EVALUATING ATTACHMENT THEORY AS A FRAMEWORK FOR UNDERSTANDING PAIN-RELATED APPRAISALS AND INTERPERSONAL CONCERNS

Lachlan A. McWilliams

Department of Psychology

University of Manitoba

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EVALUATING ATTACHMENT THEORY AS A FRAMEWORK FOR UNDERSTANDING PAIN-RELATED APPRAISALS AND INTERPERSONAL CONCERNS

BY

Lachlan A. McWilliams

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirement of the degree

Of

Doctor of Psychology

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Abstract

A few theoretical papers and research reports have suggested that insecure attachment is a risk factor for the development of chronic pain and contributes to increased distress and disability amongst those with chronic pain. The present study investigated several hypotheses raised in this literature. It was hypothesized that insecure attachment would be positively associated with maladaptive responses to pain (e.g., the tendency to catastrophize in response to pain) and with other key variables identified in the attachment-pain literature (e.g., negative relationships with healthcare providers). A large university student sample ($N = 281$) free of chronic pain completed self-report measures of attachment style, patient-physician relationship quality, responses to a recent headache, pain frequency, pain-related appraisals, attitudes towards social support, and psychopathology. Bartholomew and Horowitz's (1991) model of adult attachment was the attachment framework emphasized in the present study and was operationalized with the Experiences in Close Relationships Questionnaire (ECR; Brennen, Clark, & Shaver, 1998). This measure assesses adult romantic attachment and includes a Model of Self scale (i.e., degree of anxiety regarding rejection based on beliefs of personal unworthiness.) and a Model of Others scale (i.e., degree of interpersonal mistrust discomfort with interpersonal closeness). Correlation and multiple regression analyses indicated that insecure attachment was positively associated with reports of more frequent pain, poorer relationships with physicians, negative pain-related appraisals, less positive attitudes towards utilizing social support, and mood and anxiety symptoms. Several hypotheses were not supported, but overall the findings suggested that adult

attachment theory is a promising framework for understanding how individuals respond to pain and supported hypotheses in the chronic pain-attachment literature. Consistent with previous research, the attachment measures were generally more strongly associated the interpersonally-relevant dependent variables, such as ratings of patient-physician relationship quality. Given this trend, attachment-based research regarding pain-related interpersonal constructs, such as communal coping and patients' perceptions of solicitous responses to pain, appear to be the most promising avenues for future research.

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INTRODUCTION AND LITERATURE REVIEW

Bowlby's (1969, 1975, 1980) attachment theory and the related concept of adult romantic attachment (Hazan & Shaver, 1987) have been used as a framework for understanding and investigating a wide range of clinically-relevant behaviors and experiences, such as personality and psychopathology (e.g., Mickelson, Kessler, & Shaver, 1997). Recently, theoretical writings and a few empirical reports have suggested that attachment theory may also be a useful framework for understanding the development of chronic pain and that insecure attachment may serve as a vulnerability factor for the development of chronic pain. This thesis was aimed at further delineating the role that attachment styles may play in the development of chronic pain. Several topics are covered. First, a brief overview of the key concepts and findings in the attachment literature is presented. Second, the literature concerning the role that attachment may have in the development of chronic pain is reviewed. Third, a study investigating the relationships between individuals' attachment characteristics and their responses to pain is presented. The pain-related variables selected have been widely investigated in both non-clinical and clinical samples and are believed to play a role in the development of chronic pain. The implications of the findings in terms understanding the role of that adult attachment styles have in the development of chronic pain are highlighted along with several new directions for clinical research.

Attachment Theory: Concepts and Findings

In his seminal writings, Bowlby (1969) described an attachment system that evolved to ensure infants maintain proximity to their caretakers under conditions of danger or threat. He termed actions that help maintain proximity, such as crying, to be

attachment behaviors and suggested that primary caregivers' responses to these attachment behaviors establish an enduring set of expectancies regarding how others will respond to one's self while in distress. For example, if caregivers consistently recognize and respond appropriately to a child's needs for comfort, security, and independent exploration, the child is likely to develop a model of self as valued and self-sufficient and a model of others as caring and trustworthy. Less responsive and/or rejecting behavior from caregivers can lead to negative internalized models of self and others. Ainsworth, Blehar, Waters, and Wall (1978) used a structured laboratory procedure to examine infants' responses to separation from and reunion with their caregivers (i.e., mothers). On the basis of the responses of these infants, Ainsworth et al. (1978) identified three attachment styles. Secure infants seek proximity to their caregivers when distressed, are readily comforted by them, and welcome their caregivers' return after separation. Infants with an ambivalent attachment style (also called anxious-ambivalent) intermix attachment behaviors and expressions of protest and anger toward the caregiver when they are distressed, and they are unable to be comforted when reunited with their caregiver. Infants with avoidant attachment avoid their caregivers and exhibit signs of detachment when distressed. Secure attachment is thought to facilitate emotional well-being whereas insecure attachment (i.e., ambivalent and avoidant) is thought to obstruct the development of inner resources necessary for successfully coping with life stressors and is thought to be a risk factor for later psychopathology (Dozier, Stovall, & Albus, 1999).

Attachment theory suggests that one's relationships during infancy, childhood, and adolescence give rise to *mental models* of self and others that subsequently

influence patterns of support-seeking and support-giving in adulthood. Recent research supports this notion. For example, Waters, Merrick, Treboux, Crowell, and Albersheim (2000) assessed infants at 12-months of age and at a 20-year follow-up and found that 72% of participants received the same secure versus insecure attachment classification. The changes in attachment classification were primarily changes from secure attachment to an insecure attachment style and these changes were predicted by the experience of negative life events such as loss of a parent, parental psychiatric disorder, and abuse. A similar pattern of findings was also reported by Hamilton (2000). Longitudinal research with adults has also shown attachment styles to be highly stable (see Davila, Karney, & Bradbury, 1999).

In the mid-1980s several researchers began extending attachment theory to adolescent and adult relationships. In one of the first of these efforts, Armsden and Greenberg (1987) began a line of research investigating the attachment relationships of adolescents. They viewed attachments to one's parents and to one's peers as the forms of attachment most salient to adolescents and they developed a self-report measure, the Inventory of Parent and Peer Attachment (IPPA), as means of assessing adolescents' attachment-related perceptions. Armsden and Greenberg attempted to capture adolescents' attachment experiences by assessing the degree to which they feel their attachment figures respect and understand their needs and desires and by assessing the degree to which they perceive their attachment figures to be sensitive and responsive to their concerns and emotions.

Relative to the adolescent attachment literature, there has been a greater research interest in adult attachment experiences. Hazan and Shaver (1987) developed a measure

of adult attachment that served as the impetus for numerous studies of attachment. Hazan and Shaver (1987) suggested that romantic love is an attachment process that is experienced differently across individuals depending on one's attachment history. They posited three adult romantic attachment styles (secure, ambivalent, and avoidant) that were modeled after the three styles identified in infants. In Hazan and Shaver's model, adults with secure attachment find it easy to get close to others and are comfortable depending on others. Adults with an ambivalent attachment style view others as reluctant to get close, worry that others do not really care about them, and are often seen by others as clingy. Adults with avoidant attachment are uncomfortable being close to others and find it difficult to trust others. These adult attachment styles have been found to be associated with a wide variety of clinically important psychological and social variables such as personality traits (Shaver & Brennan, 1992), mate selection, and relationship functioning (Collins & Read, 1990).

Hazan and Shaver (1987) assessed adult attachment by presenting respondents with paragraphs describing these attachment styles and asking them to select the one that best characterizes their orientation toward romantic relationships. This assessment method, as well as other methods in which respondents are classified into one attachment style, is often referred to as the prototype approach. Hazan and Shaver's measure was subsequently modified so that respondents provide continuous ratings of each of the attachment styles (e.g., Levy & Davis, 1988). The sentences in Hazan and Shaver's paragraphs have also been used to create a multi-item self report measure that provides continuous ratings on each attachment style or to classify participants into attachment categories (e.g., Collins & Read, 1990). It is important to note that these

measures have been used to assess romantic attachment and adult attachment styles in general (i.e., non-romantic partners close to respondents).

Following these early approaches to adult attachment, Bartholomew and Horowitz (1991) suggested that adult attachment styles are based on two orthogonally related dimensions referring to one's internal *model of self* and one's internal *model of others*. In their model of attachment, each internal model can be dichotomized as either positive or negative and four unique attachment styles are derived from the combination of these two dichotomous variables. These attachment styles include secure (positive self and positive other), preoccupied (negative self and positive other), fearful (negative self and negative other), and dismissing (positive self and negative other). Respectively, the secure, preoccupied, and fearful styles correspond conceptually to the secure, ambivalent, avoidant styles in Hazan and Shaver's (1987) model. The dismissing style has no corresponding style in the Hazan and Shaver (1987) model, but it is conceptually related to the avoidant style in the three-category model. These attachment styles are based on conscious beliefs about one's self and others. The dismissing style is similar to the avoidant style in the three-category model and the fearful style in the four-category model, but dismissing individuals are thought to have suppressed their negative self-concepts by consciously maintaining a negative model of others (Klonen & John, 1998). Bartholomew and Horowitz (1991) created an interview to assess attachment in a manner consistent with their model and also modified Hazan and Shaver's (1987) original measure so that it includes four paragraphs corresponding to their four attachment styles. These four paragraphs were also subsequently modified into a multi-item format that can be used to either classify individuals with regard to attachment

style or to provide continuous ratings with regard to each attachment style (see Griffin & Bartholomew, 1994b). Modifications of this measure have also been used to provide indexes of model of self and model of others which are thought to underlie each of the attachment styles (e.g., Ognibene & Collins, 1998). The approach in which attachment is conceptualized as being comprised of two dimensions is often referred to as the dimensional approach.

Although less widely used, a variety of other methods of assessing adult attachment have been developed. For example, West and Sheldon (1988) developed a self-report measure based on Bowlby's (1980) clinical observations regarding loss in which several components of the attachment system (i.e., Availability, Feared Loss, Proximity Seeking, Use of the Attachment Figure, Separation Protest, and Angry Withdrawal) are assessed. As well, an attachment interview (George, Kaplan, & Main, 1985), based on an earlier conceptualization of attachment, has been used frequently. Bartholomew and Shaver (1998) reviewed the literature concerning the overlap of adult assessment measures and presented original research comparing measures of attachment that varied with regard to the domain of attachment considered (e.g., parental/family, peer, romantic) and the type of assessment methods utilized (e.g., self-reports vs. interviews). They concluded that the available research indicates that these methods assess a core set of relational tendencies (e.g., Griffin & Bartholomew, 1994a), but that domain-specific attachment patterns can be substantially different (e.g., Collins & Read, 1994). They also noted that factor analyses of these attachment measures have consistently resulted in two dimensions that correspond to the model of self and model of others dimensions posited by Bartholomew and Horowitz (1991).

The other major development regarding models of adult attachment style concerns the appropriateness of measuring attachment as a categorical variable. A recent taxometric analysis reported by Fraley and Waller (1998) indicated that attachment is most appropriately conceptualized and assessed as a continuous variable. Support was provided for the approach utilizing continuous ratings of the four attachment styles and for the approach utilizing the two underlying dimensions of attachment (i.e., models of self and other). Current research tends to use either continuous or categorical measures of the four attachment styles. Despite strong empirical support, the approach involving the two underlying attachment dimensions is only beginning to become popular in the attachment literature.

Attachment and Chronic Pain

The following review of the literature concerning the relationship between attachment styles and chronic pain begins with the earliest and simplest theorizing of Kolb (1982) and proceeds through to more complex models. This literature has emphasized both childhood attachments and adult romantic attachments. Distinctions between these two types of attachment will not be considered in detail for several reasons. First, recent research (e.g., Waters et al., 2000) has indicated that there is a continuity of attachment from childhood to adulthood. Second, research suggests that measures of these different domains of attachment actually overlap considerably and assess a core set of relational tendencies (see Bartholomew & Shaver, 1998). Finally, the following writings are largely based on the premise that there is continuity between childhood attachment, adult attachment, and patterns of attachment manifested with healthcare professionals.

Kolb (1982) was the first to discuss the role of attachment in pain. Kolb noted that a substantial proportion of individuals treated for chronic pain often obtain minimal or no benefit from treatment. He suggested that attachment theory offers a new way of understanding chronic pain that can: (a) improve efforts at maintaining gains in those whom have received some benefit from treatment, and (b) assist clinicians in accepting treatment failures and manage such cases more appropriately.

Kolb (1982) focused on patients who have "enduring pain problems" (p. 414). He stated that for many adults pain complaining is a form of attachment behavior intended to elicit care-taking behavior from others. While not clearly indicated by Kolb, he implied that individuals with enduring pain problems are those who use pain complaints in this manner. He suggested that the appropriate response from those treating such individuals is non-critical acceptance and an attempt to discover the source of the anxiety that provoked the attachment behavior. He further noted that the source of the anxiety could be either a new physical dysfunction or the perception of significant social separation. With regard to treatment, Kolb indicated that shortly after beginning treatment, these individuals often improve (i.e., an increase in functioning and a reduction of pain complaints). He viewed this responsiveness as similar to a placebo effect. As treatment progresses and the patient is encouraged to increase activities or reduce medication, attachment behaviors are again activated. One possible response on the part of the patient is an increase in pain complaints and questioning of treatment decisions. The second possible type of response on the part of the patient involves a pattern of withdrawal, which could include expressions of anger, critical remarks about the treatment provider's professional dedication, threats to engage in

legal action, and attempts to find new sources of help. Kolb also indicated that those who follow a pattern of withdrawal often may deny their distress and immediately end needed medical contacts.

Kolb (1982) provided several recommendations, primarily directed towards physicians, regarding the treatment of individuals with enduring pain complaints. First, he suggested that regular contact between the treatment provider and the patient increases the likelihood that the patient will develop a therapeutic relationship or attachment bond with the treatment provider. Second, he suggested that those providing treatment should recognize that pain complaints are often attachment behaviors signaling distress and that the treatment provider should accept that eradication of the pain complaint may be an unrealistic goal. Third, he suggested that treatment be aimed at improving the social functioning of patients, reducing their dependency, and improving their recreational and vocational interests.

Kolb's (1982) paper focused on how pain complaints can be conceptualized as attachment behaviors. He did not discuss specific attachment styles or directly address the issue of which individuals are most vulnerable to chronic pain. He did, however, note that those abused or neglected in childhood and those traumatized during adulthood would be less likely to develop positive relationships with those providing treatment. As well, he implied that those who have poor attachments (i.e., insecure attachment) would be the most likely to have pain complaints that function as attachment behaviors and that such people would therefore be unlikely to have their pain complaints successfully treated. Thus, the implications of Kolb's paper in terms of suggesting a vulnerability for chronic pain is that those with insecure attachment are at

increased risk of developing enduring pain problems that do not remit despite continued treatment. It should be noted that Kolb's writings on this topic were based on clinical experience and that he did not provide empirical evidence in support of his theory or in support of his treatment recommendations.

Anderson and Hines (1994) developed a theory concerning the impact of attachment styles on vulnerability to chronic pain. Their writings were largely based on their work with patients with chronic refractory spine pain. They observed that patients with childhood experiences potentially damaging to the development of secure attachment (i.e., physical abuse) were more likely to continue to experience pain following surgery and/or conservative care relative to those without such childhood experiences. Anderson and Hines posited that spine injuries and the resultant pain (as well as other forms of pain) invoke attachment behaviors. They suggested that those with insecure attachment use maladaptive forms of attachment behavior whereas those with secure attachment will use more adaptive forms of attachment. They did not, however, indicate what types of attachment behaviors would be considered adaptive or maladaptive.

Anderson and Hines' (1994) model largely focused on the concept of hyperarousal. Citing the work of trauma researchers (e.g., van der Kolk, Perry, & Herman, 1991) and pain researchers (e.g., Melzack, 1986), they noted that unresolved trauma (associated with insecure attachment) and pain can both establish self-perpetuating states of chronic hyperarousal. They further suggested that attachment styles or traumatic experiences influence the degree to which pain is inhibited by the nervous system. Those with secure attachment tend to inhibit pain whereas those with

insecure attachment tend to maintain a pattern of hyperarousal in response to pain. They viewed this pattern of hyperarousal as being responsible for the maintenance of the pain complaint.

Anderson and Hines' (1994) model has not been directly investigated. However, they cited one of their own studies (Schofferman, Anderson, Hines, Smith, & White, 1992) as providing some support for their model. Schofferman et al. (1992) retrospectively assessed the relationship between reports of childhood psychological trauma and lumbar spine surgery outcomes. They found a significant negative relationship between trauma and positive surgical outcomes. For example, patients reporting three or more risk factors had an 85% failure rate, whereas those with no risk factors had a 5% failure rate. It is important to note that Schofferman et al. (1992) used a semi-structured interview to assess the presence of childhood experiences, or risk factors, that could "endanger the establishment of secure attachment and lead to increased vulnerability to pain" (p. 143). These experiences included physical abuse, sexual abuse, alcohol or drug abuse on the part of one's primary caregiver or caregivers, abandonment, and emotional neglect/abuse. They did not directly assess current attachment styles. Despite this methodological feature, their findings are relevant to the attachment literature because childhood adversities have been found to be significantly associated with adult attachment styles (Mickelson et al., 1997).

Although they discussed the concept of attachment extensively, Anderson and Hines' (1994) model may be more accurately viewed as concerning childhood abuse. For example, in discussing the impact of insecure attachment they emphasized the negative impact that childhood abuse can have on one's vulnerability to chronic pain,

but they did not make specific distinctions regarding the unique influences that the various styles of insecure attachment (e.g., anxious vs. avoidant) would have on the manifestation of chronic pain. Additionally, Anderson and Hines stated that their model was largely based on Engel's (1959) hypothesis that childhood psychological neglect and abuse establishes a tendency towards the development of pain beyond what would be expect on the basis of the observed physical damage or injury and his concept of the pain-prone patient.

Mikulincer and Florian (1998) discussed the relationship between adult attachment styles and emotional and cognitive reactions to stressful life events including chronic pain. They noted that attachment theory was originally developed to understand reactions and coping response to stressful life events (i.e. separation from caregivers), and they reasoned that adult attachment styles would be important factors in determining one's appraisals, coping efforts, and adjustment associated with stressful life events. In general, they hypothesized that secure attachment is an inner resource that helps people positively appraise stressful experiences, to cope with such events in a constructive manner, and assists in adjusting positively following such events. Mikulincer and Florian reviewed the literature on attachment to develop hypotheses regarding relationships between the adult attachment styles identified by Hazan and Shaver (1987) and both appraisals and coping strategies. They hypothesized that: (a) those with secure attachment would primarily rely on problem-focused coping and would seek social support; (b) those with ambivalent attachment would use passive, ruminative, and emotion-focused strategies; and (c) those with avoidant attachment

would restrict their acknowledgment of the distress and use strategies involving self-reliance and withdrawing from others.

Mikulincer and Florian (1998) discussed the role of attachment in reactions to several stressful events including chronic pain. They specifically stated that appraisals of pain and coping efforts would mediate the relationship between attachment and emotional stress associated with pain. The also briefly presented some findings obtained with a sample of 85 male chronic low back pain patients and a matched control group comprised of 85 healthy men. On the basis of Hazan and Shaver's (1987) adult attachment style scale, these men were classified as having either, secure, avoidant, or ambivalent attachment styles. The securely attached chronic low back pain patients did not differ significantly from the securely attached individuals in the control group with regard to psychological distress. Consistent with their expectations, the patients with avoidant and ambivalent attachment styles scored significantly higher on the distress measure than individuals from their respective control groups and they scored significantly higher than the securely attached patients. Using Lazarus and Folkman's (1984) appraisal scale and Folkman and Lazarus's (1985) Ways of Coping Checklist, they also investigated differences in pain-related appraisals and coping amongst the chronic pain patients. Relative to the securely attached patient group, the avoidant and ambivalent patient groups reported significantly higher levels of threat, significantly greater use of emotion-focused coping, significantly lower perceived ability to cope with their pain, and significantly less use of problem-focused coping. Significant differences between the two insecure attachment groups were not found.

Mikulincer and Florian's (1998) findings are consistent with the notion that pain patients with insecure attachment cope more poorly than those with secure attachment. However, several limitations and findings of this study warrant further consideration. First, Mikulincer and Florian suggested that appraisals and coping efforts would mediate the relationship between attachment and psychological distress, but they did not examine this possibility with mediator analyses (see Baron & Kenny, 1986) or a related method. Second, they limited their study to psychological variables and did not examine the impact of attachment styles on other outcome variables, such as employment status, medication use, and functional status, which are of great interest to pain researchers. Third, in their overview they made hypotheses regarding differences between the two insecure attachment styles, but they did not find any significant differences between these two groups. It is possible that they did not select dependent variables appropriate for detecting such differences. For example, they suggested the use of social support when under stress should vary as a function of attachment style, but they did not assess social support. Finally, this study was presented in a brief format (i.e., 2 paragraphs and a table) and many relevant details (e.g., method of recruitment, number of individuals in the different attachment groups) were not reported.

Mikail, Henderson, and Tasca (1994) used attachment theory to develop an interpersonally-based model of chronic pain designed to describe and account for the development of chronic pain and to identify potential subgroups of chronic patients. They posited that chronic pain results from "... a dynamic interaction between biological alteration, intrapsychic factors, and external or systemic variables ... intertwined in a pattern of cyclical causality ..." (p. 7). Biological alterations (e.g.,

tissue damage) were viewed as a necessary precipitating event in the development chronic pain whereas intrapsychic (e.g., self-schemas, coping patterns, and illness beliefs and expectations) and environmental variables (e.g., familial response to pain and the responsiveness of the healthcare system) were viewed as vulnerability factors that would influence whether the existing acute pain condition would result in chronic pain. Mikail et al. (1994) used attachment theory to provide a framework for understanding the impact of these intrapsychic and contextual variables.

Mikail et al. (1994) noted that Bowlby (1988) observed that pain is a form of threat that often results in a sequence of attachment behaviors designed to reduce anxiety. Mikail et al.'s model was intended to explain pain-related attachment behaviors that differ depending on one's attachment style. In general, they suggested that attachment styles influence pain-related appraisals, coping efforts, and help-seeking activities taken to deal with pain and that each attachment style would be associated with a characteristic set of pain-related responses. They further suggested that, because of these differences in pain-related responses, each attachment style would also be associated with a unique developmental course of chronic pain. Using Bartholomew and Horowitz's (1991) four attachment style prototypes (viz., secure, dismissing, fearful, and preoccupied), they presented a number of hypotheses regarding the development of chronic pain within each of these attachment styles. These hypotheses are presented below along with some of the research from the general attachment literature that Mikail et al. used to support them.

Secure attachment is characterized by a positive model of self and others (Bartholomew & Horowitz, 1991). Mikail et al. (1994) noted that securely attached

individuals readily seek the assistance of others during periods of anxiety (Simpson, Rholes, & Nelligan, 1992). Based on this, they suggested that securely attached individuals experiencing pain or injury would be likely to utilize their social support networks and to consult with health care professionals. Further, they noted that securely attached individuals are willing to self-disclose (Shaver & Brennan, 1992) and that, as a result of this, they would be likely to present clear and non-defensive descriptions of their pain and the physical and emotional difficulties associated with it. Mikail et al. suggested that this characteristic way of responding to pain would decrease the probability that continuing pain would result in major life disruption and that securely attached individuals are less susceptible to developing chronic pain relative to individuals with insecure attachment styles. Mikail et al. noted two factors that may be responsible for the development of chronic pain amongst those with secure attachment. These included a healthcare system that is disorganized and slow to respond as well as the tendency of securely attached individuals to interpret and respond to pain as an acute condition. Both of these factors would interfere with obtaining appropriate treatment in a timely manner and increase the risk of developing chronic pain. Mikail et al. also suggested that securely attached individuals are more likely to respond well to interventions aimed at improving adjustment to chronic pain.

Dismissing attachment is characterized by a positive model of self and a negative model of others (Bartholomew & Horowitz, 1991). Mikail et al. (1994) noted that during periods of threat, individuals with this style of attachment view themselves as self-sufficient and others as unresponsive and unavailable (Bartholomew, 1990). They suggested that those with a dismissing style of attachment tend to minimize the

meaning of their pain and tend to delay seeking help until their condition has progressed to a fairly advanced stage. Mikail et al. characterized these individuals as having a stoical presentation, restricted emotionality, and a tendency to be externally focused and blaming. They indicated that these individuals typically obtain multiple consultations with healthcare professionals, but typically do not fully engage in treatment. They further suggested that healthcare workers will view individuals with a dismissing attachment style as either coping well or as being in need but unlikely to follow treatment recommendations.

Fearful attachment is characterized by a negative model of self and a negative model of others (Bartholomew & Horowitz, 1991). Mikail et al. (1994) noted that individuals with this style of attachment often have a history of childhood abuse (Bartholomew & Horowitz, 1991) and that they experience considerable anxiety and hostility in interpersonal interactions (Bartholomew, 1990). They characterized fearful individuals as dismissive of their initial symptoms and as being likely to delay seeking treatment. Similar to those with dismissing attachment styles, individuals with fearful attachment may delay seeking treatment until their condition has progressed and/or has been exacerbated by associated physiological and postural changes. According to Mikail et al., this delay in treatment increases the probability that they will develop chronic pain. When they do make contact for treatment, they present their situation as being hopeless, are often perceived as being highly distressed, and their symptoms are often attributed to psychological factors. Mikail et al. suggested that under conditions of prolonged and extreme stress these individuals are at a heightened risk for suicide. They also indicated that fearful individuals would derive little benefit from traditional pain

management programs, that the hostility of individuals with fearful attachment often invokes responses of withdrawal from treatment providers, and that this withdrawal is often manifested as a series of referrals.

Preoccupied attachment is characterized by a negative model of self and a positive model of others (Bartholomew & Horowitz, 1991). Individuals with this style of attachment vacillate between seeking help and withdrawing because of a fear of rejection. Mikail et al. (1994) suggested that those with preoccupied attachment present as desperate for help, have an intense need to be understood, appear to idealize health care professionals, and maintain an attitude of self-blame. Mikail et al. indicated that these individuals are initially compliant with treatment recommendations and are perceived as making good progress. However, as treatment progresses these individuals challenge and reject recommendations and often inadvertently sabotage treatment in order to reduce anxiety associated with the possibility of failing and disappointing others. These individuals often report that the treatment was not sufficiently tailored to them and feeling that they have not been taken seriously. Mikail et al. noted that this group of patients is often described in chronic pain literature as *doctor shoppers* that move from professional to professional in the hopes of obtaining relief from their pain.

Mikail et al.'s (1994) model was based on the existing attachment literature and on their clinical experience. They did not present any original research findings to support their model, but did note the need for such research. Their model specifies that those of various attachment groups would have different probabilities of developing chronic pain and that individuals with insecure attachment styles would be over-represented amongst those presenting at treatment clinics. Thus, they viewed

investigating the occurrence of the various attachment styles within pain patient populations, relative to the general population, as one method of examining the relationship between attachment and the development of chronic pain.

Several aspects of Mikail et al.'s (1994) model should be noted. First, their model incorporated an attachment model (i.e., four prototypes) that is more recent than that used by others in the pain and attachment literature. Second, they focused on the influence of attachment on both help-seeking and the quality of relationships between patients and those providing treatment. The roles of pain-related appraisals and pain-related coping strategies, other than help-seeking, were not emphasized by Mikail et al. (1994). Finally, relative to the other literature concerning attachment and chronic pain, Mikail et al. more closely focused on unique ways in which each of the various insecure attachment styles can serve as vulnerability factors for the development of chronic pain.

Mikail (2003) recently presented some case material to elaborate on the interpersonal relationships and marital interactions that characterize chronic pain patients of different attachment styles. Mikail also reported some findings obtained in an unpublished pilot study. In this pilot study, 86 chronic pain patients completed a measure of attachment style and the Inventory of Interpersonal Problems (Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988). The attachment measure was used to classify each participant into one of four attachment groups and the Inventory of Interpersonal Problems was used to assess the nature of the patients' interpersonal difficulties. The findings were consistent with the model presented by Mikail et al. (1994). Individuals with a dismissing attachment style reported a pattern of interpersonal difficulties reflecting an autocratic style and an attacking relational stance.

Preoccupied individuals were found to have a friendly-submissive style and to be expressive. Fearfully attached individuals reported an extreme form of submissiveness and an introverted and exploitable stance. Mikail did not report any findings regarding those with secure attachment.

The first published peer-reviewed research specifically concerning adult attachment styles and chronic pain was provided by McWilliams, Cox, and Enns (2000). They utilized publicly available data collected as part of the National Comorbidity Survey (Kessler et al., 1994) to examine the relationships between attachment styles and both pain and health-related disability in a nationally representative sample of Americans with arthritis (n = 383). Participants' continuous ratings of the three attachment styles (viz., secure, ambivalent, and avoidant) identified by Hazan and Shaver (1987) were used in a series of correlational and multiple regression analyses. Ratings of the two insecure attachment styles (i.e., ambivalent and avoidant) were significantly and positively associated with ratings of pain and disability. The magnitude of these correlations ranged from .108 to .182 and according to Cohen's (1992) criteria only constituted a small effect size. However, McWilliams et al., suggested that the relatively weak reliability of single-item measures likely resulted in an underestimate of the association between attachment and the pain-related variables. More support for McWilliams et al.'s hypothesis came from a multiple regression analysis that revealed participants' ratings of ambivalent attachment remained a significant predictor of disability even after controlling for demographic variables (i.e., age, gender, marital status) pain severity, and depression.

McWilliams et al.'s (2000) study had several limitations including the use of single-item measures of pain and disability. As well, the role of pain-related appraisals and coping could not be investigated. McWilliams et al.'s findings did not directly address the role of attachment styles in the development of chronic pain (i.e., the vulnerability issue), but instead were limited to addressing the associations between attachment and both pain and disability associated with a chronic and painful condition (i.e., arthritis). Nonetheless, the findings of this study lend support to Mikail et al.'s (1994) interpersonally-based model of chronic pain and to the hypotheses of Mikulincer and Florian (1998) which posit insecure attachment as being a vulnerability factor for the development of chronic pain.

Ciechanowski, Sullivan, Jensen, Romano, and Summers (2003) provided the first and only peer-reviewed research investigating attachment styles in a chronic pain patient sample. They noted that those with preoccupied and fearful attachment have higher levels of negative affect and greater rates of reported physical symptoms (e.g., Ciechanowski, Walker, Katon, & Russo, 2002) relative to those with secure and dismissing attachment. Based on these observations, they hypothesized that fearful and preoccupied attachment would be positively associated with pain intensity ratings, depression, pain-related catastrophizing, and physical dysfunction. Ciechanowski et al. (2003) also theorized that individuals with preoccupied attachment tend to rely on others and would be less receptive to treatment programs that emphasize self-care and increasing independence. They therefore hypothesized that preoccupied attachment would be associated with a smaller decrease in healthcare utilization rates following participation in a pain management program.

Ciechanowski et al. (2003) utilized a sample of 111 patients who had participated in an earlier study examining the relationships between cognitions, coping, and outcomes of a 3-week outpatient multidisciplinary pain treatment program (Jensen, Romano, Turner, Good, & Wald, 1999; Jensen, Turner, & Romano, 2001). A subgroup of participants in the earlier study were contacted 5 to 28 months after their participation in the treatment program and were administered the Relationship Scale Questionnaire (RSQ; Griffin & Bartholomew, 1994b) over the telephone. A second group of patients completed the RSQ at their 12-month post-treatment assessment. The RSQ provides ratings of one's degree of correspondence to each of the four attachment styles in Bartholomew and Horowitz's (1991) model. The emotional and physical functioning variables were assessed prior to beginning the treatment program and at a 12-month follow-up. They included the catastrophizing scale of the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983), the Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), the Roland-Morris Disability Questionnaire (Roland & Morris, 1983), and a 0-10 scale of pain intensity. Self-reports of pain-related visits to healthcare providers were also obtained and were used to generate variables representing moderate to high utilization (i.e., greater than three visits per month) and high utilization (i.e., greater than weekly visits).

Correlations were used to examine the associations between the attachment ratings and the majority of the pain-related variables. None of the attachment ratings were significantly associated with pain intensity or physical functioning at either baseline or follow-up. Secure attachment was significantly and negatively associated with baseline and follow-up CES-D scores (r = -.21 and r = -.32, respectively) and

fearful attachment was significantly and positively associated with baseline and follow-up CES-D scores (r = .20 and r = .37, respectively). There was a significant positive correlation (r = .29) between fearful attachment and catastrophizing at follow-up. The other attachment dimensions were not significantly associated with CES-D scores or catastrophizing.

Logistic regression analyses were used to examine the relationship between attachment ratings and moderate to high pain-related healthcare visits at post-treatment. Fearful attachment ratings were significantly and positively associated with this level of healthcare utilization. In subsequent regression models that included initial catastrophizing and depression scores as well as variables representing change in catastrophizing and depression, this association was no longer statistically significant.

A second group of logistic regressions considered high pain-related healthcare visits (viz., greater than weekly) at post-treatment. In these analyses, preoccupied attachment was a significant and positive predictor of utilization. This relationship remained significant even when a wide range of potential covariates (i.e., other independent variables) were included in the model (e.g., age, gender, baseline visits, the other attachment dimensions, baseline catastrophizing, change in catastrophizing, baseline depression, and change in depression).

Given the wide time range over which the attachment measure was administered (viz., 5-28 months after completing a treatment program) and the differences between the findings obtained with baseline pain-related variables and follow-up pain-related variables, Ciechanowski et al.'s (2003) findings were somewhat ambiguous. Nonetheless, they generally supported the notion that attachment styles are associated

with adjustment to chronic pain and responsiveness to cognitive behavioral treatment for pain. The most supportive findings were those involving self-reports of depression and healthcare utilization. However, numerous other findings were not consistent with their hypotheses. For example, pain-related catastrophizing was not consistently associated with fearful and preoccupied attachment. More noteworthy, attachment ratings were not significantly associated with pain intensity ratings or physical dysfunction. Ciechanowski et al. (2003) suggested this hypothesis may not have been supported because attachment styles likely account for a small amount of variance in pain and dysfunction relative to other biomedical and psychosocial determinants.

The most promising findings of Ciechanowski et al. (2003) concerned healthcare utilization. They hypothesized that those with preoccupied attachment would continue to have high rates of pain-related healthcare utilization even after receiving treatment that encouraged a reduction in the use of healthcare services. Consistent with this hypothesis, preoccupied attachment predicted high post-treatment utilization (viz., greater than weekly visits) after controlling for initial utilization levels. Fearful attachment predicted moderate levels of post-treatment pain-related utilization (viz., greater than monthly visits), but this association was no longer significant when catastrophizing was included as an independent variable. Ciechanowski et al. noted that individuals with fearful attachment are generally reluctant to seek help because of their tendency to avoid personal relationships, but suggested that in the context of chronic pain the tendency of fearfully attached individuals to experience negative affect and pain may overcome this reluctance to seek help. While not directly related to their findings, Ciechanowski et al. suggested that an interpersonal focus may be necessary for

a substantial portion of pain patients. For example, they noted that efforts directed at developing a trusting therapeutic relationship would be particularly salient for patients with fearful attachment styles whereas efforts directed at increasing greater independence and self-management would be appropriate for those with preoccupied attachment styles.

Attachment and Chronic Pain: A Comprehensive Summary

This section summarizes and integrates the above writings regarding the possible roles that attachment styles may play in the development of chronic pain and in its maintenance. Special attention is paid to discrepancies in these writings and to hypotheses that have not yet been investigated. Relevant findings from the health psychology literature are also presented.

Occurrence of Pain Problems

The theories presented above differ with regard to the role posited between insecure attachment and the occurrence of pain and chronic pain. Anderson and Hines (1994) discussed this issue to the greatest extent. They suggested that those with secure attachment tend to inhibit pain whereas those with insecure attachment tend to maintain a pattern of hyperarousal in response to pain. The implications of this suggestion are that those with insecure attachment experience more frequent pain, and that those with insecure attachment are more likely to continue to experience pain even after the injury originally associated with their pain has resolved. Anderson and Hines' proposals have not been investigated directly. However, the available research does support the notion that insecure attachment is associated with reports of more frequent symptoms of pain and poor health. For example, in a longitudinal study Lewis, Feiring, McGuffog, and

Jaskir (1984) found that boys classified as insecure (ambivalent or avoidant) at 12-months of age scored higher on the Somatic Complaints scale of the Child Behavior Profile (Achenbach, 1978) at 6-years of age in comparison to those originally classified as secure. Also supportive of this position, Feeney and Ryan (1994) found ambivalent attachment to be positively associated with scores on Pennebaker's (1982) Inventory of Limbic Languidness in a sample of late adolescents. Ciechanowski et al., (2002) investigated physical symptoms and attachment using Bartholomew and Horowitz's (1991) attachment model. In their sample of female primary care health maintenance organization patients, individuals with preoccupied and fearful attachment reported a significantly larger number of physical symptoms relative to those with secure attachment. However, it should be noted that these three studies did not directly investigate the association between insecure attachment and pain because the measures of somatic symptoms or physical complaints used included both pain complaints and other physical symptoms. For example, the measure used by Lewis et al. (1984) included several pain complaints (viz., aches and pains, headaches, and stomach aches) as well as other symptoms that would not be typically considered pain complaints (e.g., nausea and eye problems).

In contrast to Anderson and Hines' (1994) emphasis on the role of hyperarousal in pain, Mikail et al. (1994) theorized that those with insecure attachment were at greater risk for developing chronic pain as a result of difficulties seeking and obtaining assistance in dealing with pain. Mikail et al. clearly specified that biological alterations (e.g., tissue damage) serve as the precipitating event needed for the development of chronic pain and they did not discuss any mechanism by which insecure attachment

would lead to more frequent or intense pain difficulties in the absence of organic pathology. Similarly, Kolb (1982) and Mikulincer and Florian (1998) did not specifically propose a relationship between attachment styles and the occurrence of pain and chronic pain.

Pain Severity and Disability

The role of attachment styles in pain severity and disability has received less theoretical attention than has the potential role of attachment in somatic complaints. However, two studies have directly addressed this issue. In their community sample, McWilliams et al. (2000) found ratings of ambivalent and avoidant attachment were both positively associated with ratings of pain and disability. In contrast, Ciechanowski et al. (2003) found no significant associations between attachment ratings and either pain ratings or physical dysfunction in their sample of chronic pain patients. This pattern of findings suggest that attachment may contribute significant variance to pain and disability when a relatively homogeneous sample defined by a relatively less severe form of pain is considered (e.g., a community sample with arthritis-related pain), but when more a heterogeneous sample with a more severe form of pain is considered (i.e., a treatment-seeking sample comprised of individuals with a wide range of chronic pain types and/or locations) attachment may account for little variance in pain and disability relative to other biomedical and psychosocial factors.

Treatment-Seeking

Mikail et al. (1994) emphasized the role of attachment styles in treatment-seeking efforts of individuals with pain. According to Mikail et al., those with secure attachment tend to readily seek treatment and work effectively with their healthcare

providers and as a result are most likely to have their pain difficulties resolved. Dismissing and fearful attachment styles are associated with delays in treatment-seeking and difficult relationships with healthcare providers; whereas, preoccupied attachment is associated with a pattern of vacillating between seeking help and withdrawing from help.

None of these suggestions have been examined with pain patients, but there is some support for the treatment-seeking aspect of Mikail et al.'s (1994) model. Feeney and Ryan (1994) found that avoidant attachment (a combination of dismissing and fearful attachment) was negatively associated with visits to health professionals. Using health utilization and cost data collected by a health maintenance organization, Ciechanowski et al. (2002) found those with preoccupied attachment had higher healthcare utilization rates and greater primary care costs compared to those with secure, dismissing, or fearful attachment. Those with fearful attachment had the lowest utilization rates and costs.

A recent study of the relationship between the attachment styles of diabetic patients and clinical outcomes more directly investigated Mikail et al.'s suggestions regarding the role of attachment styles in the quality of relationships with treatment providers and treatment outcomes. Ciechanowski, Katon, Russo, & Walker (2001) found that diabetic patients with a dismissing attachment style had poorer blood glucose control than patients with the other styles of attachment. Contrary to what would be expected on the basis of Mikail et al.'s model, there were no significant differences between the attachment groups with regard to self-reported quality of communication between patients and their physicians. However, they did find an interaction between

attachment style and communication quality. Patients with a dismissing attachment style who rated their quality of interaction with their physician negatively had poorer blood glucose control than any of the other groups. This group also had significantly worse adherence to glucose monitoring and significantly more interruptions to treatment. Ciechanowski et al.'s (2001) findings raise the possibility that Mikail et al.'s model is too pessimistic with regard to the relationships between health care providers and patients with insecure attachment styles. It may be that those with insecure attachment styles, particularly dismissing attachment, achieve poorer health outcomes than securely attached individuals but only in the context of poor provider-patient communication. Alternatively, the relationships between attachment styles, communication with healthcare providers, and clinical outcomes may be much different in the case of chronic pain.

Mikail et al. (1994) focused on the role of attachment in delays in seeking appropriate treatment and in the quality of the relationships between patients and treatment providers. Ciechanowski et al.'s (2003) findings are generally supportive of Mikail et al.'s hypothesis that attachment plays a role in treatment-seeking. However, it is important to note that Ciechanowski et al. investigated pain patients' overuse (or at least frequent use) of healthcare services. Ceichanowski et al. found preoccupied and fearful attachment ratings were both associated with pain-related visits to healthcare providers. Thus, insecure attachment may initially serve as a barrier to treatment-seeking, but paradoxically some forms of insecure attachment (i.e., preoccupied and fearful) may lead to an overuse of healthcare services once a pain problem has become chronic.

Others have not provided detailed hypotheses regarding attachment and treatment-seeking in relation to pain. Kolb (1982) as well as Anderson and Hines (1994) viewed seeking treatment as a form of attachment behavior, but they did not indicate specific treatment-seeking responses typical of each attachment style. Instead these authors focused on the persistent treatment-seeking efforts of chronic pain patients with histories of abuse (i.e., not specific attachment styles). Mikulincer and Florian (1998) did not discuss treatment-seeking or relationships between patients and healthcare providers.

Social Support-Seeking

Mikail et al. (1994) suggested that chronic pain patients' help-seeking patterns in response to pain and the quality of the support received as a result of these help-seeking efforts varies depending on their attachment styles. Mikail et al. proposals regarding social support were similar to their suggestions regarding treatment-seeking. The impact of adult attachment styles on social support received by pain patients has not been examined. However, the findings of a pilot study reported on by Mikail (2003) found that chronic pain patients of different attachment styles had interpersonal styles consistent with the suggestions of Mikail et al. For example, individuals with fearful attachment reported being submissive and introverted. Also supportive of Mikail et al.'s model, Ognibene and Collins (1998) found university students with secure attachment reported greater levels of perceived social support from friends, perceived social support from family, and social support-seeking than those with insecure attachment.

Mikulincer and Florian (1998) also suggested that those with secure attachment would be more likely to seek and receive social support in response to pain, but did not

investigate this hypothesis. Kolb (1982) and Anderson and Hines (1994) did not posit a role for either social support or support-seeking in the development of chronic pain. Ciechanowski et al. (2003) highlighted Sullivan and colleague's (Sullivan et al., 2001; Sullivan, Tripp, & Santor, 2000) proposal that catastrophizing has a communal dimension and that this interpersonal form of catastrophizing may involve overt expressions of distress that serve to elicit support from others. Ciechanowski et al. (2003) suggested that those with preoccupied attachment, and possibly those with fearful attachment, may seek support by catastrophizing about their pain. However, they did not investigate these hypotheses.

Coping Strategies

Treatment-seeking and social support-seeking are both forms of coping. Several other types of coping have received attention in the chronic pain literature and have been found to be associated with poor adjustment to pain complaints (see Jensen, Turner, Romano, & Karoly, 1991). For example, the Coping Strategies Questionnaire (Rosensteil & Keefe, 1983) is a commonly used measure of pain-specific coping that assesses diverting attention, reinterpreting pain sensations, use of coping self-statements, ignoring pain sensations, praying or hoping, catastrophizing, increasing pain behavior, and increasing activity levels. In general, active strategies, such as increasing activity levels, have been found to be associated with lower levels of reported pain severity, depression, and functional disability; whereas passive coping strategies, such as praying and hoping, have been related to these outcomes in a reverse fashion (Jensen et al., 1991). Only Mikulincer and Florian (1998) placed an emphasis on such coping strategies. They hypothesized that those with secure attachment would rely on problem-

focused, or active, coping and that those with insecure attachment would use less adaptive coping strategies such as emotion focused coping. Their findings supported these hypotheses, but contrary to their more specific hypotheses they were unable to detect any patterns of coping unique to the different insecure attachment groups. As well, despite positing such relationships, they did not investigate the ability of coping strategies to mediate the relationships between attachment styles and outcomes such as distress.

Appraisals

Mikulincer and Florian (1998) emphasized the role of appraisals in chronic pain. They suggested that relative to those with secure attachment, those with an insecure attachment style view themselves as less capable of dealing with their pain and appraise their pain more negatively. They further suggested that these differences in self-efficacy and pain-related appraisals lead to greater levels of distress in those with insecure attachment. Mikulincer and Florian's findings indicated that those with insecure attachment did have more negative appraisals than those with secure attachment. There are several pain-specific measures that assess constructs closely related to appraisals of pain. For example, the Pain Anxiety Symptoms Scale (McCracken, Zayfert, & Gross, 1992), a measure of pain-related fear and anxiety, assesses appraisals of pain including beliefs that it will never decrease, fears of mental difficulties as a result of pain, dread of pain, and general worry in response to pain. Given the prominence of fear-avoidance models of chronic pain (for a review see Asmundson, Norton, & Norton, 1999; Vlaeyen & Linton, 2000) investigating associations between attachment styles and more pain-specific appraisals, which are commonly identified as vulnerabilities for chronic pain,

would likely be a productive line of research. Along these lines, Ciechanowski et al. (2003) considered the relationship between attachment and pain-related catastrophizing. Their findings were moderately supportive of their hypotheses that fearful and preoccupied attachment would be positively associated with catastrophizing (i.e., a significant positive association was found between fearful attachment ratings and catastrophizing at follow-up).

Mikail et al. (1994) did not specifically address the relationships between attachment, appraisals, and chronic pain. However, they did suggest that those with a dismissing attachment style and those with a fearful attachment style tend to minimize or downplay their pain difficulties. They also noted that securely attached individuals tend to present clear descriptions of their pain symptoms and that preoccupied individuals tend to be highly symptom focused. However, Mikail et al appeared to consider these differences as reflecting differences in presentation style rather than differences in appraisals of pain. The topic of appraisals was not discussed by Kolb (1982) or Anderson and Hines (1994).

Use of External Methods of Regulating Emotion

Maunder and Hunter (2001) provided a theoretical overview of the role attachment may play in the development of psychosomatic complaints. They covered much of the same material as that reviewed above as well as one additional and unique hypothesis. They suggested that since those with insecure attachment have deficits in the ability to internally regulate emotions (e.g., by using coping self-statements), they would be at greater risk of using potentially maladaptive external regulators of emotion, such as drugs, alcohol, eating, and sex. Maunder and Hunter acknowledged that there is

little evidence at present to support their contention, but they did discuss several studies that indirectly support this hypothesis. While this hypothesize of more frequent use of external methods of stress regulation amongst those with insecure attachment styles would not serve as a vulnerability for chronic pain, the use of these methods could lead to poor adaptation amongst chronic pain patients with insecure attachment.

STUDY OVERVIEW

Objectives and Rationale

The theoretical writings and research reviewed above suggest that insecure attachment may be a risk factor for the development of chronic pain. More specifically, insecure attachment may serve as a risk factor for developing chronic pain because, in comparison to securely attached individuals, those with insecure attachment have more frequent experiences of pain, tend to avoid consulting with healthcare professionals, have poorer relationships with healthcare professionals, utilize social support ineffectively, use maladaptive forms of coping, and appraise their pain more negatively. The primary objective of the present study was to examine the relationships between these maladaptive methods of responding to pain and adult attachment variables. The general hypothesis was that insecure attachment would be positively associated with these maladaptive responses to pain. Several of the key features of the present study are noted below.

First, a non-clinical sample was utilized. It is possible that associations between insecure attachment and both chronic pain and pain-related variables may be due to negative changes in attachment (viz., secure attachment to insecure attachment) amongst those with chronic pain rather than due to the influence of insecure attachment

on these variables. This possibility warrants consideration because chronic pain has been found to be associated with decreases in relationship quality between chronic pain patients and their spouses (Ahern & Follick, 1985) and changes in marital satisfaction are positively associated with changes in attachment style (Davila et al., 1999). Given this possibility, it was important to demonstrate that the relationships between adult attachment and pain-related variables exist prior to the development of chronic pain. For this reason a non-clinical sample comprised of university students was used. This type of sample is well suited for a study of pain-related variables as individuals in the age group typical of university students (18-24 years of age) report pain more frequently than individuals in other age groups (Sternback, 1986). As well, the use of a student sample allowed for a large sample size, which was required for some of the statistical tests noted below (i.e., testing interaction effects). The findings of the present study will assist in determining whether more logistically challenging research in this area is warranted (e.g., longitudinal research with a clinical sample).

Second, the primary objective of the study was to examine the relationships between the two attachment dimensions (viz., models of self and others) and the pain-related variables. However, moderation effects were also investigated. Researchers utilizing measures of attachment dimensions typically examine associations (i.e., correlation or regression coefficients) between the attachment dimensions and the variables of interest. This method, however, is not entirely appropriate. Griffin and Bartholomew (1994b) noted that it is important to consider the combination of the two dimensions and they demonstrated that the four attachment categories have "emergent properties" (p. 39) that are not apparent when only linear combinations of the

attachment dimensions are considered. In short, they suggested that the impact of each attachment dimension on relevant dependent variables is moderated by the other attachment dimension and they demonstrated that such moderation effects could be found by testing for an interaction effect using a 2 by 2 analysis of variance or with moderated correlations (i.e., determining whether the correlations between a dimension and the dependent variable differ in magnitude, or direction, at different levels of the second dimension). For example, Griffin and Bartholomew found that amongst those with a positive model of self there was a negative relationship between model of others and problems being exploited. In contrast, they found that amongst those with negative models of self there was a positive relationship between models of other and problems with exploitation. Despite their demonstration that moderation effects are important, few studies in the attachment literature have tested for interaction effects and several studies that have explored this possibility have been limited by sample sizes too small to detect interaction effects (e.g., Ognibene & Collins, 1998) or have not reported the details needed to interpret the interaction effect (e.g., Brennan, Clark, & Shaver, 1998). Based on the findings of Griffin and Bartholomew, the present study also tested for moderation effects. However, a multiple regression based method of testing for interactions suggested by Aiken and West (1991) was used.

Third, analyses regarding the attachment categories (i.e., the prototype approach) were included in order to provide descriptive information useful for comparing the present findings with those of future studies and to facilitate interpretation of significant interaction effects. As well, the prototype approach was consistent with the conceptualization of attachment utilized by the most detailed model

regarding chronic pain and attachment (i.e., Mikail et al. 1994). Descriptive information and between-group comparisons regarding the attachment groups were used to evaluate several hypotheses of this model.

Fourth, a measure of parent and peer attachment was used in order to examine relationships between pain-related variables and a measure based on an alternative conceptualization of attachment. Although romantic attachment has been widely used in studies utilizing university students, it is nonetheless possible that attachments regarding parents and peers could be more salient for university students as many of them will not have had extensive experiences in romantic relationships. Parental and peer attachment have not been directly discussed in the chronic pain literature; however, these types of attachment can be considered similar to the approach used by Anderson and Hines (1994) because in both cases attachment is conceptualized along a single dimension (secure vs. insecure) rather than consisting of several types.

Fifth, the present study focuses on variables central to fear and avoidance models of chronic pain and on pain-related interpersonal behaviors. Fear and avoidance models currently play a prominent role in the chronic pain literature and have been the subject of several review papers (e.g., Asmundson et al., 1999; Vlaeyen & Linton, 2000). In short, these models suggest that individuals that are highly fearful of pain tend to be hypervigilant to pain and avoid activities, such as exercise and leisure pursuits, that may cause pain. The avoidance of these types of activities can lead to physical consequence such as loss of strength and flexibility that in turn increase disability. As well, the avoidance is thought to maintain or exacerbate the fear of pain. Several self-report measures regarding constructs central to fear and avoidance models were

included in the present study. They were selected because they assess constructs that have received substantial attention in the chronic pain literature. Most of these variables have been found to be positively associated with unfavorable outcomes, such as disability and pain severity. These measures assess pain catastrophizing, fear of pain, and pain-related hypervigilance. Collectively, these measures were referred to as measures of pain-related appraisals. A measure of anxiety sensitivity was also used as a pain-related appraisal measure. Anxiety sensitivity refers to the fear of anxiety-related symptoms based on the belief that they have negative consequences (Reiss, 1991). Several longitudinal studies have demonstrated that high anxiety sensitivity is associated with the development of panic attacks (e.g., Schmidt, Lerew, & Jackson, 1999). Anxiety sensitivity was included as a pain-related measure because several studies (e.g., Asmundson & Norton, 1995; Asmundson & Taylor, 1996; Asmundson, Kuperos, & Norton, 1997) suggest that anxiety sensitivity is positively associated with chronic pain (for a review see Asmundson, 1998) and at least one current model (Turk, 2002) proposes that anxiety sensitivity is a major diathesis for the development of chronic pain and disability following traumatic injury.

Interpersonal behaviors were investigated in the present study because the relationship between attachment and help-seeking efforts is a major focus of attachment theory. As well, Mikail et al.'s (1994) writings emphasized the interpersonal aspects of chronic pain, such the relationships between patients and healthcare professionals. There is a paucity of well-established measures concerning help-seeking and social support that are appropriate for studying pain in a non-clinical sample. As a result, several novel measures of interpersonal behaviors were utilized. These included a

dichotomous variable regarding whether or not participants had a general practitioner or family physician, self-reports regarding the quality of their relationships with their general practitioner, and dichotomous variables regarding interpersonal responses to a recent pain episode (e.g., telling a friend about one's pain). As well, a general measure (i.e., not a pain-related or pain specific measure) of attitudes regarding seeking social support was used.

Finally, despite Mikulincer and Florian's (1998) emphasis on coping, this topic was not investigated because measures suitable for assessing pain-related coping in non-clinical samples have not been developed. However, a measure of interference associated with a recent episode was administered. Thus, it was possible to examine the relationship between attachment and an outcome likely to be associated with coping efforts (i.e., those with effective coping efforts would be expected to have minimal pain-related interference where as those using less adaptive coping strategies would be expected to have more substantial pain-related interference). A measure of general psychopathology (i.e., depression, anxiety, and stress) was also used. This feature was included because psychopathology has been found to be strongly associated with chronic pain and because psychopathology is a major focus of the chronic pain literature (e.g., Dersh, Polatin, & Gatchel, 2002).

Hypotheses

The general hypothesis of the present study was that insecure attachment would be positively associated with reports of pain or pain complaints, negative pain-related appraisals (e.g., fear of pain), and negative interpersonal variables (e.g., communication difficulties with one's physician). Since the theoretical writings reviewed above

regarding pain and attachment do not specifically address all of the pain-related constructs considered here, findings from the general attachment literature were used to guide these hypotheses.

The Experiences in Close Relationships Questionnaire (ECR; Brennan et al., 1998) provided measures of the participants' models of self and models of others. Since higher scores on the ECR reflected more negative models, positive associations (i.e., positive correlation and regression coefficients) were expected between these scales and variables reflecting negative appraisals or relationships. Previous studies (e.g., Griffin & Bartholomew, 1994b; Lopez, Melendez, Sauer, Berger & Wyssmann, 1998; Ognibene & Collins, 1998; Weems, Berman, Silverman, & Rodriguez, 2002) suggest that models of self are more strongly associated with variables related to one's self-concept and perceptions of competency than are models of others. Based on these findings, it was expected that the model of self dimension would be more strongly associated with the pain-related appraisal and psychopathology measures than the model of others dimension. These studies also suggest that models of others are more strongly associated with variables regarding interpersonal constructs, so it was expected that the model of others dimension would be more strongly associated with variables involving interactions with others, such as attitudes toward social support-seeking. Few studies concerning adult attachment dimensions have considered moderation effects, so the multiple regressions testing for interaction effects were considered exploratory.

The ECR was also used to categorize participants into one of the four attachment prototypes in Bartholomew and Horowitz's (1991) model. Given that these attachment style assignments were based on the ECR scales, it was expected that the

findings with the attachment prototypes would reflect the findings with the attachment dimensions. For example, if there was a strong association between the ECR scale assessing model of others and attitudes towards help-seeking (i.e., those with positive models have more positive attitudes), it would be expected that those classified into an attachment category with positive models of others (i.e., secure and preoccupied) would report more favorable attitudes towards seeking help than those classified into an attachment category with negative models of others (i.e., fearful and dismissing).

As noted above, the analyses regarding the prototypes were included to provide descriptive information useful for comparing the present findings with those of future studies and as a method of interpreting significant interaction effects. They were also included to more directly examine Mikail et al.'s (1994) suggestion that individuals with a dismissing attachment style tend to "dismiss symptoms and minimize the meaning of their pain" (p. 9). Based on Mikail et al.'s writing, it was hypothesized that dismissing individuals would have the lowest levels of negative pain-related appraisals.

The revised version of the Inventory of Parent and Peer Attachment (IPPA-R; Armsden & Greenberg, 1987) was included in order assess attachment for an alternative perspective (i.e., parental and peer attachment). Since high scores on this measure reflect more positive attachment experiences, negative associations were expected between the IPPA-R scales and the measures assessing pain, negative-pain-related appraisals, and psychopathology. Positive associations were expected between the IPPA-R scales and the measures reflecting the use, or attitudes towards, receiving help from others. There were no specific hypotheses regarding which attachment domain (father, mother, or peers) would be the most strongly associated with these variables.

METHOD

Participants and Procedure

A total of 316 individuals participated in the study. After removing cases that did not complete one or more of the questionnaires, a *total sample* of 311 was available for analyses. This sample had an average age of 20.26 (SD = 4.41) years and was primarily single (91.6%) and Caucasian (65.3%). The sample was almost equally distributed with regard to gender (50.5% female).

Participants were recruited from the University of Manitoba Department of Psychology Subject Pool in accordance with the recruiting guidelines and after the study had received approval from the Psychology/Sociology Research Ethics Board. Potential participants were informed that the study was aimed at understanding relationship styles and pain-related behaviors. Individuals interested in participating in the study were asked to meet the researcher at one of several data collection sessions. During the data collection sessions, those willing to participate were asked to provide informed written consent and then completed a questionnaire package consisting of a demographics questionnaire, a pain history and experience questionnaire, measures of attachment style, measures of pain-related appraisals, and general measures of emotional distress and social support perceptions. The study materials are described below.

Materials

A brief demographics questionnaire was used to obtain information from the participants regarding their age, gender, marital status, and ethnic/racial background. The questions utilized in the analyses and the self-report measures included in the

questionnaire package are described below. The self-reports concerning attachment and the pain-related variables were interspersed with each other in an effort to maintain the participants' interest.

Pain Experiences

Participants were asked to rate how frequently they experience six different types of pain including back pain, headaches, joint pain, muscle aches, stomach cramps, and neck pain. Ratings were made using a scale that ranged from 0 (*rarely or never*) to 4 (*all the time or almost all the time*). This measure was designed to be similar to Pennebaker's (1982) Inventory of Limbic Languidness (i.e., a trait measure of somatic symptoms), but was focused on pain complaints rather than the broader category of somatic complaints. Participants' ratings were summed to provide an index of pain frequency. In the total sample this measure had adequate internal consistency (i.e., alpha = .70).

Chronic or Persistent Pain

Several questions concerning ongoing pain and pain history were included in order to determine whether the respondent should be considered as having chronic or persistent (i.e., on-going, but not constant) pain. They were asked to indicate whether they currently had "pain or discomfort that has persisted continuously or intermittently for longer than three months?" This method of identifying individuals that could potentially be considered as having chronic pain was adapted from the method utilized in Elliott, Smith, Penny, Smith, and Chambers' (1999) epidemiological study of chronic pain. Those indicating the presence of such pain were asked a series of follow-up questions regarding the frequency of their pain, the intensity of their pain, and physician

contact regarding the pain. The pain intensity rating was based on the present pain intensity rating method used in the McGill Pain Questionnaire (Melzack, 1975) and ranged from 0 (*No pain*) to 5 (*Excruciating*). Individuals were considered to have chronic or persistent pain if they reported the presence of continuous or intermittent pain over the past 3 months, (b) indicated that the pain occurred almost everyday or more, (c) rated the pain intensity as discomforting or worse, and (d) reported consulting with a physician regarding this pain. The exact wording of these questions can be found in the appendix. Many of those meeting these criteria would likely not be considered *chronic pain patients* as defined in the clinical chronic pain literature (i.e., patients suitable for tertiary care for their pain). However, this method was utilized as a liberal method of identifying individuals that could be potentially considered chronic pain patients.

Recent Headache Experiences

Participants were asked how many headaches they had during the past week. Those reporting a headache in the past week were asked a series of questions regarding their worst headache during that time period. The following questions were asked in order to investigate participants' responses to a specific type of pain that had been experienced recently enough for them to provide accurate reports.

Pain Severity. Those reporting a headache in the past week were asked to indicate the severity of their worst headache during that time using a 0 - 10 scale anchored with 0 (*No pain*) and 10 (*Strongest pain imaginable*). This method is of rating pain severity, or intensity, is a numerical version of the Visual Analog Scale used by Scott and Huskisson (1976).

Pain-Related Behaviors. Respondents were asked whether they reported this pain to (a) a friend, or (b) a family member. These questions used a "yes/no" format and were based on similar questions included in Pain Behavior Checklist (Philips & Jahanshahi, 1986).

Pain-Related Interference. A modified version of the Disability Index (PDI; Pollard, 1984) was used to assess the amount of interference associated with each respondent's worst headache in the previous week. The PDI is a 7-item self-report measure designed to measure the extent to which chronic pain interferes with a person's ability to engage in various life activities. Respondents use a scale ranging from 0 (*no interference*) to 10 (*total interference*) to report on interference related to family/home responsibilities, recreation, social activity, occupational duties, sexual behavior, self-care, and life-support activity. The PDI has been found to have good psychometric properties (Tait, Chibnall, & Krause, 1990) and has been modified successfully for use with non-clinical samples (e.g., Thomas & Roy, 1995). In the present study, the wording of the PDI was modified so it would be appropriate for a student sample. Specifically, it referred to *interference* rather than *disability*. A factor analysis of the PDI (Tait et al., 1990) has indicated that it assesses pain-related interference regarding voluntary activities (e.g., socializing) and pain-related interference regarding obligatory activities (e.g., self-care). It was unlikely that the three items referring to obligatory activities would be endorsed by the study participants, so they were not included. In the total sample, this measure had excellent internal consistency (alpha = .86).

Physician Contact and Relationship Quality

Participants were asked whether they have a "regular family physician or general practitioner." This variable was labeled as "Ongoing Contact with a GP." Those with such a physician were asked to complete a 9-item questionnaire designed to assess the quality of their affective relationship with their doctor (Relationship Quality) and difficulties communicating with their doctor (Communication Difficulty). The questions included in this measure were based on a previously developed measure (the Patient Reactions Assessment; Galassi, Schanberg, & Ware, 1992) and utilized a response format ranging from 1 (*Very Strongly Disagree*) to 7 (*Very Strongly Agree*). Higher scores on these measures indicated greater affective relationship quality and greater communication difficulty. Amongst those with a family physician ($n = 241$) the internal consistency (i.e., alpha coeffecient) of the Affective Relationship Quality scale was .78 and the internal consistency of the Communication Difficulty scale was .76.

Attachment measures

Experiences in Close Relationships Questionnaire (ECR; Brennan et al., 1998). The ECR includes an 18-item Model of Self scale and an 18-item Model of Others scale. Respondents are asked to indicate their level of agreement with a series of statements concerning their relationship experiences using a response format ranging from 1 (*Disagree strongly*) to 7 (*Agree strongly*). The scale scores are created by taking the average score of the items from each scale. The ECR was developed based on a series of analyses (i.e., factor analytic and correlational) designed to select items from existing attachment measures that best capture the two attachment dimensions. Brennan et al. (1998) reported alpha coefficients > .90 for each of these scales and reported

several analyses supportive of the construct validity of the ECR. For example, theoretically meaningful associations were found between a measure of individual differences in the use of touch in the context of romantic relationships and both ECR scales. A recent item response theory analysis of several commonly used measures of adult attachment indicated that the ECR scales showed the greatest degree of measurement precision (Fraley, Waller, & Brennan, 2000).

Throughout this paper, the terms *Model of Self* and *Model of Others* (capitalized) are used to refer to the ECR scales whereas the terms *model of self* and *model of others* (not capitalized) are used to refer to the attachment constructs operationalized by the ECR. Respectively, Brennan et al. labeled the Model of Self and Model of Others scales as the Anxiety and Avoidance scales (i.e., their affective-behavioral names). In order to be consistent with the terminology used in the chronic pain literature, the working-model related names (i.e., Model of Self and Model of Others) were used in the present study. Higher scores on these scales indicate more negative models. Brennan et al. (1998) also developed a method to assign individuals to one of the attachment categories based on the their scores on the two attachment scales. This method utilizes classification coefficients derived from a linear discriminant functions analysis conducted on a large university sample ($N = 1082$). This procedure classifies individuals into one of four possible categories including secure (positive models of self and others), dismissing (positive model of self and negative model of others), fearful (negative models of self and others), and preoccupied (negative model of self and positive model of others). Complete scoring instructions are provided by Brennan et al. (1998).

Inventory of Parent and Peer Attachment -- Revised (IPPA-R; Armsden & Greenberg, 1987, 1989). The IPPA-R includes three 25-item sections that separately assess attachment to one's father, mother, and peers. It utilizes a 5-point Likert scale that ranges from 1 (*Almost Never or Never True*) to *5 (Almost Always or Always True*). These subscales have been found to have excellent internal consistency. For example, Armsden and Greeenberg (1989) reported internal consistency coefficients for the Father Attachment, Mother Attachment, and Peer Attachment subscales of .89, .87, .92, respectively. The IPPA was originally designed for use with adolescents; however, the IPPA and the IPPA-R are appropriate for use with university students and similar levels of internal consistency have been found is such samples (e.g., Rice & Mirzadeh, 2000).

Pain Measures

Pain Catastrophizing Scale (PCS; Sullivan, Bishop, & Pivik., 1995). The PCS is a 13-item self-report measure designed to assess catastrophic thoughts or feelings accompanying the experience of pain. The instructions ask one to reflect on past painful experiences and to indicate the degree to which each of the 13 thoughts or feelings are experienced when in pain. The questionnaire uses a 5-point scale ranging from 0 (*not at all*) to 4 (*all the time*). The PCS has been found to be reliable (i.e., Alpha = .95; Osman et al., 2000) and to have a test-retest reliability of .70 when readministered over periods ranging from 8 to 12 weeks (Sullivan et al., 1995). Supportive of its construct validity, PCS scores have be found to be positively associated with catastrophic thoughts in response to an experimental pain procedure (i.e., the cold pressor) and to contribute significant and unique variance to the prediction of pain intensity during such procedures (Sullivan et al., 1995).

Fear of Pain Questionnaire-III (FPQ-III; McNeil & Rainwater, 1998). The FPQ-III is a 30-item self-report measure of fear of pain. This measure presents a series of hypothetical painful situations (e.g., breaking one's arm) and requires the respondent to rate the degree of fear they anticipate experiencing related to the painful event. A Likert scale ranging from 1 (*Not at all*) to 5 (*Extreme*) is used. The FPQ-III is comprised of three subscales assessing Fear of Severe Pain (e.g., "Being in an automobile accident"), Fear of Minor Pain (e.g., "Biting your tongue while eating"), and Fear of Medical Pain (e.g., "Having a blood sample drawn with a hypodermic needle"). The total FPQ-III score, which is obtained by summing the responses to each item, was used in the present study. McNeil and Rainwater reported that the FPQ-III had excellent internal consistency (i.e., alpha = .92) and had adequate test-retest reliability (i.e., .74) over a 3-week period. Supportive of its construct validity, those with high scores on this measure more quickly stopped watching a video of a painful dental procedure (i.e., more rapid pain-related avoidance/escape behavior) than those with low scores on this measure (McNeil & Rainwater, 1998).

Pain Vigilance and Awareness Questionnaire (PVAQ; McCracken, 1997). The PVAQ is a 16-item measure of attention to pain. The original PVAQ was designed for use with chronic pain patients and requires respondents to consider their behaviour over the last 2 weeks and to indicate how frequently each item is true using a scale ranging from 0 (*never*) to 5 (*always*). McCracken (1997) reported findings supportive of the internal consistency, test-retest reliability, and the construct validity of the PVAQ. More recently, Roelofs, Peters, Murris, and Vlaeyen (2002) provided evidence supportive of its convergent and divergent validity. They found PVAQ scores were highly correlated

with measures of related constructs, such as catastrophizing, and were weakly correlated with measures of unrelated constructs, such as trait anxiety. A slightly modified version of the PVAQ suitable for use with non-clinical samples was used. McWilliams and Asmundson (2001) reported that this modified version of the PVAQ had excellent internal consistency (alpha = .92) and that its correlations with pain-related variables (e.g., pain severity ratings and pain-related restriction in activities) were supportive of its construct validity.

The Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gurskky, & McNally, 1986). The ASI is a 16-item measure of fear of anxiety-related signs and symptoms. Respondents indicate their degree of endorsement for each item on a 5-point Likert scale that ranges from 0 (*very little*) to 4 (*very much*). There is considerable evidence for the validity (Peterson & Reiss, 1992) and reliability (Maller & Reiss, 1992) of the ASI.

Other Measures

Network Orientation Scale (NOS; Vaux, 1985; Vaux, Burda, & Stewart, 1986). The NOS is a 20-item scale designed to measure "...negative expectations, attitudes, and beliefs regarding the desirability and effectiveness of seeking help from one's support network" (p. 359; Wallace & Vaux, 1993). Items were rated on a 4-point scale ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). The NOS has been found to have adequate internal consistency and stability. Supportive of its validity, the NOS has been found to be correlated with measures of theoretically related constructs such as help-seeking beliefs, social support availability, and psychological distress (see Wallace

& Vaux, 1993). The total score was used as a global measure of attitudes towards social support.

Depression-Anxiety-Stress Scales - 21 (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a brief version of the Depression-Anxiety-Stress Scales (DASS; Lovibond & Lovibond, 1995) designed to assess three constructs in the tripartite model of depression and anxiety. It contains 7-item subscales that assess the specific constructs of depression (i.e., dysphoria, low self-esteem, lack of interest) and anxiety (i.e., symptoms of hyperarousal and subjective feelings of anxiety) as well general distress (nervous tension and irritability). Respondents are asked to indicate how much the item statements applied to them over the past week using a 4-point Likert scale that ranges from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*). There is excellent support for the validity and reliability of both the DASS and the DASS-21 (for a review see Clara, Cox, & Enns, 2001).

RESULTS

Presence of Chronic Pain

The procedure for determining chronic (or persistent) pain cases is described in the methods section. When this procedure was applied, 30 participants were classified as having chronic pain and included 9 males and 21 females. The remaining sample (n = 281; referred to hereafter as the *study sample*) was used in the majority of the analyses described below and included 145 males and 136 females. A chi-square analysis indicated that the disproportionate number of females in the chronic pain group was statistically significant [χ^2 (1) = 5.06, p = .024 (2-tailed test)]. The chronic pain group was slightly older (M = 22.40, SD = 7.19) than the study sample (M = 20.01, SD =

3.95), but this difference was only marginally significant [t (30.91) = -1.79, p = .083 (2-tailed test)]. It has been suggested that individuals with chronic pain have more insecure attachment styles and this suggestion provided part of the rationale for excluding those with chronic pain. In order to examine this possibility, the chronic pain group and the study group were compared with regard to each of the attachment dimensions. The findings of these analyses are summarized in Table 1. Contrary to suggestions in the literature, the groups did not differ with regard to the ECR scales or the Mother and Peer scales of the IPPA-R. However, there was a small statistically significant difference with regard to the Father scale of the IPPA-R, but in this case the chronic pain group had higher scores (i.e., more positive attachment) than the non-pain group.

Adult Romantic Attachment Dimensions

Three individuals did not complete the ECR leaving a sample of 278 individuals without chronic pain and complete data on the ECR. The three individuals who did not complete this measure indicated in an earlier section of the questionnaire package that they had never been in a romantic relationship. The means scores on the Model of Self and Model of Others scales were 3.27 (SD = 1.11) and 2.87 (SD = 1.07), respectively. The correlation between these two scales was small and nonsignificant [r (276) = .081, n.s.].

The first step in the analyses using the ECR was to examine simple bivariate relationships (i.e., correlations and point-biserial correlations) between the two ECR scales and the dependent variables. Hierarchical multiple linear and logistic regressions were used to: (a) determine whether the ECR scales could account for unique variance in the dependent variables beyond that accounted for by the demographic variables and

Table 1

Comparison of Non-Chronic Pain and Chronic Pain Subsamples on Attachment Dimensions

Attachment Dimension	Group Means (*SD* in Parenthesis) Non-Chronic Pain ($n = 278$)	Chronic Pain ($n = 30$)	*t*-test (*df* in Parenthesis)	*p*
Model of Self	3.27 (1.11)	3.27 (1.24)	.01 (306)	n.s.
Model of Others	2.87 (1.07)	2.74 (1.24)	.61 (306)	n.s.
IPPA-R Mother	94.41 (19.02)	87.23 (25.79)	1.48 (32.48)[a]	n.s.
IPPA-R Father	88.13 (21.32)	79.59 (21.00)	2.06 (298)	.041
IPPA-R Peer	99.14 (14.69)	101 (14.55)	-.96 (309)	n.s.

Note. Degrees of freedom varied because of different levels of incomplete data across measures; the pain group had complete data for all measures except one missing case on the IPPA-R Father scale. Model of Self and Model of Others are from the Experiences in Close Relationships Questionnaire. IPPA-R = Inventory of Parent and Peer Attachment -- Revised.

[a] Degrees of freedom and t-test values were based on an assumption of equal variances except in this case in which unequal variances were found.

the other ECR scale, and (b) test whether the two attachment dimensions interacted in the prediction of the dependent variables. These analyses involved three steps. In Step 1, a block of demographic variables consisting of age and gender were entered. In Step 2, a block consisting of the two ECR scales was entered. In Step 3, the interaction term was entered. Following Aiken and West's (1991) recommendations for testing interaction effects, the ECR scales were centered (i.e., put in deviation score form with means of zero) and the interaction term (a variable created by multiplying the two ECR scales) was formed using the centered versions of the ECR scales. Centering these predictors is used to reduce problems due to multicollinearity (p. 36; Aiken & West, 1991). In order to control for Type I error the critical *p*-value was set at .01 (2-tailed test). The more liberal significance level of .05 is also reported in the tables in order to provide a more complete record of the analyses. In general, only findings considered significant at the more conservative level (i.e., $p \leq .01$) were considered in the discussion of the findings. However, given the difficulty detecting interaction effects (see McClelland & Judd, 1993) marginally significant findings regarding the interaction terms were also noted. The analyses involving the attachment categories (i.e., the prototype approach) were used to interpret the interaction effects.

Occurrence of Pain Problems

Participants rated how frequently they experience six different types of pain and these ratings were summed to provide an index of pain frequency. Model of Self scores were positively and significantly correlated with pain experiences [r (276) = .28, $p <$ .001], but Model of Others scores were not [r (276) = .02, n.s.]. The results of the regression analyses are reported in Table 2. The addition of the Model of Self and

Table 2

Summary of Hierarchical Linear Regression Predicting Pain Experiences

Independent Variables and Model Statistics	*Beta*
Step 1	
Model F (2,28) = 4.92, p = .008. *Adj.* R^2 = .028	
Age	.02
Gender	.19**
Step 2	
Model F (4,273) = 9.44, p < .001. *Adj.* R^2 = .109	
Change F (2,273) = 13.51, p < .001. R^2 Change = .087	
Age	.00
Gender	.21***
Model of Self	.30***
Model of Others	.00
Step 3	
F (5,272) = 7.64, p < .001. Adj. R^2 = .107	
Change F (1,272) = 13.51, p = .478. R^2 Change = .002	

Note. The beta values for Step 3 are not reported because the addition of the interaction term in Step 3 did not significantly improve the model.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

Others variable (Step 2) improved the model and the R^2 Change value indicated that these variables accounted for an additional 8.7% of the variance in pain experiences. Consistent with the bivariate analyses, the Model of Self variable had a significant positive relationship with pain experiences and the Model of Others variable did not have a significant relationship with pain experiences. The variable representing the interaction between the two attachment dimensions was included in Step 3 and did not result in an improvement in the model.

Treatment-seeking Variables

The treatment-seeking variables considered included the Ongoing Contact with a GP variable and the Relationship Quality and Communication Difficulty scales that referred to participants' relationships with their general practitioners. Of the 278 individuals without chronic pain who provided complete ECR data, 220 (79.1%) reported having a general practitioner. When examining the latter two variables, only the 216 individuals that reported having a general practitioner and who provided complete data regarding the Relationship Quality and Communication Difficulty scales were included in the analyses.

Point biserial correlations indicated small non-significant relationships between Ongoing Contact with a GP and both Model of Self [r_{pb} (276) = -.03, n.s.] and Model of Others [r_{pb} (276) = -.03, n.s.]. With regard to the multiple logistic regression analyses, all three models (Steps 1 to 3) were similar in terms of the level of statistical significance for the model (i.e., marginal) and the variables identified as significant predictors of the general practitioner variable, so only the final model (Step 3) is reported here. The model including all three Blocks was marginally significant [χ^2 (5) =

14.21, $p = .014$] and indicated a negative association between age and Ongoing Contact with a GP (Confidence Intervals in parentheses) [Odds Ratio = .92 (.86-.98), $p = .007$]. Non-significant relationships were found with regard to gender [Odds Ratio = 1.32 (.72-2.42), n.s.], Model of Self [Odds Ratio = .94 (.71-1.24), n.s.], and Model of Others [Odds Ratio = .934 (.70-1.25), n.s.]. However, a marginally significant association between the interaction term and the general practitioner variable was found [Odds Ratio = .76 (.60-.97), $p = .027$]. The R^2 value indicated that the final model accounted for 5.0% of the variance in Ongoing Contact with a GP.

A questionnaire based on the Patient Reactions Assessment (Galassi et al., 1992) was used to assess the quality of participants' relationships with their general practitioner. This measure produced a measure of Relationship Quality and Communication Difficulty. Respectively, the average scores on these measures suggested that the participants generally had positive relationships with their general practitioners ($M = 27.92$, $SD = 5.81$; maximum possible score = 35) and that they experienced little difficulties communicating with their general practitioners ($M = 8.99$, $SD = 4.74$; maximum possible score = 24). Model of Self scores were not significantly associated with Relationship Quality scale [r (214) = -.09, n.s.], but were positively associated with the Communication Difficulty scale [r (214) = .22, $p < .001$]. Model of Others scores were significantly and negatively associated with Relationship Quality [r (214) = -.37, $p < .001$] and significantly and positively associated with Communication Difficulties [r (214) = .33, $p < .001$]. This pattern of findings suggests that those with positive models of self (i.e., those with low scores on the Model of Self scale) have less communication difficulties with their general practitioners than those with negative

models of self (i.e., those with high scores on the Model of Self scale) and that those with positive models of others (i.e., those with low scores on the Model of Others scale) have positive relationships with their general practitioners and experience little difficulty communicating with them in comparison to those with negative models of others (i.e., those with high scores on the Model of Others scale).

The multiple regression findings are presented in Table 3. The results were similar to those found in the correlation analyses. A significant negative association was found between Model of Others and Relationship Quality, and significant positive associations were found between Communication Difficulties and both of the attachment dimensions. Age and gender were not significantly associated with either Relationship Quality or Communication Difficulties. The models including the attachment dimensions (Step 2) were both significant, but the inclusion of the interaction term (Step 3) did not improve either model. The adjusted R^2 values indicated that the models including the two attachment dimensions accounted for 14.2% and 15.2% of the variance in the Relationship Quality and Communication Difficulties scales, respectively.

Social Support Variables

Three social support-related variables were utilized in the present study. Two variables concerned responses to a recent pain experience and one was a general measure of attitudes toward seeking support from others. Participants were asked whether they experienced a headache in the past week and those reporting one or more headaches were asked to answer several questions about their worst headache in the past week. Specifically, they were asked to provide a pain severity rating, report

Table 3

Summary of Hierarchical Linear Regressions Predicting Physician-related Variables

Part I (Model Summary and Change Statistics)

		Dependent Variables	
		Relationship Quality	Communication Difficulties
Step 1	Model F (df = 2,213)	2.40	1.93
	Adjusted R^2	.013	.009
Step 2	Model F (df = 4,211)	9.88***	10.62***
	Adjusted R^2	.142	.152
	Change F (df = 2,211)	17.00***	18.97***
	R^2 Change	.136	.150
Step 3	Model F (df = 5,210)	7.90***	8.78***
	Adjusted R^2	.138	.153
	Change F (df = 1,210)	.15	1.36
	R^2 Change	.001	.005

Part II (Beta Values across Physician-related Variables)

		Dependent Variables	
Predictor Variables		Relationship Quality	Communication Difficulties
Step 1	Age	-.01	-.70
	Gender	.15*	-.11
Step 2	Age	-.01	-.07
	Gender	.12	-.06
	Model of Self	-.08	.22***
	Model of Others	-.36**	.33***

Note. The beta values for Step 3 are not reported because the addition of the interaction term in Step 3 did not significantly improve the model.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

whether they told a friend about the headache, and report whether they told a family member about the headache. The latter two questions were utilized as pain-related social support-seeking variables. Of the non-chronic pain participants who provided complete ECR data, 140 (50.4%) reported on a recent headache. The average pain severity rating was 4.61 (SD = 2.02) and indicated a moderate level of pain. A slight majority of participants (57.9%) told a friend about the headache and a slight minority (48.6%) told a family member about the headache.

Telling a friend about the headache was not significantly associated with either the Model of Self scale [r_{pb} (138) = .08, n.s.] or the Model of Others scale [r_{pb} (138) = -.12, n.s.]. Telling a family member about the headache was marginally associated with the Model of Self scale [r_{pb} (138) = -.16, p = .057], but was not significantly associated with the Model of Others scale [r_{pb} (138) = .07, n.s.]. In the multiple logistic regression analyses, pain severity ratings were also included in the first block (in addition to age and gender). The findings of these logistic regression analyses are reported in Table 4 and are similar to those found with the correlation analyses. However, the interaction term had a marginally significant (p = .037) association with the telling a friend about the headache variable.

The NOS was administered as a method of assessing attitudes towards seeking social support in general (viz., not specifically in response to pain). NOS scores had significant negative associations with the Model of Self [r (276) = -.21, p = .001] and Model of Others [r (276) = -.42, p < .001] variables. The regression analyses regarding the NOS are reported in Table 5. As can be seen in Table 5, both attachment dimensions accounted for unique variance in NOS scores and the model including them (as well as

Table 4

Summary of Logistic Regressions Predicting Headache Reporting Variables

Part I (Model Summary and Change Statistics)

		Dependent Variables	
		Telling a Friend	Telling a Family Member
Step 1	Model χ^2 ($df = 3$)	14.87**	11.12*
	R^2	.101	.076
Step 2	Model χ^2 ($df = 5$)	18.26	16.12**
	Block χ^2 ($df = 2$)	3.39	4.10
	R^2	.122	.109
Step 3	Model χ^2 ($df = 6$)	22.10***	16.33*
	Block χ^2 ($df = 1$)	4.73*	.23
	R^2	.151	.110

Part II [Odds Ratios (95% Confidence Intervals in Parentheses)]

		Dependent Variables	
Predictor Variables		Telling a Friend	Telling a Family Member
Step 1	Age	.95 (.87-1.04)	.96 (.88-1.05)
	Gender	1.62 (.79-3.33)	1.57 (.77-3.18)
	Pain Severity	1.35 (1.12-1.63)**	1.28 (1.07-1.53)**
Step 2	Age	.94 (.861-1.03)	.973 (.889-1.07)
	Gender	1.66 (.80-3.47)	1.52 (.73-3.15)
	Pain Severity	1.35 (1.12-1.63)**	1.31 (1.09-1.57)**
	Model of Self	1.24 (.87-.17)	.71 (.50-1.00)*
	Model of Others	.78 (.55-1.10)	1.19 (.85-1.67)
Step 3	Age	.94 (.86-1.03)	--
	Gender	1.84 (.86-3.94)	--
	Pain Severity	1.35 (1.11-1.63)**	--
	Model of Self	1.18 (.82-1.70)	--
	Model of Others	.78 (.54-1.12)	--
	Interaction	.70 (.50-.98)*	--

Note. Dashes indicate Odds Ratios not reported because the addition of the interaction term did not significantly improve the model. Interaction refers to the interaction of the Model of Self and Model of Others Scales from the Experiences in Close Relationships Questionnaire.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

Table 5

Summary of Hierarchical Linear Regression Predicting NOS Scores

Variable and Model Statistics	*Beta*
Step 1	
Model F (2,275) = 12.20, $p < .001$. *Adj.* $R^2 = .075$	
Age	-.12*
Gender	.26***
Step 2	
Model F (4,273) = 24.88, $p < .001$. *Adj.* $R^2 = .256$	
Change F (2,273) = 34.59, $p < .001$. R^2 Change = .186	
Age	-.11*
Gender	.23***
Model of Self	-.15**
Model of Others	-.39***
Step 3	
F (5,272) = 20.18, $p < .001$. Adj. $R^2 = .257$	
Change F (1,272) = 1.26, $p = .263$. R^2 Change = .003	

Note. The beta values for Step 3 are not reported because the addition of the interaction term in Step 3 did not significantly improve the model.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

age and gender) accounted for approximately 25.6% of the variance in NOS scores. The correlation and regression coefficients both indicated that the Model of Others variable was more strongly associated with NOS scores than was the Model of Self variable. The interaction term (Block 3) was not significant predictor of NOS scores.

Interference

Participants reported on the amount of activity restriction or interference they experienced in association with a recent headache episode. Scores on this measure indicated that on average participants reported a moderate amount of interference (M = 3.18, SD = 2.52). Scores on this measure were not significantly associated with the Model of Self scale [r (138) = .07, n.s.] or the Model of Others scale [r (138) = .07, n.s.]. The regression model including the first block indicated positive significant associations between pain-related interference and both gender (Beta = .18, $p < .018$) and pain severity (Beta = .42, $p < .001$). Age (Beta = .06, n.s.) was not associated with pain-related interference. This model was statistically significant [$F(3,136) = 14.95$, $p < .001$] and the adjusted R^2 value indicated that it accounted for approximately 23.1% of the variance. The change statistics indicated that the addition of the second [F Change (2,134) = .88, n.s.] and third [F Change (1,133) = 1.55, n.s.] blocks did not significantly improve the model. Thus, none of the ECR variables were significantly associated with pain-related interference.

Pain-related Appraisals

Four self-reports measures commonly used in the pain and chronic pain literature were administered. These questionnaires assessed pain-related catastrophizing (i.e., PCS), fear of pain (i.e., FPQ-III), vigilance to pain (i.e., PVAQ), and anxiety

sensitivity (i.e., ASI). Correlation analyses indicated that the ECR Model of Self scale was significantly and positively associated with the PCS [r (276) = .24, $p < .001$], FPQ-III [r (276) = .18, $p < .01$], PVAQ [r (276) = .20, $p < .001$], and the ASI [r (276) = .35, $p < .001$]. The ECR Model of Others scale was significantly correlated with the ASI [r (276) = .22, $p < .001$], was marginally associated with the PCS [r (276) = .14, $p < .017$], and was not significantly associated with the FPQ-III [r (276) = .03, n.s.], or the PVAQ [r (276) = .03, n.s.]. The multiple regression findings are reported in Table 6. These findings are similar to the correlational findings. In the model including the first two blocks, statistically significant associations were found between the Model of Self scale and the four pain-related self-reports whereas the Model of Other scale was significantly associated with only the ASI. The addition of the interaction term (Step 3) only significantly improved the model regarding the PVAQ. The interaction term improved the model regarding the ASI to a marginally significant degree [Change F (1,272) = 3.47, p = .064]. The adjusted R^2 values indicated that the final models ranged from 6.4% to 15.3% in terms of the amount of variance in the self-report measures that was accounted for. Between-group comparisons of the four attachment groups are reported below and were used to interpret the interaction effect regarding the PVAQ.

Psychopathology

The DASS-21 was administered to assess three forms of psychopathology. Correlation analyses indicated that the ECR Model of Self scale was significantly and positively associated with the Stress [r (276) = .42, $p < .001$], Anxiety [r (276) = .28, $p < .001$], and Depression [r (276) = .44, $p < .001$] scales of the DASS-21. The ECR Model of Others scale was also significantly and positively correlated with the Stress [r

Table 6

Hierarchical Linear Regression Models Predicting Pain-related Appraisals

Part I (Model Summary and Change Statistics)

		Dependent Variables			
		PCS	FPQ-III	PVAQ	ASI
Step 1	Model F (df = 2,275)	4.01*	15.76***	2.09	.59
	Adjusted R^2	.021	.096	.008	-.003
Step 2	Model F (df = 4,273)	8.49***	12.18***	4.26**	13.46***
	Adjusted R^2	.098	.139	.045	.153
	Change F (df = 2,273)	12.63***	7.82***	6.34**	26.23***
	R^2 Change	.082	.049	.044	.160
Step 3	Model F (df = 5,272)	7.32***	9.80***	4.81***	11.56***
	Adjusted R^2	.102	.137	.064	.160
	Change F (df = 1,272)	2.46	.39	6.67**	3.47
	R^2 Change	.008	.001	.023	.011

Part II (Beta Values across Pain-related Appraisal Scales)

		Dependent Variables			
Predictor Variables		PCS	FPQ-III	PVAQ	ASI
Step 1	Age	-.08	-.07	.08	.04
	Gender	.15	.31***	.09	.06
Step 2	Age	-.10	-.08	.07	.01
	Gender	.18*	.33***	.11	.10
	Model of Self	.26***	.21***	.21***	.35***
	Model of Others	.14*	.03	.02	.20***
Step 3	Age	--	--	.06	--
	Gender	--	--	.11	--
	Model of Self	--	--	.22	--
	Model of Others	--	--	.03	--
	Interaction	--	--	.15**	--

Note. Dashes indicate Beta values not reported because the addition of the interaction term did not significantly improve the model. PCS = Pain Catastrophizing Scale; FPQ-III = Fear of Pain Questionnaire -- III; PVAQ = Pain Vigilance and Awareness Questionnaire; ASI = Anxiety Sensitivity Index; Interaction = Model of Self by Model of Others Interaction.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

(276) = .20, $p < .001$], Anxiety [r (276) = .20, $p < .001$], and Depression [r (276) = .30, $p < .001$] scales.

The multiple regression findings regarding the DASS-21 are reported in Table 7. These findings are similar to the correlational findings. In the model including the first two blocks, the Model of Self and Model of Others scales were both positively and significantly associated with each of the DASS-21 scales. The addition of the interaction term (Step 3) did not improve the regression model regarding the Stress scale. The findings regarding the other two DASS-21 scales indicated that the interaction term had marginally significant associations with both the Anxiety [Change F (1,272) = 3.68, p = .056] and Depression [Change F (1,272) = 3.28, p = .071] scales. The adjusted R^2 values indicated that the final models ranged from 10.1% to 26.0% in terms of amount of variance in the self-report measures that was accounted for.

Adult Attachment Prototypes

The procedure developed by Brennan et al. (1998) was used to assign individuals to one of the attachment categories based on the their scores on the ECR. In the subsample without chronic pain that provided complete ECR data, 107 (38.5%) were classified as securely attached. The other participants were divided almost evenly across the fearful (n = 58), preoccupied (n = 56), and dismissing (n = 57) attachment styles.

Findings regarding the ECR attachment categories are presented for two reasons. First, they were included to provide descriptive information that could facilitate comparisons between the present sample and samples used in future studies in this area. Second, they were used to interpret the interaction effects found in the analyses

Table 7

Hierarchical Linear Regression Models Predicting DASS-21 Subscale Scores

Part I (Model Summary and Change Statistics)

		Dependent Variables		
		Stress	Anxiety	Depression
Step 1	Model F (df = 2,275)	2.30	1.52	2.04
	Adjusted R^2	.009	.004	.007
Step 2	Model F (df = 4,273)	18.28***	8.81***	25.32***
	Adjusted R^2	.200	.101	.260
	Change F (df = 2,273)	33.71***	15.94***	47.92***
	R^2 Change	.195	.103	.256
Step 3	Model F (df = 5,272)	14.99***	7.85***	21.08***
	Adjusted R^2	.202	.110	.266
	Change F (df = 1,272)	1.66	3.68	3.28
	R^2 Change	.005	.012	.009

Part II (Beta Values across DASS-21 Subscales)

		Dependent Variables		
Predictor Variables		Stress	Anxiety	Depression
Step 1	Age	.10	.00	-.01
	Gender	-.08	-.10	-.12*
Step 2	Age	.08	-.01	-.04
	Gender	-.04	-.07	-.07
	Model of Self	.40***	.26***	.41***
	Model of Others	.16**	.17**	.27***

Note. DASS-21 = Depression, Anxiety, and Stress Scale. Beta values for Step 3 are not reported because the addition of the interaction term in Step 3 did not significantly improve the model.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

involving the ECR dimensions. Given that only a few interaction effects were found and the prototype findings closely match those found with the ECR dimensions, only a few of these findings are described in detail as a means of highlighting the main findings. Analyses of variance with post-hoc pair-wise comparisons (i.e., Bonferroni *t*-tests) were used to investigate the continuous dependent variables. These findings are presented in Table 8. Frequency counts and logistic regression analyses were used when considering the categorical dependent variables.

Several different procedures can be used to interpret interactions effects. One widely used method involves multiple regression and plotting the relationship between one of the interacting independent variables and the predicted values of the dependent variable at several different levels (e.g., 1 SD above the mean and 1 SD below the mean) of the second interacting independent variable (see Cohen & Cohen, 1983). Differences in the slopes of these lines are used to interpret the interaction effect. The multiple regression based method produces a figure that is conceptually similar to what would be produced when graphing the findings of studies involving at least two categorical independent variables. Based on this similarity, it is also possible to examine interaction effects by dichotomizing the independent variables and plotting the mean scores of the dependent variable at the various combinations of the dichotomized independent variables. This approach is well suited to examining interaction effects with regard to attachment dimensions because the two attachment dimensions are frequently investigated and conceptualized as dichotomous variables. It is also noteworthy that a similar approach (testing interaction effects in a 2 by 2 analysis of variance and plotting the means across the attachment groups) was advocated and used

Table 8

Continuous Self-report Measure Scores as a Function of Experiences in Close Relationship Questionnaire Attachment Category

	Attachment Category					
Dependent Variables	Secure (n = 107)	Fearful (n = 58)	Preoccupied (n = 567)	Dismissing (n = 57)	Univariate F	Partial Eta-square
Pain Experience (df = 3,274)	7.05_{a}	$8.04_{a,b}$	9.39_{b}	6.81_{a}	5.30***	.055
Physician Variables (df = 3,212)						
Relationship Quality	29.81_{a}	$26.00_{b,c}$	$28.11_{a,c}$	$26.04_{b,c}$	6.59***	.085
Communication Difficulty (n = 84, 41, 44, 47, respectively)	7.33_{a}	12.05_{b}	$8.73_{a,c}$	$9.53_{b,c}$	10.60***	.130
NOS (df = 3, 274)	61.08_{a}	54.78_{b}	58.14_{c}	$56.60_{b,c}$	14.65***	.138
Interference (df = 3,136) (n = 52, 30, 35, 23, respectively)	3.01_{a}	3.61_{a}	3.23_{a}	2.99_{a}	.41	.009
Pain-related Appraisals (df = 3, 274)						
PCS	13.94_{a}	18.90_{b}	$16.64_{a,b}$	$14.81_{a,b}$	4.34**	.045
FPQ-III	74.34_{a}	79.50_{a}	81.05_{a}	74.39_{a}	1.98	.021
PVAQ	35.86_{a}	39.54_{a}	37.09_{a}	32.39_{a}	2.44	.026
ASI	14.03_{a}	21.24_{b}	$20.07_{b,c}$	$16.79_{a,c}$	11.19***	.109
Psychopathology (df = 3, 274)						
DASS-21 Stress	9.16_{a}	16.07_{b}	$15.36_{b,c}$	$11.65_{a,c}$	12.05***	.117
DASS-21 Anxiety	5.63_{a}	11.21_{b}	$9.14_{b,c}$	$7.44_{a,c}$	8.24***	.083
DASS-21 Depression	5.94_{a}	15.24_{b}	$12.96_{b,c}$	9.54_{c}	19.07***	.173

Note. Abbreviations are the same as those used in earlier tables. Means with the same subscript are not significantly different at $p \leq .05$ (Bonferroni t-test).

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

by Griffin and Bartholomew (1994b). In the present study, graphs of the means across the attachment categories were used to highlight the main findings of the study and to interpret the one statistically significant interaction that was found. Model of self was represented on the X-axis (negative or positive) and each dependent variable considered was represented on the Y-axis. Model of others was represented by two different lines (negative or positive). The combinations of these two variables were represented by four different points each of which referred to a particular attachment style. The ECR attachment categories produced using Brennan et al.'s (1998) procedure were used to define the four combinations of the independent variables. For example, those with attachment styles with positive models of self (secure and dismissing attachment) were considered to have positive models of self whereas those with attachment styles with negative models of self (fearful and preoccupied) were considered to have negative models of self. In the figures presenting the means of the dependent variables across the four different attachment groups (or the four combinations of the two independent variables), differences between the means at various levels of the independent variables represent main effects and differences between the two lines in terms of their slope were indicative of interaction effects.

Please note that when describing the attachment categories and the figures utilizing them, the terms positive model of self and term positive model of others are used frequently. These terms refer to favorable models of self and others rather than to scores on the ECR scales. Positive models of self and other are actually indicated by low scores on the two ECR scales. As a result, the nature of the relationships (i.e.,

positive vs. negative) noted in the attachment prototype section is described in a manner opposite to what was utilized in the preceding section.

Occurrence of Pain Problems

A significant attachment group effect was found. Although the differences between the groups were not all statistically significant, the attachment groups with negative models of self (i.e., Fearful and Preoccupied) had the highest scores on the pain experience variable. This is consistent with the significant positive association between pain experiences and the Model of Self scale and the non-significant association between pain experiences and the Model of Others scale found using the dimensional approach to attachment. The partial eta-square value indicated that attachment category accounted for 5.5% of the variance in pain experiences.

Treatment-Seeking Variables

In the analyses using the ECR attachment scales, neither dimension was significantly associated with Ongoing Contact with a GP variable. However, a marginally significant interaction was found ($p = .027$). A cross tabulation was utilized to explore this interaction effect. Within the secure, preoccupied, and dismissing attachment groups 81.3%, 80.4%, and 82.5% of individuals reporting having a general practitioner. Only 70.7% of the fearful attachment group reported having a general practitioner. This pattern of findings can be used to infer how the Model of Self and Model of Others variables may be interacting. Within the two groups with positive models of self and differing levels of models of others (i.e., secure and dismissing) there are similar rates of endorsement of this variable. Thus, it appears that amongst those with positive models of self there is no relationship between models of others and

having a general practitioner. There are different rates of endorsement of the general practitioner variable between the two attachment groups with negative models of self and differing levels of models of others (i.e., preoccupied and fearful). Thus, it appears that there is a significant Negative association between Model of Others scores and the general practitioner variable, but it is only present amongst those with negative models of self. A logistic regression analysis was conducted to determine whether this pattern of findings was statistically significant. Attachment category was treated as a categorical independent variable and Ongoing Contact with a GP was the dependent variable. The Fearful attachment group was treated as the reference category (i.e., the remaining three categories were each compared with the fearful attachment group). The findings of these analyses indicated that the secure [Odds Ratio = 1.80 (CI = .86-3.80)], preoccupied [Odds Ratio = 1.70 (CI = .71-4.04), and dismissing [Odds Ratio = 1.95 (CI = .80-4.73)] attachment groups did not differ significantly from the fearful attachment group with regard to the presence of a general practitioner variable. Given that the interaction effect was only marginally significant and the loss of statistical power that results from transforming continuous variables into categorical variables, this null finding was not surprising.

The analyses of variance regarding the Relationship Quality and Communication Difficulty variables indicated significant attachment group effects for each of these variables. Consistent with expectations, the securely attached group reported the most positive relationships with their general practitioner (i.e., high relationship quality and low communication difficulty). The partial eta-square values

indicated that attachment category accounted for 8.5% and 13.0% of the variance in Relationship Quality and Communication Difficulty, respectively.

Social Support

In the analyses using the ECR scales, telling a friend about the headache was not significantly associated with either the Model of Self scale or the Model of Others scale, but the interaction term was marginally significant ($p = .037$). Individuals in the preoccupied group were more likely to report their headache to a friend (71.4%) than were individuals in the secure (51.9%), fearful (53.3%), and dismissing (56.5%) groups. The two attachment groups that have positive models of self and vary with regard to models of others (secure and dismissing) endorsed the telling a friend variable at approximately similar rates. This suggests that amongst those with positive models of self, model of others does not have a significant relationship with the telling a friend about a headache variable. In contrast, the two attachment groups that have negative models of self and vary with regard to models of others (preoccupied and fearful) did have different rates of endorsement of the telling a friend variable. This suggests that amongst those with negative models of self there is a positive relationship between Model of Others scores and telling a friend about a headache variable. A logistic regression analysis was conducted to further explore this pattern of findings. The preoccupied attachment group was treated as the reference category (i.e., the remaining three categories were each compared with the preoccupied attachment group) and age, gender, and pain severity ratings were included as independent variables. The findings of these analyses indicated that the secure [Odds Ratio = .40 (CI = .15-1.08)], fearful [Odds Ratio = .42 (C I = .14-1.26), and dismissing [Odds Ratio = .52 (CI = .16-1.67)]

attachment groups did not significantly differ from the preoccupied group with regard to their association with telling a friend about their headache experience. Age [Odds Ratio = .95 (CI = .87-1.04)] and gender [Odds Ratio = 1.89 (CI = .89-4.02)] were not significantly associated with telling a friend about a headache, but pain severity was significantly and positively associated with this variable [Odds Ratio = 1.33 (CI = 1.10-1.61). Given that the interaction effect was only marginally significant and the loss of statistical power that results from transforming continuous variables into categorical variables (i.e., attachment dimensions to attachment categories), this null finding was not surprising.

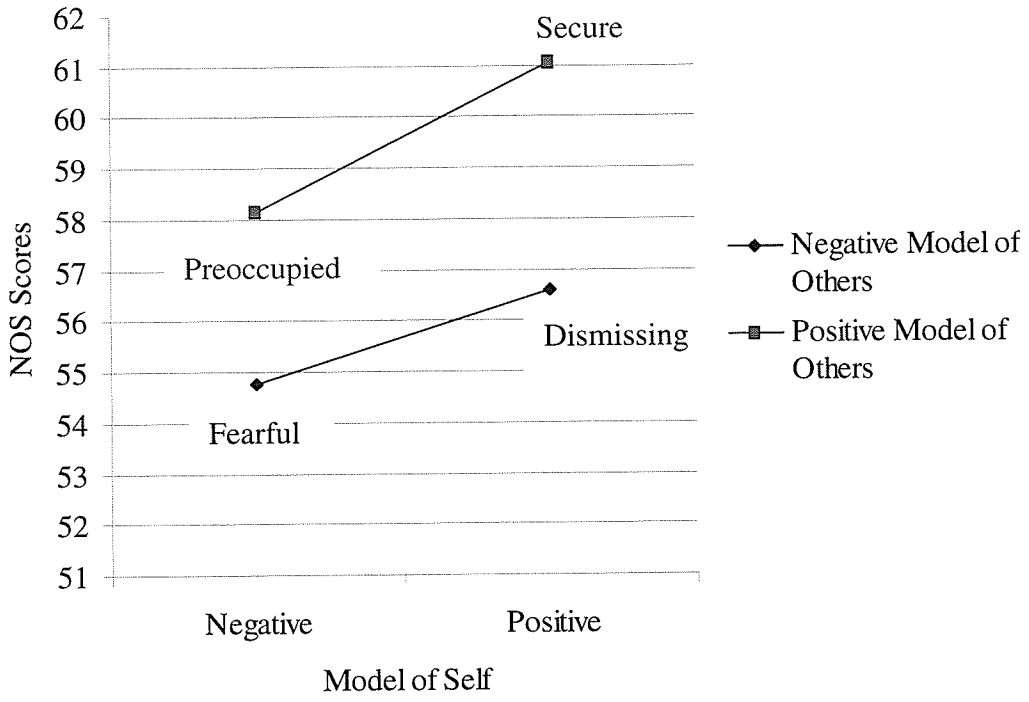
Telling a family member about the headache was marginally associated with the Model of Self scale and was not significantly associated with the Model of Others scale, so substantial differences between the attachment groups in terms of reporting their headaches to a family member were not expected. A slight majority of individuals with secure and fearful attachment told a family member about their headache (55.8% and 53.3%, respectively). A slight minority of those with preoccupied and dismissing attachment styles told a family member about their headaches (34.3% and 47.8%, respectively). A logistic regression analysis was conducted to further explore this pattern of findings. The preoccupied attachment group was treated as the reference category and age, gender, and pain severity ratings were included as independent variables. The findings of these analyses indicated that a significant positive association between secure attachment and telling a family member [Odds Ratio = 2.83 (CI = 1.10-7.33]. Fearful attachment [Odds Ratio = 2.42 (CI = .85-6.69)] and dismissing [Odds Ratio = 2.01 (CI = .65-6.19)] were not significantly associated with the telling a family

member variable. Similar to the previous analysis, Age [Odds Ratio = .96 (CI = .87-1.05)] and gender [Odds Ratio = 1.38 (CI = .66-2.89)] were not significantly associated with telling a friend about a headache, but pain severity was [Odds Ratio = 1.32 (CI = 1.10-1.60)].

As can be seen in Table 8, the analyses of variance regarding the NOS indicated significant effect for attachment category. The partial eta-square value indicated that 13.8% of the variance in NOS scores was accounted for by the attachment category variable. NOS scores of each attachment group are plotted in Figure 1 by using two lines representing Models of Others (positive and negative) and two points on the horizontal axis representing Models of Self (positive and negative). The mean NOS score of those with negative models of self (the midpoint between Fearful and Preoccupied) is smaller than the mean NOS score of those with positive models of self (the midpoint between Secure and Dismissing). This pattern of findings suggests a main effect of model of self and is consistent with significant negative association between Model of Self and NOS scores found earlier. The mean NOS score of those with negative models of others (midpoint on the line connecting Dismissing and Fearful) is smaller than the mean NOS score of those with positive models of others (midpoint on the line connecting Secure and Preoccupied). This pattern of findings suggests a main effect of model of others and is consistent with the significant negative association between Model of Others and NOS scores found earlier.

Figure 1

Network Orientation Scale (NOS) Scores as a Function of Dichotomized Model of Self and Model of Others



Interference

The differences in pain-related interference across the attachment style groups were not significant. These findings are consistent with the non-significant findings obtained with the two ECR scales.

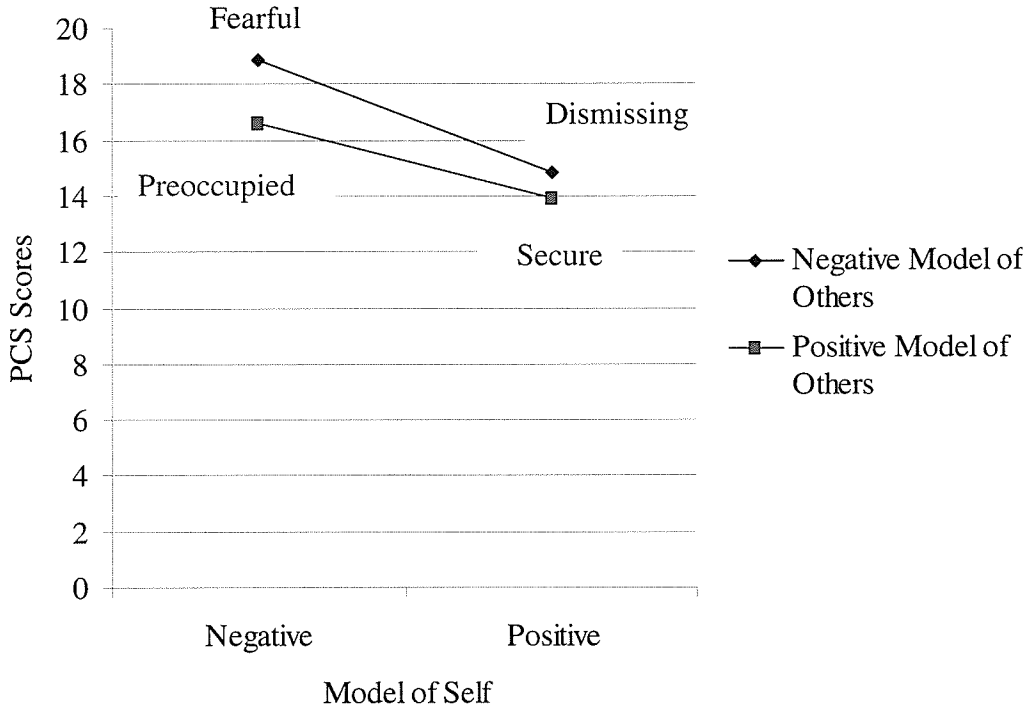
Pain-related Appraisals

A significant attachment category effect was found regarding the PCS. The partial eta-square value indicated that attachment category accounted for 4.5% of the variance in PCS scores. PCS scores of each attachment group are plotted in Figure 2 by using two lines representing Models of Others (positive and negative) and two points on the horizontal axis representing Models of Self (positive and negative). The mean PCS score of those with negative models of self (the midpoint between Fearful and Preoccupied) is greater than the mean PCS score of those with positive models of self (the midpoint between Secure and Dismissing). This pattern of findings suggests a main effect of model of self and is consistent with significant positive association between Model of Self and PCS scores found earlier. The mean PCS score of those with negative models of others (midpoint on the line connecting Dismissing and Fearful) is slightly greater than the mean PCS score of those with positive models of others (midpoint on the line connecting Secure and Preoccupied). This pattern of findings suggest a small, or non-significant, effect of model of others and is consistent with the small marginally significant association found between Model of Others and PCS scores noted earlier.

The findings regarding the FPQ-III are noteworthy. Similar to the findings regarding the other pain-related appraisals, the Fearful and Preoccupied attachment groups had the highest scores on the FPQ-III. However, the attachment category effect

Figure 2

Pain Catastrophizing Scale (PCS) Scores as a Function of Dichotomized Model of Self and Model of Others

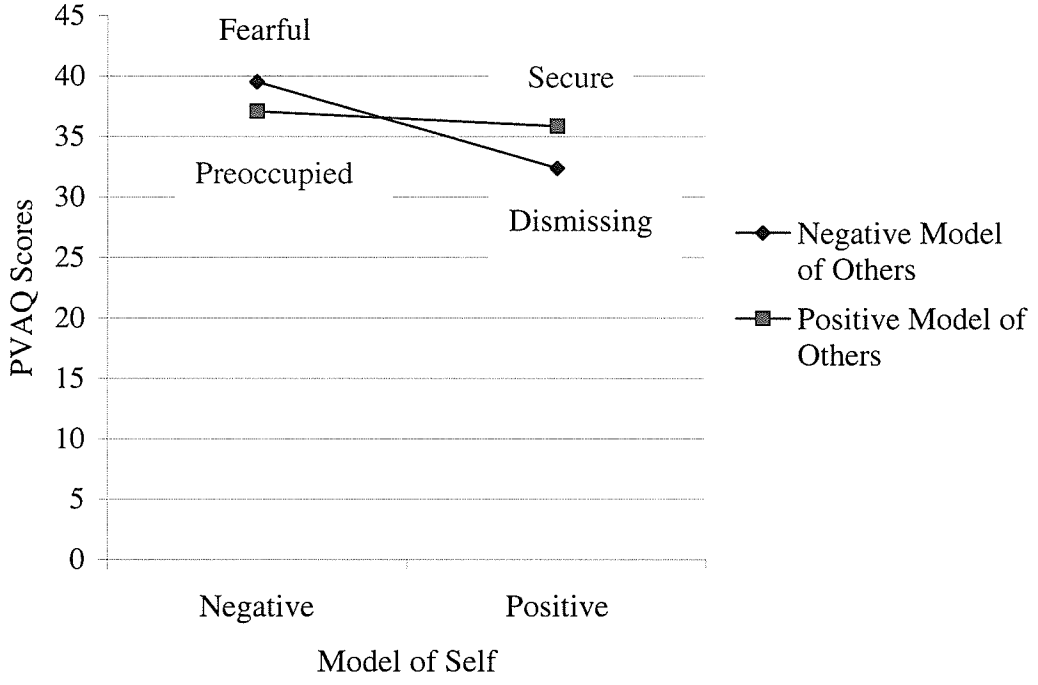


and the pair-wise comparisons were not statistically significant. In contrast to these null findings, Model of Self was significantly associated with FPQ-III scores in the dimensional analyses. This inconsistency across methods provides an example of the loss of statistical power that results when continuous variables (i.e., attachment dimensions) are transformed into categorical variables (i.e., attachment categories).

Group differences on the PVAQ are illustrated in Figure 3. The mean PVAQ score of those with negative models of self (the midpoint between Fearful and Preoccupied) is greater than the mean PVAQ score of those with positive models of self (the midpoint between Secure and Dismissing). This pattern of findings suggests a main effect of model of self and is consistent with significant positive association between Model of Self and PVAQ scores found earlier. The mean PVAQ score of those with negative models of others (midpoint on the line connecting Dismissing and Fearful) is virtually the same as the mean PVAQ score of those with positive models of others (midpoint on the line connecting Secure and Preoccupied). This pattern of findings suggests an absence of a main effect for model of others and is consistent with the findings of the regression analyses. The findings regarding the PVAQ are particularly important because they provide a good example of an interaction effect. While a marginally significant effect of attachment group was found ($p = .065$), no significant differences were found between the four attachment groups. However, a significant interaction was found in the regression analyses and the crossover of the lines representing the two levels of model of others illustrates this interaction effect. In the dimensional analyses, Model of Self scores had a significant positive association with the PVAQ. The pattern in Figure 3 suggests that the association between Model of Self

Figure 3

Pain Vigilance and Awareness Questionnaire (PVAQ) Scores as a Function of Dichotomized Model of Self and Model of Others



scores and PVAQ scores is stronger amongst those with negative models of self (i.e., the slope of this line is steeper) than it is amongst those with positive models of other (i.e., the slope of that line is relatively less steep).

Psychopathology

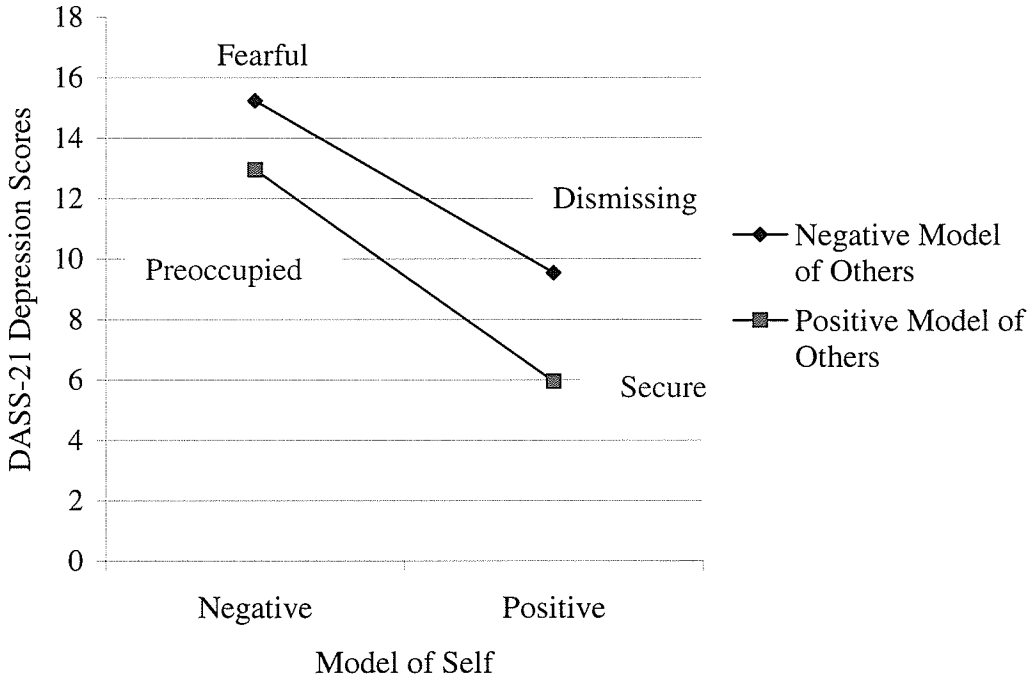
A significant effect of attachment group was found with regard to all of the DASS-21 scales. Respectively, the partial eta-square values indicate that the attachment group variable accounted for 11.7%, 8.3%, and 17.3% of the variance in the Stress, Anxiety, and Depression scales. The findings regarding the Depression scale are plotted in Figure 4. The pattern of findings illustrated in Figure 4 suggests that there is a main effect of Model of Self and of Model of Others. This is consistent with the findings using the attachment dimensions as significant associations were found between the Depression scale and both the ECR scales. The findings regarding the ASI and the other DASS-21 scales are similar to those regarding the Depression scale.

Parental and Peer Attachment

Romantic attachment variables have been widely used in studies utilizing university students, but it is possible that attachments to parents and peers may be more salient for university students as many young adults have not had extensive experiences in romantic relationships. For this reason the three scales of the IPPA-R were used to assess participants' attachments to their mothers, fathers, and peers. In order to provide consistency with regard to the number of participants in the analyses, only those without chronic pain and with complete data for all of the IPPA-R scales were included (n = 271). The majority of cases not included in the analyses were excluded because the participants' fathers were deceased and the Father scale of the IPPA-R was not

Figure 4

DASS-21 Depression Scores as a Function of Dichotomized Model of Self and Model of Others



completed. In this sample, the ECR Model of Self scale was significantly associated with the Mother [r (267) = -.25, $p < .001$] and Peer [r (267) = -.18, $p < .01$] scales of the IPPA-R (2-tailed tests). The relationship between the Model of Self scale and the Father scale of the IPPA-R was marginally significant [r (267) = -.14, $p = .024$]. The ECR Model of Others scale was also associated with the Mother [r (267) = -.25, $p < .001$], Father [r (267) = -.23, $p < .001$], and Peer [r (267) = -.32, $p < .001$] scales of the IPPA-R. The r-square values indicate that the attachment dimensions assessed by the IPPA-R share some common variance with the ECR measures (viz. 1.9% to 10.4%) and the directions of these associations indicates that those with positive attachments regarding parents and peers tend to have positive romantic attachment perceptions. The relationships between the IPPA-R scales were also considered. Maternal and Paternal attachment were highly correlated [r (269) = .55, $p < .001$], but the relationship between Peer attachment and both Maternal attachment [r (269) = .29, $p < .001$] and Paternal attachment [r (269) = .26, $p < .001$] were not as strong.

The first stage of the analyses was to investigate the bivariate relationships (i.e., correlations and point-biserial correlations) between the IPPA-R scales and the study variables. The second stage of the analyses involved the use of multivariate methods (i.e., multiple linear regression and multiple logistic regression) to examine the ability of the parental and peer attachment dimensions to contribute unique variance to the prediction of the study variables beyond that contributed by the other IPPA-R dimensions and age. Analyses were conducted separately for each gender as research with the IPPA (e.g., Williams & McGee, 1991) has indicated that the relationships between these attachment domains and dependent variables can vary depending on the

gender of the respondent. Several subsamples were also used. For example, only 133 reported on a recent headache experience and provided complete data on the IPPA-R, so the analyses involving the variables associated with a recent pain experience were conducted on a sample of 133. In this case, in order to maintain adequate statistical power the analyses were not conducted separately for gender. In order to control for Type I error the critical *p*-value was set at .01 (2-tailed test). The more liberal significance level of .05 is also reported in the tables in order to provide a more complete record of the analyses. However, only findings considered significant at the more conservative level (i.e., $p \leq .01$) were considered in the discussion of the findings.

Occurrence of Pain Problems

In the male subsample, pain frequency had a negative and marginally significant association with the Mother subscale of the IPPA-R [r (140) = -.20, p = .019] and was not significantly associated with either the Father [r (140) = -.08, n.s.] or the Peer [r (140) = -.09, n.s.] subscales of the IPPA-R. In the female subsample, pain frequency was not significantly correlated with either the IPPA-R Mother [r (127) = -.14, n.s.], IPPA-R Father [r (127) = -.12, n.s.,], or IPPA-R Peer [r (127) = -.03, n.s.] scales. Given the largely null findings, multiple regression analyses were not conducted.

Treatment-seeking Variables

The treatment-seeking variables considered included the presence of a general practitioner variable, and the Relationship Quality and Communication Difficulty scales that referred to participants' relationships with their general practitioners. When examining the latter two variables, only the 108 males and 105 females that reported having a general practitioner and who provided complete data regarding the

Relationship Quality and Communication Difficulty scales were included in the analyses.

Point-bicorrelations were conducted to examine the relationship between the IPPA-R subscales and the general practitioner variable. In the male subsample, the general practitioner variable was not significantly associated with the Mother [r_{pb} (140) = -.02, n.s.], Father [r_{pb} (140) = .02, n.s.], or Peer [r_{pb} (140) = -.09, n.s.] subcales of the IPPA-R. In the female sample, the general practitioner variable was not significantly associated with the Mother [r_{pb} (127) = -.05, n.s.], Father [r_{pb} (127) = .10, n.s.], or Peer [r_{pb} (127) = -.16, n.s.] subcales of the IPPA-R. Since all of these associations were not statistically significant, they were not investigated further with multiple regression analyses.

The findings regarding the Relationship Quality and Communication Difficulty scales are presented in Table 9. As can be seen in Table 9, the Peer subscale was the only IPPA-R subscale significantly associated with the patient-physician relationship variables. In the male subsample, the peer attachment measure was found to have a positive and significant association with the Relationship Quality variable and significant negative association with the Communications Difficulties variable. Only the former association remained statistically significant in the multiple regression analyses that included age and the other attachment dimensions. In the female subsample, peer attachment was positively and significantly correlated with Relationship Quality and was significantly and negatively correlated with the measure of Communication Difficulties. Both of these associations remained significant in the multiple regression models.

Table 9

Associations between IPPA-R Scales and Physician-related Variables

Males (n = 108)	Dependent Variables			
	Relationship Quality		Communication Difficulties	
Predictor	*r*	*Beta*	*r*	*Beta*
Age		-.03		-.01
IPPA-R Mother	.20*	.08	-.134	-.04
IPPA-R Father	.23*	.07	-.149	-.02
IPPA-R Peer	.33***	.28**	-.29**	-.27*
Multivariate Summary Statistics	F (4,103) = 3.59** *Adj.* R^2 = .088		F (4,103) = 2.36, n.s. *Adj.* R^2 = NA	

Females (n = 105)	Dependent Variables			
	Relationship Quality		Communication Difficulties	
Predictor	*r*	*Beta*	*r*	*Beta*
Age		-.04		-.10
IPPA-R Mother	.16	.01	-.11	.01
IPPA-R Father	.16	.08	-.105	-.06
IPPA-R Peer	.38***	.36***	-.30**	-.31**
Multivariate Summary Statistics	F (4,100) = 4.55** *Adj.* R^2 = .120		F (4,100) = 2.87* *Adj.* R^2 = 067	

Note. IPPA-R = Inventory of Parent and Peer Attachment -- Revised.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

Social Support Variables

Of those providing complete IPPA-R data 133 (49.1%) reported experiencing a headache in the past week. The social support related variables included telling a friend about the headache and telling a family member about the headache. A majority of participants reported telling a friend about their headache (59.4%) and a slight majority of participants reported that they did not tell a family member about their headache (51.1%). Given the importance of considering pain severity and gender when investigating pain-related behaviors, associations between the attachment dimensions and the social support related variables were only investigated using multivariate logistic regression. These findings are presented in Table 10. As can be seen in Table 10, pain severity ratings were significantly and positively associated with both these variables. However, none of the IPPA-R attachment dimensions were significantly associated with either the dichotomous pain-reporting variables.

The NOS was administered as a method of assessing general attitudes towards social seeking social support. Correlations and multiple regressions presented in Table 11 were used to examine the associations between the IPPA-R scales and the NOS. In both the male and female subsamples, significant positive correlations were found between the NOS and each of the attachment dimensions. In multiple regression analyses with the male subsample, maternal (IPPA-R Mother) and peer (IPPA-R Peer) attachment were significant positive predictors of NOS scores. In the female subsample, only peer attachment was a significant predictor of NOS scores. The adjusted R^2 values from the multiple regression analyses indicated that in the male subsample

Table 10

Logistic Regression Models Predicting Headache Reporting Variables with IPPA-R Scales

	Dependent Variable	
	Telling a Friend	Telling a Family Member
Predictor	Odds Ratio (95% *C.I.* in parentheses)	Odds Ratio (95% *C.I.* in parentheses)
Age	.94 (.83-1.05)	1.01 (.90-1.13)
Gender	1.29 (.57-2.92)	1.54 (.69-3.43)
Pain Severity	1.42 (1.14-1.75)***	1.33 (1.09-1.62)**
IPPA-R Mother	1.01 (.99-1.04)	1.02 (1.00-1.04)
IPPA-R Father	.99 (.97-1.01)	1.01 (.99-1.03)
IPPA-R Peer	1.04 (1.00-1.07)*	1.01 (1.00-1.04)
Model Summary Statistics	χ^2 (6) = 23.19*** *R-square* = .160	χ^2 (6) = 16.32* *R-square* = .071

Note. IPPA-R = Inventory of Parent and Peer Attachment -- Revised.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

Table 11

Associations between IPPA-R Scales and the Network Orientation Scale

	Males (n = 142)		Females (n = 129)	
Predictors	*r*	*Beta*	*R*	*Beta*
Age		-.06		-.12
IPPA-R Mother	.47***	.26***	.29**	.09
IPPA-R Father	.43***	.13	.26**	.06
IPPA-R Peer	.58***	.45***	.62***	.57***
Multivariate Summary Statistics	F (4,137) = 26.70*** *Adj.* R^2 = .422		F (4,124) = 22.63*** *Adj.* R^2 = .403	

Note. IPPA-R = Inventory of Parent and Peer Attachment -- Revised.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

approximately 42% of the variance in NOS scores was accounted for and that in the female subsample approximately 40% of the variance in NOS scores was accounted for.

Pain-related Interference

Those reporting a recent headache were also asked to provide a rating of the degree to which the pain interfered or disrupted several aspects of their lives. Given the importance of considering pain severity and gender when attempting to statistically predict pain-related behaviors, correlation coefficients regarding the relationships between the attachment dimensions and pain-related interference were not calculated. Instead the associations between the attachment dimensions and pain-related interference measure were investigated using a multiple regression analysis that included pain severity ratings as an independent variable. The model was significant [$F(6,126) = 5.76$, $p < .001$] and the adjusted R^2 value indicated that the variables accounted for approximately 17.8% of the variance in pain-related interference. Age (*Beta* = -.03, n.s.) and gender (*Beta* = .16, n.s.) were not significantly associated with pain-related interference, but pain severity ratings were (*Beta* = .40, $p < .001$). With regard to the attachment dimensions, the Mother (*Beta* = -.04, n.s.), Father (*Beta* = .03, n.s.), and Peer (*Beta* = .02, n.s.) subcales of the IPPA-R all failed to be statistically significant predictors of pain-related interference.

Appraisals

Correlations between the scales of the IPPA-R and the pain-related self-report measures are reported in Table 12. The associations found using multiple regression analyses that included age and the IPPA-R attachment dimension as independent variables are also presented in Table 12. In the male subsample, no significant

Table 12

Univariate and Multivariate Associations between IPPA-R Attachment Dimensions and Pain-Related Self-Report Measures

Males (n = 142)	Dependent Variables							
	PCS		FPQ-III		PVAQ		ASI	
Predictor	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*
Age		-.08		.02		.02		.07
IPPA-R Mother	-.18*	-.12	-.06	-.03	-.09	-.12	-.15	-.06
IPPA-R Father	-.16	-.06	-.04	.04	-.02	.06	-.180*	-.12
IPPA-R Peer	-.15	-.10	-.17*	-.17	-.06	-.05	-.16	-.09
Multivariate Summary Statistics (df = 4,137)	F = 1.91, n.s. *Adj.* R^2 = NA		F = 1.04, n.s. *Adj.* R^2 = NA		F = .46, n.s. *Adj.* R^2 = NA		F = 1.78, n.s. *Adj.* R^2 = NA	

Females (n = 129)	Dependent Variables							
	PCS		FPQ-III		PVAQ		ASI	
Predictor	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*
Age		-.08		-.20*		.08		.01
IPPA-R Mother	-.06	.09	.01	.18	-.04	.01	-.31***	-.23*
IPPA-R Father	-.17*	-.22*	-.19*	-.33**	-.07	-.04	-.26**	-.12
IPPA-R Peer	-.09	-.08	.06	.06	-.11	-.10	-.15	-.05
Multivariate Summary Statistics (df = 4,124)	F = 1.38, n.s. *Adj.* R^2 = NA		F = 3.26, p = .014 *Adj.* R^2 = .066		F = .632, n.s. *Adj.* R^2 = NA		F = 3.81, p = .006 *Adj.* R^2 = .081	

Note. IPPA-R = Inventory of Parent and Peer Attachment -- Revised; PCS = Pain Catastrophizing Scale; FPQ-III = Fear of Pain Questionnaire -- III; PVAQ = Pain Vigilance and Awareness Questionnaire; ASI = Anxiety Sensitivity Index.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

associations were found between the IPPA-R scales and the pain-related appraisals. In the female subsample, the parental attachment dimensions were both significantly and negatively correlated with AS. These relationships remained significant in the multiple regression analyses. The adjusted R^2 value indicated that the multivariate model including age and all the IPPA-R scales accounted for 8.1% of the variance in ASI scores. The other statistically significant finding in the female subsample concerned the FPQ-III. The bivariate association between paternal attachment and fear of pain was marginally significant, but in the multiple regression analyses this association was statistically significant. The adjusted R^2 value indicated that the multivariate model including age and all the IPPA-R scales accounted for 6.6% of the variance in FPQ-III scores.

Psychopathology

Correlations between IPPA-R and DASS-21 scales were conducted in order to examine the associations between psychological distress and the parental and peer attachment dimensions. These correlations, as well as the follow-up multivariate analyses, are reported in Table 13. In the male subsample, a few significant negative correlations were found, but these associations were no longer statistically significant in the multiple regression models. In the female subsample, all but one of the correlations were significant and negative. In the multiple regression analyses, peer attachment remained a significant predictor of anxiety and depression, but the parental attachment dimensions were no longer significant predictors of depression or anxiety. The adjusted R^2 values indicated that the multivariate model including age and all the IPPA-R scales accounted for 14.7% and 22.2% of the variance in DASS-21 Anxiety and Depression

Table 13

Univariate and Multivariate Associations between IPPA-R Attachment Dimensions and DASS-21 Scales

Males ($n = 142$)

	Dependent Variables					
	DASS-Stress		DASS-Anxiety		DASS-Depression	
Predictor	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*
Age		.20*		.09		.02
IPPA-R Mother	-.23**	-.17	-.17*	-.13	-.30***	-.25*
IPPA-R Father	-.21*	-.14	-.14	-.05	-.20*	-.00
IPPA-R Peer	-.11	-.00	-.13	.07	-.25**	-.17
Multivariate Summary Statistics ($df = 4,137$)	$F = 3.97, p = .004$ *Adj.* $R^2 = .078$		$F = 1.69, p =$ n.s. *Adj.* $R^2 =$ NA		$F = 4.51, p = .002$ *Adj.* $R^2 = .090$	

Females ($n = 129$)

	Dependent Variables					
	DASS-Stress		DASS-Anxiety		DASS-Depression	
Predictor	*r*	*Beta*	*r*	*Beta*	*r*	*Beta*
Age		.04		-.05		-.05
IPPA-R Mother	-.33***	-.22*	-.33***	-.23*	-.39***	-.24*
IPPA-R Father	-.28**	-.11	-.22*	.04	-.30***	-.11
IPPA-R Peer	-.29***	-.20*	-.33***	-.26**	-.39***	-.31***
Multivariate Summary Statistics ($df = 4,124$)	$F = 6.03, p < .001$ *Adj.* $R^2 = .136$		$F = 6.50, p = .001$ *Adj.* $R^2 = .147$		$F = 10.16, p < .001$ *Adj.* $R^2 = .222$	

Note. IPPA-R = Inventory of Parent and Peer Attachment -- Revised; DASS = Depression, Anxiety, and Stress Scale.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ (2-tailed tests).

scores, respectively. In the multivariate models, the IPPA-R scales were no longer significantly associated with the Stress scale of the DASS-21.

DISCUSSION

A growing body of theoretical and empirical literature suggests that adult attachment styles play an important role in the development of chronic pain and in the adjustment to chronic pain. In general, insecure attachment is thought to increase the risk of developing chronic pain and to contribute to increased distress and disability amongst those with chronic pain. This study investigated several hypotheses raised in this literature by determining whether adult attachment dimensions are associated with the presence of chronic pain, frequency of pain, treatment-seeking related variables, social support-seeking, pain-related disability, and pain-related appraisals. A measure of psychopathology was also included because psychopathology is strongly associated with chronic pain and psychopathology is a major focus of the pain literature. The model of self and model of others dimensions of attachment included in Bartholomew and Horowitz's (1991) conceptualization of adult attachment were of greatest interest and comprised the attachment framework focused on in the present study. However, several other attachment approaches were considered and included: (a) testing for interaction effects involving the model of self and model of others attachment dimensions, (b) attachment prototypes or categories, and (c) parental and peer attachment. The findings from each of the perspectives are discussed separately. A more general discussion of the implications of the present study and future research directions follows.

Findings Across Attachment Style Assessment Methods

Models of Self and Others

Bartholomew and Horowitz's (1991) conceptualization of attachment was selected as the primary attachment framework for the present study because it is the most recent and sophisticated model. The approach utilizing the attachment dimensions was selected because a taxometric analysis (Fraley & Waller, 1998) indicated this approach was more appropriate than the prototype approach. As well, a psychometrically sound measure, the ECR, was available to assess the attachment dimensions posited by Bartholomew and Horowitz. Furthermore, the use of continuous measures allowed for greater statistical power than the use of categorical measures. The findings regarding the Model of Self and Others scales were the primary focus of the present study and are discussed below.

Mikail et al. (1994) suggested that attachment groups differ in terms of their rates of chronic pain and that individuals with insecure attachment styles would be over-represented amongst those presenting at treatment clinics. In the present study, those with chronic or persistent pain were not included in the majority of the analyses. However, the possibility that adult attachment dimensions are associated with chronic or persistent pain was investigated. There were no significant differences between those with and without chronic pain with regard to their scores on the scales of the ECR. Mikail et al.'s suggestions were based on their experiences with treatment-seeking chronic pain patients. Given that the present sample of individuals with chronic or persistent pain were likely much different than chronic pain patients (i.e., less severe, persistent, and disabling pain), the present findings do not directly address Mikail et

al.'s hypotheses. Thus, the possibility that insecure attachment styles are over-represented within clinical samples warrants further investigation.

Two studies with non-clinical samples (Feeney & Ryan, 1994; Lewis et al., 1984) have found insecure attachment to be positively associated with more frequent symptoms of pain. As well, in a sample of female members of a primary care health maintenance organization, Ciechanowski et al., (2002) found individuals with preoccupied and fearful attachment reported significantly more physical symptoms relative to those with secure attachment. Their findings indicated that the model of self dimension is most strongly associated with pain complaints because the attachment groups with the most pain complaints were those with negative models of self (i.e., preoccupied and fearful). The present findings extended this literature by directly considering attachment dimensions as independent variables. Consistent with expectations, Model of Self scores had a significant positive association with reports of pain experience. Using Cohen's (1992) criteria for characterizing effect sizes, this association ($r = .28$) was just under the criterion for a medium effect size ($r \geq .30$). The multiple regression analysis indicated that Model of Self scores accounted for approximately 9% of the variance in pain experiences beyond that accounted for by gender. Model of Others was not significantly associated with pain experiences.

The variables related to treatment-seeking included having a family physician (i.e., Ongoing Contact with a GP) and two scales designed to measure the quality of the relationships between participants and their family physicians. Models of Self and Others were not significant predictors of Ongoing Contact with a GP. This finding was initially surprising as previous studies (e.g., Ciechanowski et al., 2002) have found

attachment style ratings to be significantly associated with the level of contact one has with healthcare providers. Close to 80% of the sample reported having a family physician, so a restriction of range problem may have played a role in this null finding. As well, a substantial number of students would have recently moved to attend university and would likely have had little time to find a family physician. Relocation to attend university could have played a major role in terms of having a family physician and could have obscured potential relationships involving attachment dimensions. However, data necessary for testing this hypothesis was not collected.

The existing research regarding treatment and attachment styles has focused on the frequency of healthcare utilization. However, Mikail et al. (1994) also discussed the role of attachment styles in the relationship quality between patients and healthcare providers. The present study investigated this hypothesis. Participants were asked to rate their relationships with their family physicians or general practitioners. The pattern of findings from this study supported Mikai et al.'s hypothesis as they indicated that: (a) those with positive models of self have less communication difficulties with their general practitioners than those with negative models of self, and (b) those with positive models of others have positive relationships with their general practitioners and experience little difficulty communicating with them in comparison to those with negative models of others. It was hypothesized that the model of others dimension would be more strongly associated with variables involving interpersonal relationship than would model of self. This expectation was met as the effect sizes for the relationships between Model of Others scores and the physician relationship variables were both in the medium range (i.e., $r \geq .30$) whereas the one statistically significant

association involving Model of Self scores was in the range considered small (i.e., $r \geq .10$). The multiple regression analyses provided a similar pattern of findings and indicated that the attachment dimensions accounted for 13.6% and 15.0% of the variance in relationship quality and communication difficulties with one's physician, respectively.

Two social support variables included in the present study concerned responses to a recent headache. Multiple logistic regression analyses indicated that ratings of pain severity were significantly associated with telling a friend about a recent headache and with telling a family member about a recent headache, but the associations involving the pain-reporting variables and attachment dimensions were small and non-significant.

There is a lack of psychometric measures aimed at assessing social support-seeking in relation to chronic pain, so the present study included a general measure of support-seeking (viz., the NOS). Consistent with the hypotheses, both ECR scales were negatively and significantly associated with attitudes toward seeking social support and the association involving Model of Others was larger than the association involving Model of Self. The multiple regression analysis indicted that the attachment dimensions accounted for an additional 18.6% of the variance in help-seeking attitudes beyond that contributed by gender.

Self-reports of pain-related appraisals often found to be associated with negative outcomes (e.g., increased disability) were included in the present study. Previous research (e.g., Griffin & Bartholomew, 1994; Lopez et al., 1998; Ognibene & Collins, 1998; Weems et al., 2002) suggests that models of self are more strongly associated with variables related to one's self-concept and perceptions of competency than are

models of others. Based on these earlier findings, it was expected that the ECR Model of Self scale would be more strongly associated with the pain-related appraisal and psychopathology measures than the Model of Others scale. This hypothesis was supported as the ECR Model of Self scale had significant positive correlations with the PCS, FPQ-III, PVAQ, and ASI. These associations generally represented small effect sizes, but the association involving the ASI ($r = .35$) was in the medium range (i.e., $r > .30$). Model of Others was significantly associated only with the ASI. The multiple regression analyses indicated that Model of Self (and Model of Others in the case of ASI) accounted for unique variance in the pain-related appraisals beyond that contributed by age and gender. Ciechanowski et al. (2003) hypothesized those with negative models of self (i.e., those with preoccupied and fearful attachment) would be more prone to pain-related catastrophizing. It is noteworthy that unlike Ciechanowski et al.'s study, the present findings supported this hypothesis. As well, the more general hypothesis of Mikulincer and Florian (1998) that insecure attachment is associated with more negative appraisals was also supported.

A growing body of research has demonstrated a significant positive relationship between insecure attachment and psychopathology. These studies have generally utilized measures of attachment involving ratings of each attachment style (e.g., Reinecke & Rogers, 2001; Roberts, Gotlib, & Kassel, 1996). Relationships between the underlying dimensions of attachment and psychopathology have received little attention. The present findings addressed this gap in the literature and demonstrated that both attachment dimensions are significantly associated with several common forms of psychopathology (viz., stress and symptoms of both depression and anxiety). The

hypothesis that Model of Self would be more strongly associated with psychopathology than Model of Self was supported. In this case, however, Model of Others was also significantly associated with each of the measures of psychopathology (viz., DASS-21 scales) and remained significantly associated with these measures when age, gender, and Model of Self were included in the regression model.

Interactions between Model of Self and Model of Others

Similar to previous research, associations (i.e., correlation or regression coefficients) between the attachment dimensions and the variables of interest were examined. However, this approach is not entirely complete. Griffin and Bartholomew (1994b) noted the importance of considering the combination of the two dimensions and demonstrated that the four attachment categories have "emergent properties" (p. 39) that are not apparent when only the linear combinations of the attachment dimensions are considered. To investigate this possibility, the multiple regression analyses included a third step comprised of a Model of Self by Model of Others interaction term. This third step was used to examine whether the association of each attachment dimension with various dependent variables was moderated by the other attachment dimension. The attachment category variable generated with the ECR was used to interpret significant interactions.

Overall, there was little evidence of interaction effects. A marginally significant ($p = .037$) interaction was found when investigating the Ongoing Contact with a GP variable. Within the two groups with positive models of self and differing levels of models of others (i.e., secure and dismissing) there were similar rates of endorsement of this variable (81.3% and 82.5%, respectively). This pattern suggests that amongst those

with positive models of self there is no relationship between models of others and having a general practitioner. Within the attachment groups with negative models of self and differing levels of models of others (preoccupied and fearful) there were also different rates of endorsement (80.4% and 70.7%, respectively). This overall pattern suggests that there may be a significant negative association between Model of Others scores and the general practitioner variable, but it is only present amongst those with negative models of self. However, a logistic regression analysis indicated that these rates of endorsement were not statistically different from each other. A similar pattern (i.e., a marginally significant interaction term and no significant group differences) emerged when the telling a family member about a recent headache variable was considered. Given the marginally significant nature of these initial finding and the subsequent failures to find differences between the attachment groups, these findings should not be over-interpreted because they may be instances of Type I error.

Interaction terms were included in the multiple linear regressions for 12 continuous dependent variables. Only in the case of PVAQ scores was the interaction term a statistically significant predictor. The prototype analyses indicated that there were no significant differences between the attachment groups on the PVAQ. Figure 3 shows that the lines representing those with positive models of others and those with negative models of others cross each other. This pattern is indicative of an interaction. The dimensional analyses indicated that Model of Self scores were significantly associated with PVAQ scores. The interaction illustrated in Figure 3 suggests that the relationship between Model of Self and PVAQ scores is moderated by Model of Others scores. Amongst those with a negative model of others (i.e., fearful and dismissing

attachment) the association between Model of Self scores and PVAQ scores is relatively stronger than it is when those with positive models of others (i.e., secure and preoccupied) are considered. While this finding provides a good illustration of an interaction effect, it is difficult to interpret. The pain-related appraisal variables have been shown to be positively associated with each other in previous research (e.g., Muris, Vlaeyen, & Meesters, 2001; Zvolensky, Goodie, McNeil, Sperry, & Sorrell, 2001) and more specifically PVAQ scores have been shown be significantly associated with FPQ-III and PCS scores (Roelofs, Peters, McCracken, & Vlaeyen, 2003; Roelofs et al., 2002). Given this shared variance between the pain-related appraisals, it is surprising that a significant interaction effect was found with regard to the PVAQ but not the other pain-related appraisal measures. As well, there are no obvious or compelling theoretical reasons to believe that a moderation effect would be found regarding pain-related vigilance but not with the other pain-related appraisal constructs. Viewed in this light, the possibility that this statistically significant interaction effect is a spurious finding warrants consideration. However, testing for possible interaction effects in future research in this area is warranted.

The inclusion of descriptive statistics for each dependent variable across attachment categories was initially planned as a means of interpreting interaction effects. Given the prototype findings paralleled those obtained with the ECR scales and the lack of statistically significant interaction effects, there was little need for these descriptive statistics or the between-group comparisons. Nonetheless, they were included because they may facilitate the comparison of the present findings with those of future studies.

The prototype analyses were also included to more directly examine Mikail et al.'s (1994) suggestion that individuals with a dismissing attachment style tend to "dismiss symptoms and minimize the meaning of their pain" (p. 9). Based on Mikail et al.'s writings, it was hypothesized that dismissing individuals would report less pain-related fear, catastrophizing, and vigilance relative to those with secure attachment. A similar pattern was expected regarding anxiety sensitivity. These hypotheses were not supported as there were no statistically significant differences between the secure and dismissing groups with regard to these variables. Mikail et al.'s suggestions were intended to apply to chronic pain patients' verbal reports of pain made to healthcare providers and family members. Thus, it was likely inappropriate to directly apply these ideas to a non-clinical sample and to self-report trait measures of pain appraisals (i.e., they assess the tendency to appraise pain negatively rather than current appraisals). Additional research with samples experiencing clinical pain is warranted and would be better suited to investigating the patterns of pain-related appraisals and communications described by Mikail et al. State-based reports of pain appraisals could be obtained from such a sample. As well, these appraisals could be assessed in a manner more directly related to the verbal reports considered by Mikail et al. (e.g., structured coding of interviews regarding pain complaints) than are self-report measures.

Parental and Peer Attachment

The IPPA-R was designed to assess attachment experiences by focusing on the degree to which individuals feel their attachment figures respect and respond sensitively to their needs. It is comprised of three separate scales assessing attachment to each parent and to one's peers. Attachments to these individuals are conceptualized as lying

on a continuum of insecurity to security. No studies have investigated the overlap between the IPPA-R and the ECR. However, attachment measures generally share some overlap, but the extent of this overlap depends on the degree of congruence between the measures in terms of the domains of attachment considered (e.g., peer vs. parental), response formats used (e.g., categories vs. dimensions), the conceptual framework underlying the measures (3 category system vs. 4 category system), and the assessment method used (e.g., self-report vs. interview; Bartholomew & Shaver, 1998). The correlations between the ECR and IPPA-R scales were negative and in most cases were statistically significant. This pattern indicates that those who rated themselves as securely attached on the ECR also provided responses to the IPPA-R that were indicative of secure attachment. The *r*-square values indicated that the attachment dimensions assessed by the IPPA-R shared some common variance with the ECR measures (viz. 1.9% to 10.4%). The ECR Model of Others scale had significant associations with each IPPA-R scale and the association involving the Peer scale had a medium effect size. The ECR Model of Self scale had small significant associations with the Mother and Peer IPPA-R scales. It was not significantly associated with the Father scale. Given that the Model of Others scale and the IPPA-R scales all primarily assessed perceptions of others, it is not surprising that the Model of Others scale would be mores strongly associated with the IPPA-R scales than was the Model of Self scale which assesses anxiety about rejection based on beliefs of personal unworthiness.

The IPPA-R was included in order to consider an alternative conceptualization of attachment. Measures of romantic attachment have been widely used with university students; however, it is possible that attachments regarding parents and peers may be

more salient for university students as many of them will not have had extensive experiences in romantic relationships. Parental and peer attachment have not been directly discussed in the chronic pain literature, so there was only one general hypothesis. Namely, attachment security would be positively associated with desirable outcomes (e.g., having a good relationship with one's physician) and negatively associated with undesirable outcomes (e.g., having negative pain-related appraisals). The primary purpose of including the IPPA-R was to determine whether it held greater promise for investigating pain-related constructs than did a measure based on Bartholomew and Horowitz's (1991) attachment model.

In order to provide a general comparison of the ECR attachment dimensions and the IPPA-R attachment scales, the number of significant associations that each scale had with the continuous self-report measures was considered. Since statistical significance levels do not directly indicate the magnitude of these relationships, the magnitude of the effect sizes were also considered using Cohen's (1992) guidelines for interpreting or characterizing effect sizes. These comparisons are summarized in Table 14. While this is not a perfect method for comparing the attachment measures, it does demonstrate that there are no striking differences between the ECR and the IPPA-R in terms of their associations with pain-related variables. In most cases, at least one scale from each measure was associated each dependent variable. However, there were two general trends. First, the ECR was more consistently associated with the pain-related appraisals than were the IPPA-R scales. Second, the IPPA-R scales had larger associations with the interpersonal variables than did the ECR scales. For example, the IPPA-R scales'

Table 14

Effect Size Ratings regarding Associations between the Continuous Dependent Variables and Attachment Scales

	ECR (Total Sample)		IPPA-R (Males)			IPPA-R (Females)		
Dependent Variable	Model of Self	Model of Others	Mother	Father	Peer	Mother	Father	Peer
Pain Experiences	S	--	--	--	--	--	--	--
Relationship Quality	--	M	--	--	M	--	--	M
Communication Difficulty	S	M	--	--	S	--	--	M
Network Orientation Scale	S	M	M	M	L	M	M	L
Pain Catastrophizing Scale	S	--	S	--	--	--	--	--
Fear of Pain Questionnaire –III	S	--	--	--	--	--	--	--
PVAQ	S	--	--	--	--	--	--	--
Anxiety Sensitivity Index	M	S	--	--	--	M	S	--
DASS-21 Stress	M	S	S	--	--	M	S	S
DASS-21 Anxiety	S	S	--	--	--	M	--	M
DASS-21 Depression	M	M	M	--	S	M	M	M

Note. Ratings are based on Cohen's (1992) guidelines for interpreting effect sizes. S = Small (r = .10 to < .30), M = Medium ($r \geq .30$ to < .50), L = Large ($r \geq .50$). ECR = Experiences in Close Relationships Questionnaire; IPPA-R = Inventory of Parent and Peer Attachment – Revised; PVAQ = Pain Vigilance and Awareness Questionnaire; DASS-21 = Depression, Anxiety, and Stress Scale.

associations with the NOS had medium and large effect sizes; whereas, the ECR scales' associations with the NOS did not have any large effect sizes.

The comparisons regarding the ECR scales and the IPPA-R scales do not clearly demonstrate one scale is more strongly associated with the pain-related variables, so other factors should guide decisions regarding which attachment model would be most appropriate for future research efforts. Given that the majority of theoretical writings and research in this area have utilized the adult attachment tradition developed by Hazan and Shaver (1987) and further refined by Bartholomew and Horowitz (1991), this approach would be most consistent with the existing literature. As well, this approach is advantageous because hypotheses about each attachment style or dimension can be developed. For example, Mikail et al. (1994) described each attachment style in terms the help-seeking patterns typically associated with it. In contrast, the IPPA-R is better suited to testing hypotheses about a single or global dimension of general attachment security.

General Discussion

Main Contributions

The use of a non-clinical sample and a cross-sectional design are limitations of the present study. In particular, the cross-sectional design precludes conclusions regarding causal relationships. However, given the paucity of research regarding attachment and pain, cross-sectional findings with a non-clinical sample can make an important contribution to the literature. It is also important to note that the associations between insecure attachment and negative outcomes that have been demonstrated in earlier studies utilizing clinical samples could have occurred because the experience of

chronic pain and pain-related distress led to negative changes in attachment (viz., secure attachment to insecure attachment). This possibility warrants consideration because chronic pain has been found to be associated with decreases in relationship quality between chronic pain patients and theirs spouses (Ahern & Follick, 1985) and changes in marital satisfaction have been found to be associated with changes in attachment style (Davila et al., 1999). The present findings with a non-clinical sample indicate that associations between attachment variables and pain-related variables exist prior to the development of chronic pain. While not unequivocal, the consistency between the present findings and previous research with clinical samples (e.g., Ciechanowski et al., 2003) suggests that insecure attachment likely leads to negative pain-related outcomes rather than the reverse causal pathway (i.e., chronic and severe pain leading to insecure attachment).

One of the most significant contributions of the present study concerns pain-related appraisals. Self-report measures of pain-related appraisals were included because Mikulincer and Florian (1998) suggested that those with insecure attachment would appraise their pain more negatively. Ciechanowski et al.'s (2003) findings provided modest support for this idea, but the present finding provided much stronger support as Model of Self scores had significant positive associations with each of the pain-related appraisal variables.

The findings regarding pain-related appraisals are also highly relevant to the broader pain literature. The constructs of fear, catastrophizing, and hypervigilance related to pain and anxiety sensitivity have all been incorporated into fear-avoidance models of chronic pain. In brief, these models posit that in the context of injury those

highly fearful of pain "get caught in a downward spiral of increasing avoidance, disability, and pain" (p. 319; Vlaeyen & Linton, 2000). In a comprehensive review of fear-avoidance models of chronic pain, Vlaeyen and Linton noted that there has been virtually no research regarding precursors of pain-related fear and highlighted this issue as an important topic for future research. In the present study, those with negative models of self in romantic relationships were found to make more negative pain-related appraisals. If the continuity between childhood attachments and adult attachment styles assessed in this study is emphasized in interpreting the findings, the findings raise the possibility that negative experiences that play a role in the development of insecure attachment also contribute to the development of pain-related fear, catastrophizing, and hypervigilance. For example, experiences that lead to negative models of self with regard to relationships may also develop negative working models of themselves regarding a wide range of issues including the ability to cope with pain. In such a case, those with negative models of self would be expected to appraise pain more negatively based on their beliefs that they are incapable of coping with pain.

It is important to note that the present study focused on a measure of romantic attachment. Thus, one possible interpretation of the findings regarding the appraisal measures is that one's sense of unworthiness in romantic relationships causes one to make negative pain- and anxiety-related appraisals. However, the hypotheses of the present study were intended to apply to attachment in general rather than the more specific domain of romantic attachment. Given the overlap in attachment measures (see Bartholomew & Shaver, 1998) and the strong psychometric properties of the ECR, the current approach to assessing attachment was reasonable. As well, a recent study (Watt,

McWilliams, & Campbell, 2005) investigated the relationships between anxiety sensitivity and both romantic and close-relationship attachment dimensions and obtained similar findings across both types of attachment. Given Watt et al.'s (2005) findings, it is likely that the findings of present study would have been similar if a measure based on Bartholomew and Horowitz's (1991) model that focused on a different domain of attachment had been used.

The findings regarding the associations between attachment dimensions and relationship quality with one's general practitioner was another more substantive contribution of the present study. Ratings of relationship quality with one's physician were included because Mikail et al. (1994) suggested that attachment styles play a role in determining whether individuals with pain will seek treatment and in the quality of the relationship between pain patients and their healthcare providers. For example, they indicated those with secure attachment readily seek treatment and work effectively with healthcare providers. The findings of several studies (e.g., Feeney & Ryan, 1994; Ciechanowski et al., 2002) have supported the idea that attachment characteristics influence treatment-seeking efforts. As well, Ceichanowski et al. (2003) found that chronic pain patients' preoccupied and fearful attachment ratings were both associated with more frequent pain-related visits to healthcare providers. This greater rate of treatment-seeking amongst those characterized by preoccupied and fearful attachment may reflect their tendency to rely on others. It may also reflect difficulties working effectively with healthcare providers and the resulting greater need for treatment. However, only in Ciechanowski et al.'s (2001) study of patients with diabetes have the quality of relationships between patients and healthcare providers been considered in

relation to attachment. Ciechanowski et al. (2001) did find those with dismissing attachment style had poorer treatment outcomes, but the attachment groups in their study did not differ with regard to self-reported quality of communication with their physicians. In contrast to this null finding, the present study indicated that those with negative models of others have less positive relationships and more communication difficulties with their general practitioners. Mikail et al.'s more specific hypotheses (e.g., preoccupied attachment is associated with a pattern of vacillating between seeking help and withdrawing from help) could not be investigated. Nonetheless, the current findings indicated that attachment theory holds promise for understanding patients' relationships with their healthcare providers.

Griffin and Bartholomew (1994b) noted that it is important to consider the combination of the two attachment dimensions and they found evidence that models of self moderated the association between models of others and interpersonal problems. Despite their demonstration that moderation effects are important, few studies in the attachment literature have tested for these types of interaction effects. The present study used a multiple regression approach to test for such interaction effects. There was very little evidence that the attachment dimensions assessed by the ECR moderated each other with regard to predicting pain, pain behaviors, patient-physician relationship quality, or pain-related appraisals. Null findings were also found with regard to measures of stress, anxiety, and depression. The findings of Stone-Romero and Anderson's (1994) simulation study indicated that the multiple regression approach to detecting moderation effects is highly accurate when applied in samples similar in size to the present study and when using predictor variables with similar levels of internal

consistency. For example, with predictor variables with internal consistencies of .80 and a sample size of 240 the null hypothesis of no moderating effect would be correctly rejected 99.0% of the time when considering associations with medium effect sizes. Thus, the present null findings regarding moderation effects were particularly noteworthy because they demonstrated that even with excellent statistical power moderation effects were not observed. Based on these findings, it is expected that further attempts to find moderation effects with regard to pain-related variables and common forms of psychopathology (i.e., distress, depression, and anxiety) will be unsuccessful. However, Griffin and Bartholomew demonstrated that moderation effects can be found with regard to interpersonal problems, so it remains likely that moderation effects would be found when considering forms of psychopathology involving interpersonal issues and problems (e.g., personality disorders).

Future Directions

The growing body of literature regarding adult attachment and pain raises numerous directions for future research. The attachment variables in the present study were not significantly associated with pain-related interference. In a clinical sample, Ciechanowski et al. (2003) also failed to find a significant association between attachment ratings and self-reports of pain and physical functioning. In contrast, McWilliams et al. (2000) found ratings of insecure attachment to be positively associated with pain and disability in a community sample of individuals with arthritis. Further research investigating the role that attachment experiences play in pain-related disability is required. For example, a longitudinal study of a homogeneous group of acute pain patients (e.g., patients with whiplash-related pain) could be used to

investigate whether insecure attachment is associated with poorer treatment outcomes (e.g., chronic pain and disability) and whether variables such as pain-related catastrophizing and patient-healthcare provider communication quality mediate these relationships. As well, Mikail (2003) and Ciechanowski et al. discussed the possibility of tailoring treatments on the basis of patients' attachment styles, but no research has investigated whether treatments tailored in this manner are more effective than existing treatment approaches. Aside from these more broad issues for further research, the findings of the present study point to several more specific potential lines of research.

Attachment theory has been frequently applied to understanding coping behavior and appraisals in general (e.g., Mikulincer & Florian, 1998). However, it is arguably better suited to providing a theoretical framework for understanding constructs involving interpersonal relationships. Consistent with this, many of the largest associations observed in the present study involved interpersonal variables (e.g., the patient-physician relationship variables). As well, much of the existing literature regarding pain and attachment (e.g., Ciechanowski et al., 203; Mikail et al., 1994) has focused on interpersonal factors. Thus, interpersonal aspects of pain are likely the most promising area for future research from an adult attachment perspective. Two avenues for incorporating attachment theory into existing bodies of pain research involving interpersonal factors are presented below.

Attachment theory could be incorporated into Sullivan et al.'s (2001) communal coping model of pain-related catastrophizing. In short, Sullivan et al. suggested that individuals vary in the extent to which their coping efforts have social or relational goals and that catastrophizing may be engaged in as a means of communicating distress

and eliciting social support. It is noteworthy that this style of coping bears a striking resemblance to Kolb's (1982) observation that patients' complaints of pain are often attachment behaviors designed to elicit caretaking behavior in others. In support of this model, Sullivan, Adams, and Sullivan (2004) found that those high in catastrophizing exposed to a painful stimulus (viz., the cold pressor procedure) in the presence of an observer displayed more communicative pain behavior (e.g., facial expressions and vocalizations communicating pain) than high catastrophizers exposed to pain alone and that the presence of an observer was not associated with communicative pain behavior amongst low catastrophizers.

Sullivan and collleagues (Sullivan et al., 2001, 2004) have not considered whether individual difference variables could underlie the association between communal coping and catastrophizing. In the present study, the ECR Model of Self scale was significantly associated with catastrophizing and the Model of Others scale had a marginally significant association with catastrophizing, so models of self and others should be considered as possibly being involved in the coping strategy described by Sullivan et al (2001). In support of the notion that attachment variables would related to communal forms of coping, the general attachment literature (e.g., Ognibene & Collins, 1998) indicates that those with positive models of others are more likely to seek the assistance from others when dealing distress. The present findings regarding the NOS are also consistent with this wider literature. The relationships between attachment characteristics and efforts to elicit support by catastrophizing would likely be complex as communal/catastrophizing-based coping appears to be a combination of potentially adaptive responses (viz., seeking help from others) and potentially maladaptive

responses (negative appraisals) to pain. Those with secure attachment would likely view themselves as capable of dealing with pain and would have little need for communal coping. In situations involving more intense pain those with secure attachment may want the support of others, but would be expected to use more direct means to obtain such support. Those with dismissing and fearful attachment have negative views of others and would therefore be unlikely to utilize communal forms of coping with pain. Preoccupied attachment would likely be associated with communal/catastrophizing-based coping. Those with preoccupied attachment would be expected to view themselves as incapable of coping with pain and would view others as being valuable sources of support. However, those with preoccupied attachment are anxious about abandonment and potential rejection (i.e., negative model of self) and as a result may believe they will only receive help from others if they exaggerate their pain.

The hypotheses presented above regarding the relationships between specific attachment styles and communal/catastrophizing-based coping await further investigation as they were not tested in the current study. If these hypotheses were supported, they would represent a moderation effect if conceptualized from an attachment dimension approach. More specifically, there would be no relationship between models of self and communal/catastrophizing coping amongst those with negative models of other (i.e., those with dismissing and fearful attachment would not differ), but there would be a positive association between models of self and communal/catastrophizing coping amongst those with positive models of other (i.e., those with preoccupied attachment would report more of this form of coping than those with secure attachment).

Sullivan et al.'s (2001) communal coping model is one of the newest interpersonally-focused approaches to understanding chronic pain. An earlier and highly prominent body of research has focused on "solicitous responses" (e.g., getting pain medication, doing household work, encouraging rest) of pain patients' spouses. This line of research developed from Fordyce's (1976) operant conditioning theory regarding the development of chronic pain. He suggested that pain persists when expressions of pain and pain behaviors receive positive reinforcement. Several studies (e.g., Faucett & Levine, 1991; Fillingim, Doleys, Edwards, & Lowery, 2003; Flor, Kerns, & Turk, 1987; Paulsen & Altmaier, 1995) have used the Multidimensional Pain Inventory (Kerns, Turk, & Rudy, 1985) to investigate relationships between patients' perceptions of solicitous responses and outcomes such as pain behavior, pain severity, and disability. These studies have generally found perceptions of solicitous responses to be positively associated with such negative outcomes. The Multidimensional Pain Inventory also includes scales designed to assess the degree to which pain patients' spouses punish them (e.g., expressing irritation or anger) and attempt to distract them during pain. These types of responses have not been consistently associated with negative outcomes and have not received as much interest.

Research regarding patients' perceptions of solicitous, punishing, and distracting responses to pain has not yet considered what individual difference variables or underlying interpersonal patterns give rise to these various responses to pain. That is, research has shown solicitous responses may have undesirable outcomes, but there is no research regarding why spouses respond that way. Simpson et al.'s (1992) study of adult attachment and support-giving provides some direction in this regard. They

exposed female members of dating couple dyads to an anxiety-provoking situation and investigated whether attachment variables were associated with patterns of support-seeking and support-giving. Of most relevance to the present discussion, amongst men with secure attachment there was a positive relationship between partners' anxiety levels and the provision of support; whereas amongst men with avoidant attachment there was a negative association between their partners' anxiety levels and the provision of social support. Given the experience of pain is a potential form of distress, it is likely that attachment characteristics influence the provision of support regarding pain. A study similar to that of Simpson et al. could be used investigate relationships between attachment and support giving related to the experience of pain.

More directly related to the clinical research utilizing the Multidimensional Pain Inventory, attachment styles would likely be associated with the types of pain responses pain patients receive from their spouses. Securely attached individuals are most likely to have romantic partners with secure attachment; whereas individuals with insecure attachment are more likely to have romantic partners with insecure attachment (Kirkpatrick & Davis, 1994; Senchak & Leonord, 1992). Based on this pattern of attachments within romantic relationships and Simpson et al.'s findings regarding support-giving, it is likely that securely attached individuals would tend to receive solicitous responses from their partners (who also have secure attachment) whereas those with insecure attachment would tend to receive punishing responses from their spouses (who also have insecure attachment). Integrating attachment theory into this line of research may lead to findings with direct clinical implications. For example, securely attached pain patients may benefit from interventions aimed at reducing their

partners' solicitous responses. In contrast, those with insecure attachment may benefit from interventions aimed at developing more adaptive support-seeking and support-giving patterns within their relationships.

Summary

A few theoretical papers and research reports have suggested that adult attachment styles are important factors in the experience of chronic pain. In short, insecure attachment has been posited as being a vulnerability factor for chronic pain, pain severity, disability, emotional distress, and poor response to treatment. The present study utilized a non-clinical sample to investigate several of the hypotheses in this literature. The findings suggest that adult attachment theory is a promising framework for understanding how individuals respond to pain. Self-reports of adult romantic attachment dimensions from Bartholomew and Horowitz's (1991) attachment model were significantly associated with reports of recent pain experiences and negative pain-related appraisals. The pattern of associations observed supported the notion that those with insecure attachment experience more pain and have more negative pain-related appraisals. More general, or not specifically pain-related measures of attitudes towards social support, patient-physician relationship quality, and psychopathology were also included. Secure attachment was positively associated with more adaptive relational variables (e.g., positive attitudes towards social support) and with lower levels of psychopathology. Consistent with previous research, the attachment measures were generally more strongly associated with several of the more interpersonally-relevant dependent variables, such as ratings of patient-physician relationship quality. Given this trend, attachment-based research regarding pain-related interpersonal constructs, such

as communal coping and patients' perceptions of solicitous responses to pain, appear to be the most promising avenues for future research. A measure of parental and peer attachment was also included and was comparable to the adult romantic attachment scale (i.e., ECR) in terms of the number and magnitude of significant associations found with the dependent variables. Despite this level of comparability, Bartholomew and Horowitz's adult attachment model would arguably be the most appropriate framework for future research concerning pain because it has been adopted in the majority of recent theoretical writings and research in this area.

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Appendix

(questionnaire package)

UNIVERSITY OF MANITOBA | Department of Psychology

190 Dysart Road
Winnipeg, Manitoba
Canada R3T 2N2
Fax (204) 474-7599

Research Project Title: An Investigation of Attachment Styles and Pain Behaviors
Researchers: Lachlan McWilliams and Dr. Michael Thomas

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

This research is aimed at understanding relationship styles and pain-related behaviors. Participation involves completing a series of questionnaires regarding your experiences in relationships, episodes of pain, and your mood. Completing this questionnaire will likely take between 30 to 60 minutes. For your participation in this study, you will be awarded 2 research participation credits for your Introduction to Psychology course. This study does not involve deception and there are no known risks of participating.

Your responses to this questionnaire package will be anonymous. If you agree to participate in this study, please sign at the bottom of the page. Once you have completed the questionnaire package, please remove this page from the questionnaire package and return both to the researcher. **This form and the questionnaire package will be collected separately, so there will be no way to link your responses with your name.** The questionnaires completed in this study will be stored in a secure location (Dr. Thomas's research lab) and will only be viewed by the researcher and his associates.

A summary of the major findings of this research will be posted in the Psychology Department prior to the end your Introductory Psychology class (likely at the end of March 2003). If you would like this summary to be sent to you directly, please provide your email address in the space below. Once you have returned this questionnaire, a copy of this form will be given to you for your records and reference.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. The researchers conducting this study are Lachlan McWilliams (Tel: 787-5084) and Dr. Michael Thomas (Tel: 474-9633).

This research has been approved by the Psychology/Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

Participant's Signature _____ Date _____

Participant's Email Address _____ (optional -- include if you want a summary sent to you)

Researcher 's Signature _____ Date _____

Background and Health-Related Information

Please answer the following background and health-related questions.

1) How old are you? _____ years

2) Gender? ☐ Male ☐ Female

3) Racial Background? ☐ Caucasian ☐ Asian
☐ Native Canadian ☐ Other (Please Specify _____)
☐ Black

4) a) Have you been involved in a dating relationship at some point in your lifetime?
☐ No ☐ Yes

b) If so, how many people have you dated exclusively for longer than two months?
_____ people

c) For what length of time was your longest dating relationship?
_____ years _____ months

d) Please indicate your marital status?
☐ Single ☐ Divorced or Separated
☐ Married ☐ Widowed
☐ Living Common-Law

5) When you were growing up, what was the marital status of your parents? Please circle the best choice.

Married Separated Divorced Never Married Other

6) When growing up, did you have regular contact (daily or almost daily) with your mother?
☐ No ☐ Yes

7) When growing up, did you have regular contact (daily or almost daily) with your father?
☐ No ☐ Yes

8) When growing up, did you have a step-mother?
☐ No ☐ Yes

9) If so, did you have regular contact with her? If this question is not applicable, proceed to the next question.
☐ No ☐ Yes

10) When growing up, did you have a step-father?
☐ No ☐ Yes

11) If so, did you have regular contact with him? If this question is not applicable, proceed to the next question.
☐ No ☐ Yes

12) Did you ever have foster parents or live in a foster home?
☐ No ☐ Yes

13) Other than the people listed above, were there any other people that were involved on a daily basis in raising you? If so, please list these individuals below (list their relationship to you not their names).

_____

_____

_____

14) On average how many times per week do you engage in strenuous exercise (e.g. weight lifting, jogging, playing a sport) of at least ½ hours duration? _____ Times

15) How would you rate your current fitness level? Please circle the best choice.

Well Below Average	Below Average	Average Fitness	Above Average	Well Above Average

16) Some people have one doctor (i.e., a family physician, general practitioner, or GP) that they see regarding medical/health problems and concerns. Others do not have a regular doctor, but instead see a variety of doctors in walk-in clinics. Is there one particular doctor that you consult with when you have a health problem or concern? That is, do you have a regular family physician or general practitioner?

☐ No
☐ Yes

17) Please rate how accurately the following statements describe your interactions with your doctor. If you do not have a regular doctor, please answer these questions by considering your interactions with doctors over the past year. Using the scale below, record your rating on the line next to each item. A score of 1 means that you very strongly disagree with the statement, and a score of 7 means that you very strongly agree with the statement.

Very Strongly Disagree						Very Strongly Agree
1	2	3	4	5	6	7

_____ 1. It is difficult to ask my doctor questions.
_____ 2. My doctor doesn't seem interested in me as a person.
_____ 3. It is hard for me to tell my doctor about my symptoms
_____ 4. It is difficult to ask my doctor about something I don't understand.
_____ 5. My doctor really respects me.
_____ 6. I find it difficult to get my doctor to clarify conflicting information.
_____ 7. My doctor is warm and caring toward me.
_____ 8. My doctor makes me feel comfortable discussing personal issues.
_____ 9. Sometimes I feel insulted by my doctor.

PAIN EXPERIENCES

The following list includes several different types of pain. Please circle the number that best describes how frequently you experience these types of pain.

	Rarely or Never				All the time or Almost all the time
Back Pain	0	1	2	3	4
Headaches	0	1	2	3	4
Joint Pain	0	1	2	3	4
Muscle Aches	0	1	2	3	4
Stomach Cramps	0	1	2	3	4
Neck Pain	0	1	2	3	4

Recent Pain Experiences

1) On average how many headaches do you have in a month? _____ headaches

2) How many headaches did you have in the past week? _____ headaches

If you had a headache in the past week, please answer the following questions. If you did not have a headache in the past week, skip to the PAIN HISTORY section on page 5

For the following questions, please consider your worst or most painful headache in the past week.

3a) What type of headache was it? Please circle the best choice.

Tension Migraine Cluster/Mixed Other Don't Know

Pleases use the scale below to rate how painful your worst headache in the past week was. Circle the number that best represents your worst headache pain in the past week.

0	1	2	3	4	5	6	7	8	9	10

NO PAIN — UNBEARABLE PAIN

3b) How long did this headache last? _____ Hours

If the pain lasted more than a day, please indicate how many days it was present. _____ Days

The following questions also concern your worst headache in the past week.

4) Did you tell a family member about your headache or pain?
☐ No ☐ Yes

5) Did you tell a friend about your headache or pain?
☐ No ☐ Yes

6) Did you tell any acquaintances about your headache or pain?
☐ No ☐ Yes

7) Did you see a physician because of this headache?
☐ No ☐ Yes

8) Did you take over the counter analgesic (pain killing) medication for this headache?
☐ No ☐ Yes

9) Did you take prescribed analgesic (pain killing) medication for this headache?
☐ No ☐ Yes

The rating scales below are designed to measure the degree to which your pain interfered or disrupted several aspects of your life. When answering these questions **please consider your worst headache in the past week** and indicate how much that pain prevented you from doing what you would normally do. For each category please circle the number on the scale which describes the level of interference you experienced. A score of 0 means no interference at all, and a score of 10 signifies that all of the activities in which you would normally be involved were totally interfered with or prevented by your headache.

If you think a category does not apply to you, circle "0"

Family/home responsibilities. This category refers to activities related to the home or family. It includes chores and duties performed around your home.

0 1 2 3 4 5 6 7 8 9 10
No Interference Total Interference

Recreation. This category includes hobbies, sports, and other leisure-time activities.

0 1 2 3 4 5 6 7 8 9 10
No Interference Total Interference

Social activity. This category includes parties, theater, concerts, dining out, and other social activities.

0 1 2 3 4 5 6 7 8 9 10
No Interference Total Interference

Occupation/Education. This category refers to activities that are directly related to one's job (e.g., attendance at work and ability to perform job duties) or to activities that are directly related to one's schooling (e.g., attendance at classes and completion of homework).

0 1 2 3 4 5 6 7 8 9 10
No Interference Total Interference

PAIN HISTORY

Do you have pain or discomfort that has persisted continuously or intermittently for longer than three months?

☐ No ☐ Yes

If you answered "yes" to the above question, please answer the following questions. If you answered "no" to the above question, please skip two pages and begin answering the questions on page 7 (RQ appears at the top of the page).

Referring to the pain that has persisted continuously or intermittently for longer than three months, please answer the following questions.

1. How long have you had this type of pain? _____ months

2. Circle the letter that best represents the frequency of your pain.

   a) it is almost constant pain
   b) it occurs everyday, but not constantly
   c) it occurs almost everyday
   d) it occurs several days a week
   e) it occurs about once a week
   f) it occurs once a month

3. The following words can be used to describe pain intensity. Please consider the pain that you have on a continuous or intermittent basis, and check the box beside the word that best represents the average intensity of this pain.

0	No pain	☐
1	MILD	☐
2	DISCOMFORTING	☐
3	DISTRESSING	☐
4	HORRIBLE	☐
5	EXCRUCIATING	☐

4. What type of pain, do you experience on a continuous or intermittent basis? Please describe it in a few words (e.g., low back pain, headaches, arthritis, injury-related pain).

   _____

5. Have you ever consulted with a physician regarding this pain?
   ☐ No ☐ Yes

6. Is this continuous or intermittent pain associated with a medical condition?
   ☐ No ☐ Yes

   If yes, please name the condition _____

7. Please read all of the options below and indicate which locations in your body pain you experience on a frequent basis (the pain referred to in the above questions). If more than one option applies, select the one option that best represents the nature of you frequent pain.

☐ Back	☐ Joints	☐ Arm and/or hands
☐ Neck	☐ Stomach	☐ Legs and/or feet
☐ Head	☐ Shoulder	☐ Other (Please specify _____)

8. Do you typically use over the counter analgesic (pain-killing) medication when you have this type of pain?
☐ No ☐ Yes

9. Do you typically use prescribed analgesic (pain-killing) medication when you have this type of pain?
☐ No ☐ Yes

10. Have you ever been referred to a chronic pain clinic?
☐ No ☐ Yes

11. Have you ever received treatment at a chronic pain clinic?
☐ No ☐ Yes

12. Other than a family doctor or general practitioner, have you ever consulted with a medical specialist for this pain?
☐ No ☐ Yes

If so, please indicate what type of specialist _____
If so, how long ago was this consultation _____

13. Are you currently involved in treatment for this pain?
☐ No ☐ Yes

If yes, please indicate what type of treatment you are currently involved with. Circle all the options that apply.

a) Medication (only include this if you take prescribed medication at least once a day)
b) Surgery (waiting for surgery or recovering from it)
c) Physiotherapy
d) Chiropractic
e) Other (please indicate _____)

Please continue to the following pages.

RQ

Instructions. Following are four general relationship styles that people often report. Place a checkmark next to the letter corresponding to the style that best describes you or is closest to the way you are.

____ A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

____ B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

____ C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

____ D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

Instructions. Now please rate each of the relationship above to indicate how well or poorly each description corresponds to your general relationship style. Circle the appropriate number.

Style A

1	2	3	4	5	6	7
Not at All Like Me	.....	.....	*Neutral/ Mixed*	.....	.....	*Very Much Like Me*

Style B

1	2	3	4	5	6	7
Not at All Like Me	.....	.....	*Neutral/ Mixed*	.....	.....	*Very Much Like Me*

Style C

1	2	3	4	5	6	7
Not at All Like Me	.....	.....	*Neutral/ Mixed*	.....	.....	*Very Much Like Me*

Style D

1	2	3	4	5	6	7
Not at All Like Me	.....	.....	*Neutral/ Mixed*	.....	.....	*Very Much Like Me*

PCS

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feeling that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

0 - not at all **1** - to a slight degree **2** - to a moderate degree **3** - to a great degree **4** - all the time

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When I'm in pain...

_____ I worry all the time about whether the pain will end.

_____ I feel I can't go on.

_____ It's terrible and I think it's never going to get any better.

_____ It's awful and I feel that it overwhelms me.

_____ I feel I can't stand it anymore.

_____ I become afraid that the pain will get worse.

_____ I keep thinking of other painful events.

_____ I anxiously want the pain to go away.

_____ I can't seem to keep it out of my mind.

_____ I keep thinking about how much it hurts.

_____ I keep thinking about how badly I want the pain to stop.

_____ There is nothing I can do to reduce the intensity of the pain.

_____ I wonder whether something serious may happen.

ECR

The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Write the number in the space provided, using the following rating scale:

1	2	3	4	5	6	7
Disagree Strongly	.....	.....	*Neutral/ Mixed*	.....	.....	*Agree Strongly*

___ 1. I prefer not to show a partner how I feel deep down.

___ 2. I worry about being abandoned.

___ 3. I am very comfortable being close to romantic partners.

___ 4. I worry a lot about my relationships.

___ 5. Just when my partner starts to get close to me I find myself pulling away.

___ 6. I worry that romantic partners won't care about me as much as I care about them.

___ 7. I get uncomfortable when a romantic partner wants to be very close.

___ 8. I worry a fair amount about losing my partner.

___ 9. I don't feel comfortable opening up to romantic partners.

___ 10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.

___ 11. I want to get close to my partner, but I keep pulling back.

___ 12. I often want to merge completely with romantic partners, and this sometimes scares them away.

___ 13. I am nervous when partners get too close to me.

___ 14. I worry about being alone.

___ 15. I feel comfortable sharing my private thoughts and feelings with my partner.

___ 16. My desire to be very close sometimes scares people away.

___ 17. I try to avoid getting too close to my partner.

___ 18. I need a lot of reassurance that I am loved by my partner.

1	2	3	4	5	6	7
Disagree Strongly	.....	.....	*Neutral/ Mixed*	.....	.....	*Agree Strongly*

___ 19. I find it relatively easy to get close to my partner.

___ 20. Sometimes I feel that I force my partners to show more feeling, more commitment.

___ 21. I find it difficult to allow myself to depend on romantic partners.

___ 22. I do not often worry about being abandoned.

___ 23. I prefer not to be too close to romantic partners.

___ 24. If I can't get my partner to show interest in me, I get upset or angry.

___ 25. I tell my partner just about everything.

___ 26. I find that my partner(s) don't want to get as close as I would like.

___ 27. I usually discuss my problems and concerns with my partner.

___ 28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.

___ 29. I feel comfortable depending on romantic partners.

___ 30. I get frustrated when my partner is not around as much as I would like.

___ 31. I don't mind asking romantic partners for comfort, advice, or help.

___ 32. I get frustrated if romantic partners are not available when I need them.

___ 33. It helps to turn to my romantic partner in times of need.

___ 34. When romantic partners disapprove of me, I feel really bad about myself.

___ 35. I turn to my partner for many things, including comfort and reassurance.

___ 36. I resent it when my partner spends time away from me.

FPQ – III

INSTRUCTIONS: The items listed below describe painful experiences. Please look at each item and think about how **FEARFUL** you are of experiencing the **PAIN** associated with each item. If you have never experienced the **PAIN** of a particular item, please answer on the basis of how **FEARFUL** you expect you would be if you had such an experience. Circle one number for each item below to rate your **FEAR OF PAIN** in relation to each event.

	Not At All	A Little	A Fair Amount	Very Much	Extreme
I FEAR the PAIN associated with:					
1. Being in an automobile accident.	1	2	3	4	5
2. Biting your tongue while eating.	1	2	3	4	5
3. Breaking your arm.	1	2	3	4	5
4. Cutting your tongue licking an envelope.	1	2	3	4	5
5. Having a heavy object hit you in the head.	1	2	3	4	5
6. Breaking your leg.	1	2	3	4	5
7. Hitting a sensitive bone in your elbow – your "funny bone."	1	2	3	4	5
8. Having a blood sample drawn with a hypodermic needle.	1	2	3	4	5
9. Having someone slam a heavy car door on your hand.	1	2	3	4	5
10. Falling down a flight of concrete stairs.	1	2	3	4	5
11. Receiving an injection in your arm.	1	2	3	4	5
12. Burning your fingers with a match.	1	2	3	4	5
13. Breaking your neck.	1	2	3	4	5
14. Receiving an injection in your hip/buttocks.	1	2	3	4	5
15. Having a deep splinter in the sole of your foot probed and removed with tweezers.	1	2	3	4	5

Questions Continue on Next Page →

	Not At All	A Little	A Fair Amount	Very Much	Extreme
I FEAR the PAIN associated with:					
16. Having an eye doctor remove a foreign particle stuck in your eye.	1	2	3	4	5
17. Receiving an injection in your mouth.	1	2	3	4	5
18. Being burned on your face by a lit cigarette.	1	2	3	4	5
19. Getting a paper-cut on your finger.	1	2	3	4	5
20. Receiving stitches in your lip.	1	2	3	4	5
21. Having a foot doctor remove a wart from your foot with a sharp instrument.	1	2	3	4	5
22. Cutting yourself while shaving with a sharp razor.	1	2	3	4	5
23. Gulping a hot drink before it has cooled.	1	2	3	4	5
24. Getting strong soap in both your eyes while bathing or showering.	1	2	3	4	5
25. Having a terminal illness that causes you daily pain.	1	2	3	4	5
26. Having a tooth pulled.	1	2	3	4	5
27. Vomiting repeatedly because of food poisoning.	1	2	3	4	5
28. Having sand or dust blow into your eyes.	1	2	3	4	5
29. Having one of your teeth drilled.	1	2	3	4	5
30. Having a muscle cramp.	1	2	3	4	5

IPPA-R

This questionnaire asks about your relationships with important people in your life; your mother, your father, and your close friends. Please read the directions to each part carefully.

Part I: The following statements ask about your feelings about your mother or the person who has acted as your mother. If you have more than one person acting as your mother (e.g. a natural mother and a step-mother) answer the questions for the one you feel has most influenced you.

Please read each statement and circle the ONE number that tells how true the statement is for you now.

	Almost Never or Never True	Not Very Often True	Some-times True	Often True	Almost Always or Always True
1. My mother respects my feelings.	1	2	3	4	5
2. I feel my mother does a good job as my mother.	1	2	3	4	5
3. I wish I had a different mother.	1	2	3	4	5
4. My mother accepts me as I am.	1	2	3	4	5
5. I like to get my mother's point of view on things I'm concerned about.	1	2	3	4	5
6. I feel it's no use letting my feelings show around my mother.	1	2	3	4	5
7. My mother can tell when I'm upset about something.	1	2	3	4	5
8. Talking over my problems with my mother makes me feel ashamed or foolish.	1	2	3	4	5
9. My mother expects too much from me.	1	2	3	4	5
10. I get upset easily around my mother.	1	2	3	4	5
11. I get upset a lot more than my mother knows about.	1	2	3	4	5
12. When we discuss things, my mother cares about my point of view.	1	2	3	4	5
13. My mother trusts my judgment.	1	2	3	4	5
14. My mother has her own problems, so I don't bother her with mine.	1	2	3	4	5
15. My mother helps me to understand myself better.	1	2	3	4	5
16. I tell my mother about my problems and troubles.	1	2	3	4	5
17. I feel angry with my mother.	1	2	3	4	5
18. I don't get much attention from my mother.	1	2	3	4	5
19. My mother helps me to talk about my difficulties.	1	2	3	4	5
20. My mother understands me.	1	2	3	4	5
21. When I am angry about something, my mother tries to be understanding.	1	2	3	4	5
22. I trust my mother.	1	2	3	4	5
23. My mother doesn't understand what I'm going through these days.	1	2	3	4	5
24. I can count on my mother when I need to get something off my chest.	1	2	3	4	5
25. If my mother knows something is bothering me, she asks me about it.	1	2	3	4	5

IPPA-R

Part II: This part asks about your feelings bout your father, or the man who has acted as your father. If you have more than one person acting as your father (e.g. natural and step-father) answer the question for the one you feel has most influenced you.

Please read each statement and circle the ONE number that tells how true the statement is for you now.

	Almost Never or Never True	Not Very Often True	Some-times True	Often True	Almost Always or Always True
1. My father respects my feelings.	1	2	3	4	5
2. I feel my father does a good job as my father.	1	2	3	4	5
3. I wish I had a different father.	1	2	3	4	5
4. My father accepts me as I am.	1	2	3	4	5
5. I like to get my father's point of view on things I'm concerned about.	1	2	3	4	5
6. I feel it's no use letting my feelings show around my father.	1	2	3	4	5
7. My father can tell when I'm upset about something.	1	2	3	4	5
8. Talking over my problems with my father makes me feel ashamed or foolish.	1	2	3	4	5
9. My father expects too much from me.	1	2	3	4	5
10. I get upset easily around my father.	1	2	3	4	5
11. I get upset a lot more than my father knows about.	1	2	3	4	5
12. When we discuss things, my father cares about my point of view.	1	2	3	4	5
13. My father trusts my judgment.	1	2	3	4	5
14. My father has his own problems, so I don't bother him with mine.	1	2	3	4	5
15. My father helps me to understand myself better.	1	2	3	4	5
16. I tell my father about my problems and troubles.	1	2	3	4	5
17. I feel angry with my father.	1	2	3	4	5
18. I don't get much attention from my father.	1	2	3	4	5
19. My father helps me to talk about my difficulties.	1	2	3	4	5
20. My father understands me.	1	2	3	4	5
21. When I am angry about something, my father tries to be understanding.	1	2	3	4	5
22. I trust my father.	1	2	3	4	5
23. My father doesn't understand what I'm going through these days.	1	2	3	4	5
24. I can count on my father when I need to get something off my chest.	1	2	3	4	5
25. If my father knows something is bothering me, he asks me about it.	1	2	3	4	5

IPPA-R

Part III: This part asks about your feelings about your relationships with your close friends.

Please read each statement and circle the ONE number that tells how true the statement is for you now.

	Almost Never or Never True	Not Very Often True	Some-times True	Often True	Almost Always or Always True
1. I like to get my friends' point of view on things I'm concerned about.	1	2	3	4	5
2. My friends can tell when I'm upset about something.	1	2	3	4	5
3. When we discuss things, my friends care about my point of view.	1	2	3	4	5
4. Talking over my problems with friends makes me feel ashamed or foolish.	1	2	3	4	5
5. I wish I had different friends.	1	2	3	4	5
6. My friends understand me.	1	2	3	4	5
7. My friends encourage me to talk about my difficulties.	1	2	3	4	5
8. My friends accept me as I am.	1	2	3	4	5
9. I feel the need to be in touch with my friends more often.	1	2	3	4	5
10. My friends don't understand what I'm going through these days.	1	2	3	4	5
11. I feel alone or apart when I am with my friends.	1	2	3	4	5
12. My friends listen to what I have to say.	1	2	3	4	5
13. I feel my friends are good friends.	1	2	3	4	5
14. My friends are fairly easy to talk to.	1	2	3	4	5
15. When I am angry about something, my friends try to be understanding.	1	2	3	4	5
16. My friends help me to understand myself better.	1	2	3	4	5
17. My friends care about how I am feeling.	1	2	3	4	5
18. I feel angry with my friends.	1	2	3	4	5
19. I can count on my friends when I need to get something off my chest.	1	2	3	4	5
20. I trust my friends.	1	2	3	4	5
21. My friends respect my feelings.	1	2	3	4	5
22. I get upset a lot more than my friends know about.	1	2	3	4	5
23. It seems as if my friends are irritated with me for no reason.	1	2	3	4	5
24. I can tell my friends about my problems and troubles.	1	2	3	4	5
25. If my friends know something is bothering me, they ask me about it.	1	2	3	4	5

Reiss-Epstein-Gursky A.S.I.

Circle the *one* phrase that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience (e.g., "It scares me when I feel shaky" for someone who has never trembled or had the "shakes"), answer on the basis of how you thing you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience.

1. It is important to me not to appear nervous.	Very Little A Little Some Much Very Much
2. When I cannot keep my mind on a task, I worry that I might be going crazy.	Very Little A Little Some Much Very Much
3. It scares me when I feel "shaky" (trembling).	Very Little A Little Some Much Very Much
4. It scares me when I feel faint.	Very Little A Little Some Much Very Much
5. It is important to me to stay in control of my emotions.	Very Little A Little Some Much Very Much
6. It scares me when my heart beats rapidly.	Very Little A Little Some Much Very Much
7. It embarrasses me when my stomach growls.	Very Little A Little Some Much Very Much
8. It scares me when I am nauseous.	Very Little A Little Some Much Very Much
9. When I notice that my heart is beating rapidly, I worry that I might have a heart attack.	Very Little A Little Some Much Very Much
10. It scares me when I become short of breath.	Very Little A Little Some Much Very Much
11. When my stomach is upset, I worry that I might be seriously ill.	Very Little A Little Some Much Very Much
12. It scares me when I am unable to keep my mind on a task.	Very Little A Little Some Much Very Much
13. Other people notice when I feel shaky.	Very Little A Little Some Much Very Much
14. Unusual body sensations scare me.	Very Little A Little Some Much Very Much
15. When I am nervous, I worry that I might be mentally ill.	Very Little A Little Some Much Very Much
16. It scares me when I am nervous.	Very Little A Little Some Much Very Much

NETORNT

Below is a list of statements concerning relations with other people. Please indicate the extent to which you agree or disagree with each statement. (Using the scale below, circle one number corresponding to each statement.)

1 STRONGLY DISAGREE
2 DISAGREE
3 AGREE
4 STRONGLY AGREE

1. Sometimes it is necessary to talk to someone about your problems	1	2	3	4
2. Friends often have good advice to give	1	2	3	4
3. You have to be careful who you tell personal things to	1	2	3	4
4. I often get useful information from other people	1	2	3	4
5. People should keep their problems to themselves	1	2	3	4
6. It's easy for me talk about personal and private matters	1	2	3	4
7. In the past, friends have really helped me out when I've had a problem	1	2	3	4
8. You can never trust people to keep a secret	1	2	3	4
9. When a person gets upset they should talk it over with a friend	1	2	3	4
10. Other people never understand my problems	1	2	3	4
11. Almost everyone knows someone they can trust with a personal secret	1	2	3	4
12. If you can't figure out your problems, nobody can	1	2	3	4
13. In the past, I have rarely found other peoples' opinions helpful when I have a problem	1	2	3	4
14. It really helps when you are angry to tell a friend what happened	1	2	3	4
15. Some things are too personal to talk to anyone about	1	2	3	4
16. It's fairly easy to tell who you can trust, and who you can't	1	2	3	4
17. In the past, I have been hurt by people I confided in	1	2	3	4
18. If you confide in other people, they will take advantage of you	1	2	3	4
19. It's okay to ask favors of people	1	2	3	4
20. Even if I need something, I would hesitate to borrow it from someone	1	2	3	4

PVAQ

Below is a list of statements about how much (or how little) you notice pain. Please rate how accurately these statements describe you. Record your rating on the line next to each item.

Never					Always
0	1	2	3	4	5

_____1. I am very sensitive to pain.

_____2. I am aware of sudden or temporary changes in pain.

_____3. I am quick to notice changes in pain intensity.

_____4. I am quick to notice effects of medication on pain.

_____5. I am quick to notice changes in location or extent of pain.

_____6. I focus on sensations of pain.

_____7. I notice pain even if I am busy with another activity.

_____8. I find it easy to ignore pain.

_____9. I know immediately when pain starts or increases.

_____10. When I do something that increases pain, the first thing I do is check to see how much pain was increased.

_____11. I know immediately when pain decreases.

_____12. I seem to be more conscious of pain than others.

_____13. I pay close attention to pain.

_____14. I keep track of my pain level.

_____15. I become preoccupied with pain.

_____16. I do not dwell on pain.

DASS21

Please read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied to you ***over the past week***. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3