or (2) abnormal sensations such as prickling of hands or feet on one side; or (3) transient muscle weakness on one side; or (4) noticeable speech difficulty.	40.4
My headache is usually accompanied by sensitivity to light.	80.9
My headache is usually described as throbbing or pulsating.	78.7

Table 9
Frequency (%) of Migraine Attacks in a Year

Frequency Category	Migraine (%)	Other headaches (%)
Never	0	17.0
Once a year	0	6.0
2-5 times a year	8.5	10.0
6-11 times a year	17.0	6.0
About once a month	21.3	12.0
About 2-4 times a month	34.0	10.0
About once a week	6.4	10.0
About twice a week	4.3	18.0
About 3-6 times a week	6.4	10.0
Almost every day	2.1	2.0

Common Triggers for Migraine

Table 10 shows the commonly reported categories of triggers for migraines (see Appendix J for questionnaire). For physical stress, the most commonly reported triggers were over-tiredness and muscle tension in the neck and shoulders. For emotional stress, the end of a busy or stressful time and worry were the most common triggers. Long gaps between meals was a common trigger in the food and diet category, and the most common environmental triggers were bright lights and flashing or flickering lights.

Table 10
Frequency (%) of Common Triggers for Migraines

Trigger	Never (%)	Sometimes (%)	Often (%)
Physical Stress			
Overtiredness	6.4	31.9	61.7
Change in Sleeping pattern	40.4	31.9	25.5
Changes in Routine	42.6	31.9	25.5
Muscle tension especially in neck/shoulders	29.8	17.0	53.2
Emotional Stress			
Worry	23.4	23.4	53.2
Depression, often after a stressful experience	36.2	23.4	40.4
The end of a busy or stressful time, when you are looking forward to relaxing or resting	17.0	19.1	63.9
Anger	46.8	34.0	19.2
Excitement	59.6	27.6	12.8
Diet/Food			
Alcohol	34.0	37.7	38.3
Certain food (e.g., chocolate, cheese, citrus fruit, fried food)	46.8	23.4	29.8
Long gaps between meals, insufficient food	17.0	27.7	55.3
Environmental			
Bright light	40.4	25.6	34.0
Flickering or flashing lights	40.4	25.6	34.0
Intense or penetrating smells	55.3	31.9	12.8
Change of climate or weather	57.4	23.4	19.2

Materials

Massage Therapy Condition

Massage sessions were conducted in identical clinic spaces at the New Zealand College of Massage in Newmarket, Auckland. Massage Therapy Diploma students from the New Zealand College of Massage received training in the massage sequence and practiced the sequence until it was standardised across all of the therapists. Materials needed included towels, massage table, and scent-free oil (almond oil).

<u>Massage Routine</u>

The massage was a 45-minute massage developed by a registered and trained therapist and tutor from the New Zealand College of Massage specifically for this study. The protocol was specifically designed for the treatment of migraines. The massage involved the upper body that is the back, shoulders, neck, and head, and was completed by a trained therapist.

The sequence consisted of:

Starting in supine position with rocking and holistic pulsing. Stretches and presses

1. Shoulder presses (Myofascial Release, MFR) – press posterior/inferior

2. Erector Spinae (upper) – crossed forearms/lift head

3. Upper Trapezius – head and shoulder (cranial release)

4. Levator – head flex, rotate C/R

Roll over into prone position – warm up with no oil –myofascial release, skin roll

5. Lower trapezius – pincer, cross fibre

6. Upper trapezius – pincer, cross fibre

7. Levator insertion –deep ischaemic compression (DIC) each side

8. Levator Origins – deep ischaemic compression (DIC) each side

Warm up – with oil

9. Upper trapezius

10. Levator – glides and reverse glides

11. Lamina groove

12. Posterior sub occipital muscles — deep ischaemic compression -drag thumbs medially

Rolled towel placed under chest

13. Lamina groove – repeated lamina glides

Roll over into supine position – head on bolster

14. Lamina groove – glides

15. Sub occipitals – deep ischaemic compression-long and cross fibre – drag fingers medially

16. Anterior neck – sternocleidomastoid – deep ischaemic compression, cross fibre

17. Sternocleidomastoid – presses, glides and scoops

18. Sternocleidomastoid – MET (muscle energy techniques)

19. Anterior and Lateral neck – scalenes

20. Jaw Masseter- deep, – deep ischaemic compression, easy glides

21. Temporalis – deep ischaemic compression, easy glides

22. Masseter and Temporalis – pin and stretch (active)

Final Touches in Supine

23. Repeat the opening sequence of stretches

24. Shoulder presses (myofascial release) – press posterior/Inferior

25. Erector Spinae (upper) – crossed forearms/lift head

26. Upper trapezius – head and shoulder cranial release

27. Cranial base release

Daily Diary Control Condition

The daily diary control condition involved keeping a diary of headache frequency and intensity, medication use, and sleep behaviour for the duration of the study. At the end of the study, participants in this condition were offered thermal biofeedback training and given the equipment (i.e., finger temperature band and a tape with the relaxation sequence recorded) for home use.

Measures

Demographic Characteristics

Demographic and background information regarding age, gender, ethnic group, marital status[2], and types of techniques/activities regularly used for relaxation were collected in the initial questionnaire (see Appendix K).

Longer-term measures

Stress: Perceived Stress Scale (PSS)

The Perceived Stress Scale (see Appendix B) is a 14-item measure assessing the 'degrees to which situation's in one's life are appraised as stressful' (S. Cohen et al., 1983). The items are scored on a scale from 0 (*never*) to 4 (*very often*). The scores can range from 0 to 56. The mean for the current study's sample was lower than that reported in Study One ($M = 23.65$, $SD = 7.82$), but higher than that reported in the survey of a random community sample of 2,387 people ($M = 19.62$, $SD = 7.49$) (S. Cohen & Williamson, 1988). The psychometric properties of the PSS are reported in Chapter 5. For the current study internal consistency was high, Cronbach's $\alpha = .82$.

Coping Efficacy

The coping efficacy questionnaire (see Appendix C) assesses how well people perceive themselves to be coping with and controlling problems (Lawler, 1999). For a full description of the measure see Chapter 5. For the current study internal consistency was high, Cronbach's $\alpha = .83$. The means and standard deviations for the stress management study (Lawler, 1999), Study One, and the current study are comparable ($M = 17.55$, $SD = 4.61$; $M = 16.08$, $SD = 4.68$; and $M = 16.73$, $SD = 5.77$, respectively).

Fatigue

The fatigue scale (see Appendix D) measures general feelings of energy and fatigue over the past three days (Lawler, 1999). For a full description of the measure see Chapter 5. The mean and standard deviation for this study ($M = 14.01$, $SD = 6.35$) was slightly higher than a previous stress management study ($M = 12.04$, $SD = 6.71$; Lawler, 1999). The internal consistency is high for the current study, Cronbach's $\alpha = .86$, which is comparable to that obtained in prior research, Cronbach's $\alpha = .89$ (Lawler, 1999).

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[2] Due to low frequencies of marital status categories, responses were categorised as "in a long-term relationship" or "not in a relationship".

Headache History Questionnaire

This questionnaire was administered for the purpose of screening headache condition according to the headache classifications established by the International Headache Society (Saper, Silberstein, Gordon & Hamel, 1995) in order to determine study eligibility (see Appendix L). Questions for diagnosing headache type included descriptors for headache pain, severity, frequency, duration, location of pain and any associated symptoms (e.g., vomiting and sensitivity to light). Respondents placed a tick next to the statement that applied to themselves, where seven statements related to migraines and five related to tension type headaches. The response format for the items were either "*yes*" or "*no*". Three further open-ended style questions asked the age of onset of first migraine, whether there was a family history, and how the person generally feels between attacks.

Migraine Quality of Life

The Quality of Life Questionnaire (Cavallini, Micieli, Giuseppe, Rossi, & Nappi, 1995) was administered to evaluate key aspects of the impact of migraine on quality of life (see Appendix M). It is composed of two sections totalling 46-items. The first 23-items pertain to periods of actual headache attack and the second 23-items pertain to the period in between headache attacks. The survey assesses three main areas: functional capacity (physical functioning, role functioning, social functioning and mental health), symptoms, and health perceptions for both during a migraine attack and in between migraine attacks. Response options include: 0 (*no*), 1 (*yes, but it doesn't bother* me), 2 (*yes, and it bothers me a little*), 3 (*yes, and it bothers me a moderate amount*), and 4 (*yes, and it bothers me a great deal*). Scale scores are obtained by summing the scores for each of the subscale domain items for quality of life for during and between an attack.

For quality of life during an attack, there are 10-items that relate to symptoms, such as nausea, vomiting, and coldness (items 1-10), where total scores range from 0 to 40. There are three items that assess physical functioning (items 11-13), where total scores range from 0 to 12. Two items assess role functioning, (items 14 and 15), and total scores can range from 0 to 8. Two item assess social functioning (items 16 and 17), with scores ranging from 0 to 8. There are six items assessing mental health (items 18–23), where scores can range from 0 to 24.

For quality of life in between attacks, there are three items relating to role functioning (items 1, 2 and 3), where summed scores can range from 0 to 12. Five items assess social

functioning (items 4-8), summed scores can range from 0 to 20. There are eight items that assess mental health (items 9-13 and 21-23), with summed scores ranging from 0 to 32. There are seven items assessing health perceptions (items 14-20), scores can range from 0 to 28. Higher scores are associated with greater impairment. The internal consistencies for the subscales, calculated using baseline data are all acceptable (see Table 11).

Table 11
Internal Consistencies (Cronbach's α for the Subscales of the Migraine Quality of Life Measure for During and Between Migraine Attacks

Quality of life subscale	Cronbach's α
During a migraine attack:	
Symptomomatology	.76
Physical Functioning	.54
Role functioning	.70
Social Functioning	.90
Mental Health	.81
In between migraine attacks:	
Role Functioning	.71
Social Functioning	.76
Mental Health	.86
Health Perceptions	.84

Immediate Pre- and Post-Massage Session Measures

State Anxiety, Fatigue, Heart Rate, and Blood Pressure

The same immediate pre-to post-massage session measures were used as for Study One. For a full description of these measures see Chapter 5.

Cortisol

Measures of salivary cortisol were taken before and after the first and last massage session. The cortisol samples were obtained by placing a cotton dental swab in the subject's mouth (along the gumline) for 40 seconds. The swab was then placed in a syringe and frozen. The samples were then shipped to the University of Dusseldorf, Germany for assaying. The unit of measurement for salivary cortisol is nanomoles.

Daily Diary Measures

Migraine or other type of headache was rated four times a day: Breakfast, lunch, dinner, and at bedtime. As migraine headaches can last from 4-72 hours these intervals are sufficient to detect any migraine occurring during the day (Headache Classification Committee of the International Headache Society, 1988). The respondents rate their migraines/headaches on a scale ranging from 0 (*no migraine or headache*) to 5 (*Intense, incapacitating headache*). On each diary page the participant ticked a box if he/she was completing the diary because of a migraine or some other form of headache. The respondents were also asked to list any medication(s) and quantity of medication(s) taken during the day to reduce headache pain. Lastly, two questions assessed sleep quantity and quality. Sleep quality was rated on a 6-point scale (0 – *very poor* to 5 – *very good*). For sleep quantity, respondents wrote down how many hours they had slept for the previous night (Holroyd *et al.*, 2001a; MacGregor, 1999; Materazzo *et al.*, 2000; see Appendix N). For the daily diary variables, weekly data were averaged into meaningful time slots: baseline (four-weeks), intervention period (six-weeks), and follow-up (three-weeks).

Evaluation Questionnaire

An eight-item questionnaire was used to assess the perceived effectiveness of the massage activities. Items were rated on a seven-point scale, from 1 (*Not at all*) to 7 (*A great deal*; see Appendix O). The items related to how effective the participants thought the intervention was in helping them to relax and cope with their problems and manage their migraines. Similar questionnaires have been used in emotional disclosure research (Cameron & Nicholls, 1998; Lawler, 1999). An additional, open-ended question was included where participants could include any further comments. This evaluation was not given to the daily diary group as the items were relevant only for participants receiving the massage intervention.

Procedure

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee. The researcher posted notices on public notice boards around the University of Auckland. A flyer was also sent out with the Auckland-based New Zealand Migraine Sufferers Support Groups' newsletter, inviting participants to contact the researcher for further information about the study. Upon contacting the researcher, people were invited to participate in a study investigating massage techniques for migraine management, where

they would be randomly assigned to one of two groups: a massage therapy group or a daily diary group. It was explained that the massage therapy would require 6 sessions over a six-week period lasting for no more than 45-50-minutes in each session. After a brief explanation of the study, interested persons provided their name, address, and phone number and received an information pack containing a participant information sheet (see Appendix P), Headache History Inventory, consent form, and freepost envelope. Potential participants were asked to complete the inventory and consent form and post it back if they would like to participate in the study (Appendix Q). If the forms had not been sent back within two weeks of the information pack being sent out, the participant was contacted by phone to see if he or she had any questions and determine the reasons for not participating. Participants chose a pseudonym by which their questionnaires and data would be identified to ensure confidentiality.

Consenting participants were randomly assigned to either the massage therapy or daily diary control using random number tables. Daily diaries were sent to all participants, which they kept for a four-week baseline period prior to the massage sessions. One week prior to the massage session, the baseline questionnaire was sent out and participants were asked to complete it and return in the freepost envelope provided. During this week, participants in the massage group were contacted and massage times were scheduled for the following week. The participants in the massage group attended the same time and day for each of the intervention sessions. Reminder calls were made the night before the scheduled session to minimise attrition due to participants forgetting about their session time.

The participants in the massage group were asked to attend six sessions (the sessions were 45-50-minutes in length) held at weekly intervals. The participants were asked to complete immediate pre- and post-session measures of heart rate (HR), blood pressure (BP), state anxiety, and fatigue. Salivary cortisol measures were taken before and after each massage for the first and last sessions. The same procedure was used in Study One for the massage sessions, see Chapter 5 for a full description.

All participants kept daily records of their migraines, other types of headache, medication, and sleep behaviour. The researcher made random phone calls to the participants to check up on diary compliance.

Two follow-up questionnaires were sent out to both groups at equivalent time-points; the first one-day after the last massage session had finished and the second at one-month after the last massage session. Questionnaires were posted back in the freepost envelope

provided. Participants were extensively debriefed about the study's aims and design. The participants were also offered the opportunity to attend an information evening at the end of the last follow-up, to learn about migraines and thermal biofeedback training was given.

Analysis

Statistical analyses were carried out using version 12.1 of the Statistical Package for Social Science (SPSS). Normality plots, skewness statistics, and the Levene's test were conducted to test ANOVA and t-test assumptions. Associations between variables were determined using Pearson and point-biserial correlation coefficients. Independent samples t-tests were used to assess group intervention differences on the demographic, psychosocial, and health variables at baseline. Pearson Chi-square analysis was used to assess experimental group differences in gender, relaxation activities, and headache characteristics. Paired-samples t-tests were conducted to assess changes over time in pre-post-session measures of heart rate, blood pressure, state anxiety, fatigue, and cortisol. Repeated measures ANOVA's were conducted to assess group differences in changes in the main psychosocial and health outcome variables over Time 1, Time 2, and Time 3. These analyses were followed up by two planned comparisons: one comparing group differences in changes in scores from Time 1 to Time 2 and the second comparing group differences in changes in scores from Time 1 to Time 3. Planned comparisons were conducted because Time 2 effects were predicted, and Time 3 effects were being explored to assess the duration of massage effects. For the daily diary variables, repeated measures ANOVA's including all three time periods (Baseline – four weeks, Intervention – six weeks and Follow-up – three weeks) assessed between-group differences in changes over time. For some analyses with the daily diary variables, age was used as a covariate as it was significantly correlated with baseline scores. ANCOVA's were conducted including all three time-points, to assess between-group differences in changes over time. These analyses were followed up by two planned comparisons: one comparing group differences in changes in scores from Baseline to Intervention scores and the second comparing group differences in changes in scores from Baseline to Follow-up scores.

CHAPTER 10
STUDY 2: RESULTS

Group Comparisons of Demographics Characteristics, Migraine Experiences, and Relaxation Activities

Comparisons of the two experimental conditions (massage therapy and daily diary control) were made to determine if there were any group differences in age, gender, and ethnicity. The groups did not differ in age; $t(43) = 1.97$, *ns*. Moreover, there were no significant group differences in gender ($\chi^2(1, N = 47) = 0.48$, *ns*), marital status ($\chi^2(1, N = 47) = 0.94$) *ns*), or ethnicity ($p = 0.34$, Fisher's exact test).[6]

Activities regularly used for relaxation included watching television (70.21%), reading for relaxation (70%), listening to music (53%), walking (53%), and aerobic exercise (21%). Pearson Chi-square analyses revealed no significant differences between the groups for most of the relaxation activities regularly used, except for walking ($\chi^2(1, N = 47) = 4.85$, $p < .05$). The massage group had more participants who reported using walking for relaxation than the daily diary group did.

Chi-square analysis showed no significant differences between the groups in frequencies of migraine attacks ($\chi^2(7, N = 47) = 0.33$, *ns*) or frequencies of headaches other than migraines ($\chi^2(8, N = 47) = 0.62$, *ns*. The groups did not differ on average age of first migraine attack; $t(43) = 0.59$, *ns* or average length of migraine attack; $t(43) = 0.50$, *ns*. Preliminary analyses of the pre-session longer-term measures (perceived stress, coping efficacy, fatigue, and migraine quality of life) revealed no significant differences between the two conditions. Preliminary analyses of the first week of the baseline data measures (migraine frequency, intensity, medication, other types of headache and sleep) revealed no significant differences between the two conditions for any of these variables.

6There were insufficient numbers of different ethnicities in each group, so it was regrouped in to New Zealand European and Other Ethnicities.

Normality plots, skewness statistics, Levene's test, and assessments of sphericity were conducted to test repeated measures ANOVA assumptions and there were no violations, except for the migraine frequency data. Migraine frequency data was skewed for some of the weeks. The migraine group data was positively skewed for week eight and the daily diary group data was positively skewed for weeks four, five, nine, and twelve. All repeated measures analyses were conducted with both truncated data (correcting for skewness) and non-truncated data. There were no changes in the significance of effects and so the non-truncated data was used in the final analyses.

Correlations

Pearson and point-biserial correlational analyses assessed zero-order relationships of age, gender, and marital status with the baseline psychosocial and health measures (see Table 12). Age was positively correlated with all of the daily measures of migraine and medication, and negatively correlated with other types of headache and sleep quantity (the first week of the baseline period was used for these variables). Age was also negatively correlated with physical functioning during an attack. Gender and headache intensity were not significantly correlated with any other variable. Marital status was negatively correlated with migraine and coping efficacy, and positively correlated fatigue. Stress was significantly correlated with a number of the psychosocial variables (i.e., coping efficacy, the quality of life subscales relating to between attacks, and anxiety) and health variables (i.e., fatigue and sleep behaviour). Coping efficacy was correlated in the expected way with a number of the psychosocial variables (stress, anxiety, mental health, and health perceptions) and health variables (sleep behaviour and fatigue).

Table 12
Correlations among Individual Difference, Psychosocial, and Health Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Age	--														
2 Marital Status	-.29	--													
3 Migraine	.41*	-.37*	--												
4 Other Headache	-.43*	.20	-.35*	--											
5 Medication	.42**	-.20	.42**	.10	--										
6 Sleep Quantity	-.40*	.11	-.05	-.09	-.55**	--									
7 Sleep Quality	.03	.07	-.04	-.05	-.23	.06	--								
8 Stress	-.26	.14	.01	.23	-.07	.33	-.36*	--							
9 Coping	.26	-.31*	.03	-.27	.19	-.39*	.21	-.85**	--						
10 Mental Health (D)	-.10	.07	.00	.04	-.16	.18	-.10	.44**	-.36*	--					
11 Role Function (B)	-.09	.12	-.14	.02	-.29	.27	.04	-.32*	-.28	.63**	--				
12 Social Function (B)	.38*	-.10	.35*	-.11	.21	-.10	-.12	.07	-.05	.29	.31*	--			
13 Mental health (B)	-.13	.06	.06	.12	-.04	.32	-.37*	.59**	-.51**	.63**	.51**	.39*	--		
14 Health Perception (B)	-.19	.14	-.01	.17	-.20	.39*	-.16	.62**	-.56**	.59**	.63**	.32*	.79**	--	
15 Fatigue	-.33*	.37*	-.06	.37*	.06	.10	.08	.31*	-.37*	.16	.25	.15	.26	.22	--

Note. $N = 47$; * $p < .05$, ** $p < .01$; D = during attacks, B = between attacks. For marital status 0 = *married/defacto* and 1 = *single*

Immediate Pre-to Post-Session Measures of Heart Rate, Blood Pressure, State Anxiety, and Fatigue

Table 13 shows the difference scores from pre- to post-session for each of the six massage therapy sessions.

Heart Rate and Blood Pressure

Significant time effects in heart rate from pre- to post-session emerged for all 6 sessions, with heart rate decreasing over the course of the session. For Session 1, $t(23) = 6.09$, $p < .001$; for Session 2, $t(23) = 2.85$, $p < .01$; for Session 3, $t(23) = 2.71$, $p < .01$; for Session 4, $t(23) = 3.63$, $p < .005$; for Session 5, $t(23) = 3.74$, $p < .001$; and for Session 6, $t(23) = 4.22$, $p < .000$). There were no significant changes in diastolic or systolic blood pressure over time for any of the 6 sessions.

State Anxiety and Fatigue

Significant time effects in state anxiety from pre- to post-session emerged for all 6 sessions, with state anxiety decreasing over the course of the session. For Session 1, $t(23) = 6.60$, $p < .001$; Session 2, $t(23) = 5.62$, $p < .001$; Session 3, $t(23) = 6.33$, $p < .001$; Session 4, $t(23) = 4.81$, $p < .001$; Session 5, $t(23) = 6.13$, $p < .000$; Session 6, $t(23) = 5.58$, $p < .001$. There were no significant changes in fatigue over time for any of the 6 sessions.

Cortisol

Significant time effects in salivary cortisol from pre- to post-session emerged for both week 1 and week 6, which were the only times when cortisol was measured. For Session 1, $t(23) = 4.23$, $p < .001$; Session 6, $t(23) = 4.85$, $p < .001$. Salivary cortisol readings from pre- to post- massage significantly decreased.

Table 13

Change Scores for Heart Rate, Blood Pressure, State Anxiety, and Fatigue from Pre- to Post-Sessions for Massage Therapy Participants

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Heart Rate (BPM)						
Pre	76.00	73.33	72.89	72.63	73.63	74.55
Post	67.83	67.56	62.11	66.32	66.73	66.55
Change	-8.17**	-5.77**	-10.78**	-6.31**	-6.90**	-8.00**
Diastolic Blood Pressure						
Pre	62.86	66.67	67.22	69.94	71.73	71.45
Post	64.82	64.33	66.28	68.53	71.09	68.91
Change	-1.96	2.34	0.94	1.41	0.64	2.54
Systolic Blood Pressure						
Pre	108.32	107.67	111.50	112.05	116.45	112.36
Post	106.50	107.89	108.00	110.95	113.18	113.64
Change	1.82	-0.22	3.50	1.10	3.27	-1.28
State Anxiety						
Pre	10.41	9.22	8.56	7.50	7.82	8.64
Post	4.77	4.28	3.72	3.67	2.68	4.27
Change	-5.64**	-4.94**	-4.84**	-3.83**	-5.14**	-4.37**
Fatigue						
Pre	16.53	15.44	13.18	13.42	13.27	14.04
Post	15.12	15.83	14.65	13.79	14.59	15.19
Change	-1.41	0.39	1.47	0.37	1.32	1.15
Cortisol						
Pre	6.25	--	--	--	--	6.22
Post	3.86	--	--	--	--	3.40
Change	- 2.39**	--	--	--	--	-2.22**

Note. $*p < .05$, $**p < .01$ for significant differences from pre to post-session measures. A negative change value denotes a decrease in scores from pre-to post-session. BPM = beats per minute.

Daily Diary Assessments of Migraines, Medication and Sleep Behaviour

There was 13 weeks of data collected in daily diaries for migraine frequency, intensity and medication use (see Figure 10, Figure 11, and Figure 12). Other types of headache frequency (see Figure 13) and sleep quantity and sleep quality were also measured (see Figure 14 and Figure 15).

A total of 44 diaries were used in the final analysis, as three participants reported sending back their diaries but they were never received. Four diaries were incomplete, so a conservative approach was used whereby the baseline data was used to replace the missing data for the following weeks for these participants. Analyses were run with the original data set ($n = 40$) and the data set with the missing values replaced ($n = 44$). There were no

differences in statistical significance of the effects, and final analyses were conducted on the dataset with the missing values replaced with baseline values.

For all daily variables, data were averaged into three meaningful periods of time: Baseline (four weeks), Intervention period (six weeks) and Follow-up (three weeks). All three time periods were then included in repeated measures ANOVA's to investigate group differences in changes over time. Planned comparisons were conducted to investigate any within group differences in changes from Baseline to Intervention and Baseline to Follow-up.
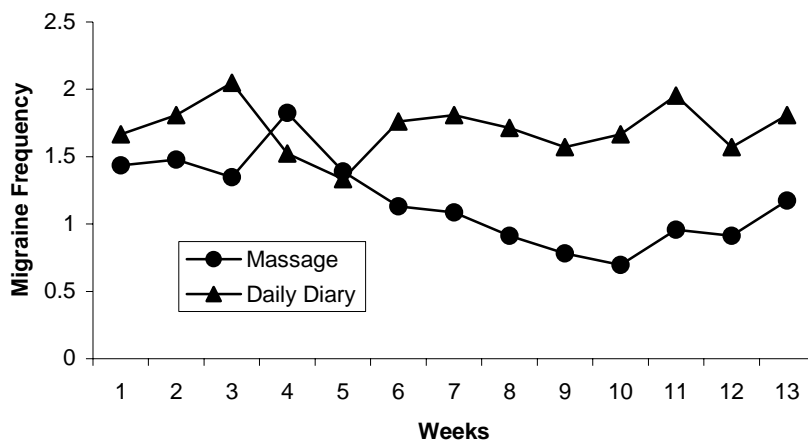
Figure 10. Migraine frequency per week for each experimental condition.
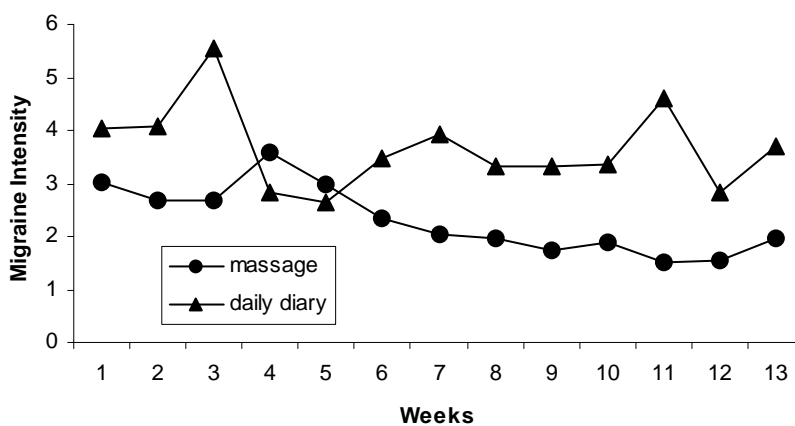
Figure 11. Intensity per migraine/week for each experimental condition.
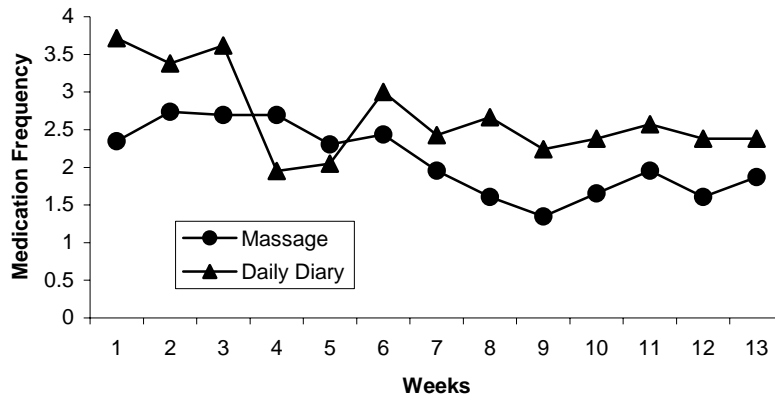
Figure 12. Medication Frequency per week for each experimental condition.
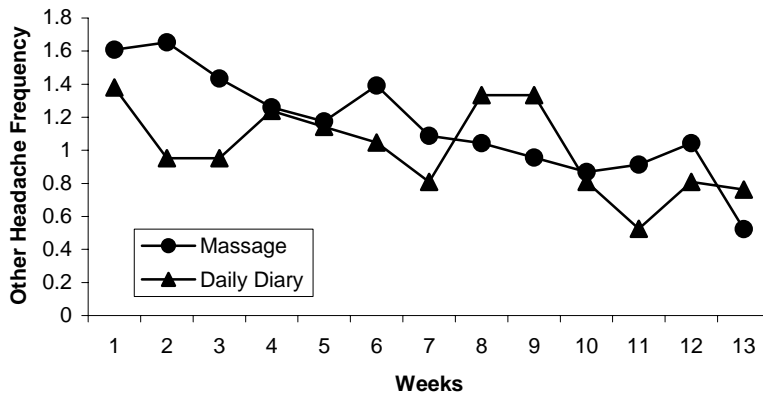
Figure 13. Other type of headache frequency per week for each experimental condition.
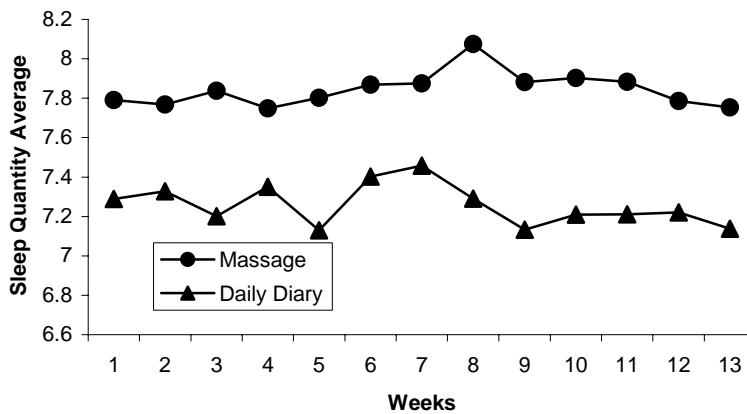
Figure 14. Sleep quantity average per night per week for each experimental condition.
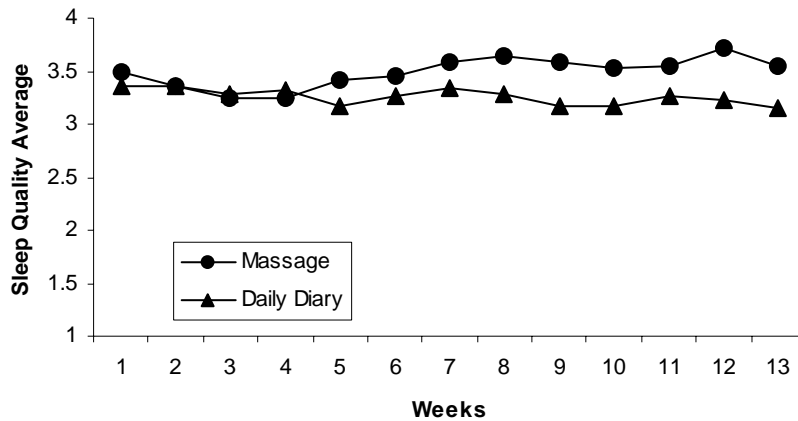
Figure 15. Sleep quality average per night per week for each experimental condition.

Migraine Frequency

Figure 16 depicts the scores for each group across the three time periods. As age was significantly correlated with migraine frequency at baseline, it was included as a covariate in the analysis. The repeated measures ANCOVA revealed no significant Time effect. As predicted, there was a significant Group x Time effect; $F(2, 40) = 4.15$, $p < .05$. The massage group demonstrated a decrease in migraine frequency during the Intervention and Follow-up time periods, while the average migraine frequency of the daily diary group remained stable throughout the three time periods. The planned comparisons of Group differences from Baseline to Intervention revealed a significant Group x Time interaction effect; $F(1, 42) = 4.05$, $p < .05$. Simple effects analyses revealed that the massage group exhibited decreases in migraine frequency from Baseline to Intervention (Baseline $M = 1.52$, $SE = 0.26$; Intervention $M = 1.00$, $SE = 0.24$; $p < .01$), whereas the daily diary condition reported no change (Baseline $M = 1.76$, $SE = 0.27$; Intervention $M = 1.64$, $SE = 0.25$; *ns*). The planned comparisons from Baseline to Follow-up revealed a trend for Group x Time interaction effect, although it did not reach statistical significance; $F(1, 42) = 3.18$, $p < .10$. Simple effects analyses revealed that the massage group exhibited decreases in migraine frequency from Baseline to Follow-up (Baseline $M = 1.52$, $SE = 0.26$; Follow-up $M = 1.01$, $SE = 0.27$; $p < .05$), whereas the daily diary condition reported no change (Baseline $M = 1.76$, $SE = 0.27$; Intervention $M = 1.79$, $SE = 0.29$; *ns*).
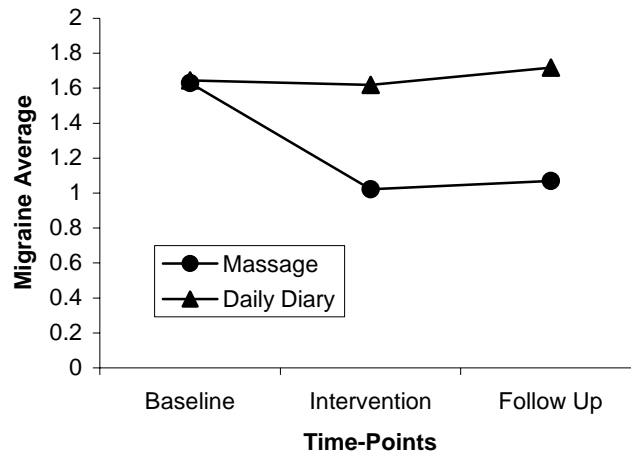
Figure 16. Migraine scores for the massage group and daily diary group across the three time-points.

Migraine Intensity

Figure 17 depicts the scores for each group across the three time periods. All three-time periods (Baseline, Intervention, and Follow-Up) were included in a repeated measures ANOVA. There was an overall significant time effect; $F(2, 41) = 4.27$, $p < .05$. Overall, migraine intensity scores decreased over time. The Group x Time interaction effect was not significant. The planned comparisons of group differences in changes from Baseline to Intervention, revealed no significant Group x Time interaction effect. The planned comparisons of group differences in changes from Baseline to Follow-up revealed no significant Group x Time interaction effect. Simple effects analyses revealed that the massage group exhibited decreases in migraine intensity from Baseline to Follow-up (Baseline $M = 2.99$, $SE = 0.56$; Follow-up $M = 1.66$, $SE = 0.64$; $p < .05$), whereas the daily diary control group reported a small decrease (Baseline $M = 4.11$, $SE = 0.58$; Follow-up $M = 3.72$, $SE = 0.66$; *ns*).
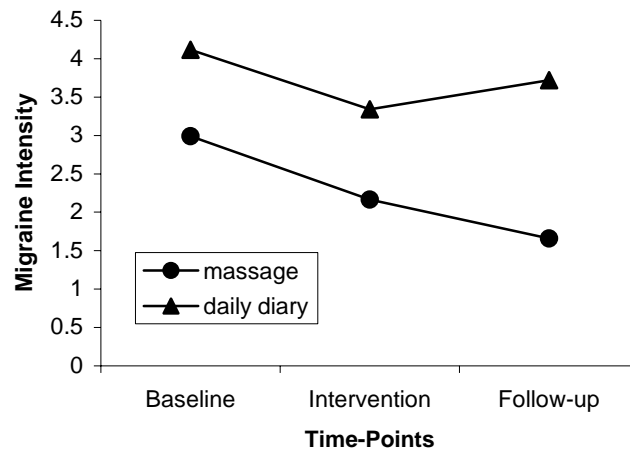
Figure 17. Migraine intensity scores for the massage group and daily diary group across the three time-points.

Medication Use

Figure 18 depicts the scores for each group across the three time periods. Repeated measures ANCOVA of medication use, with age as a covariate, revealed that there was no significant Time effect. The Group x Time interaction effect was not significant. The planned comparisons of group differences in changes from Baseline to Intervention revealed no significant Group x Time interaction effect, although simple effects analyses revealed a trend for the massage group, to exhibit a decrease in medication use from Baseline to Intervention (Baseline $M = 2.75$, $SE = 0.57$; Intervention $M = 1.89$, $SE = 0.43$; $p < .10$). In contrast, the daily diary group exhibited a smaller decrease (Baseline $M = 3.03$, $SE = 0.60$; Intervention $M = 2.46$, $SE = 0.45$; ns). Planned comparisons from Baseline to Follow-up, revealed no significant Group x Time interaction effect. Simple effects analyses revealed a trend for the massage group, to exhibit a decrease (Baseline $M = 2.75$, $SE = 0.57$; Follow-up $M = 1.87$, $SE = 0.46$; $p < .10$). In contrast, the daily diary group showed little decrease over time (Baseline $M = 3.03$, $SE = 0.60$; Follow-up $M = 2.38$, $SE = 0.48$; ns).
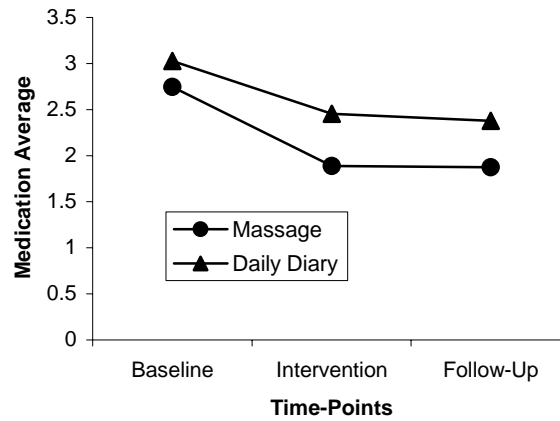
Figure 18. Medication scores for the massage group and daily diary group across the three time-points.

Other Headaches

Repeated measures ANCOVA of other types of headaches and their intensity, with age as a covariate revealed no significant Time or Group x Time interaction effects. Planned comparisons of group differences in changes from Baseline to Intervention, and from Baseline to Follow-up were not significant.

Sleep Quantity

Repeated measures ANCOVA's of sleep quantity, with age as a covariate, revealed that there was no significant Time or Group x Time interaction effects. Planned comparisons of group differences in changes from Baseline to Intervention, and from Baseline to Follow-up were not significant.

Sleep Quality

Figure 19 depicts the scores for each group across the three time periods. All three-time periods (Baseline, Intervention, and Follow-Up) were included in a repeated measures ANOVA. There was no significant Time effect. There was a significant Group x Time effect such that the massage group demonstrated an increase in sleep quality during the Intervention and Follow-up time periods, while the sleep quality of the daily diary group remained stable throughout the three time periods. The planned comparisons of group differences in changes from Baseline to Intervention, revealed a significant Group x Time interaction effect; $F (1, 42) = 10.50$, $p < .005$. Simple effects analyses revealed that the massage group exhibited increases in sleep quality from Baseline to Intervention (Baseline

$M = 23.33$, $SE = 0.86$; Intervention $M = 24.75$, $SE = 0.88$; $p < .01$); while the daily diary group revealed no change (Baseline $M = 23.32$, $SE = 0.90$; Intervention $M = 22.62$, $SE = 0.92$; ns). The planned comparisons of group differences in changes from Baseline to Follow-up revealed a significant Group x Time interaction effect, $F(1, 42) = 12.54$, $p < .005$. Simple effects analyses revealed that the massage group exhibited increases in sleep quality from Baseline to Intervention (Baseline $M = 23.33$; $SE = 0.86$; Intervention $M = 25.24$, $SE = 0.87$; $p < .005$), while the daily diary group revealed no change (Baseline $M = 23.32$, $SE = 0.90$; Intervention $M = 22.52$, $SE = 0.91$; ns).
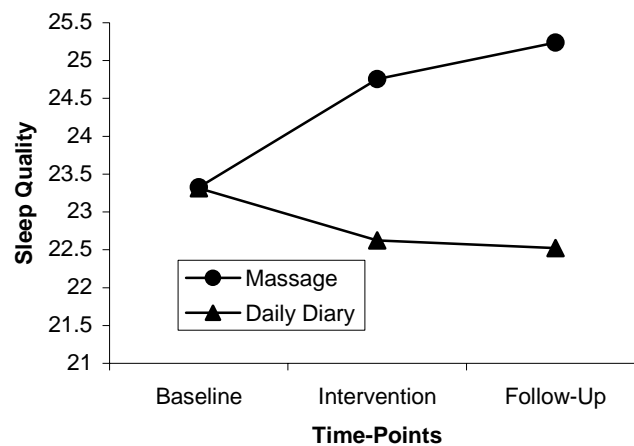
Figure 19. Sleep quality scores for the massage group and daily diary group across the three time-points.

Longer-Term Measures of Perceived Stress, Coping Efficacy, Fatigue, and Quality of Life

Table 14 presents the means and standard deviations of all the measures across all three time-points. Time 1 (one-day before first session), Time 2 (one-day post-intervention), and Time 3 (one-month post-intervention).

Table 14

Means and Standard Deviations of the Dependent Measures for Massage and Daily Diary

Groups

Dependent Measures	Massage (*n* = 23)			Daily Diary (*n* = 24)		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Coping Efficacy						
M	15.70	16.52	17.35	17.86	15.5	15.84
SD	6.12	5.98	6.52	5.28	6.57	7.13
Perceived Stress						
M	24.55	25.13	24.60	22.76	25.2	24.21
SD	7.94	8.31	8.56	7.69	8.08	10.62
Fatigue						
M	15.76	13.09	14.15	12.10	14.30	13.47
SD	6.87	6.35	7.18	5.23	5.12	5.93
Quality of Life -During Attacks						
Symptoms						
M	27.18	15.59	14.10	22.42	15.45	13.00
SD	8.79	8.53	10.42	8.23	7.44	7.00
Physical Functioning						
M	8.61	6.22	5.68	6.81	5.95	4.47
SD	2.71	5.95	3.42	2.60	3.62	2.72
Role functioning						
M	5.86	4.61	4.45	5.20	4.85	4.11
SD	3.71	3.14	2.74	4.05	2.60	2.38
Social Functioning						
M	5.35	4.30	3.85	6.25	4.45	3.63
SD	4.59	3.17	2.70	4.23	2.78	2.79
Mental Health						
M	10.74	10.74	8.90	11.15	11.15	9.10
SD	7.14	7.14	7.09	7.21	7.21	7.02
Quality of Life -Between Attacks						
Role functioning						
M	7.00	5.86	5.32	5.75	5.20	4.32
SD	2.60	3.70	3.42	3.82	4.05	3.38
Social Functioning						
M	5.96	5.34	4.90	6.16	5.94	5.17
SD	4.99	4.66	4.41	3.93	3.54	3.15
Mental health						
M	14.18	11.65	11.40	13.32	12.33	10.44
SD	9.18	10.11	9.53	7.27	8.0	9.62
Health Perceptions						
M	12.13	10.61	8.65	10.89	10.65	9.58
SD	6.78	6.72	7.22	7.34	7.91	7.78

Note. Time 1 = one-day before the first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session.

Perceived Stress

Figure 20 depicts the perceived stress scores for each group across the three time-points. All three time-points (Time 1, Time 2, and Time 3) were included in a repeated measures ANOVA, and the overall Time effect was not significant. The Group x Time interaction was not significant, although the planned comparisons of group differences in changes in perceived stress from Time 1 to Time 2 revealed a trend; $F(1, 40) = 3.50$, $p < .10$. Simple effects analysis revealed the massage group reported no change from Time 1 to Time 2 ($F(1, 41) = 0.40$, ns), while the daily diary group exhibited increases in perceived stress from Time 1 to Time 2 ($F(1, 41) = 3.94$, $p < .05$). The planned comparisons of group differences in changes in perceived stress from Time 1 to Time 3 were not significant.
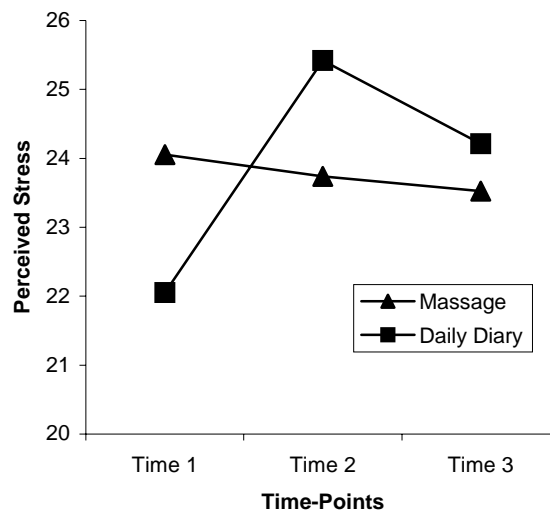
Figure 20. Perceived stress scores for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Coping Efficacy

Figure 21 depicts the coping efficacy scores for each group across the three time-points. All three time-points (Time 1, Time 2, and Time 3) were included in a repeated measures ANOVA, and the Time and Group x Time interaction effects were not significant. Planned comparisons of group differences in changes in coping efficacy from Time 1 to Time 2 revealed a significant Group x Time interaction effect; $F(1, 41) = 5.95$, $p < .05$. Simple effects revealed the massage group reported a slight increase from Time 1 to Time 2 (Time 1 $M = 16.80$, $SE = 1.24$; Time 2 $M = 17.25$, $SE = 1.38$; ns), while the daily diary group exhibited decreases in coping efficacy from Time 1 to Time 2 (Time 1 $M = 17.90$, $SE =$

1.25; Time 2 $M = 15.32$, $SE = 1.42$; $p < 10$). Planned comparisons of group differences in changes in coping efficacy from Time 1 to Time 3 also revealed a significant Group x Time interaction effect; $F(1, 41) = 5.13$, $p < .05$. Simple effects analysis revealed the massage group reported no change from Time 1 to Time 3 (Time 1 $M = 16.80$, $SE = 1.24$; Time 3 $M = 16.91$, $SE = 1.27$, ns), while the daily diary group exhibited decreases in coping efficacy from Time 1 to Time 3 (Time 1 $M = 17.90$, $SE = 1.25$; Time 2 $M = 15.50$, $SE = 1.37$; $p < .05$).
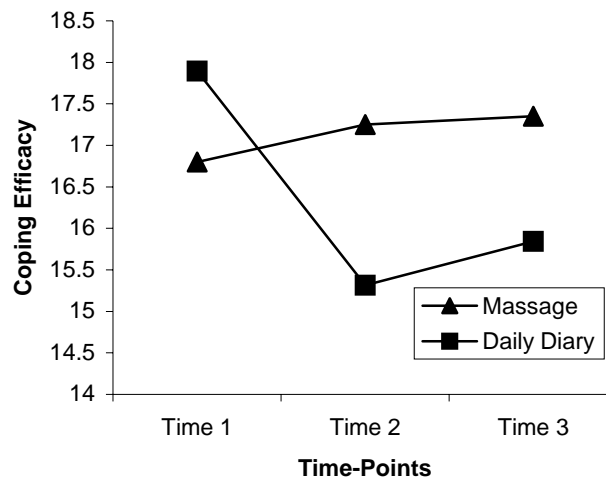
Figure 21. Coping Efficacy scores for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Fatigue

Figure 22 depicts the fatigue scores for each group across the three time-points. A repeated measures ANOVA, revealed no significant Time effect over the three time-points, while the Group x Time interaction effect was significant; $F(1, 36) = 3.37$, $p < .05$. The massage group exhibited a decrease then an increase in fatigue, whereas the daily diary group exhibited an increase then a small decrease in fatigue. Planned comparisons of group differences in changes in fatigue from Time 1 to Time 2 revealed a significant Group x Time interaction effect; $F(1, 41) = 6.28$, $p < .05$. Simple effects analysis revealed that the massage group showed a decrease in fatigue from Time 1 to Time 2 (Time 1 $M = 15.76$, $SE = 1.29$; Time 2 $M = 13.09$, $SE = 1.21$; $p < .05$), while the daily diary group showed a small increase in fatigue from Time 1 to Time 2 (Time 1 $M = 12.15$, $SE = 1.39$; $M = 14.30$, $SE = $

1.30, *ns*). The planned comparisons of group differences in changes in fatigue from Time 1 to Time 3 revealed that the Group x Time interaction effect was not significant.
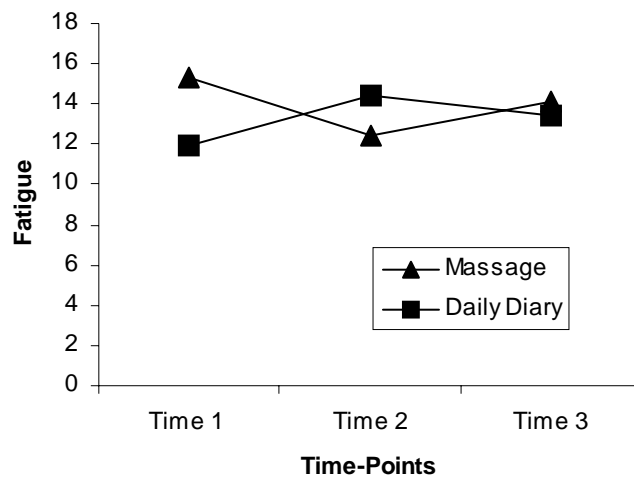
Figure 22. Fatigue scores for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Migraine Quality of Life – During Attacks

Symptoms

Figure 23 depicts the symptom scores for each group across the three time-points. All three time-points (Time 1, Time 2, and Time 3) were included in a repeated measures ANOVA. There was an overall significant Time effect; $F(2, 41) = 29.59$, $p < .001$; symptom scores generally decreased over the course of the study, indicating a general improvement over time. The Group x Time interaction effect was not significant. Planned comparisons of group differences in changes in symptoms from Time 1 to Time 2 and from Time 1 to Time 3 were not significant.
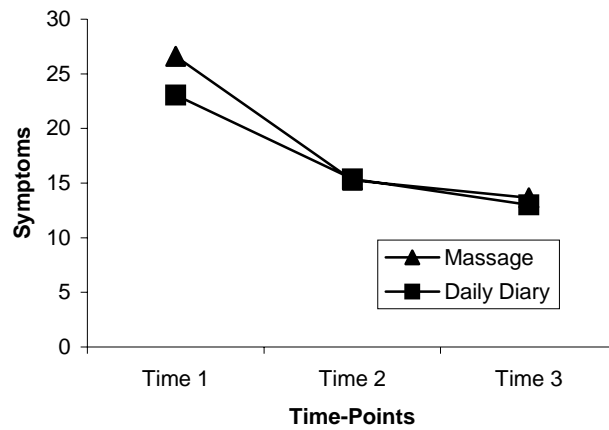
Figure 23. Symptom scores during an attack for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Physical Functioning

Figure 24 depicts the physical functioning scores for each group across the three time-points. A repeated measures ANOVA revealed a significant Time effect; $F(2, 41) = 7.71$, $p < .005$: Physical functioning scores generally decreased over the three time-points, indicating a general improvement over the course of the study. The Group x Time interaction effect was not significant, nor were the planned comparisons of group differences in changes in physical functioning from Time 1 to Time 2 and from Time 1 to Time 3.
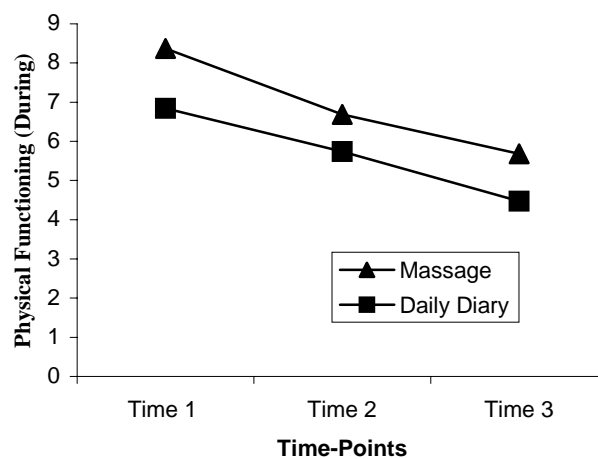
Figure 24. Physical Functioning scores during an attack for the massage group and daily diary group across the three time-points (Time 1 = 1 day before first session, Time 2 = 1-day post the last session, Time 3 = 1-month post the last session).

Role Functioning

Figure 25 depicts the role functioning scores for each group across the three time-points. A repeated measures ANOVA revealed a significant Time effect; $F(2, 41) = 10.88$, $p < .001$: Role functioning scores generally decreased over the three time-points, indicating a general improvement over the course of the study. The Group x Time interaction effect was not significant, nor were the planned comparisons of group differences in changes in role functioning from Time 1 to Time 2 and from Time 1 to Time 3.
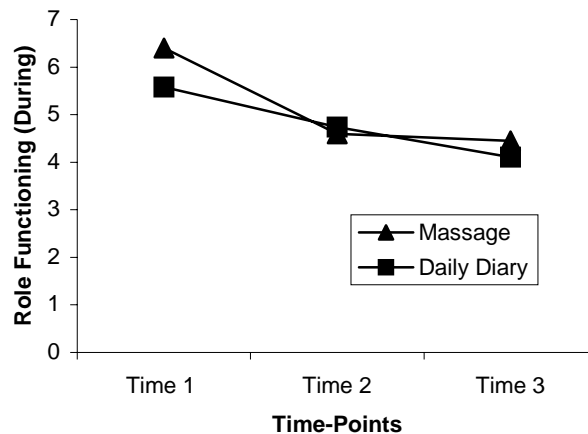
Figure 25. Role Functioning scores during an attack for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Social Functioning

Figure 26 depicts the social functioning scores for each group across the three time-points. A repeated measures ANOVA revealed a significant Time effect; $F(2, 41) = 7.97$, $p < .005$: Social functioning scores generally decreased over the three time-points, indicating a general improvement over the course of the study. The Group x Time interaction effect was not significant, nor were the planned comparisons of group differences in changes in role functioning from Time 1 to Time 2 and from Time 1 to Time 3.
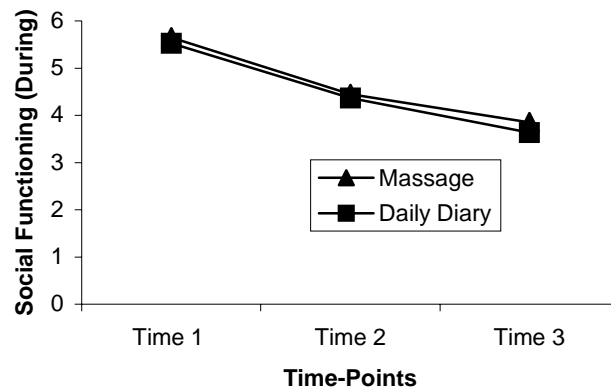
Figure 26. Social Functioning scores during an attack for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Mental Health

Figure 27 depicts the mental health scores for each group across the three time-points. A repeated measures ANOVA revealed a significant Time effect; $F (2, 41) = 9.31$, $p < .005$: Mental health scores generally decreased over the three time-points, indicating a general improvement over the course of the study. The Group x Time interaction effect was not significant, nor were the planned comparisons of group differences in changes in mental health from Time 1 to Time 2 and from Time 1 to Time 3.
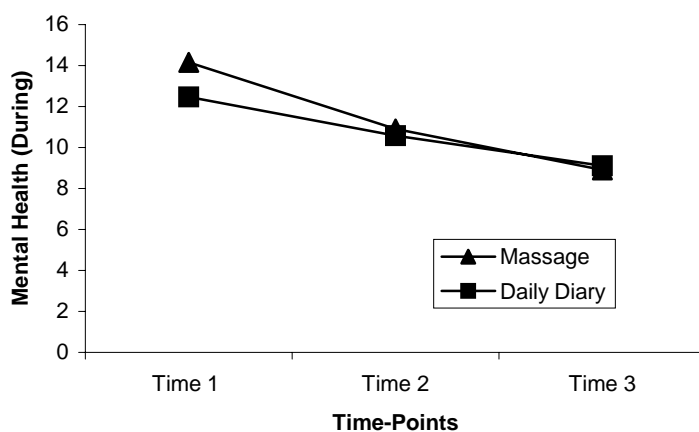
Figure 27. Mental Health scores during an attack for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Migraine Quality of Life – Between Attacks

Role Functioning, Social Functioning, and Mental Health

Repeated measures ANOVA's of role functioning, social functioning, and mental health, revealed that the Time and Group x Time interaction effect were not significant. Moreover, the planned comparisons of group differences in changes in scores from Baseline to Intervention, and from Baseline to Follow-up revealed no significant Group x Time interaction effects.

Health Perceptions

Figure 28 depicts the health perception scores for each group across the three time-points. A repeated measures ANOVA revealed a significant Time effect; $F (2, 41) = 4.73$, $p < .05$: Health perception scores generally decreased over the three time-points, indicating a general improvement over the course of the study. The Group x Time interaction effect was not significant, nor were the planned comparisons of group differences in changes in mental health from Time 1 to Time 2 and from Time 1 to Time 3.
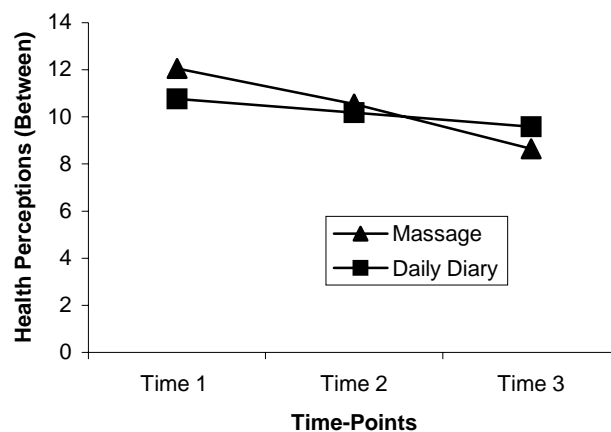
Figure 28. Health Perception scores between attacks for the massage group and daily diary group across the three time-points (Time 1 = one-day before first session, Time 2 = one-day post the last session, Time 3 = one-month post the last session).

Evaluation Questionnaire

Table 15 shows the means and standard deviations of the responses to the evaluation questionnaire items, which was given to the massage group at the end of the six sessions. The means were all above the ratings scale midpoint, indicating a positive evaluation overall. Participants reported that the sessions helped them to feel relaxed and less stressed,

that participation was a meaningful experience, they felt they had more control over problems and challenges, and that they would like to keep using this technique to help control their migraines, and importantly participants reported feeling satisfied with their massage. The item with the lowest mean and highest standard deviation was "the sessions helped to alleviate migraines" indicating that participants had the greatest inconsistency in agreement that massage helps migraine. In contrast, the items regarding the beneficial effects of massage on stress received higher ratings. Table 16 summarises the comments made in the open-ended section of the evaluation questionnaire.

Table 15
Means and Standard Deviations of Massage Session Evaluation Ratings

Variable	Mean	Standard Deviation
1. Relax and feel less stressed	5.30	1.26
2. Effective way to manage stress levels	4.52	1.24
3. Deal effectively with problems and challenges	3.78	1.57
4. Was participation a valuable experience	5.43	1.31
5. More control over challenges/problems	4.00	1.65
6. Helped to alleviate your migraines	3.83	2.01
7. Continue to use this technique to help control your migraines	4.87	1.52
8. Enjoy participating	6.39	1.08
9. Were you satisfied with the massage sessions	6.04	1.17

Note. Ratings ranged from 1 (*Not at all*) to 7 (*A great deal*).

Table 16

Summary of Comments Made for Open-Ended Section of the Evaluation Questionnaire

Responses from participants in the massage group

I think this has been very effective for me. I rarely have a headache of any kind now. Glad I took part.

I feel six weeks of massage is not long enough to have had any effect but that several months may be very beneficial in helping my migraines – particularly if they were individually tailored and trigger points treated. It was a bit frustrating when therapists identified areas needing attention but were unable to treat. More facial/cranial massage would have been interesting and relaxing.

I did notice I always slept really well the evenings of the massage.

Although I understand the importance of standardised massage therapy in terms of the study, I feel a study where the massage focuses more specifically on problems the individual client has in terms of their individual, physical problem related to their migraines, would also be useful.

Would like to continue with similar sessions for a longer period to give better trial, if not too expensive. Thanks for the chance to participate in the research.

I never felt the sessions were rushed. I thoroughly enjoyed the course. I had a different therapist every time but felt the results were very similar.

Fantastic. Thanks a heap. Just knowing about "other' techniques- not drugs- gives me confidence to try and deal with them. I thought it was something I was going to have to live with.

I think during the 6 weeks I have become more critical of my lifestyle because I notice my stress more.

CHAPTER 11
STUDY 2: DISCUSSION

Migraine is a highly distressing and prevalent disorder, where it is difficult for the person to predict when they are going to have an attack, how long the attack is going to last, and how incapacitating the attack will be. This, of course, has a profound impact on the person's quality of life that makes management of migraine stressful and extremely difficult. Many people commonly identify stress as a trigger for their migraine attacks. The effects of massage versus daily diary monitoring (control group) were compared on a number of self-report measures, including migraine frequency, sleep, stress, coping, quality of life, and fatigue. This replicates and extends the findings of the only other study investigating the effect of massage on migraines (Hernandez-Reif et al., 1998) by using a larger sample, including post-intervention follow-up assessments, and integrating the findings into the CSM of self-regulation in relation to massage, stress and coping, and migraine-related mechanisms.

Immediate Massage Effects (Heart Rate, Blood Pressure, State Anxiety, Fatigue, and Cortisol)

As previous massage research has shown decreases in heart rate, blood pressure, state anxiety, fatigue, and cortisol (Cady & Jones, 1997; Diego et al., 2004; Field et al., 1996a; Field et al., 1997; D. I. Glaser, 1991; Zeitlin et al., 2000), it was hypothesised that the massage group would exhibit decreases in heart rate, blood pressure, state anxiety, and fatigue from pre- to post- session for each of the six sessions. In addition, it was predicted that the massage group would exhibit decreases in cortisol from pre- to post-session in the first and last intervention weeks.

The massage group experienced a significant decrease in heart rate and state anxiety across all six sessions, although there were no significant effects or trends found for blood pressure or fatigue. In addition, the massage group reported significant decreases in salivary cortisol from pre-to post-session. These short-term effects in heart rate, state anxiety, and cortisol provide evidence of a relaxation response involving a switch-over to parasympathetic activity characteristic of a state of rest and restoration (Sapolsky, 1998). Future research may consider measuring these short-term variables multiple times after the massage, (e.g., one hour after), in order to establish the duration of these relaxation effects. These findings are identical to the Study One findings of reductions in heart rate and state anxiety and yet no changes in blood pressure or fatigue. Previous research has shown decreases in blood pressure in students and workplace employees (Cady & Jones, 1997;

Link, 1986; Zeitlin et al., 2000), and the recent meta-analysis found a significant effect for blood pressure across studies (Moyer et al., 2004). Future research is needed to investigate more closely for which populations and in what conditions reductions in blood pressure occur.

Longer-Term Massage Effects on Stress and Coping

The first study of this thesis revealed that massage can reduce levels of perceived stress and enhance appraisals of coping efficacy during stressful periods, and it was predicted that the migraine massage group (relative to the control group) in the present study would show similar decreases in perceived stress and increases in coping efficacy. The results demonstrated significant group differences, where the massage group reported an increase in coping efficacy from baseline to the end of the six-week intervention that was sustained to four weeks later. In contrast, the daily diary group reported a decrease in coping efficacy from baseline to follow-up. A trend emerged for perceived stress from baseline to the end of the six-week intervention, where the daily diary group reported an increase in perceived stress and the massage group had very little change in perceived stress. It is possible that the slight increase in coping efficacy was attenuating the effects of perceived stress in the massage group. These findings partially supported the predictions; one possible explanation of the detriment of changes in coping efficacy and perceived stress experienced in the control group is that daily monitoring of their headaches and medication use may have promoted perceptions that their migraines are not under control. One might expect that the daily diary activity would have had similar effects on perceived stress and coping efficacy for the intervention group if the massage therapy had no influence on the their stress and migraine experiences. It therefore appears that massage has some effects on perceived stress and coping efficacy for migraine participants which are still evident past the last day of massage in this population.

One possible explanation for the longer-term effects could relate to the short-term relaxation response induced by massage therapy, which may involve parasympathetic and neuroendocrine changes that may alter the perception or evaluation of stressors and one's coping ability. Specifically, the immediate physiological relaxation response and affective changes in state anxiety lead to cognitive re-appraisals of the stressor, and the alterations in the perception and representation of the stressor may lead to changes in coping behaviours.

These potential effects of massage therapy on perceived stress and coping efficacy reflect one set of mechanisms potentially mediating the impact of massage on migraine

experience, although more research is needed to determine and extend these findings. As identified by the migraine trigger threshold model (MacGregor, 1996), a person's threshold for a migraine can be raised or lowered by internal or external factors, and stress can be a trigger for migraine attacks. The participants in this study reported that emotional and physical stress were common triggers identified for the onset of a migraine. The relaxation response decreased anxiety and enhanced coping efficacy and should raise the threshold, so a person either experiences less migraines, or else requires more triggers for an attack to occur (see Figure 9).

These effects are consistent with the integrated CSM of self-regulation (see Figure 3). Massage impacts on some of the factors triggering migraine (stress, state anxiety, and muscle tension). Moreover, massage enhances relaxation (as evidenced by reductions in heart rate and cortisol) and can raise the threshold. As the person experiences fewer migraines, they may start to feel more in control. These experiences then feed back to further reduce stress and enhance appraisals of coping efficacy, translating into a cycle of improved self-regulation. In addition, it is thought that migraine triggers may also activate the trigeminal nerve; if the incidence of triggers or the perception of triggers is altered, the trigeminal nerve may be activated less often and result in fewer migraines. While this was not measured directly in this study, future research could address the role of trigeminal nerve responses.

Migraine and Massage

Importantly, the massage group experienced significant decreases in migraine frequency from baseline to intervention phases, and these effects were lasting up to three weeks past the last day of intervention. It is important to note that these effects were only evident for migraines and not for other headaches, highlighting the specificity of the treatment protocol used in this study. A trained therapist developed the massage sequence specifically for migraine, as other musculoskeletal and neuromuscular pathways are important in other types of headaches such as tension headaches. This is important to consider in the development of future research projects, where trained and specialised therapists need to be involved in the development of the protocol to ensure that it is specific to the condition under investigation.

The findings are consistent with the vascular theory of migraines, which focuses on the dilation of blood vessels during sympathetic nervous system arousal as a primary cause of migraines. They suggest that massage promotes the activation of the parasympathetic

nervous system (which would result in less sympathetic arousal and less vascular dilation) and fewer migraines.

It was expected that the massage intervention would be more effective than the daily diary activity in improving sleep quantity and sleep quality. Interestingly, sleep quantity showed no significant changes in either group, yet a significant intervention effect emerged for sleep quality with the massage group reporting better quality of sleep. While the massage group did not experience any changes in sleep quantity, their perceptions of the quality of sleep improved. Research has shown that sleep quality, rather than quantity, is related to health, satisfaction with life, and feelings of tension, depression, anger, fatigue, and confusion (Pilcher *et al.*, 1997). In addition, the massage group had significant decreases in fatigue across time, even though they did not experience immediate short-term effects; these longer-term effects may be due to the improvements in sleep quality. This finding is different to that in the first study, where no effects were found for fatigue. Future research needs to determine the effects of massage on fatigue for healthy but stressed populations as well as populations living with a distressing disorder, in order to establish for which populations massage may impact on fatigue. The longer-term effects on fatigue once again provide evidence that massage can have lasting effects past the last day of massage.

Improved sleep quality and reductions in fatigue induced by massage suggest another potential set of mechanisms through which massage reduces migraines. Substance P is released when an individual is deprived of deep sleep and it is noted for exacerbating pain (Sunshine et al., 1996). Substance P is implicated in the hypersensitivity theory of migraine, where activation of the meningeal nociceptors leads to the release of Substance P, which is involved with inflammation in the dura mater and the release of further inflammatory agents, thus enhancing the experience of pain. While this proposed sequence of effects requires further exploration, particularly, as it is not known yet what leads to the activation of the meningeal nociceptors, it is plausible that massage and better sleep quality, lead to lower levels of Substance P and thus fewer migraines are experienced.

While serotonin was not directly measured in this study, previous research suggests that massage increases serotonin levels (Hernandez-Reif et al., 1998; Hernandez-Reif et al., 2004) and migraine is associated with serotonin depletion (Rains et al., 2002). It is important to consider that this may be a further pathway through which massage may impact on the experience of migraine, and future research in massage for migraine may find it useful to consider this relationship.

A previous study investigating massage and migraines reported that the participants in their study reported fewer migraines, less intensity when a migraine was experienced, and reductions in medication use (Hernandez-Reif et al., 1998). The results from this present study provide support for a reduction in migraines but only partial support for a reduction in intensity and medication use, as trends emerged for reduction in medication use and intensity in the massage group. The reasons for the disparity in the results between these studies need further clarification. One potential reason may relate to the differences in the measurement of headache pain intensity. Hernandez-Reif and Colleagues (1998) used a 10-point scale (0- *no pain* and 10- *worse pain*) with descriptors placed along the scale such as *happy*, *contented*, *somewhat distressed*, and *very distressed*. These descriptors are psychological and may be confounding the measurement of intensity. In contrast, the current study used a six-point intensity scale, from 0 (*no headache*) to 5 (*intense, incapacitating headache*), and no other markers or descriptors were used.

A recent study of an intervention using a multidisciplinary approach for chronic daily headache, including psychological counselling, physiotherapy, kinesiologist for posture appraisal, and group support, found that intensity decreased after the intervention (ranging from 2 to 22 months in duration). However, the authors noted that it was unclear whether the reduction in intensity was related to actual reduction in severity or whether the patient had better pain coping skills, such as more effective use of medications (Magnusson et al., 2004). The difference in intensity effects found in this multidisciplinary study and those obtained in the Hernendez-Reif (1998) study and the current stud may be due to the use of multiple treatments, the considerably longer duration and the focus on chronic daily headache rather than migraine. Future research, could address this issue by including an intensity measure over a longer period of time.

Quality of Life

Migraine is a burden not only in terms of costs to society in terms of work productivity and healthcare costs, but also in terms of the individual's experience of disability and reduced quality of life in all areas - psychological, social, and physical (Magnusson et al., 2004). The quality of life measure employed in this study assessed a number of dimensions (symptoms, physical functioning, role functioning, social functioning, mental health, and health perceptions) both during an attack and between attacks (Cavallini et al., 1995). It was expected that the massage group would show improved quality of life from baseline to the first follow-up; however, the findings were mixed and warrant further explanation. For assessments of quality of life dimensions during an attack, both groups reported increases

in quality of life. Both groups reported improvements in symptoms, physical functioning, role functioning, social functioning, and mental health. One potential explanation relates to the daily monitoring of headache conducted by both groups. For the participants in the daily diary group and the mere act of doing something (i.e., closely monitoring their migraines) may have led to improvements in quality of life during an attack. Alternatively, they may have become more aware of their medication use. In addition, actually being involved in a research project may enhance a participant's perceived quality of life. It was been found that control/comparison groups in behavioural interventions for headache usually show some improvement in quality of life (Penzien *et al.*, 2002). In contrast, to the improvements in quality of life during attacks, the changes in quality of life between attacks were not significant for either group with the exception that the massage group reported a significant improvement in health perception scores from baseline to the last follow-up. Interestingly, these health perception items relate to sense of control, lost time, understanding of headaches, and rumination about migraines. In effect, some of the potential benefits experienced in the massage group, who experienced decreased frequency of migraine three weeks past the last day of follow-up, were feeling more control, thinking about their migraines less frequently, and understanding more about their migraines. These improvements in health perception are consistent with the enhancements in coping efficacy, and both sets of findings, suggesting the pathways through which massage can impact on migraine include cognitive regulation processes.

Evaluations of the Intervention

The intervention evaluations showed that the participants in the massage group felt relaxed and less stressed, thought that massage was an effective technique for managing their stress levels, and helped them to deal effectively with their problems - that is, they felt they had more control over their challenges and problems. In addition, many participants felt they would like to continue using massage to help control their migraines, had enjoyed participating, and were satisfied with the massage sessions. Participants made a number of interesting comments in the open-ended section of the evaluation questionnaire and, while there were not enough comments to identify reliable themes, some comments highlighted the improvements in migraine experienced by these individuals; for example, "I think this has been very effective for me I rarely have a headache of any kind now", "I did notice I always slept well the evenings of the massage", and "Just knowing about other techniques-not drugs gives me the confidence to try and deal with them".

Interestingly, several participants reported wanting further sessions, and felt this would have been even more effective for their headaches, and two further comments acknowledged the importance of a standardised massage protocol but felt that a tailored treatment would be more effective. This idea is often debated among researchers and massage therapists, with therapists stating that if a client came to see them for some particular condition they would receive a tailored individualised treatment, and yet research requiring standard protocols to identify treatment effects (Kahn, 2002). Future research could address this issue by comparing a standard massage treatment with a more individualised approach.

Integrated Massage, Migraine, and CSM of Self-Regulation

The first study of this thesis highlighted that the stress and coping effects resulting from the massage are integral to self-regulation processes, and supported the use of a psychological model in helping to delineate the effects of massage therapy. These findings were extended to a migraine population in this second study. This study further supports that the changes experienced in a migraine population after massage are related to massage mechanisms and link with psychological and physiological processes identified by the CSM of self-regulation. This model will be fully discussed in the final discussion of the thesis.

Limitations

The results of this study are essentially only generalisable to the treatment of migraine headaches and not other types of headache. Another consideration is the cost of massage: While the participants in this study received free massages, the usual cost may inhibit migraineurs from accessing this type of treatment. It appears that massage therapy is an effective non-pharmacologic treatment for migraine, and cost-effectiveness studies are warranted. In addition, to the no-contact control, it would be useful to include some other comparison group, for example, thermal biofeedback; inclusion of a comparison group allows for efficacy of treatments to be established. In addition, as the daily diary was a pen-and-paper assessment with respondents asked to write down what time they filled out the diaries (at breakfast, lunch, dinner and bedtime). There is no way of knowing if these reported times were accurate and such inaccuracies may have introduced measurement error that may have reduced the sensitivity of the analyses in detecting treatment effects. With a larger budget, electronic methods of assessment could provide more reliable and accurate data. The sample size is larger than many previous massage studies (Field, 1998) but an even larger sample may be needed to detect small- to moderate-sized effects.

Finally, comparisons between the two groups on the immediate short-term effects were impractical, as it was not feasible to identify appropriate venues and times for assessments of heart rate, state anxiety, and salivary cortisol for participants in the daily diary condition.

Conclusion

Overall, this study has extended research in massage therapy for migraine. At a theoretical level migraine and massage mechanisms have been integrated with the CSM of self-regulation (Leventhal et al., 2003) for the management of migraine. At an empirical level, the findings provide evidence that massage therapy had immediate effects on parasympathetic nervous system activity indicative of relaxation responses (i.e., reductions in state anxiety, heart rate, and cortisol), and longer term effects of enhanced coping efficacy, improved sleep quality, and improved health perceptions. Taken together, the findings indicate that massage therapy leads to improved emotional and cognitive regulation in coping with migraine experiences. Importantly, the findings indicate that massage therapy reduces the frequency of migraines. This research extends previous research by including a comparison group, measures of coping, fatigue, and quality of life, and follow-up past the last day of massage treatment. This longer term follow-up showed that many of the effects of massage were lasting up to three weeks past the end of the intervention.

Further research is needed to establish a more comprehensive picture of how massage and migraine theories impact on self-regulation. Future research might also consider including measures that provide more direct tests of the migraine theories involving the roles of serotonin and Substance P. Future research may also investigate the usefulness of including a individualised massage condition in addition to a condition using standardised protocol for the massage therapy.

This study highlights that migraine is indeed a highly distressing and disabling disorder and a non-pharmacologic treatment in the form of a standardised massage therapy can induce beneficial reductions in the frequency of migraine, enhanced coping efficacy, and improvements in sleep quality. Given that many people report that managing their migraines is difficult and want to try other treatments other than drugs, massage may be a very plausible treatment for some people. The third study will attempt to address the question of whether health professionals (i.e., GPs) have knowledge about the effects of massage as well as their attitudes and beliefs about massage therapy. In addition, their

knowledge, attitudes and beliefs about massage therapy and other complementary and alternative therapies (CAM) will be compared to those of patient's attending general practitioner clinics. The reason for the shift in focus of the third study is that the first two studies and previous studies have found beneficial and promising effects of massage therapy, and they suggest health professionals should have knowledge about them in order to recommend massage therapy to people experiencing stress and migraines as appropriate. As the focus shifts somewhat to discuss health professionals' and patients' perceptions of massage therapy and other CAM, the next chapter will review the CAM literature in order to place massage therapy in its context.

CHAPTER 12
COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM): USE, PREVALENCE, AND VIEWS

Complementary and alternative medicine (CAM) is of increasing interest to the public and to health professionals, which is reflected in its recent coverage in the media, medical, and psychological literature (Hadley, 1988). This awareness and use of CAM may be linked to a growing awareness of the importance of lifestyle and personal responsibility for one's health (Ernst & White, 2000; Hadley, 1988). A primary focus of CAM is long-term lifestyle changes (Chung, 1996). The American Massage Therapy Association reports that the demand and use of massage therapy has grown steadily over the last several years (American Massage Therapy Association, 2003). Health care is faced with challenging issues involving health promotion, disease prevention, and the management of chronic illnesses (such as in the treatment of cancer and HIV/Aids) (Chung, 1996). CAM can contribute to addressing these health care needs through its promotion of healthy lifestyles, preventing disease, and treating acute and chronic conditions.

Defining complementary and alternative medicine is problematic. Alternative and complementary (sometimes called unconventional or holistic) medicine are terms currently used interchangeably to refer to a large range of therapies considered outside the domain of mainstream Western medicine. However the terms complementary and alternative have distinctive meanings. Complementary medicine is used in conjunction with conventional medicine, whereas alternative medicine is used in place of conventional medicine (e.g., using a special diet to treat cancer instead of undergoing conventional surgery, radiation, or chemotherapy; National Centre for Complementary and Alternative Medicine, 2000). The term CAM is currently the favoured option by the New Zealand Ministerial Advisory Committee on Complementary and Alternative Heath or MACCAH (Ministerial Advisory Committee on Complementary and Alternative Health, 2003), and it will be used in this thesis.

Some common themes permeating CAM include: (1) an emphasis on the unit of body, mind, and spirit; (2) a view of health as a positive state and not merely an absence of disease; (3) a concern for the individual's responsibility for his/her health; (4) an emphasis on health education, self-care, and self-healing; and (5) a relationship between the provider and the client that is relatively open, equal, and reciprocal (Goldstein *et al.*, 1988).

The MACCAH have adopted the following working definition of CAM (Ministerial Advisory Committee on Complementary and Alternative Health, 2003):

> Complementary and alternative medicine (CAM) is a broad domain of healing resources that encompasses all health systems, modalities, and practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health system of a particular society or culture in a given historical period. CAM includes all such practices and ideas self-defined by their users as preventing or treating illness or promoting health and well-being (Ministerial Advisory Committee on Complementary and Alternative Health, 2003; O'Connor *et al.*, 1997, p 50).

This definition is similar to the definition provided by the United States National Centre for Complementary and Alternative Medicine (NCCAM). NCCAM also classify CAM into the five main categories: (1) Alternative medical systems which are built upon complete systems of theory and practice (e.g., homeopathic medicine, naturopathic medicine, Traditional Chinese medicine, and Ayurveda), (2) Mind-body interventions, where a variety of techniques are used to enhance the mind's capacity to affect bodily function and symptoms (e.g., biofeedback, relaxation, imagery, and meditation), (3) Biologically-based therapies that use substances found in nature, such as herbs, foods, and vitamins (e.g., dietary supplements and herbal products), (4) Manipulative and body-based methods (e.g., osteopathic and chiropractic manipulation, and massage), and (5) Energy therapies involving the use of energy fields, including biofield therapies (e.g., Reiki and therapeutic touch) and bioelectromagnetic-based therapies (National Centre for Complementary and Alternative Medicine, 2000).

Costs of CAM

Research in Western cultures reveals that CAM is frequently used by patients and increasingly recommended by doctors for a variety of health problems. Surveys conducted in the United States to determine the prevalence, costs, and patterns of use of CAM therapies (Eisenberg et al., 1998; Eisenberg et al., 1993) reveal that individuals who consulted a CAM provider made an average of 19 visits in the previous year, with an average charge of US$27.60 per visit. Expenditures associated with the use of CAM in 1990 amounted to approximately $14.6 billion and $21.2 billion in 1997, demonstrating approximately a 45% increase in expenditure.

In Australia (MacLennon *et al.*, 1996), a population survey ($N = 3004$) revealed that nearly half of the respondents (49%) used at least one non-medically prescribed alternative medicine and 20% of the respondents had visited at least one alternative practitioner. This revealed that Australians spent AUD $621 million for alternative medicines and AUD $309 million for alternative therapists in 1993, which compares to the AUD$ 360 million that patients contribute for pharmaceutical drugs purchased in Australia in 1992/93. The authors suggest that these figures represent a level of health consumer activity that should be taken seriously, as randomised trials for CAM have been small and often have not demonstrated clear therapeutic benefits (Desmet, 1995). It is clear that large amounts of money are being spent on CAM each year, and with its growing trend this expenditure is likely to increase. Interestingly, a large proportion of this money comes from the person's own pocket.

CAM Efficacy and Safety

It is important to establish efficacy and safety of CAM therapies, as emerging research demonstrates that some CAM treatments may interact or interfere with conventional treatments or even have adverse side effects (Weiger et al., 2002). Establishing safety and efficacy is crucial for CAM to be adopted into mainstream medicine (Barnes, 2003b). However, many of the individual CAM therapies do not have a governing or controlling body, which makes government regulation difficult. Moreover, doctors and consumers need to be assured that what they recommend and use will be beneficial or, at the minimum, do no harm. Family physicians are interested in alternative health care and appear to frequently make referrals for CAM. Physicians need to feel confident about any referrals they do make, which may be difficult given that most CAM therapies are not regulated. MACCAH is currently working on policies for CAM regulation in New Zealand (Ministerial Advisory Committee on Complementary and Alternative Health, 2003), and they use the same criteria for efficacy and safety used for conventional drugs. As many CAM therapies, particularly herbal medicines, have a long history of traditional use and have not been subject to rigorous experimentation (e.g., in randomised controlled trials), most are of unproven efficacy and safety (Barnes, 2003b). The lack of established efficacy does not mean that CAM treatments are ineffective or unsafe, just that rigorous clinical investigation remains to be undertaken. The third study of this thesis explores the beliefs about the effects of massage and other CAM techniques held by doctors and patients, whether patients feel comfortable disclosing their use of CAM to their physician, and whether physicians are equipped to respond to questions patients may have about CAM

therapies. It is important to determine whether patients are disclosing their use of CAM to their physicians, as use is reportedly increasing worldwide.

Physician Attitudes, Beliefs, Knowledge, and Referral Patterns of CAM

Research assessing physicians' attitudes, beliefs, knowledge, referrals, and practice of CAM has been conducted in various countries, including New Zealand, England, Canada, and the USA. Before outlining some of these research findings, some basic concepts referring to attitudes and beliefs need to be defined. An attitude can be considered as an enduring mental organisation of beliefs, feelings, and behavioural tendencies about some idea, object, event or person (Gleitman *et al.*, 2000; Himmelfarb & Eagly, 1974). An attitude is expected to be relatively persistent across time, and it includes a belief component, an evaluative or affective component, and a behavioural component (Haddock & Zanna, 1998). For example, an attitude about massage therapy may include a belief that massage can reduce stress, positive affect when recommending massage therapy for patients with stress-related disorders (anxiety, sleep problems), and behavioural intentions, to recommend that patients see a massage therapist.

A belief can be considered as mental acceptance of or conviction in the truth or actuality of a concept (Webster's New Riverside University Dictionary, 1984). For example, a doctor who has had a massage and experienced relief of back pain may believe that massage can reduce back pain. Attitudes and beliefs often are not explicitly defined in research on CAM, and the terms tend to be used interchangeably. Research in CAM, generally includes referral patterns, doctors' practice of CAM and their training or training preferences, and their knowledge, attitudes, and beliefs about CAM.

Referral Patterns

Surveys of family physicians have revealed that most physicians are referring patients to CAM, although the referral rates do differ. GPs report referring their patients to CAM for a range of conditions; common ones include: musculoskeletal disorders, chronic pain syndromes, and psychological problems (Hadley, 1988). Other reasons for referral include failure of conventional medicine, requests from patients, and to complement existing treatment (Berman et al., 1995). A survey ($N = 174$, 77% response rate) conducted in the Wellington area in New Zealand revealed that 77% of general practitioners (GPs) indicated that they had referred to other medical practitioners for CAM and 80% had referred to non-medical practitioners (Hadley, 1988). This study focused specifically on hypnosis, acupuncture, osteopathy, chiropractic, naturopathy, homeopathy, and spiritual healing. The

majority (94%) of the GPs knew of CAM practitioners of these therapies in their locality. An Auckland-based survey revealed that 69% of respondents had referred patients to one or more forms of CAM and 32% of these doctors felt it necessary that the CAM practitioner be medically qualified (Marshall et al., 1990). Other surveys report that over half of the GPs surveyed are referring to CAM (Anderson & Anderson, 1987; Verhoef & Sutherland, 1995).

A literature review by Astin (1998) examined five of the more prominent CAM therapies: acupuncture, chiropractic, homeopathy, herbal medicine, and massage. Across the surveys, acupuncture had the highest rate of physician referral (43%) among the five therapies, followed by chiropractic (40%) and massage (21%). Other research has shown that common therapies for referral are acupuncture, osteopathy, massage, homeopathy, and hypnotherapy (Marshall et al., 1990; Verhoef & Page, 1998). Respondents in another survey reported feeling willing to refer their patients frequently to non-physicians for diet and exercise, chiropractic, biofeedback, behavioural medicine, and massage therapy (Berman et al., 1995). It is important to note that these surveys were conducted between 1987 and 1998, and it is likely that referral rates for CAM have changed since then.

Some studies have assessed whether there are any relationships between GP characteristics and referral patterns, and results are mixed (Astin, 1998). Some surveys report that younger doctors and female doctors were more inclined to refer or to practice some form of CAM (Anderson & Anderson, 1987; Verhoef & Sutherland, 1995), while others do not investigate these associations or find no significant relationships (Hadley, 1988; Marshall et al., 1990).

Physician Practice and Training

Previous research in New Zealand and Canada found that between 15% and 30% of physicians were practicing some form of CAM (Hadley, 1988; Marshall et al., 1990; Verhoef & Sutherland, 1995). Acupuncture, hypnosis, homeopathy, massage, and chiropractor were the most common ones practiced (Astin, 1998; Hadley, 1988; Marshall et al., 1990; Verhoef & Sutherland, 1995). The conditions treated with CAM by physicians included spine/joint problems, acute illness, pain, chronic illness, psychological problems, and undiagnosed symptoms (Marshall et al., 1990).

Astin's (1998) literature review assessed the rates of practice of five CAM therapies, and found that approximately half of the surveyed physicians believed in the efficacy of acupuncture (51%), chiropractic (53%), and massage (48%), while fewer believed in the

value of homeopathy (26%) and herbal approaches (13%). In another study (Berman et al., 1995) physicians recorded their level of expertise for 18 CAM therapies along three dimensions: training, knowledge, and interest in receiving training. Most of the respondents had training in diet and exercise, behavioural medicine, and psychotherapy. For massage therapy, 37% had training, 61% had knowledge, and nearly 80% were interested in training. Studies conducted with doctors in New Zealand in the late 1980's found that most GPs wanted further training in CAM, with acupuncture, hypnosis, and chiropractic being the most popular (Hadley, 1988). In addition, authors have acknowledged that all doctors who wish to practice CAM should have adequate and recognised training (Anderson & Anderson, 1987).

Knowledge, Attitudes, and Beliefs

Research investigating GPs' knowledge, attitudes, and beliefs about CAM has used differing methodologies. In one survey conducted in New Zealand (Marshall et al., 1990) doctors rated some common alternative therapies on their usefulness using a five-point scale (1= *useless* to 5= *very useful*). Acupuncture received the highest mean rating of 3.33, with massage second (2.83), and hypnotherapy third (2.33). A meta-analysis of physician perceptions of the usefulness of CAM showed considerable variability among the 12 surveys included in the analysis (Ernst *et al.*, 1995). On average, physicians perceive CAM medicine as moderately effective. Results from another questionnaire study indicated that 31% of the doctors said they had working knowledge of at least one form of CAM, 29% had read publications on CAM, and 41% had attended classes or lectures on CAM. Furthermore, 12% had received training and 42% wanted training in an alternative form of medicine (Anderson & Anderson, 1987).

Results from a more recent survey in Canada showed that 56% of general practitioners believed that CAM has ideas and methods from which conventional medicine could benefit (Verhoef & Sutherland, 1995). Another study revealed that a positive attitude towards alternative medicine was held by 38% of the respondents, while 33% held a negative view and 29% were equivocal. The reported reasons for the positive support of alternative therapies were their effectiveness, their complementary nature to orthodox medicine, and their safety (e.g. lack of drug side effects). Most doctors who felt negative about CAM considered them unscientific, or ineffective, or both.

One issue that appears consistently in the research is that physicians tend to believe there is a lack of scientific information about the efficacy and safety of CAM, and physicians expect the same scientific evidence for both orthodox and CAM (Berman et al., 1995). In addition, doctors have reported wanting registers of CAM practitioners to be made readily available for both doctors and members of the public (Anderson & Anderson, 1987). This is difficult as many of the individual complementary or alternative therapies do not have a governing body, which makes government regulation of CAM extremely complex (Lawler & Cameron, 2004).

One limitation of the relatively scant research to date is that studies often do not focus on just one therapy or practice so that they cannot provide information about beliefs and behaviours for a particular therapy (Hadley, 1988; Marshall et al., 1990). In addition, the only surveys of New Zealand urban GPs were conducted in 1988 and 1990, and attitudes and referral patterns are likely to have changed since then, as attention to CAM has increased in recent years. Updated data on New Zealand GPs' beliefs, knowledge, and referral patterns for massage therapy and other forms of CAM is needed.

One of the aims of the third study of this thesis is to investigate doctors' referral rates, reasons for referral, and types of therapies recommended. A further aim is to assess the associations between GP characteristics including gender and referral for CAM therapies and massage therapy specifically.

Patient Use of CAM

Studies suggest that between 30% and 50% of the adult population in industrialised nations use some form of CAM to prevent or treat a variety of health-related problems (Astin, 1998; MacLennon et al., 1996). The popularity of particular types of CAM varies geographically, but more commonly used techniques include: massage, chiropractic, relaxation techniques, herbal medicine, and homeopathy (Astin, 1998; Eisenberg et al., 1993). The patterns of demographic characteristics associated with use of CAM do not vary regionally. International surveys consistently report that users of CAM therapies tend to be women who are more educated, have higher incomes, and are more likely to be between the ages of 30 and 49 years (Adams *et al.*, 2003; Eisenberg et al., 1993; MacLennon et al., 1996; Ong et al., 2002). For example, a review of surveys on CAM use in the USA (Wootton & Sparber, 2001) found that women are consistently more likely than men to use CAM therapies, although the difference is sometimes only marginally

significant and this gender difference is also proportional to the gender difference in use of health care services (Wootton & Sparber, 2001). Further investigation is needed to assess the impact of increasing access to worldwide information on use of CAM, and whether there is any relationship between the increasing costs of conventional health care and increased use of CAM.

Beliefs, Attitudes, and Perceptions

Several studies have now found that perceived health status is a significant predictor of CAM use (Astin, 1998; Druss & Rosenheck, 1999; Jonas, 1998), where poorer health and the presence of particular health problems are related to higher CAM use. Chronic disorders such as back and neck pain, arthritis, allergies, hypertension, insomnia, digestive disorders, depression, and anxiety are all associated with higher use and reliance on CAM (Eisenberg et al., 1998). A recent study (Chrystal *et al.*, 2003) conducted in New Zealand to assess CAM use in cancer patients found that 48% of the respondents used CAM, with vitamins, antioxidants, diets, and herbal therapies being the most common and 17% of the sample using massage therapy. Patients reported that desire for improvement in quality of life was the main reason for using CAM. Other reasons reported were the potential for a cure for cancer and to reduce the side effects of conventional treatment. The majority (89%) of respondents believed CAM therapies were safe and only one patient felt they were unsafe (Chrystal et al., 2003).

One study examined the characteristics of family practice patients using CAM, the problems that led them to use it, and their satisfaction with its use (Drivdahl & Miser, 1998). A questionnaire was mailed to 250 randomly selected adults from a large military practice, with a response rate of 71%. More than 28% of the respondents reported using some form of CAM. Common alternative therapies used were chiropractic (64%), massage therapy (36%), herbal therapy (32%), and acupuncture (16%). The most common problems for which patients sought alternative care were back pain (56%), other musculoskeletal pain (22%), and stress or other psychological problems (20%). A surprising finding in this study was that over half the users of alternative medicine were not satisfied with their alternative care, yet 82% reported at least some improvement in their condition, and nearly half reporting greater improvement or cure. This lack of satisfaction with CAM may be due to unrealistic expectations about cure or the length of time without symptoms, as nearly one third of respondents reported that the effects of the therapy only lasted one to three months. Only one third of patients had told their family physician they were using some form of alternative health care.

One mail-out survey of 1035 individuals in the USA (69% response rate; (Astin, 1998) was designed to provide a detailed analysis of factors influencing the decision of the general public to use various forms of CAM. Results suggested that users of CAM were generally better educated and more likely to have a holistic philosophical orientation to health and life (i.e., a belief in the importance of mind, body, and spirit). As found in other surveys, CAM users were more likely than nonusers to report poorer health status, and relief of symptoms was the main benefit of CAM use reported. In addition, it was found that CAM users were no more dissatisfied with or distrustful of conventional care than were nonusers. The authors suggest that better educated people may be more likely to have exposure to various nontraditional forms of health care through their reading of popular or academic books on the subject, to educate themselves about their illnesses and the variety of treatments available to them, and to question conventional medicine and be open to alternatives as a consequence. Some possible explanations for why poorer health status predicts use are that firstly, those who are in poor health may have had less success in treating their health problems and their continued suffering may motivate them to seek alternatives. Secondly, people who are ill have available to them numerous treatment options and ways of seeking advice from physicians, friends, family, and the Internet (Barnes, 2003a). These information searches are likely to lead then to information about CAM therapies. Another factor potentially motivating people to choose CAM therapies is their perceived safety: there is an assumption that, because they are natural, CAM therapies are inherently safe and promote holistic health (Ernst & White, 2000).

Regardless of the type of people and the reasons for seeking CAM, prevalence of its use is increasing. A national telephone survey, conducted by Eisenberg and colleagues (1998) in the USA, compared the use of at least one alternative therapy (during the previous year) in 1990 ($N = 1539$) to 1997 ($N = 2055$) and found that use had significantly increased from 33.8% in 1990 to 42.1% in 1997 ($p < 0.001$). The therapies that had the greatest increase in use included herbal medicine, massage, megavitamins, self-help groups, folk remedies, energy healing, and homeopathy. In both surveys, the most common reasons for CAM use were as a treatment for chronic conditions including back problems, anxiety, depression, and headaches. In the 1997 survey massage was most commonly used for back and neck problems and fatigue. Interestingly, there was no change in disclosure rates of use of CAM to physicians from 1990 (39.8%) to 1997 (38.5%). This survey shows that CAM use has increased substantially from 1990 to 1997, and it is possible that there have been further increases over the last six years.

Surveys of Both Patients' and General Practitioners' Views and Use of CAM

Only a few studies have investigated both GPs' and patients' views, referrals and use of CAM in order to provide information about the congruency in views of doctors and patients in the same geographic location during the same timeframe. A recent study in Wanganui, New Zealand explored patients' and GPs' attitudes to CAM (Conner et al., 1999). A questionnaire survey was issued to 50 consenting patients (69% response rate) at three medical practices and sent to each of the 30 general practitioners (83% response rate) in the region. Patient respondents reported using CAM when ill (67%), with rongoa Maori (traditional Maori medicine) reported as a commonly used therapy. Reasons for patients' use of CAM were ease of access, recommendation of the efficacy by someone else, low cost, previous positive experience with the therapy, safety, control over one's own health, and the failure of orthodox medicine. The majority (82.6%) of the patients felt able to talk to their doctor about CAM, but mostly reported that their doctor did not ask about their use of CAM. Only 15% of patients reported that their doctors had referred them to a CAM therapist, yet, most patients (66%) wanted their doctors to know more about CAM. The majority of patients (89%) thought that CAM therapies were sometimes, usually or always safe, and 64% acknowledged that there could be side effects to CAM therapies.

The majority of GP respondents (84%) estimated that fewer than 50% of their patients were using CAM. GPs typically thought that the majority of their patients would disclose their use of CAM. Most GPs (92%) said that they referred patients to CAM practitioners, although most GPs (96%) had concerns about the safety of CAM therapies and would like to see CAM therapies better regulated. This study which provides data on CAM views and use of New Zealand doctors and patients in the same rural region, identifies some potential discrepancies in beliefs and expectations about CAM. Many GPs appear to have underestimated the use of CAM by patients. Although the findings are limited by the small sample sizes, they suggest some potential areas that require further investigation.

Another study assessed whether family physicians ($N = 71$) met their patients' ($N = 310$) expectations with regard to their CAM use (Himmel *et al.*, 1993). The response rate for the GPs was moderate at 56%. The majority of GPs reported using, at least occasionally, some form of CAM medicine (e.g., herbal medicine and homeopathy). Most doctors (85%) used CAM treatments to supplement mainstream medicine, and a few used them if orthodox

medicine failed. Interestingly, over half the doctors thought they were responsible for actively recommending CAM medicine to their patients.

About 40% of the patients reported receiving CAM treatment, mostly herbal medicine. Interestingly, a high proportion (61%) of patients were able to name one or more CAM therapy used by their doctor. Only a few patients (4%) disliked or were skeptical of CAM. Of the patients, 68% wanted to be treated with CAM therapies more often and 58% preferred CAM to mainstream medicine. Over a third of the patients reported that their doctor had recommended an alternative treatment at least once (Himmel et al., 1993). Overall, patients felt that their physicians were not meeting their demands for CAM.

Physician and Patient Views and Use of Massage Therapy

There is little research examining the knowledge, opinions, and referral behaviour of physicians with respect to massage therapy, which falls under the manipulation, body-based category of CAM. Studies assessing physician' perspectives and practices regarding CAM therapies have often not identified specific therapies in order not to restrict the respondent to a limited range of disciplines (Verhoef & Page, 1998). Surveys that have assessed physicians' attitudes and knowledge about massage therapy show a fair level of knowledge and perceived usefulness (Astin, 1998; Berman et al., 1995; Marshall et al., 1990). However, it is unclear if physicians are aware of how much training is involved in becoming a massage therapist, especially in New Zealand. An application of massage for therapeutic benefits requires education in assessment, anatomy and physiology (Verhoef & Page, 1998).

A random mail survey was conducted with a sample of 300 (54% response rate) family practitioners in Alberta (Verhoef & Page, 1998). The questionnaire included questions relating to knowledge, beliefs, and referral behaviours regarding massage therapy. Most of the physicians (69%) rated their knowledge of massage therapy as minimal to none, yet most (73%) believed physicians should have some knowledge of massage therapy. Few physicians had received training in massage therapy (6%) and nearly a quarter of the respondents (23%) indicated they would like to receive training in massage therapy. Additionally, 50% believed massage therapy to be useful or very useful; only 12% agreed that the results from massage therapy are primarily due to a placebo effect; 55% agreed that massage therapy includes ideas and methods from which traditional health care could benefit; and 22% agreed or strongly agreed massage therapy stimulates the body's natural healing power. Most physicians (72%) were unaware of the educational standards for

massage therapists, and just over half of the physicians (51%) would support government regulation of massage therapy. Most physicians (75%) perceived a demand from their patients for massage therapy. The majority (83%) considered massage therapy to be a valuable adjunct to their own treatment, and most (71%) reported having referred patients at least once to massage therapists in the previous year. The most common reasons for referral were tension headaches (31%), chronic pain (31%), and motor vehicle accidents (28%). In this study, physicians demonstrated a large discrepancy between knowledge base, perceived usefulness, and referral practice. Although most physicians reported little or no knowledge of massage therapy, most had also referred patients to a massage therapist. Given this discrepancy, it would be advisable to establish guidelines and physician education so that physicians are better equipped to evaluate the pros and cons of massage therapy as a treatment option and make appropriate referrals (Verhoef & Page, 1998).

Over the last several years, the American Massage Therapy Association (AMTA) has commissioned the Opinion Research Corporation, Princeton, to conduct national surveys on massage therapy among consumers living in private households in the United States. The most recent study was conducted in August, 2003, with a sample of 1,015 adults (American Massage Therapy Association, 2003). The results showed that the use of massage therapy has increased steadily over the previous seven years, from 8% in 1997 to 21% in 2003. Moreover, more than one in five adults in the 2003 survey received a massage in the past 12 months.

Nearly half of the respondents (47%) in the 2003 survey reported getting a massage for pain relief, and 91% of those surveyed agreed that massage can be effective in reducing pain. Other reasons for getting a massage included relaxation or stress relief (22%), injury-related reasons, or muscle soreness (25%). The majority (90%) of respondents reported that massage can be beneficial to one's health, although the survey did not assess why respondents thought this. In terms of doctor–patient discussions of massage therapy, 19% of adults reported discussing massage therapy with their doctors, which reflects an increase from 14% in 2002. Of those who discussed massage with their doctors, the majority (62%) reported that their providers strongly recommended or encouraged them to get a massage (American Massage Therapy Association, 2003). There is a scarce research investigating GP and patient views and use of massage therapy. To date, all patient and GP data are from the US or Canada. Research is needed in other geographic locations to assess GP and patient referrals, use, and knowledge.

Summary

In summary, the limited survey evidence suggests that many physicians recommend CAM to their patients, mostly for chiropractics, acupuncture, osteopathy, naturopathy, and massage therapy, and for a variety of reasons including chronic pain, musculoskeletal problems, stress, and anxiety. Doctors, on average, have tended to underestimate how many of their patients are using CAM. Use is increasing in the general public, with costs coming directly out of their own pocket. The users of CAM tend to be of higher socio-economic status, educated, and women. Surveys in the USA demonstrate that massage therapy use has steadily increased over the last eight years, yet no studies have been conducted in New Zealand and other countries. Moreover, research investigating GPs knowledge of and referrals to massage therapy is scarce.

Study Rationale and Hypotheses

The previous two intervention studies for this thesis revealed some promising findings regarding the beneficial effects of massage therapy on stress regulation and migraine experiences. This third study aims to explore the extent to which GPs are making referrals for massage in light of these findings and other research evidence of the beneficial effects of massage. In addition, there is limited research in New Zealand investigating CAM referrals by GPs and use by patients, especially surveys that focus on one particular therapy such as massage. Moreover, comparisons of GPs and patients in the same geographic location are scarce. This type of information is invaluable in a time when the use of CAM is popular and appears to be increasing, and many governing bodies want to establish regulation of CAM (Ministerial Advisory Committee on Complementary and Alternative Health, 2003) to minimise risk and increase safety.

Firstly, this study aimed to explore GPs' recommendation rates for massage therapy and CAM therapies and to compare these findings with previous findings of referral rates in New Zealand and overseas. Secondly, the study investigated the types of conditions and illnesses for which doctors recommend massage therapy and CAM therapies. Thirdly, it aimed to investigate the rates of massage therapy use amongst patients and the kinds of conditions and illnesses they treat with massage, and to compare these reports with the GPs' responses. Fourthly, the survey investigated the amount of information GPs and patients had about the therapeutic effects of massage therapy. Fifthly, the survey aimed to ascertain if any GP characteristics (i.e., age and years in practice) were associated with attitudes, knowledge, and referrals of massage therapy and CAM. Similarly, the study

assessed the characteristics of patients who used massage and CAM therapies and evaluated whether any of these variables predicted their use. Lastly, for patients who had regular massages, the study investigated their evaluations of their massage experiences.

Although the study is mostly exploratory and descriptive in nature, several predictions based on prior research will be assessed. First, more woman patients than men patients will use massage therapy and CAM therapies. Secondly, it is predicted that higher levels of knowledge about massage therapy will be associated with more favourable beliefs about the therapeutic efficacy of massage therapy, such as enhancing immune function, blood circulation, and attention, and reducing depression, anxiety, and stress. Finally, younger doctors are expected to have more favourable attitudes towards massage therapy and CAM than older doctors and, therefore, to make more referrals.

CHAPTER 13
STUDY 3: METHODOLOGY

Study Design and Participants

An anonymous survey was developed for this study to assess GPs' and patients' attitudes, beliefs, and use of massage therapy and CAM. For GPs, the design was a random, mailed survey. For patients, the design entailed a consecutive sampling approach where every person who entered one of the four clinics was approached and invited to complete the survey.

Participants

General Practitioners

The anonymous questionnaire, including a participant information sheet (see Appendix R), was mailed to 200 GPs randomly selected using random number tables from telephone directories for the North Health region. A total of 86 questionnaires were returned, with 74 completed. The total response rate was 44%. One questionnaire was returned with the demographics section not completed. Three questionnaires were returned to sender, as the addressee was not known at that address. A further 12 questionnaires were returned not completed, and the reasons given for non-completion included being too busy (2), unable to complete (5), declined to complete (1), and not interested (1). A total of 74 questionnaires (37%) were used in the analyses.

The demographic breakdown (see Table 17) of the general practitioners who responded appear to be representative of general practitioners in New Zealand, according to statistics published by the Ministry of Health from data collected from surveys carried out by the Medical Council of New Zealand in 2000 (New Zealand Health Information Service, 2000). For example, these statistics indicate that 37% of general practitioners are female, 44% are aged over 45 years, 80% are European/Pakeha, 2% are Maori, 1% are Pacific Island, 5% are Chinese, and 4% are Indian (New Zealand Health Information Service, 2000).

Patients

Of the 20 clinics approached, four clinics consented to be part of the study and these four clinics (Papakura, Albany, Henderson, and Ellerslie) were geographically representative of Auckland. Each clinic had up to four GPs practicing fulltime. The researcher spent four to

ten hours in each clinic; all patients entering the clinic were invited to participate in the survey. A total of 49 patients were recruited from the clinics, only three people refused to complete the questionnaire. The reasons for declining participation included: not knowing anything about massage therapy and poor English skills. The demographic information for the patient sample is provided in Table 18.

Table 17

Demographic and Practice Characteristics of General Practitioners

Variable	Frequency	Percentage (%)
Gender		
Male	42	58
Female	31	42
Ethnicity		
New Zealand European	54	74
Pacific Island	1	1
Indian	5	7
Asian	5	7
Other	10	11
Age	*M*	*SD*
Male	46.69	10.15
Female	41.03	5.35
Total	46.08	9.47
Years in Practice	18.63	9.52
Year Graduated Medical School	1979	9.17

Table 18

Demographic Characteristics of Patients

Variable	Frequency	Percentage (%)
Gender		
Male	10	20
Female	39	80
Ethnicity		
New Zealand European	41	84
Maori	4	8
Indian	1	2
European	2	4
Missing	1	2
Age		
M	39.94	
SD	12.63	
Income($)		
Median	30,000-40,000	

Measures

The questionnaire sent to GPs (see Appendix S) contained questions about sociodemographic characteristics, perceived knowledge of massage therapy, opinions about the usefulness of massage therapy, and referral behaviour for both massage therapy and other types of CAM therapies.

The questionnaire given to patients (see Appendix T) was similar to the GP questionnaire except it included questions regarding the use of massage therapy, satisfaction with massage, discussions about massage with their doctor, and their use of CAM.

The survey questions included a number of items used in previous studies investigating GPs' views, perceptions, and referral behaviours for massage therapy and CAM therapies (Anderson & Anderson, 1987; Eisenberg et al., 1993; Verhoef & Page, 1998; Verhoef & Sutherland, 1995). Many of the questions from these previous studies were adapted for use with patients in order to compare their perceptions and beliefs with those of GPs. The questionnaire also included questions developed by the author.

The questions relating to CAM therapies, were preceded with the following definition of CAM therapies: "Complementary therapies generally include treatments or practices that aim to provide therapeutic benefits which are considered for use along with or in addition to mainstream medical treatments". An additional definition was included in the questionnaire for placebo effect (see Appendix T)

The questions on the survey were logically grouped to form six sections: (1) Knowledge and attitudes about training and demand for massage therapy (GPs); (2) Referral and discussion behaviour with patients about massage therapy and GPs and patients use of massage therapy (GPs and patients); (3) Knowledge, attitudes, and referral behaviour for CAM therapies (GPs and patients); (4) Regulatory standards for CAM therapies (GPs); (5) Beliefs and attitudes about massage therapy (GPs and patients); and (6) Satisfaction with massage (patients). The questions within these sections are listed in Appendices S and T.

Procedure

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee. After random selection, each of the 200 GPs was sent a questionnaire, a cover letter inviting their participation, a participant information sheet, and a self-addressed prepaid envelope for the return of the completed questionnaire. A second mail-out was sent one month later, which included a notice to not complete a second questionnaire if the person had already responded.

A random selection of 20 clinics was obtained using the local telephone directories, and a request to recruit participants from the clinic was sent to practice managers. A follow-up phone call was made one week later to discuss the possibility of attending their clinics to approach potential participants in the waiting room to complete the questionnaire.

Data Analysis

Statistical analysis was carried out using the version 12.1 of the Statistical Package for Social Science (SPSS). Means, standard deviations, and frequencies were reported for all items. Associations between variables were determined using Pearson correlation coefficients. Independent samples t-tests were used to compare gender differences in means of variables. ANOVA's were calculated to compare GPs and patients on their perceptions, attitudes, and beliefs about massage therapy. For GP referral behaviours conservative estimates of the proportion of GPs engaging in the behaviours were calculated based on the actual responses divided by 200 (the number of GPs randomly selected to receive a questionnaire), rather than by 74 (the number of respondents).

CHAPTER 14
STUDY 3: RESULTS

GPs' Knowledge and Attitudes about Training and Demand for Massage Therapy

The first set of survey questions pertained to beliefs about the demand for massage therapy, knowledge about massage therapy, and training standards. The descriptive data for this section is outlined in Table 19. The majority of GPs thought the use of massage therapy had increased in New Zealand. Most GPs were unaware of what is involved in becoming a trained therapist and did not have any training in massage therapy themselves. The majority of GPs thought they had poor to moderate levels of knowledge about massage therapy.

Table 19

Descriptive Statistics for Knowledge and Attitudes about Training and Demand for Massage Therapy

Questions	Frequency	Percentage
Do you think the use of massage therapy in New Zealand over the last five years has:		
Increased	58	78
Decreased	0	0
Stayed the same	9	13
Missing	7	9
Are you aware of what is involved in becoming a trained massage therapist?		
Yes	9	12
No	62	84
Missing	3	4
Do you have any training in massage therapy?		
Yes	9	12
No	62	84
Missing	3	4
*Please rate on this scale what level of knowledge you have about massage therapy:**		
1 (poor)	7	9
2	23	31
3	22	30
4	15	20
5 (excellent)	3	4
Missing	4	5

Note. * For this item, $M = 2.77$ and $SD = 1.04$.

GP and Patient Referral, Discussion, and Use of Massage Therapy

Table 20 summarises GPs' responses to the items in this category. The majority of the GPs had recommended that a patient see a massage therapist, mostly for musculoskeletal problems, stress, and pain. According to the conservative estimates, where it is assumed that non-responders would have answered negatively, over a quarter of the GPs would recommend that a patient see a massage therapist. Most of the GP respondents had also discussed massage therapy as a treatment with their patients, and the conservative estimate indicates that a minimum of 28% of GPs in the region are discussing massage therapy with their patients. Doctors reported that nearly two-thirds of their patients are favourable about massage therapy.

Table 21 summarises patients' responses to the items in this category. Nearly a quarter of the patients reported that their doctors had recommended massage therapy, most commonly for back and neck injuries, pain, and tension relief. A minority of patients had discussed massage therapy as a treatment with their doctor and found their GPs to be favourable about massage therapy. As shown in Table 22, 47% of GPs and 78% of patients had received a massage from a trained therapist, most commonly for relaxation, tension, or stress.

Table 20

GP Referral and Discussion of Massage Therapy

Questions	Frequency	Percentage	Non-response estimate (%)*
Have you ever recommended that a patient see a massage therapist?			
Yes	55	74	28
No	15	20	72
Missing	4	5	
If yes, what for?			
Muscuskeletal problems	37	67	
Stress	24	44	
Pain	20	3	
Relaxation	9	16	
Fibromyalgia	5	9	
Headaches	4	7	
Anxiety	4	7	
Other (Bereavement, HIV, Pregnancy, Insomnia, sports injuries)			
	8	15	
How many people have you recommended see a massage therapist over the last year?			
None	18	24	
1-10	36	49	
11-25	13	18	
26-50	3	4	
51 or more	1	1	
Missing	3	4	
Have you ever discussed massage therapy as a treatment with a patient?			
Yes	55	74	28
No	16	22	72
Missing	3	4	
In conversations with your patients regarding massage therapy, patients tend to be:			
Favourable	46	62	23
Unfavourable	0	0	0
Indifferent	8	11	4
Missing	19	26	

Note. The conservative estimate is based on the actual response given in the questionnaire but divided by 200, the number of GPs randomly selected to receive a questionnaire.

Table 21
Patient Experience of GP referral for Massage Therapy

Questions	Frequency	Percentage
Has your doctor ever referred you to or suggested you see a massage therapist?		
Yes	12	24
No	37	76
If yes, what for?		
Back/neck injury	5	
Tension relief	3	
Pain (leg, back)	3	
Migraines	1	
Have you ever discussed massage therapy as a treatment with your doctor?		
Yes	9	18
No	40	82
If yes, conversations with my doctor regarding massage therapy are:		
Favourable	7	
Unfavourable	0	
Indifferent	2	

Table 22
GP and Patient Experience with Massage

Variable	GPs	Frequency %	Patients	Frequency %
Have you ever had a massage?				
Yes	35	47	38	78
No	34	46	11	22
Missing	5	7		
What were your reasons for having a massage?				
Relaxation	18	51	20	53
Tension or stress	17	49	19	50
Sprains/strains	14	40	11	29
Sports related injury	8	23	9	24
Recovery from sports	4	11	2	5
Chronic pain	2	6	6	16
Other (acute low back pain, general well-being, psychotherapeutic)	3	9	3	8
Do you think you will have a massage in the next year?				
Yes	28	38	37	76
No	37	50	9	18
Missing	9	12	3	6

Knowledge, Attitudes, and Referral Behaviour for CAM Therapies

As shown in Table 23, the majority of GPs reported that their patients ask them about complementary therapies, with acupuncture, vitamin supplements, and homeopathy being the most commonly discussed. The conservative estimate indicates that at least 31% of GPs in the region are being asked about CAM by their patients. Less than a quarter of the respondents practised a form of complementary therapy. The majority of GPs thought that the demand for complementary therapies had increased in New Zealand. Most GPs had recommended that a patient seek a complementary therapy, most commonly acupuncture, homeopathy, and massage. The conservative estimate suggests that at least 28% of GPs in the region have recommended a form of CAM to patients. The most common reasons for recommendation included musculoskeletal problems and pain, and some stated there was an absence of any mainstream treatment.

As shown in Table 24, a moderate number of patients reported using complementary therapies, commonly chiropractor and herbal remedies. Only a few had discussed complementary therapies with their doctor. Most were unaware if their GP practiced any form of complementary therapy and the majority did not feel reluctant to tell their doctor about their use of complementary therapies.

Table 23

GP Knowledge and Referral Behaviour for Complementary Therapies

Variable	Frequency	Percentage	Non-response estimate (%)
Do many of your patients ask you about complementary therapies?			
Yes	61	83	31
No	9	12	69
Missing	4	5	
If yes, which ones are most commonly asked about?			
Acupuncture	22	36	
Vitamin Supplements	18	30	
Homeopathy	18	30	
Osteopathy	15	25	
Chiropractor	15	25	
Herbal Treatments	10	16	
Massage	7	11	
Reflexology	5	8	
Other (Iridology, aromatherapy, hypnotherapy)			
	9	15	
Do you practice any form of complementary medicine?			
Yes	17	23	7
No	53	72	73
Missing	4	5	
If yes, which ones do you practice?			
Acupressure	5	7	
Homeopathy	5	7	
Acupuncture	4	5	
Soft Tissue massage	2	3	
Other (manipulation, hypnosis, nutrition)			
	5	29	
Do you think the demand for complementary medicine in New Zealand over the last five years has:			
Increased	62	84	31
Decreased	0	0	
Remained unchanged	7	9	4
Missing	5	7	
Have you ever recommended that a patient seek a complementary therapy?			
Yes	56	76	28
No	16	22	72
Missing	2	3	

If yes, which therapies do you most commonly recommend?		
Acupuncture	18	33
Homeopathy	15	27
Massage	12	22
Osteopath	11	20
Naturopath	10	18
Chiropractor	6	11
Physiotherapy	4	7
Acupressure	4	7
Meditation	4	7
Other (Alexander technique, psychotherapy, St John's Wort, Kinesiology)		
	8	15
And for what medical reasons?		
Muscuskeletal problems	13	24
Pain	11	20
Back problems	6	11
Women-specific problems	6	11
Absence of any mainstream treatment	6	11
Stress	5	9
Allergies	5	9
Other (headaches, depression, recurrent viral illness, sleep, fatigue)		
	14	25
How many people have you recommended try a complementary therapy over the last year?		
None	13	18
1-10	26	35
11-25	16	22
26-50	6	8
51 or more	9	12
Missing	4	5

Table 24
Patient Use of Complementary Therapies

Variable	Frequency	Percentage
Do you use any complementary therapies?		
Yes	19	39
No	28	57
Missing	2	4
If yes, which ones		
Chiropractor	5	26
Herbal remedies	5	26
Aromatherapy	3	16
Osteopath	2	11
Physiotherapy	2	11
Hypnotherapy, Acupuncture, Naturopathy, Alexander technique, Psychotherapist	1 each	5
Have you ever asked your doctor about any type of complementary therapy?		
Yes	7	14
No	39	80
Missing	2	4
If yes, which ones?		
Acupuncture, Natural remedies, homeopathy	2 each	
Massage, Osteopathy	1 each	
Does your doctor practice any complementary therapy that you are aware of?		
Yes	4	8
No	37	76
Missing	8	16
If yes, could you list them?		
Natural therapies, acupuncture	2 each	
Do you feel reluctant to tell your doctor about your use of any complementary therapy?		
Yes	1	2
Somewhat	4	8
Not at all	40	82
Missing	4	8

Regulatory Standards for Complementary Therapies

The majority of GPs (85%, *n* = 63) responded "*yes*" to the question "*Do you think that there should be a regulatory standard for complementary therapies?*". The rest of the GPs were equally divided in responding "*no*" (8%, *n* = 6) or providing no response (7%, *n* = 5).

An open-ended question asked "What would be your major concerns if complementary therapies were to be integrated with mainstream medicine?". Of the 74 respondents, 52 (70%) indicated concerns. This data was analysed by creating a schedule of the comments,

and then extracting themes using a deductive approach. Comments could be categorised into more than one category. An independent rater also categorised the comments into the themes, and the agreement rate was high 88%. Figure 29 shows the results for the resulting eight themes. These included: (1) Therapies need to evidence-based/scientifically evaluated; (2) Lack of accountability, professional liability of complementary therapists; (3) Standards – how to maintain and assess and policing of adherence to; (4) Complementary therapists may not refer to conventional doctor and have inadequate skills to recognise medical urgency; (5) Government funding and increased cost; (6) Concerns for patients- confusion, cost; (7) Interaction/interference with mainstream treatments and therapies; and (8) Complementary therapies are nonsense.
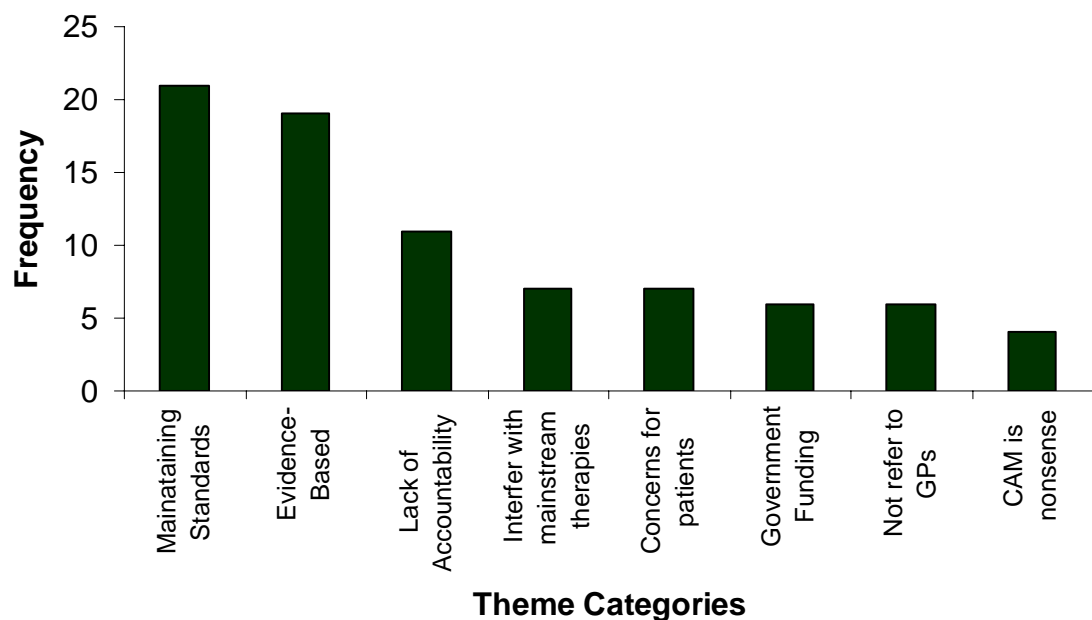
Figure 29. Frequencies of concerns about the integration of complementary therapies with mainstream medicine reported by GPs (*n* = 52).

GP and Patient Beliefs and Attitudes about Massage Therapy

Table 25 provides the means and standard deviations for the items assessing benefits, general knowledge, and usefulness of massage therapy. For these items a "don't know" response category was included to identify knowledge deficits. A table showing the frequency of GP responses for all of these items is in Appendix U. These questions were the same for both patients and GPs, with slight re-wordings as appropriate for each group (see Appendices S and T). ANOVA's revealed no differences between the GPs' and patients' responses for any of the items.

For patients, the items with the highest mean agreement ratings were: massage therapy is a useful treatment, massage reduces stress, and massage improves circulation. For GPs, the items with the highest mean agreement ratings were: GPs should ask patients about their use of complementary therapies whenever they obtain a medical history, massage reduces stress, and massage therapy is helpful for some of my patients' conditions/illnesses. Both GPs and patients did not agree that effects of massage are primarily due to a placebo effect, that massage can cause emotional distress, and that massage can cause physical harm. Both GPs and patients had a high frequency of "don't know" responses for the following items: Massage has not been sufficiently validated as a treatment, massage improves attention, and massage enhances immune function.

Table 25

GPs' and Patients' Knowledge and Perceived Usefulness of Massage Therapy

Variable	GPs	Patients	Frequency of "Don't Know" Response	
			GPs	Patients
Doctors should ask patients about their use of complementary therapies whenever they obtain a medical history.				
M	4.12	3.58	0	0
SD	1.04	1.05		
Massage therapy reduces stress.				
M	4.01	4.47	4	1
SD	0.81	0.75		
Massage therapy is helpful for some of my patients' conditions/illnesses.				
M	3.94	4.14	7	0
SD	1.05	1.05		
Massage therapy reduces anxiety.				
M	3.89	4.17	8	7
SD	0.87	0.85		
Massage therapy is a useful treatment.				
M	3.82	4.53	5	3
SD	0.95	0.63		
As a doctor I should have some knowledge of massage therapy.				
M	3.71	3.90	0	0
SD	0.92	1.02		
Massage therapy would be a useful adjunct to my practice.				
M	3.57	4.20	7	3
SD	1.20	0.76		
Massage therapy improves blood circulation.				
M	3.57	4.47	5	2
SD	1.15	0.80		
There is a place for MT in mainstream medicine.				
M	3.51	4.26	8	1
SD	1.13	0.80		
I would make more referrals for massage therapy if it was subsidised by the government.				
M	3.41	4.43	4	3
SD	1.47	0.78		
Massage therapy reduces depression.				
M	3.41	4.13	14	10
SD	0.99	0.86		
I would like to learn more about massage therapy.				
M	3.18	3.81	1	0
SD	1.14	1.10		
Massage therapy has not been sufficiently validated as a treatment.				
M	3.10	3.51	14	12
SD	1.17	1.17		
Massage therapy improves attention.				
M	3.02	3.97	26	15
SD	0.94	0.83		

Massage therapy should be included in health insurance packages.				
M	2.84	4.34	6	5
SD	1.44	0.81		
Massage therapy can cause physical harm.				
M	2.84	1.86	7	12
SD	1.26	0.94		
Massage therapy enhances immune function.				
M	2.71	3.92	30	24
SD	1.18	0.81		
Massage therapy can cause emotional distress.				
M	2.52	1.58	11	11
SD	1.23	0.94		
The effects of massage therapy are primarily due to a placebo effect.				
M	2.35	2.30	8	20
SD	1.02	1.30		

Note. Scale ratings were1 = *strongly disagree* and 5 = *strongly agree*. To calculate the means, the "don't know" response categories were excluded.

Patient Satisfaction with Massage

Patients who had received a massage (*n* = 38, 78% of the sample) were asked to answer some additional questions regarding their experience with massage. As shown in Table 26, these patients tended to be satisfied with the results from their massage, sometimes checked the therapists' qualifications, and, importantly, generally did not feel reluctant to tell their doctor about their use of massage therapy.

Table 26
Patient Satisfaction with Massage Therapy

Variable	*M*	*SD*
I am satisfied with the results of my massage.		
	4.42	0.94
When I have a massage I check the massage therapists qualifications.		
	3.18	1.44
I feel reluctant to tell my doctor about my use of massage therapy.		
	1.66	0.97

Note. Ratings were made on a 5-point scale where 1 = strongly agree and 5 = strongly disagree.

Correlations of GP Characteristics and Beliefs with Massage Therapy Referrals

Preliminary analyses assessed the correlations of all variables with GP recommendations for massage therapy in order to assess which GP characteristics and beliefs relate to recommendations for massage therapy and complementary therapies. Table 27 presents the variables that correlate significantly with GP recommendations for massage therapy. Recommendations to see a massage therapist was strongly correlated with whether the GP had received a massage themselves. It was moderately correlated with level of knowledge and awareness of training standards for massage therapy. Age was also positively correlated with recommendations to see a massage therapist, the belief that massage was a placebo effect, and negatively correlated with wanting to learn more about massage. As expected, years in practice positively correlated with the belief that massage was a placebo effect, and negatively correlated with making referrals if subsidised by the government, and wanting to learn more about massage therapy. There were no significant correlations of knowledge level with the beliefs regarding the potentially beneficial effects of massage therapy (i.e., reducing stress, depression, and anxiety, and enhancing blood circulation, attention, and immune function).

Gender Differences in GP Knowledge, Use, and Referral Behaviour

Chi-square analyses assessing gender differences in knowledge, use, and referral behaviour for massage therapy and complementary therapy revealed only one gender difference: Women (65%) were more likely than men (41%) to have ever received a massage (χ^2 (1, N = 68) = 3.99, $p < .05$). Independent samples t-tests assessing gender differences in beliefs and attitudes about massage therapy revealed no significant differences between men and women.

Correlations of GP Characteristics and Beliefs with Recommendations to Use a Complementary Therapy

A GP recommendation for patients to seek a complementary therapy was significantly correlated with the item "do many of your patients ask about complementary therapies". These two items were positively correlated with each other ($r = .36$, $p < .01$).

Correlations of Patients Characteristics with Use of Massage Therapy and Complementary Therapies

There were no significant correlation for patients' age, gender, and income with use of massage and use of any complementary medicine.

Table 27
Correlations for GP recommendations to see a Massage Therapist

Variable	1	2	3	4	5	6	7	8	9	10.
1.Age	--									
2.Years in practice	.94**	--								
3.Referral for MT	.30*	.30*	--							
4.Level of Knowledge	-.08	-.06	.32**	--						
5.Aware of training standards	.07	-.03	.30*	-.43**	--					
6.Ever received massage your self	.29*	.04	.39**	-.31*	.25*	--				
7.Recommend MT if subsidised by Govt	-.22	-.30**	.30*	-.00	.04	-.37**	--			
8.A place for MT in mainstream medicine	-.14	-.015	-.36**	-.14	-.19	-.10	.33*	--		
9.Like to learn more about MT	-.28*	-.28*	-.02	-.36**	.03	.06	.36**	.33**	--	
10.Effects due to placebo effect	.32**	.32**	.40**	-.32**	.32**	.27*	-.18	-.18	-.18	--

Note. $* p < .05$, $** p < .01$. [a] item was scored where 1 = *no*, 2 = yes, [b] item was scored where 1 = *strongly disagree* and 5 = *strongly agree*, [c] higher value indicate more knowledge, MT = Massage Therapy.

CHAPTER 15
STUDY 3: DISCUSSION

Information regarding GPs' and patients' beliefs, use, and referral behaviour for massage therapy is scarce. This study is the first in New Zealand to directly assess both GPs' and patients' knowledge and behaviour regarding massage therapy in the same geographic location and the findings provide some preliminary information about Auckland area GPs' and patients' views of massage therapy as well as CAM use in general.

GP Referral for Massage Therapy and CAM

These exploratory findings indicate that massage therapy is widely used in the Auckland region by patients, and through GP recommendations. Approximately three-quarters of GPs reported that the demand for massage has increased over the last five years; 74% of the GPs had recommended that a patient see a massage therapist, and a conservative estimate indicates that at least 28% of GPs in the region have done so. These recommendation rates are comparable to those found in Canada, with 71% of GPs in Canada having referred patients to see a massage therapist (Verhoef & Page, 1998). The majority of GPs in the present sample (69%) perceive massage to be helpful for some of their patients' conditions, which is higher than the proportion of GPs in Canada (50%) who report these perceptions (Verhoef & Page, 1998).

Conditions and illnesses, for which massage therapy was recommended by GPs in the present sample included musculoskeletal problems, stress, pain, and relaxation. The questionnaire was not specific about the condition referred for and GPs often did not expand further on the types of musculoskeletal problems for which they recommended massage therapy. Similarly with pain, GPs may have included headaches under the pain domain, but specific conditions were not named. In the Canadian survey (Verhoef & Page, 1998) headaches, chronic pain, and motor vehicle accidents were the most common reasons for referral to a massage therapist. The current findings suggest that GPs are referring massage therapy for only a limited set of conditions and may require education regarding the wider variety of conditions for which massage may be beneficial.

GPs in the current study generally felt that it is important to ask patients about their use of CAM when obtaining a medical history. Unfortunately, the current study did not include an item asking patients whether their doctors asked about their use of complementary therapies. In a survey in Wanganui, New Zealand, the majority of GPs thought that less

than half of their patients were using alternative remedies when 67% of the patients reported using a complementary therapy at some time (Conner et al., 1999). This has some important implications for doctor-patient communication, where the patients may not disclose their use of CAM unless asked by their GP. GPs may have to make it a question regularly asked in consultations (Eisenberg et al., 1998).

Patient and GP Use of Massage Therapy

The use of massage therapy reported by patient respondents (78% overall; 61% in past year) is high in relation to usage rates observed in a 2003 US sample (32% overall, 21% in past year (American Massage Therapy Association, 2003). The most common reasons patients used massage therapy included relaxation, tension or stress and sprains/strains. Interestingly 47% of GPs reported having had a massage themselves, which is still higher than the percentage reported by the US general public (American Massage Therapy Association, 2003). In general, patients and GPs in the Auckland region appear to have a relatively high use of massage therapy. Given the exploratory nature of this study, however, further research with a larger sample is needed to verify this trend. A New Zealand-wide study would also allow for comparisons between urban and rural areas.

The majority of the patients who reported having received a massage from a trained therapist were satisfied with the results from their massage and thought it was helpful for their condition/illness. Importantly and contrary to expectations, they did not feel reluctant to tell their doctor about their use of massage therapy or CAM. This general tendency is comparable to that found in a recent Wanganui study of medical practice patients (Taylor, 2003), and findings from both studies contrast with international findings indicating high reluctance (Eisenberg et al., 1998). However, only a small percentage of the present sample had asked their GP about CAM therapies. It is important that patients tell their doctors about their use of CAM, as its popularity continues to grow and more evidence comes to light that some therapies can interfere with mainstream medical practices (Weiger et al., 2002). The similar findings between Auckland and Wanganui are encouraging in suggesting that people feel comfortable talking to their GPs about CAM, which is reflected by the large number of GPs who reported that their patients ask about CAM. Further investigation is required as to whether patients are actually telling their GPs about CAM use or are just stating that they feel comfortable, but are not actually disclosing their CAM use to their GPs.

The patients' age, gender, and income levels did not relate to the use of either massage therapy or CAM in general. Although it was predicted that more female patients would use massage therapy and CAM, these comparisons were not possible due to the small numbers of males who completed the questionnaire. Other research findings indicate that more woman than men use massage and complementary therapies (American Massage Therapy Association, 2003; Eisenberg et al., 1998). The absence of demographic predictors of massage and CAM use in the present study contrasts with the evidence that female gender, income and education are associated with higher use of CAM reported in USA surveys. This however, could be due to the small sample size in the current study, or due to cultural differences, and differences in health care systems between the USA and New Zealand. The majority of people in the USA hold health insurance, and some health insurance companies may be reimbursing for CAM, particularly acupuncture, chiropractic, and relaxation therapies (Eisenberg et al., 1998).

GP and Patient Knowledge of Massage Therapy

One of the main aims of the study was to ascertain how much information GPs and patients have about massage therapy. It was hypothesised that general practitioners would have some knowledge about massage therapy but would like to learn more. The evidence supports this hypothesis. These reports contrast with those obtained in a 1998 survey of family physicians in Canada, in which most physicians reported minimal to no knowledge about massage therapy (Verhoef & Page, 1998). This difference may be due to differences in cultural awareness of massage therapy or to increased knowledge about massage therapy internationally over recent years. Interestingly, no significant differences in knowledge were found between GPs and patients. Both GPs and patients reported wanting to learn more about massage therapy. GPs reported higher awareness of the beneficial effects of massage on stress, anxiety, and blood circulation than about the effects of massage on depression, attention, and immune function. However, contrary to predictions, higher levels of knowledge about massage therapy were not associated with having more favourable views about the effects of massage therapy, suggesting that GPs' knowledge is not based on research findings on the therapeutic effects of massage therapy but on other sources of information, such as personal experience with massage therapy or reports from patients. A "don't know" response category was included for the items relating to the effects of massage to help gauge where education may be required. The items with high "don't know" response frequencies included "massage enhances immune function", "massage therapy has not been sufficiently validated as a treatment", "massage reduces

depression" and "massage improves attention". GPs may need to be educated or brought up to date with advances in CAM, in order to provide optimal care for their patients. An information package summarizing research findings on the therapeutic effects of massage therapy could be one way of increasing sound knowledge about massage therapy, given that there are research findings supporting massage effects for depression, attention and more recently immune function (Field, 1998). In addition, this provision of information could also improve the perceived credibility of massage therapy. GPs could also feel more assured in advising patients on the types of conditions for which massage therapy has shown to be effective, as their advice would be backed by research findings.

There were some similarities in findings from the Canadian study (Verhoef & Page, 1998) and the present study. Approximately, three quarters of the doctors in both studies thought they should have some knowledge of massage therapy (73% Canada; 80% New Zealand) and very few agreed that the effects of massage therapy were due to a placebo effect (12% Canada, 8% New Zealand). Slightly more New Zealand doctors (60%) than Canadian doctors (50%) believed massage therapy to be a useful treatment, and the majority of both Canadian doctors (72%) and New Zealand doctors (62%) were unaware of the education standards for massage therapy. New Zealand has one of the highest education standards in the world for massage training and GPs in New Zealand should be referring to qualified therapists.

Complementary Therapies

The current study found that 75% (28% by the conservative estimate) of GPs had recommended that a patient seek a complementary therapy, which is comparable to previous New Zealand survey findings of 69% of GP respondents recommending CAM in Wellington (Hadley, 1988), 77% in Auckland (Marshall et al., 1990) and, more recently, 92% in Wanganui (Taylor, 2003). The most common therapies recommended by GPs in the current study were acupuncture, homeopathy, massage, osteopathy, and naturopathy, which are very similar to the therapies recommended in Marshall (1990). The most common reasons for referral in the current study are musculoskeletal disorders and pain, which are similar to a previous study (Marshall et al., 1990).

A number of GPs (23%) practiced a form of complementary therapy including acupressure, homeopathy, and soft tissue massage. This percentage is similar to those found in the previous two New Zealand studies, in which the percentages of GPs practicing

a form of CAM were 27% for Wellington (Hadley, 1988) and 30% for Auckland (Marshall et al., 1990).

GP Characteristics and Beliefs Associated with CAM Use

A further aim of the study was to investigate whether characteristics and beliefs of GPs were associated with the propensity to make referrals for massage therapy and CAM. Younger age, greater level of knowledge, awareness of massage therapist training, having received a massage themselves, and a number of favourable beliefs (e.g., massage is not a placebo effect, massage would be useful adjunct to GP practice, and there is place for massage in mainstream medicine) were associated with a greater propensity to make referrals to a massage therapist. In addition, younger doctors were more likely than older doctors to refer to a massage therapist, think that the effects of massage were not a placebo effect, and want to learn more about massage therapy. These findings are consistent with those of a previous study in which younger doctors were more optimistic than older doctors about complementary therapies (Ernst et al., 1995). Younger doctors may have had more exposure to research in the area and as suggested in the present findings, more personal experience with massage therapy and other CAM therapies. These findings suggest acceptance and referrals for massage therapy and CAM should continue to grow in the future.

In terms of referrals for CAM in general, previous research findings revealed that younger doctors are more likely than older doctors to refer to complementary therapies (Marshall et al., 1990; Verhoef & Sutherland, 1995). In the current study, however, age was not associated with CAM referrals nor were any other GP characteristics predictive of referrals to CAM. Given that previous research regarding gender and referral to complementary medicine has found no significant associations, it is not surprising that the current study did not find any associations either. Age rather than gender appears to be related to recommendations to use massage therapy, but not other complementary therapies, which may relate to the GPs personal experience with massage.

Regulatory Standards

The majority of GPs felt that there should be regulatory standards for complementary therapies. The major concerns about integrating CAM into mainstream medicine included the need to maintain, assess, and adhere to regulation standards. The other major concern was that therapies need to have been tested using the same rigorous standards used for

mainstream therapies. In terms of massage therapy, the majority of patients agreed that massage could become part of mainstream medicine and be a useful addition to their GPs practice, while only half of the GPs felt this to be the case. This relative hesitancy by GPs may relate to the current absence of regulatory standards for massage therapy in New Zealand. Regulating CAM is problematic due to the wide array of therapies that are included under that umbrella, yet regulation is clearly needed given these and other findings that many therapies are being recommended by GPs and used by patients. It is important for a CAM regulatory body (Ministerial Advisory Committee on Complementary and Alternative Health, 2003) to investigate education standards and current research evidence for each of the commonly used and referred therapies and then develop informational materials for GPs and patients. Survey research, such as the present survey, can assist in providing information regarding which therapies are being used by patients and recommended by GPs and therefore help to guide which regulatory standards should be given first priority for development.

Conclusions

The present survey findings point to a number of issues requiring further investigation, including: 1) The identification of social and health care factors responsible for the high rates of massage use in the Auckland region relative to the United States (American Massage Therapy Association, 2003); 2) The need to establish rates of CAM use disclosure by patients to their GPs and whether GPs ask about their CAM use when obtaining a medical history; 3) The need to determine what information GPs require in order to feel confident in their recommendations for or against a CAM treatment for their patients; 4) The need to identify what information do patients require in order to feel confident about their use of a particular therapy; 5) Whether referral and use rates are similar in other geographic locations throughout New Zealand, and whether urban and non-urban areas differ in their use of CAM; and 6) What regulatory standards need to be established in New Zealand for CAM. Regulatory standards would give more information to both GPs and patients regarding efficacy and safety of specific CAM therapies.

This study highlights the growing need for information regarding the efficacy of massage therapy for specific conditions, and the importance of making such information accessible to both GPs and patients. There is a need for regulatory standards to be established in New Zealand for CAM and MACCAH are attempting to address this issue. Interestingly GPs felt that it was very important to obtain information about a person's use of CAM when

obtaining a medical history, and future research should assess whether GPs are actually asking patients for this information.

There are a number of limitations with this study. Firstly, the study was sent out only to GPs in the North Health region, and this sample may not be representative of GPs in New Zealand. Secondly, it was an anonymous questionnaire with a moderate response rate, although the 44% response rate is comparable to that of other studies (Himmel et al., 1993; Verhoef & Sutherland, 1995). Thirdly, a response bias may have occurred where those GPs have an interest in CAM are more likely to have participated, although the conservative estimate was used in an attempt to account for non-responses. Fourthly, the sample size of patients was small, and a larger study is warranted. Finally, conditions and illnesses for which GPs recommend massage and CAM were not specific which in, some cases, made comparisons with past research difficult.

In sum, this exploratory study highlights the growing need for information regarding the efficacy of massage therapy for specific conditions, and the importance of making such information accessible to both GPs and patients. In addition, there is a need to establish regulatory standards in New Zealand for CAM. Regulatory standards would give more information to both health professionals and consumers regarding efficacy and safety of certain therapies.

CHAPTER 16
FINAL DISCUSSION

Massage therapy can be considered as a discipline within the domain of CAM, and is the conscious manipulation of soft tissues for therapeutic benefit. Research on the effects of massage therapy has only begun to be explored more widely in the last 20 years, with some promising findings emerging. Previous research has shown that massage is helpful for many different aspects of physical as well as psychological health (Field, 1998; Moyer et al., 2004). However, there are a number of methodological issues with this research including: (1) No control or comparison group; (2) Small sample sizes; (3) Failure to include a self-report measure of stress; (4) Failure to include a measure of coping; (5) No post intervention follow-up has been included; (6) No attempts have been made to integrate a psychological model with any of the positive outcomes found for stress, anxiety, and depression, such as the CSM of self-regulation (Leventhal et al., 2003).

One of the main aims of this thesis was to develop and assess an integrative model (see Figure 3) of massage therapy effects on stress, coping, and physiological processes (autonomic nervous system activation, neuroendocrine responses, the musculoskeletal, sleep, immune system, and migraine theories) with Leventhal's CSM of self-regulation (Leventhal et al., 2003).

The first study provided support for this integrated model, where immediate effects from massage on heart rate and state anxiety, suggested a relaxation response, which flowed through to positive effects for perceived stress and coping efficacy, which were evident one-day after the final massage session, but not one-week later when the students were fully into final examination mode. These findings for stress and coping were exciting as these highlighted paths to the CSM of self-regulation. The immediate effects of massage on anxiety highlight that massage can be considered an emotional regulation strategy. These immediate changes in both psychological and physiological responses may lead to cognitive reappraisals of stressors, and thus changes in representations, where the coping efficacy is enhanced. Many of the open-ended comments from the evaluation questionnaire supported the theory that massage is promoting changes in cognitive appraisals. Importantly, this study highlighted that massage rather than watching television promoted relaxation and coping, and reductions in stress, despite the fact that people often report watching television as a way to relax and unwind. In conclusion, massage therapy appears to be inducing a relaxation response that is having the desired effect on stress and coping

processes, and hence, self-regulation. The promising and exciting findings from this first study, led to the development of the second study, which investigated the effects of massage therapy on migraines, which can be exacerbated by stress, and also a stressful disorder to manage.

Massage therapy reduced migraine frequency over the 6-week intervention period and this effect was still evident three weeks later. The massage group did not demonstrate reductions in perceived stress, but reported enhanced coping efficacy, which seems to have attenuated the effects of perceived stress, as it changed very little across time. In addition, the massage group showed improvements in health perceptions from baseline to follow-up, and these items reflect a person's control and understanding of his or her migraines. The massage group reported similar immediate pre-to post-session decreases for state anxiety and heart rate, and also exhibited decreases in cortisol. Again, suggesting that a relaxation response was induced, which again may be leading to cognitive reappraisals and hence enhanced coping efficacy. Interestingly, the massage group reported an increase in their quality of sleep but not quantity, and this effect was evident up to three weeks post intervention.

Many of the pathophysiological processes of migraine could potentially interact with the mechanisms proposed for massage therapy, such as vascular theory with the autonomic nervous system, neuroendocrine responses (serotonin, Substance P) with the hypersensitivity theory and serotonin implications for migraine, and sleep with Substance P. These physiological effects may translate into psychological changes and thus enhanced self-regulation. One further theory provides support for the integrated model, which is the migraine trigger threshold model (MacGregor, 1996), where an increased threshold results in fewer migraines. It appears that massage may play a role in raising the threshold, by enhancing coping efficacy, improving sleep quality, and enhancing the health perception aspect of quality of life. Increasing the threshold relates to enhanced internal factors, such as coping and relaxation abilities. Thus, the second study provided support for the integrative model, and by investigating potential links between massage mechanisms with migraine processes, the associations between these interactions with emotional and cognitive regulation can be explored further in future research.

The above studies add to previous massage research by beginning to address many of the methodological and theoretical issues. Firstly, the inclusion of follow-up periods in these studies adds considerable knowledge to the area, and there are some promising findings for

massage for migraines, where effects are lasting up to three weeks after the intervention. Future research needs to extend these follow-up time periods to try and establish the duration of the effects, which of course will also provide invaluable information for the cost-effectiveness of massage therapy as a treatment for migraines. Secondly, including control and comparison conditions is important, as some previous research had failed to do so, and those that had, needed replication. Thirdly, these studies included measures of stress and coping, which has helped to elucidate the effects of massage on the stress and coping process. Lastly, this study was one of the first to include a psychological model to start to investigate some of the psychological processes effected by massage, and by using an integrative model, could initiate theoretical links between physiological and psychological processes, thus highlighting mind-body links, which is one of the common themes of CAM.

As massage is considered a complementary therapy, and given the positive findings for stress, coping, and migraines in the first two studies of this thesis, it was important to investigate GPs and patient's attitudes, beliefs, and use of massage therapy and other complementary therapies. Nearly three-quarters of the GP respondent's in the Auckland area had recommended that a patient see a massage therapist, commonly for musculoskeletal problems, stress, pain, and relaxation. Even taking a conservative estimate, over a quarter of GPs would have recommended that a patient see a massage therapist in the previous year. These recommendation rates were quite high considering that the GPs reported only limited knowledge about massage therapy, in terms of positive effects and training standards of therapists. The majority of patients reported having had a massage and felt that it was helpful for their condition, and importantly did not feel reluctant to tell their doctor about their use of massage therapy or other CAM. This survey highlighted the need for a national survey on this topic and more investigation into whether patients are actually disclosing their use of CAM to their GPs and other health professionals.

Conclusion

Massage therapy is beneficial for tertiary students building up to final examinations in promoting relaxation and enhancing stress and coping processes. Massage therapy is also beneficial for people who suffer from migraines, as shown by the reduction in migraine frequency, enhanced coping efficacy, sleep quality, and promotion of a relaxation response. GPs are recommending that patients see massage therapists for musculoskeletal,

stress, and pain conditions and patients report satisfaction with their massage treatment in helping with illnesses and conditions.

Future Directions

Considerably more research is needed in the field of massage therapy. In regards to students, future research may include more massage sessions throughout highly stressful periods, such as examinations. In addition, research investigating immune markers and physical illness in this population is needed. In regards to migraine sufferers, future research should include longer periods of follow-up to determine the enduring effects of massage. Research might also consider investigating further the possible interactions between migraine processes and massage mechanisms. Also, including a comparison group with an individualised approach for massage would be beneficial. Variables that address cost-effectiveness, such as health care visits and days of work missed; need to be included in future research. Replication of the three studies is essential, especially by including the CSM of self-regulation to help explain the psychological effects that are experienced after massage. A national survey of GPs' and patients' attitudes, beliefs, and use of massage therapy and CAM would help to guide education needs of health professionals and patients. This information would be useful in developing national policy regarding CAM.

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APPENDICES

Demographics for Study 1

BACKGROUND INFORMATION

AGE:_____

GENDER: ____MALE ____FEMALE

Please select any name or term that can serve as a codename for you on the questionnaires for this study. It can be any term you like (e.g., "Bart", "Paris", or "Aardvark") but please use a term that is meaningful to you so that you will be able to remember it for the duration of the study.

CODENAME:_____
(NOTE: All of your responses will be identified by this codename rather than by your name. From this point on, only your codename will be used in conjunction with your responses so that your responses remain completely confidential).

YEAR IN UNIVERSITY:_____

WITH WHICH ETHNIC GROUP DO YOU MOST IDENTIFY:

    ____New Zealand/European   ____Maori

    ____Pacific Island   ____Asian

    ____Other (please specify)_____

Do you currently set aside time for relaxation: ____YES ____NO

Please indicate if you regularly do any of the following activities for relaxation?

____ Aerobic Exercise   ____ Yoga

____ Meditation   ____ Watch Television

____ Have a Massage   ____ Walking

____ Listen to music   ____ Read for relaxation

____Other (Please specify)_____

    _____

Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last week. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try and count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:

0 = never
1 = almost never
2 = sometimes
3 = fairly often
4 = very often

1. In the last week, how often have you been upset because of something that happened unexpectedly?

2. In the last week, how often have you felt that you were unable to control the important things in your life?

3. In the last week, how often have you felt nervous and stressed?

4. In the last week, how often have you dealt with irritating life hassles?

In the last week, how often have you have you felt that you were effectively coping with important changes that were occurring in your life?

In the last week, how often have you felt confident about your ability to handle your personal problems?

In the last week, how often have you felt things were going your way?

8. In the last week, how often have you found that you could not cope with all the things you had to do?

9. In the last week, how often have you been able to control irritations in your life?

10. In the last week, how often have you felt that you were on top of things?

11. In the last week, how often have you been angered because of things that happened that were outside of your control?

12. In the last week, how often have you found yourself thinking about things that you have to accomplish?

13. In the last week, how often have you been able to control the way you spend your time?

14. In the last week, how often have you felt difficulties were piling up so high that you could not overcome them?

Coping Efficacy

Please use the following scale to rate the extent to which each of the following items describes how you have been feeling <u>TODAY</u>. Write the most appropriate scale number on the blank next to the item.

0	1	2	3	4
Not at all				Extremely

1. I feel good about the way I am handling my problems and challenges.

2. I feel overwhelmed by problems.

3. I am enjoying my life.

4. I feel stressed by problems and responsibilities.

5. I worry about problems, challenges and responsibilities.

6. I am coping well with problems and challenges facing me.

7. My life is going well.

Appendix D

Fatigue Scale

Please use the following scale to rate the extent to which of the following items describes how you are feeling at the moment. Write the most appropriate scale number on the blank next to them.

0	1	2	3	4
Not at All				Extremely

1. I feel very tired
2. I feel very energetic
3. I feel lively
4. I feel worn out
5. I feel lethargic
6. I feel vigorous
7. I feel exhausted

State Anxiety (STAI) Scale – Short Form

Please use the following scale to rate the extent to which of the following items describes how you are feeling at the moment. Write the most appropriate scale number on the blank next to them.

0	1	2	3	4
Not at All				Extremely

1. I feel content
2. I feel calm
3. I am worried
4. I am tense
5. I am relaxed
6. I feel upset

Appendix F

Evaluation Questionnaire for Study 1

Please use the scale below to rate your responses to each of the following questions. Please write the appropriate scale number in the blank next to each question:

1   2   3   4   5   6   7

Not at all   A great deal

TO WHAT EXTENT………

_____ 1. ….have these sessions helped you to relax and feel less stressed?

_____ 2. …do you think that this technique is an effective way for people to manage
           their stress levels?

_____ 3. …have these sessions helped you to deal effectively with your problems and
           challenges?

_____ 4. … was participation a valuable and meaningful experience for you?

_____ 5. …do you feel that you have more control over the challenges and problems
           facing you after participating in these sessions?

_____ 6. …do you think it is important to take time out to relax?

_____ 7. …do you think you will continue to use this technique in times of stress?

_____ 8. …did you enjoy participating in the sessions?

Any Further Comments:

Participant Information Sheet- Study 1

PARTICIPANT INFORMATION SHEET

EVALUATION STUDY OF HEALTH MASSAGE THERAPY AND TELEVISION WATCHING ACTIVITY AS TECHNIQUES FOR COPING WITH STRESS

My name is Sheleigh Lawler, and I am a Ph.D. student in the Department of Psychology at The University of Auckland. I am conducting research on stress and relaxation techniques because I am interested in the ways people choose to relax in response to stress and in developing ways to help people deal with stress. You are invited to be a part of an evaluation study comparing the ways in which people cope with stress around exam time. I would appreciate your assistance in the project.

If you agree to be part of the study, you will be randomly assigned to receive one of three conditions. Each of these conditions involves either receiving a back neck and arm massage or watching a television programme or just completing 3 questionnaires and two short sessions over a 6-week period. The massage and television activities will involve participating in three sessions, each of which would last no more than one hour. The third group will involve two ten-minute sessions in the first and third week. You will be asked to complete a short questionnaire concerning your mood before and after each session. Also your heart rate, blood pressure and skin temperature will be taken. In the consent form you will note that there are two sections, one giving consent to participate in the study and the other giving consent to accessing your grades. The reason for this is that I am interested in whether the ways people cope with stress relates to performance during examination time.

If you decide to participate in this study, you will complete an initial questionnaire, after which you will be contacted by a researcher and scheduled for the 3 weekly sessions. You will be asked to complete a follow-up questionnaire one week after the sessions have finished and again two weeks later. You are under no obligation to answer all of the questions in the questionnaires or complete any of the activities during the sessions.

All of the information obtained from this study will be confidential and available only to the researchers. No information which could personally identify you will be used in any reports on this study. The questionnaires will be identified with a codename that you choose and will be stored in locked files. Research information will be destroyed after 8 years. A summary of the findings of the research will be given to you.

Participation in the study is purely voluntary. You are under no obligation to participate and you are free to withdraw at any time. If you have any queries or concerns about your right as a participant in this study, please contact me at 373-7599 ext. 6868. You may also contact my supervisor Dr. Linda Cameron, Department of Psychology at 373-7599 ext. 6869 or else you can contact Professor Glynn Owens, Head of the Department, at 373-7599 ext. 6806. We are all at the following address:
Department of Psychology at Tamaki Campus, Division of Science and Technology
The University of Auckland, Private Bag 92019, Auckland.
For any queries regarding ethical concerns please contact:
Chair of The University of Auckland Human Subjects Ethics Committee The University of Auckland, Financial Registry, Private Bag 92019, Auckland, ph: 373-7599 ext. 8939

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN SUBJECTS ETHICS COMMITTEE on 06 December 2000 for a period of 3 years, from 01/February/2001. Reference 2000/281.

Appendix H
Consent Form- Study 1

<u>CONSENT TO PARTICIPATE IN RESEARCH PROJECT</u>

THE CONSENT FORM WILL BE HELD FOR A PERIOD OF EIGHT YEARS

Title of project: Evaluation Study Of Health Massage Therapy And Television Watching Activity As Techniques For Coping With Stress

Researcher: Sheleigh P. Lawler, MSc.

I have been given and have understood an explanation of this research project. I have had an opportunity to ask questions and to have them answered. I understand that I may withdraw myself or any information traceable to me at any time during the study period and up until the 1 November 2001 without giving a reason. I understand that my participation is confidential and that no material that could identify me will be used in any reports on the study.

I consent to take part as a participant in this research.

Signed: _____

Name: _____
(Please print clearly)

Date: _____

Appendix I

1988 International Headache Society Classification Criteria for Migraine

Migraine without aura

Diagnostic Criteria

    A. At least 5 attacks fulfilling B-D

    B. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)

    C. Headache has at least two of the following characteristics:

- Unilateral location

- Pulsating Quality

- Moderate or severe intensity (inhibits or prohibits daily activities)

- Aggravation by walking stairs or similar routine activity

    D. During headache attack at least one of the following:

- Nausea and/or vomiting

- Photophobia and phonophobia

Migraine with aura

A. At least 2 attacks fulfilling B.

B. At least 3 of the following 4 characteristics:

1. One or more fully reversible aura symptoms indicating focal cerebral cortical – and/or brain stem dysfunction

2. At least one aura symptom develops gradually over more than 4 minutes or, 2 or more symptoms occur in succession.

5. No aura symptom lasts more than 60 minutes. If more than one aura symptom is present, accepted duration is proportionally increased.

6. Headache follows aura with a free interval of less than 60 minutes. (it may also begin simultaneously with the aura).

Appendix J

Common Migraine Triggers Questionnaire

The following questions relate to some commonly identified triggers for migraine attacks. Please rate the extent to which you experience a migraine during or after the following triggers.

For each question choose from the following alternatives:

0 = never
1 = almost never
2 = sometimes
3 = fairly often
4 = very often

<u>Physical Stress</u>

Over-exertion/overtiredness (both physical and mental)

Change in sleep pattern; e.g., shift work, a lie-in at the weekend

Changes of routine such as a new job, going on holiday

Muscle tension especially in neck and/or shoulders

<u>Emotional Stress</u>

Worry

Excitement

Anger

Depression, often after a stressful experience

The end of a busy or stressful time, when you are looking forward to relaxing or resting.

<u>Diet/food</u>

Alcohol

Certain foods, such as chocolate, cheese, citrus fruit, fried food

Long gaps between meals, insufficient food, fasting or dieting

<u>Environmental</u>

Bright light

Flickering or flashing lights

Intense or penetrating smells

Change of climate or weather

Appendix K

Demographics for Study 2

BACKGROUND INFORMATION

NAME:_____

PHONE NUMBER:_____

AGE:_____

GENDER: ☐ MALE ☐ FEMALE

Please select any name or term that can serve as a codename for you on the questionnaires for this study. It can be any term you like (eg, "Bart", "Paris", or "Aardvark") but please use a term that is meaningful to you so that you will be able to remember it for the duration of the study.

CODENAME:_____
(NOTE: All of your responses will be identified by this codename rather than by your name. From this point on, only your codename will be used in conjunction with your responses so that your responses remain completely confidential).

WITH WHICH ETHNIC GROUP DO YOU MOST IDENTIFY:

        ☐ New Zealand/European   ☐ Maori

        ☐ Pacific Island   ☐ Asian

        ☐ Indian   ☐ Other (please

    specify)_____

What is your marital status?

    ☐ Married   ☐ Single   ☐ Defacto   ☐ Divorced   ☐ Widowed   ☐

Separated

Do you currently set aside time for relaxation: ☐ YES ☐ NO

Please indicate if you regularly do any of the following activities for relaxation?

☐ Aerobic Exercise   ☐ Yoga

☐ Meditation   ☐ Watch Television

☐ Have a Massage   ☐ Walking

☐ Listen to music   ☐ Read for relaxation

☐ Other (Please specify)_____

Appendix L

Headache History Questionnaire

Using the following scale numbers, please indicate the extent to which you experience the following problems by writing the appropriate scale number on the blank next to the problem.

1 = Never	6 = about 2-4 times a month
2 = once a year or less	7 = about once a week
3 = 2-5 times a year	8 = about twice a week
4 = 6-11 times a year	9 = about 3-6 times a week
5 = about once a month	10 = almost every day

To what extent do you experience….
_____ Migraine Headaches
_____ Headaches other than migraines

Place a tick next to any of the statements, which apply to you.

_____ My headache usually begins on one side of my head only.

_____ My headache is usually accompanied by nausea and vomiting.

_____ One or more of my first degree relatives have been diagnosed as having migraine headaches.

_____ I have been diagnosed as having migraine or vascular headaches.

_____ My headache is usually preceded by (1) visual changes such as seeing lights, lines, stars or having blind spots; or (2) abnormal sensations such as prickling of hands or feet on one side; or (3) transient muscle weakness on one side; or (4) noticeable speech difficulty.

_____ My headache is usually accompanied by a sensitivity to light.

How old were you when you had your first migraine attack? _____

How do you feel between attacks? _____

Appendix M

Quality of Life Questionnaire

The following questions concern your health <u>during a typical migraine attack</u> <u>over the last 6 weeks</u>. Please answer every question by ticking the appropriate line.

0 = no
1 = yes, but it did not bother me
2 = yes, and it bothered me a little
3 = yes, and it bothered me a moderate amount
4 = yes, and it bothered me a great deal

	0	**1**	**2**	**3**	**4**
1. Nausea	___	___	___	___	___
2. Vomiting	___	___	___	___	___
3. Coldness	___	___	___	___	___
4. Sensitivity to light	___	___	___	___	___
5. Sleepiness	___	___	___	___	___
6. Asthenia (lack or loss of bodily strength)	___	___	___	___	___
7. Lack of energy	___	___	___	___	___
8. Lack of concentration	___	___	___	___	___
9. Loss of appetite	___	___	___	___	___
10.Dizziness	___	___	___	___	___

	0	**1**	**2**	**3**	**4**
11. Did you have difficulty bending down?	___	___	___	___	___
12. Did you have to lie down?	___	___	___	___	___
13. Did you find it difficult to carry on with your normal activities?	___	___	___	___	___
14. Did it interfere with your work at home or in your job?	___	___	___	___	___
15. Did it interfere with your hobbies?	___	___	___	___	___
16. Did you want to avoid others?	___	___	___	___	___
17. Did it interfere with your social life?	___	___	___	___	___
18. Did you feel irritable?	___	___	___	___	___
19. Did you feel a burden to others?	___	___	___	___	___
20. Did you feel fed up?	___	___	___	___	___

21. Did you feel frustrated? ___ ___ ___ ___ ___

22. Did you feel others let you down? ___ ___ ___ ___ ___

23.Did you feel anxious? ___ ___ ___ ___ ___

The following questions are concerned with how being a migraine sufferer bothers you <u>in between attacks over the last 6 weeks</u>. Please answer by ticking the appropriate space.

0 = no
1 = yes, but it did not bother me
2 = yes, and it bothered me a little
3 = YES, AND IT BOTHERED ME A MODERATE AMOUNT

4 = yes, and it bothered me a great deal

	0	**1**	**2**	**3**	**4**
1. Have you worried coming up to an event that you might have a migraine attack?	___	___	___	___	___
2. Have you taken into account suffering from migraine when thinking about job or career decisions?	___	___	___	___	___
3. Have you tried to prevent pressure building up at home or at work?	___	___	___	___	___
4. Have you taken into account suffering from migraine when planning your social life?	___	___	___	___	___
5. Have you avoided smokey places?	___	___	___	___	___
6. Have you avoided noisy places?	___	___	___	___	___
7. Did you avoid the sun?	___	___	___	___	___
8. Have you avoided other activities?	___	___	___	___	___
9. Have you been feeling fed up?	___	___	___	___	___
10. Have you been feeling afraid of letting others down?	___	___	___	___	___
11. Have you been feeling that you are a burden?	___	___	___	___	___
12. Have you been feeling frustrated? ___		___	___	___	___
13. Have you been feeling irritable?	___	___	___	___	___

14. Migraine is often or always on my mind?   ___   ___   ___   ___
     ___

15. I'm afraid my migraine attacks will get worse.   ___   ___   ___   ___   ___

16. I feel cheated out of time.   ___   ___   ___   ___   ___

17. I feel I'm not in control.   ___   ___   ___   ___   ___

18. I feel guilty.   ___   ___   ___   ___   ___

19. I feel others do not understand my migraines.   ___   ___   ___   ___   ___

20.. I worry about others worrying about me.   ___   ___   ___   ___   ___

21. Interfered with how you got on with members
 of your family?   ___   ___   ___   ___   ___

22.Interfered with how you got on with friends
 or colleagues at work?   ___   ___   ___   ___   ___

23. Interfered with your physical relationship?   ___   ___   ___   ___

Appendix N

Daily Diary Questions for Migraine and other Headache

(Please indicate whether you are filling out this diary for a migraine or some other type of headache). _____Migraine   _____Other type of headache

HEADACHES
Using the following scale rate the intensity of your migraine/headache activity at breakfast, lunch, dinner and bedtime; also record the approximate time you make the rating.

<u>0   1   2   3   4   5</u>
No headache   Intense, incapacitating headache

Date: _____

Breakfast: Time of rating _____ Intensity of headache _____
Lunch: Time of rating _____ Intensity of headache _____
Dinner: Time of rating _____ Intensity of headache _____
Bedtime: Time of rating _____ Intensity of headache _____

MEDICATION
Please list any medication(s) and the quantity of that medication(s), that you my have taken during the day to reduce headache pain.

        Treatment taken _____
        Dose_____
        Times Taken _____
                    _____
                    _____

SLEEP
How many hours did you sleep last night? _____

How would you rate the quality of your sleep? (Please circle)
            1   2   3   4   5
        Very poor   very good

Appendix O

Evaluation Questionnaire for Study 2

Please use the scale below to rate your responses to each of the following questions. Please write the appropriate scale number in the blank next to each question:

1   2   3   4   5   6   7

Not at all   A great deal

TO WHAT EXTENT………

____ 1. ….have these sessions helped you to relax and feel less stressed?

____ 2. …do you think that this technique is an effective way for people to manage
their migraines?

____ 3. …have these sessions helped you to deal effectively with your problems and
challenges?

____ 4. …have these sessions helped alleviate your migraines?

____ 5. …was participation a valuable and meaningful experience for you?

____ 6. …do you feel that you have more control over the challenges and problems
facing you after participating in these sessions?

____ 7. …do you think you will continue to use this technique to help control your
migraines?

____ 8. …did you enjoy participating in the sessions?

____ 9. …were you satisfied with the massage sessions?

Any Further Comments:

Participant Information Sheet – Study 2

PARTICIPANT INFORMATION SHEET

AN EVALUATION STUDY COMPARING MASSAGE THERAPY WITH A
HEADACHE DAILY DIARY AS TECHNIQUES FOR ALLEVIATING MIGRAINE
HEADACHES.

My name is Sheleigh Lawler, and I am a Ph.D. student in the Department of Psychology at
The University of Auckland. I am conducting research on relaxation techniques for coping
with migraine headaches. I am interested in how these techniques might help alleviate
migraine and associated symptoms. You are invited to be a part of an evaluation study
comparing the effectiveness of different techniques for coping with migraine headaches,
and I would appreciate your assistance in the project.

If you agree to be part of the study, you will be randomly assigned to receive one of two
conditions. These conditions involve either receiving a back, shoulder, neck and head massage, or
keeping a daily journal of your headaches, medication use and sleep patterns. You will also be
asked to complete 4 questionnaires about your migraines, physical symptoms, and general mood
over a 14-week period. The massage condition will involve participating in six sessions, each of
which will last no more than 45 minutes. Both groups will be required to do daily entries into a
journal about your headaches, medication use and sleep patterns. Measures of mood, heart rate,
finger temperature and headaches will be taken before and after the sessions. Participants in the
third condition will also be required to complete these measures at a designated time once a week.
The salivary cortisol sample will be taken before and after the first and last sessions. This involves
placing a cotton bud swab on your gum for 30 seconds. These swabs are sent to Germany for
testing and are placed in a biohazard bag and disposed of as medical waste after the testing is
completed.

If you decide to participate in this study, you will complete an initial questionnaire about your
headache history, after which you will be contacted by a researcher and scheduled for the 6 weekly
sessions for the massage group and the thermal biofeedback group. You will be asked to complete
a follow-up questionnaire one week after the sessions have finished and again one month later. You
are under no obligation to answer all of the questions in the questionnaires or complete any of the
activities during the sessions.

All of the information obtained from this study will be confidential and available only to the
researchers. No information which could personally identify you will be used in any reports on this
study. The questionnaires will be identified with a codename that you choose and will be stored in
locked files. Research information will be destroyed after 8 years. A summary of the findings of the
research will be given to you.

Participation in the study is purely voluntary. You are under no obligation to participate and you
are free to withdraw up until 1 November 2002, as this is when data analysis will begin. If you
have any queries or concerns about your right as a participant in this study, please contact me at
373-7599 ext. 6868. You may also contact my supervisor Dr. Linda Cameron, Department of
Psychology at 373-7599 ext. 6869 or else you can contact Professor Glynn Owens, Head of the
Department, at 373-7599 ext. 6806.

Department of Psychology at Tamaki Campus, Division of Science and Technology
The University of Auckland, Private Bag 92019, Auckland.

For any queries regarding ethical concerns please contact: The Chair, The University of Auckland Human Subjects Ethics Committee, The University of Auckland, Research Office- Office of the Vice Chancellor, Private Bag 92019, Auckland, ph: 373-7599 ext. 7830

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN SUBJECTS ETHICS COMMITTEE on 20 March 2002 for a period of 3 years, from 20/03/2002. Reference 2002/061.

Consent Form – Study 2

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

THE CONSENT FORM WILL BE HELD FOR A PERIOD OF EIGHT YEARS

Title of project: An evaluation study comparing massage therapy and a headache daily diary as techniques for alleviating migraine headaches.

Researcher: Sheleigh P. Lawler, MSc.

I have been given and have understood an explanation of this research project. I have had an opportunity to ask questions and to have them answered. I understand that I may withdraw myself or any information traceable to me at any time during the study period and up until the 1 November 2002 without giving a reason. I understand that my participation is confidential and that no material that could identify me will be used in any reports on the study.

I consent to take part as a participant in this research.

Signed: _____

Name: _____
(Please print clearly)

Date: _____

Appendix R

Participant Information Sheet – Study 3

PARTICIPANT INFORMATION SHEET

<u>Massage Therapy: Attitudes and use among General Practitioners and patients in Northern New Zealand.</u>

My name is Sheleigh Lawler, and I am a Ph.D student in the Department of Psychology at the University of Auckland. The purpose of this study is to investigate doctors' and patients' views of massage therapy.

The use and popularity of massage therapy in New Zealand has increased over the last decade. To date, however, little is known about how GPs and patients in New Zealand view massage therapy and the extent of their knowledge and use.

You are invited to participate in a survey of massage therapy attitudes and use among general practitioners and men and women attending private general practice clinics in the North Health Region. If you decide to participate in this study, the questionnaire will take you approximately 15 minutes to complete. Completion of the questionnaire is totally voluntary. You are under no obligation to answer all of the questions in the questionnaire.

The questionnaire is totally anonymous. All of the information obtained from this study will be confidential and available only to the researchers. The questionnaires will be stored in locked files and the research information will be destroyed after 6 years.

Thank you very much for your time and help in making this study possible. If you have any queries, please contact me at 373-7599 ext.6868. You may also contact my supervisor Dr. Linda Cameron, Department of Psychology at 373-7599 ext.6869 or else you can contact Professor Glynn Owens, Head of Department, at 373-7599 ext.6886. We are all at the following address:

Department of Psychology at Tamaki Campus, Division of Science and Technology
The University of Auckland, Private Bag 92019, Auckland.

For any queries regarding ethical concerns please contact:

The Chair, The University of Auckland Human Subjects Ethics Committee,

The University of Auckland, Research Office – Office of the Vice Chancellor, Private Bag 92019, Auckland. Tel. 373-7999 extn 7830

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN SUBJECTS ETHICS COMMITTEE on 13 June, 2001 for a period of 3 years, from 13/06/01
Reference 2001/Q / 021.

General Practitioner Questionnaire

Do you think that the use of massage therapy in New Zealand over the last 5 years has [1]:

    ____ increased
    ____ decreased
    ____ remained the same

Please rate on this scale what level of knowledge you have about massage therapy[1]:

    1   2   3   4   5
    poor   excellent

Have you ever recommended that a patient see a massage therapist?[2]

    ____ Yes   ____ No

If Yes, what for?

_____

How many people have you recommended see a massage therapist over the last year?[2]

(Please circle)
    0   1-10   11-25   26-50   51 or more

Have you ever discussed massage therapy as a treatment with a patient?[2]

    _____Yes   _____No

In conversations with your patients regarding massage therapy, patients tend to be:[2]

    ____ favourable
    ____ unfavourable
    ____ indifferent

Are you aware of what is involved in becoming a trained massage therapist?[1]

(i.e., educational standards, registration)
    _____Yes   _____No

Do you have any training in massage therapy?[1]

    _____Yes   _____No

Complementary therapies generally include treatments or practices that aim to provide therapeutic benefits and which are considered for use along with or in addition to mainstream medical treatments.

Do many of your patients ask you about complementary therapies?[3]

    ____ Yes   ____ No

    If Yes, which ones are most commonly asked about?

    _____

Do you practice any form of complementary medicine?[3]

    ____ Yes   ____ No

    If yes, which one's do you practice?

    _____

Do you think the demand for complementary medicine in New Zealand over the last five years has:[3]

    _____increased
    _____decreased
    _____remained unchanged

Have you ever recommended that a patient seek a complementary therapy?[3]

    ____ Yes   ____ No

    If Yes, which therapies do you most commonly recommend?

    _____

    And for what medical reasons would you make these recommendations?

    _____

How many people have you recommended try a complementary therapy over the last year?[3]

    0   1-10   11-25   26-50   51 or more

Do you think that there should be a regulatory standard for complementary therapies?[4]

    _____Yes   _____No

What would be your major concerns if complementary therapies were to be integrated with mainstream medicine?[4]

    _____

Please indicate to what extent you agree/disagree with the following statements by circling the number that best corresponds to your opinion. Please check the "don't know" box if you are unsure.

(Note: A placebo effect is where there is a beneficial effect of a treatment administered to a patient who believes it has therapeutic powers even though it has none.)

	Strongly Disagree				Strongly Agree	Don't Know
The effects of massage therapy are primarily due to a placebo effect.[5]	1	2	3	4	5	☐
Massage therapy has not been sufficiently validated as a treatment.[5]	1	2	3	4	5	☐
Massage therapy is helpful for some of my patients' conditions/illnesses.[5]	1	2	3	4	5	☐
There is a place for massage therapy in mainstream medicine.[5]	1	2	3	4	5	☐
I would make more referrals for massage therapy if it was subsidised by the government.[5]	1	2	3	4	5	☐
Massage therapy should be included in health insurance packages.[5]	1	2	3	4	5	☐
I would like to learn more about massage therapy[5].	1	2	3	4	5	☐
As a doctor I should have some knowledge of massage therapy.[5]	1	2	3	4	5	☐
Doctors should ask patients about their use of complementary therapies whenever they obtain a medical history.[5]	1	2	3	4	5	☐

Please indicate to what extent you agree/disagree with the following statements by circling the number that best corresponds to your opinion. Please check the "don't know" box if you are unsure.

Massage Therapy……	Strongly Disagree				Strongly Agree	Don't Know
..enhances immune function[5]	1	2	3	4	5	
..reduces anxiety[5]	1	2	3	4	5	
..reduces stress[5]	1	2	3	4	5	
..improves blood circulation[5]	1	2	3	4	5	
..improves attention[5]	1	2	3	4	5	
..is a useful treatment[5]	1	2	3	4	5	
..would be a useful adjunct to my practice[5]						
	1	2	3	4	5	
..can cause physical harm[5]	1	2	3	4	5	
..can cause emotional distress[5]	1	2	3	4	5	

Please complete the following details:

Age:_____

Gender: _____Male _____ Female

With which ethnic group do you most identify:

_____New Zealand European   _____Maori

_____Pacific Island   _____Asian

_____Indian   _____Other (please specify)_____

What year did you graduate medical school? _____

How many years have you been in practice? _____

Questions that relate to sections in the survey

[1]Knowledge and attitudes about training and demand for massage therapy (GPs)

[2] Referral and discussion behaviour with patients about massage therapy and GPs and patients use of massage therapy (GPs and patients)

[3] Knowledge, attitudes, and referral behaviour for complementary therapies (GPs and patients)

[4] Regulatory standards for complementary therapies (GPs)

[5] Beliefs and attitudes about massage therapy (GPs and patients)

[6] Satisfaction with massage (patients).

Patient Questionnaire

Please complete the following details:

Age:_____

Gender: _____Male _____ Female

With which ethnic group do you most identify:

____ New Zealand European	____ Maori
____ Pacific Island	____ Asian
____ Indian	____ Other (please specify)_____

Please indicate on the scale below what is your annual income?

____ $0 – 10,000	____ $10,001 - 20,000
____ $20,001 – 30,000	____ $30,001 – 40,000
____ $40,001 – 50,000	____ $50,001 – 60,000
____ $60,001 – 70,000	____ $70,001 – 80,000
____ $80,001 – 90,000	____ $100,000 plus

Have you ever received a massage from a trained therapist?
　　　____ Yes 　　　____ No

How many massages have you received in the last year?
1　　2　　3　　4　　5　　6　　7　　8　　9　　10　　More than 10

What were the reasons for having a massage?
(You may tick more than one reason)

____ Sprains/Strains	____ Sports related injury
____ Recovery from sports	____ Relaxation
____ Tension or stress	____ Chronic Pain
____ Other (Please specify)_____	

Do you think you will have a massage in the next year?[2]
　　　____ Yes 　　　____ No

Do you think that the use of massage therapy over the last 5 years has:[2]
　　　____ increased
　　　____ decreased
　　　____ remained the same

Has your doctor ever referred you to, or suggested you see a massage therapist?[2]
　　　　　　____Yes 　　____ No

　　If Yes, what for?
　　_____

Have you ever discussed massage therapy as a treatment with your doctor?[2]

　　____ Yes 　　____ No

　　If Yes, Conversations with my doctor regarding massage therapy are:[2]
　　____ favourable
　　____ unfavourable
　　____ indifferent

Please indicate the extent to which you agree/disagree with the following statements by circling the number that best corresponds to your opinion. Please check the "don't know" box if you are unsure.

(Note: A placebo effect is where there is a beneficial effect of a treatment administered to a patient who believes it has therapeutic powers even though it has none.)

	Strongly Disagree				Strongly Agree	Don't Know
The effects of massage therapy are primarily due to a placebo effect.[5]	1	2	3	4	5	☐
Massage therapy has not been sufficiently validated as a treatment.	1	2	3	4	5	☐
There is a place for massage therapy in mainstream medicine.[5]	1	2	3	4	5	☐
I would use massage therapy as a treatment if it was subsidised by the government.[5]	1	2	3	4	5	☐
Massage therapy would be a useful addition to my doctor's practice.[5]	1	2	3	4	5	☐
Massage therapy should be included in health insurance packages.[5]	1	2	3	4	5	☐
	Strongly Disagree				Strongly Agree	
I would like to learn more about massage therapy.[5]	1	2	3	4	5	
I would have more confidence in my doctor if he/she had more knowledge about complementary therapies.[5]	1	2	3	4	5	
My doctor should have some knowledge of massage therapy.[5]	1	2	3	4	5	
My level of knowledge about massage therapy is low.[5]	1	2	3	4	5	
Doctors should ask me about my use of complementary therapies whenever they obtain a medical history.[5]	1	2	3	4	5	

Please indicate the extent to which you agree/disagree with the following statements by circling the number that best corresponds to your opinion. Please check the "don't know" box if you are unsure.

Please indicate to what extent you agree/disagree with the following statements by circling the number that best corresponds to your opinion. Please check the "don't know" box if you are unsure.

Massage Therapy……	Strongly Disagree				Strongly Agree	Don't Know
..enhances immune function[5]	1	2	3	4	5	
..reduces depression	1	2	2	4	5	
..reduces anxiety[5]	1	2	3	4	5	
..reduces stress[5]	1	2	3	4	5	
..improves blood circulation[5]	1	2	3	4	5	
..improves attention[5]	1	2	3	4	5	
..is a useful treatment[5]	1	2	3	4	5	
..can cause physical harm[5]	1	2	3	4	5	
..can cause emotional distress[5]	1	2	3	4	5	

PLEASE ONLY COMPLETE THE NEXT 4 QUESTIONS IF YOU HAVE HAD A MASSAGE.

Please indicate to what extent you agree/disagree with the following statements by circling the number that best corresponds to your opinion:

	Strongly Agree				Strongly Disagree
I am satisfied with the results from my massage.[6]					
When I have a massage I check the massage therapists qualifications[6]					
I feel reluctant to tell my doctor about my use of massage therapy[6]					

Complementary therapies generally include treatments or practices that aim to provide therapeutic benefits and which are considered for use along with or in addition to mainstream medical treatments.

Do you use any complementary therapies?[3]

    ____ Yes   ____ No

If Yes, please list them.

_____

_____

Have you ever asked you doctor about any type of complementary therapy?[3]

    ____ Yes   ____ No

If Yes, which ones?

_____

_____

Does your doctor practice any complementary therapy that you are aware of?[3]

    ____ Yes   ____ No

If Yes, could you list these?

_____

_____

Do you feel reluctant to tell your doctor about your use of any complementary therapy?[3]

    ____ Yes

    ____ Somewhat

    ____ Not at all

Questions that relate to sections in the survey

[1]Knowledge and attitudes about training and demand for massage therapy (GPs)

[2] Referral and discussion behaviour with patients about massage therapy and GPs and patients use of massage therapy (GPs and patients)

[3] Knowledge, attitudes, and referral behaviour for complementary therapies (GPs and patients)

[4] Regulatory standards for complementary therapies (GPs)

[5] Beliefs and attitudes about massage therapy (GPs and patients)

[6]Satisfaction with massage (patients).

Appendix U

Frequency of Responses for Attitudes and Beliefs about Massage Therapy

Table showing the frequencies of GP responses for items relating to attitudes and beliefs about massage therapy.

Variable	1	2	3	4	5	Don't Know	Missing
The effects of MT are primarily due to a placebo effect.	12	28	19	2	4	8	1
MT stimulates the body's natural healing powers.	1	12	19	14	7	17	1
MT has not been sufficiently validated as a treatment.	4	18	12	18	7	14	1
MT is helpful for some of my patients' conditions/illnesses.	3	4	8	30	21	7	1
There is a place for MT in mainstream medicine.	5	6	17	25	12	8	1
I would make more referrals for MT if it was subsidised by the government.	14	5	7	25	18	4	1
MT should be included in health insurance packages.	17	15	6	20	9	6	1
I would like to learn more about MT.	3	14	22	21	9	1	1
As a doctor I should have some knowledge of MT.	3	3	8	27	32	0	1
Doctors should ask patients about their use of complementary therapies whenever they obtain a medical history.	3	3	8	27	32	0	1
MT enhances immune function.	9	8	12	12	1	30	2
MT reduces depression.	4	5	16	29	4	14	2
MT reduces anxiety.	2	1	13	35	14	8	1
MT reduces stress.	2	0	10	40	17	4	1
MT improves blood	7	4	11	35	11	5	1

circulation.

MT improves attention.	4	7	21	14	1	26	1
MT is a useful treatment.	2	2	18	31	14	5	2
MT would be a useful adjunct to my practice.	5	8	13	27	13	7	1
MT can cause physical harm.	10	19	19	11	7	7	1
MT can cause emotional distress.	14	20	13	9	5	11	2

Note. MT = massage therapy. Scale ratings ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).