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**Working Models of Attachment and Health Threats:
Distress, Appraisal, Coping and Health-Related Behaviours
in Colorectal Cancer**

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**Dissertation submitted to the Faculty of Graduate Studies and Post Doctoral Studies
of the University of Ottawa
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy**



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Abstract

Attachment theory has evolved from early work on infant-caregiver relationships to exploring the role of attachment processes in close relationships in adults. Most recently, it has been investigated under conditions of threat or stress. Bowlby (1973, 1988) proposed that attachment processes should be most activated under these circumstances. Using a cross-sectional design, the present project investigated working models of attachment within the context of a threat to health. Specifically, it tested components of a model proposed by Collins and Read (1994) that attachment models affect relevant behavioural outcomes via cognitive and emotional responses. Working models of attachment, emotional distress, appraisal and coping were studied in 71 male and female colorectal cancer patients undergoing adjuvant treatment. Health-related behaviours were chosen as behavioural outcomes.

Although measurement and design issues did not permit a complete test of the model, the results suggested that working models of attachment are related to distress and coping in ways that are consistent with attachment theory. Perceived threat of illness was related to negative self models. Emotional distress was found to be primarily a function of model of self and mediated the relationship between the self model and coping. Model of self also had a direct link with the degree to which patients engaged in healthful behaviours. Results for model of other were less robust. Results of this study suggest that internal working models of attachment are important constructs in situations beyond close relationships.

General Introduction to Project

Attachment theory, as delineated by Bowlby (1969, 1973, 1988), conceptualizes the nature and quality of the bond between infants and caretakers as fundamental to healthy interpersonal and emotional development. The theory developed from Bowlby's observations of the deleterious effects of separation from caregivers on the well-being of infants. He argued that attachment is an ethologically-based process, one that is hard-wired into humans and other species. Bowlby suggested that infants are inherently motivated to seek and maintain contact with those in a position to protect them from threat and to help them manage distress. The goal of attachment is a sense of security about the self and the world: a secure base from which the child can explore. Sroufe and Waters (1977) referred to this as *felt security*. In this way, the infant ensures its own survival and enhances its reproductive success. According to Bowlby, children's experiences with their caretakers become internalized and over time result in mental, or *working, models* about the self and others. These models, in turn, guide behaviour in relationships and influence the regulation of distress across the lifespan.

Individuals differ in their internal models and attachment behaviours. Ainsworth, Blehar, Waters and Wall (1978) were the first researchers to test empirically tenets of Bowlby's theory. Ainsworth identified three basic types of infant/caregiver relationships: secure, insecure/avoidant and insecure/anxious-ambivalent. Later, Main and Solomon (1986) identified a fourth category which they termed "disorganized". Secure infants, when confronted with the stress of being separated from their caregivers, exhibited distress upon the caregiver's return. These infants sought contact with and actively used the relationship with the caregiver to regulate distress, and were able to resume exploratory behaviour relatively quickly. Conversely, avoidant

infants rejected the returning caregiver and seemed to regulate or dissipate their distress through means independent of the relationship. Anxious-ambivalent infants also failed to use the presence of the caregiver as a source of comfort. However, rather than avoiding him or her, these children displayed clinginess and anger and were unable to regulate his or her distress for some time. Moreover, exploratory behaviour was diminished. Infants classified as disorganized showed contradictory behaviours. For example, approaching the mother without looking at her or settling down initially, then becoming distressed again. Some infants appeared disoriented, some emotionless, and others looked depressed. Bowlby (1977) proposed that each behavioural strategy is designed to regulate distress in a way that maintains as much comfort and security as possible, given the infants' relational experiences. He believed that these processes are activated under conditions of separation from the caretaker or when the infant is threatened, afraid or sick.

Bowlby (1977) asserted that working models of attachment and associated behaviours are inherent to relationships across the lifespan. He proposed that working models are resistant to change but, given certain environments, may be modified. Individuals can hold multiple working models for significant relationships (e.g., relationships with parents versus peers) (e.g., Collins & Read, 1994; Griffin & Bartholomew, 1994a) but changes in adult attachment are not *predictably* related to life events (Scharfe & Bartholomew, 1994). In the past decade attachment theory has been expanded from its original focus on infant development and has been employed as a framework for understanding intimate adult relationships and their impact on emotional functioning.

Several lines of research suggest that attachment is both applicable to and a relevant construct for adults. First, there is evidence that attachment patterns are relatively stable across

time. There is concordance between attachment styles of children tested at infancy and at pre-adolescence (Sroufe, Egeland & Kreutzer, 1990). The attachment patterns of young adults were found to be at least moderately stable over an eight month time period (Scharfe & Bartholomew, 1994). Stability of attachment style has also been demonstrated in that there are consistencies, as would be predicted by theory, between the attachment styles of parents, their style of parenting and the attachment patterns of their children (Main, Kaplan & Cassidy, 1985). Moreover, congruence has been demonstrated in adult's self-reported attachment style and their memories of their caregiver's parenting style (Rothbard & Shaver, 1994). Second, attachment processes appear to be active in close relationships beyond those of parent and child. Research suggests that working models of attachment explain satisfaction and longevity in romantic relationships, and predict how individuals respond to conflict and stress in these relationships (e.g., Collins & Read, 1990; Hazan & Shaver, 1987).

Based on her work with adolescents and adults, Bartholomew (Bartholomew & Horowitz, 1991) identified four prototypes of attachment using Bowlby's original conceptualization of internal working models. Secure attachment was proposed to reflect a positive view of both self and other. Preoccupied attachment reflects a negative view of self but a positive view of other. Fearful attachment refers to a negative view of self and other. Finally, dismissing attachment is associated with a positive view of self but a negative view of other. Preoccupied attachment style corresponds approximately to Ainsworth's "anxious-ambivalent" type. Fearful and dismissing styles comprise two aspects of the original "avoidant" category. Consistent with Bowlby's concept that working models reflect the individuals' best efforts to maintain security, the four attachment styles represent different ways of coping with the caregiving and attachment

experiences that the individual has encountered over time (Klohnen & John, 1998). There is extensive evidence to support the construct validity of the dimensional model of self and other (e.g, Bartholomew & Horowitz, 1991; Fraley & Waller, 1998; Griffin & Bartholomew, 1994a, 1994b) and this conceptualization is increasingly employed in the attachment literature (Brennan, Clark & Shaver, 1998; Cozzarelli, Sumer & Major, 1998).

Most recently, patterns of adult attachment have been proposed as a way of understanding how adults respond to threatening or stressful situations outside the context of close relationships. This work is consistent with Bowlby's (1973, 1988) position that internal working models are structures through which individuals organize their experience of stress and manage distress. Inherent in Bowlby's theory is the suggestion that internal working models shape expectations about the environment and determine the selection of particular coping strategies for dealing with perceived threat. In this way, attachment is consistent with the stress, appraisal and coping paradigm delineated by Lazarus and Folkman (e.g., 1984). The function of coping is to regulate distress and manage the problems evoking it (Folkman & Moskowitz, 2000). The Lazarus and Folkman model helped account for observations that individuals do not respond identically to the same stressor. The model emphasized the role of subjective cognitive appraisal of the stressor as a determinant of emotional distress, which in turn, influences the choice of coping strategy. The effects of the choice of coping strategy can be seen on later emotional distress levels and eventual adjustment (Folkman & Lazarus, 1988). Collins (1996) and Collins and Read (1994) proposed a similar model of attachment-related behaviours, arguing that working models of attachment function as cognitive schema "to enable people to make sense of

their social world” (p. 811). Once activated, the working models impact influence both cognitive appraisal and emotional processes, which in turn, determine behavioural responses.

Mikulincer and colleagues found that adult attachment style moderates emotional distress, coping, and adjustment under a variety of stressful situations, including divorce, war, military training, threat of death and failure (e.g., Mikulincer & Florian, 1995; Mikulincer & Florian, 1998; Mikulincer, Florian & Weller, 1993; Mikulincer, Horesh, Eilati, & Kotler, 1999). Based on their findings, the authors proposed that security facilitates coping and adaptation: “secure attachment is an inner resource that may help a person to positively appraise stressful experiences, to constructively cope with these events, and to improve his or her well-being and adjustment” (Mikulincer & Florian, 1998, p. 142). Secure attachment, inasmuch as it reflects positive experiences and beliefs about the self and world, affords the secure base from which individuals can tolerate unpleasant or painful situations. In contrast, insecure attachment is a vulnerability factor that is associated with sub-optimal coping and maladjustment.

Serious physical illness is an all too common example of a significant threat to well-being. To date, few researchers have examined attachment style within this context. Feeney (1995) and Feeney and Ryan (1994) explored differences in coping style, health locus of control, medical care-seeking and health behaviours as a function of attachment style in a student sample. Insecure attachment was associated with reports of increased physical symptoms, medical care-seeking, coping style (monitoring versus blunting) and decreased intent to modify health behaviours. Several methodological anomalies render it difficult to ascertain how the results fit with findings from other studies on attachment and coping. Specifically, because the students were healthy, the degree of threat may have been insufficient for attachment patterns to emerge

clearly. Second, the authors did not use standard measures of the three or four category model of attachment nor did they use a standard measure of coping.

Consistent with Collins and Read's (1994) model, the present study employed a conceptual integration of attachment with stress and coping theory to examine how dimensions of adult attachment related to appraisals of and coping with an illness-related stressor, colorectal cancer. With respect to the nature of threat, colorectal cancer is an example of a prevalent, serious cancer. One in 18 Canadian adults will develop this form of cancer during their lifetime. It is diagnosed equally in men and women and is quite treatable if detected early. Appraisal of the nature of the cancer threat was defined, in the present study, as the degree to which the patient felt responsible for his or her cancer and believed that it was serious, controllable, or changeable (e.g., Lau & Hartman, 1983; Leventhal, Nerenz, & Steele, 1984; Taylor, 1983; Turk, Rudy & Salovey, 1986). The relationship between attachment style and emotional distress was also explored. Finally, given the theoretical relevance of self-care behaviour from the perspective of working models of attachment (i.e., view of self) and the importance of working models to health and recovery from illness, the project examined the relationship between attachment style and the degree to which patients engaged in health promoting or risk behaviours and reported physical symptoms. An analysis of health behaviours is also relevant to colorectal cancer because 70% of cases are believed to be related to health habits and lifestyle (Lichtenstein, Holm, & Verkasalo et al., 2000).

The project advances the extant research in that it recruited a homogeneous and balanced sample of male and female colorectal cancer patients undergoing chemotherapy treatment.

The remainder of this discussion reviews literature relevant to the issues described above. First, theoretical and empirical aspects of attachment theory are described to substantiate the relevance of adult attachment patterns as a framework for understanding individual differences in coping with threatening situations. Second, an overview of the stress and coping paradigm is presented. The process by which health-related stressors are appraised and their potential relationships with health-relevant outcomes is described. Third, psychological aspects of cancer are presented in the context of stress and coping. Finally, pertinent research on the nature of health-related behaviours is discussed. The Introduction concludes by outlining the specific research hypotheses suggested by the literature review.

Literature Review

Models of Attachment and Response to Threat

Bowlby (1988) defined attachment behaviour as:

“any form of behaviour that results in a person attaining or maintaining proximity to some other clearly identified individual who is conceived as better able to cope with the world. <The behaviour> is most obvious whenever the person is frightened, fatigued, or sick, and is assuaged by comforting and care-giving” (p. 27).

The creation of a safe base is predicated on the primary caregiver being accessible and responsive to the signals of the child for closeness and safety. These experiences form the child’s “working models” of attachment figures which determine his or her view of other people. The development of a view of self stems from the infant’s belief that he or she can elicit these responses from the care-giver (i.e., is worthy of attention and protection). When caregivers respond to the infants’ needs for comfort, security and exploration in a consistent and appropriate

fashion, the child is likely to develop a view of self as worthy and self-sufficient and a view of the other as trustworthy and caring. In contrast, if the needs are not recognized or are rejected and the infant's attempts at exploration not supported by the caregiver then he or she is likely to develop a view of self as unworthy or incapable, and a view of the other as unavailable, unreliable or rejecting (Bowlby, 1973). Working models are internally organized expectations, or cognitive-affective schema. They are integrated into the structure of personality influencing how the individual construes him or herself, other people and the environment.

Working models are proposed to underlie individual differences in attachment behaviours which were first observed in infants. In the Strange Situation research paradigm, Ainsworth and colleagues (1978) separated children aged 12 to 18 months from their mothers. They examined the infant's level of distress, comfort seeking and exploration behaviour during the mother's absence, during interactions with a stranger and upon the mother's return. Securely attached infants were comfortable exploring their environment and responded to threat or separation from the mother by seeking closeness and comfort from her. When separated and subsequently reunited with the mother, ambivalently attached infants reacted with both proximity seeking and anger. Infants classified as avoidant reacted by avoiding or disregarding her return (Ainsworth, 1985). Main and Solomon (1986) described a fourth category which seemed to be a mixed anxious-avoidant type. Disorganized/disoriented (Type D) infants displayed contradictory behaviours toward their mothers; for example, tentatively seeking proximity but becoming distressed when with her. Brennan et al. (1998) suggested that this attachment style may be related to an abusive or dysfunctional family structure. In general, children whose caregivers are consistently available and responsive to their needs display less fear, anger, and avoidance

behaviours when separated from and reunited with their parents (Ainsworth et al., 1978).

Ainsworth reported that about half the babies were securely attached, about 20% were classified as anxious-ambivalent and 25% as avoidant. Main and Solomon (1986) determined that about 10% of infants exhibited the disorganized/disoriented type.

Results from the Strange Situation suggest that attachment styles function to regulate the infant's affect in emotionally distressing situations, as well as to provide a basic model for physical safety (Bowlby, 1988). Working models are internalized from early experiences with caregivers but continue to serve as prototypes for later relationships; moreover, they provide guidelines for how adults experience, express and cope with emotional distress (Hazan & Shaver, 1987; Rothbard & Shaver, 1994). Collins and Read (1994) proposed that attachment models in adults comprise memories of attachment-related experiences, beliefs and expectations about the self and others, attachment related goals (e.g., safety), and strategies for achieving these goals.

Hazan and Shaver (1987) were the first researchers to test the hypothesis that attachment processes observed in infants should be exhibited in intimate adult relationships. They developed a self-report measure of attachment in an attempt to classify adults according to Ainsworth's descriptions of the three infant types. Although participants in this study were self-selected (i.e., recruited through a newspaper "love quiz"), proportions of each attachment style were found to approximate those in the infant literature: secure, 56-58%; avoidant, 23-25% anxious, 18-20%. These proportions have since been substantiated through meta-analysis (e.g., van IJzendoorn & Bakermans-Kranenburg, 1996). Hazan and Shaver described behavioural patterns in adult relationships analogous to those found in infants. Securely attached individuals were described as relatively self-confident and able to develop and maintain close and satisfying

romantic relationships. Avoidant adults were found to be emotionally inhibited, uncomfortable with self-disclosure and closeness, and less likely than securely attached individuals to be involved in long-term romantic relationships. Anxious adults expressed self-doubt, were worried about rejection and abandonment in relationships and reported more emotional instability in their relationships, including frequent break-ups and reunions. Collins and Read (1990) reported that this group was most associated with an obsessive or dependent relationship style. Hazan and Shaver also found that attachment style was related to memories of parenting style in theoretically predictable ways. Securely attached adults recalled their mothers as reliable and caring; whereas insecurely attached adults reported cold, rejecting or inconsistent parental behaviour.

The second aspect of Bowlby's theory concerns the role of internal models in the regulation of distressing emotion. Presumably, securely attached adults have had positive experiences with relationships throughout their lives that have led them to feel valued and to trust that others will be responsive to their needs. Insecurely attached individuals do not expect others to respond to them in a consistent and appropriate fashion and, as such, have less positive or stable views of self and other people. In keeping with these premises, research has pointed to attachment-related differences in the experience and expression of negative emotion. Securely attached persons openly acknowledge distress and readily turn to others to modulate negative emotion (e.g., Simpson, Rholes & Nelligan, 1992). They describe themselves in more positive terms and as more comfortable in social interactions (Collins & Read, 1990). Avoidantly attached individuals are uncomfortable expressing distress and turn away from others or actively reject their assistance (Simpson et al., 1992). They describe themselves somewhat less positively

and as less socially comfortable than those who are securely attached. However, the differences seldom reach statistical significance (e.g., Collins & Read, 1990). This finding may be due to avoidant individuals' discomfort with disclosing negative information about the self. In a sample of first-year college students, Kobak and Sceery (1988) discovered that individuals classified as avoidant tended to push others away and to avoid unpleasant affect. Autonomy and self-reliance prevailed in their interactions with others and working models of self. Bowlby (1988) described this style as "compulsive self-reliance". Anxiously attached persons, on the other hand, seem unduly focused on their dysphoric affect. They actively seek out contact with others and are often less discriminating in their choice of confidants, relative to the other styles. Of the three, those classified as anxiously attached reported the lowest levels of social comfort (Collins & Read, 1990). Students with anxious attachments (termed anxious-ambivalent by the authors) were found to be less confident and more hyper-vigilant in their interpersonal style, anxiously looking for signs of rejection from the other person (Kobak & Sceery, 1988). Kobak and Sceery suggested that this strategy "inhibits the development of autonomy and self-confidence" (1988, p. 142). Although these findings fit with attachment theory, it is important to note that most of the studies have employed cross-sectional designs based on samples of college students or adult volunteers. Thus, the results may not generalize to an older, less educated or less "motivated" population (i.e., to participate in research). It is possible that differences in attachment style or working models are related to a propensity to volunteer for research. Specifically, avoidant individuals may be under-represented and securely attached persons over-represented. The finding of similar proportions of attachment categories between infant and adult samples lends some support for generalizability but it is possible that attachment style

proportions differ across age groups. Longitudinal research with representative samples is needed to ascertain more clearly the effects of attachment on relationships.

Bowlby (1973) believed that the attachment system should be most strongly activated under conditions of high stress, for example, frightening environmental events, relationship conflict or dissolution, or internal factors such as pain or illness. Threat is proposed to activate the attachment system by intensifying the accessibility of individuals' internal models of self and other, thus, eliciting attachment behaviours designed to obtain security (Simpson & Rholes, 1994). Because these behaviours are attempts to maintain as much felt security as possible given the attachment history of the person, each attachment style should exhibit a relatively distinct behavioural pattern (Simpson et al., 1992).

In research with couples in which the female partner was placed in an anxiety-provoking situation, Simpson et al. (1992) found an interaction between attachment style and level of threat. For securely attached women, higher levels of anxiety were associated with increased support seeking from their partners. Avoidant women tended to seek less support as their distress increased. Securely attached male partners displayed more supportive behaviours as their female partners' anxiety levels increased; whereas avoidant men were less supportive.

Mikulincer and colleagues have conducted several studies of adult attachment under conditions of actual threat. Striking and reliable differences in attachment style and responses to stress have emerged across the various investigations. Mikulincer et al. (1999) compared a sample of Israeli Jewish citizens living in the state of Israel (low threat condition) to Jewish citizens living within the Palistinian Authority (high threat condition) on attachment style, psychiatric symptomatology and posttraumatic stress. Symptomatology was significantly

elevated in the high threat condition; however, secure attachment was associated with decreased psychiatric and posttraumatic symptomatology in both the high and low threat conditions.

Mikulincer et al. reasoned that the positive sense of self and effective coping strategies associated with secure attachment serve as an inner resource that enables secure individuals to dissipate their distress more adaptively. As expected, anxious attachment was positively related to both forms of symptomatology in the high and low threat conditions. This finding may reflect a sense of vulnerability which derives from a poor self-concept and a lack of faith that others will be available and responsive to them. Avoidant attachment style was significantly and positively related to emotional distress and posttraumatic symptoms but only under the high threat condition. The authors suggested that, while avoidant individuals normally inhibit negative affect, under severe or chronic threat they may be overwhelmed with the persistence and strength of their emotions, ultimately undermining their coping efforts (poor coping was inferred from the self-reported high levels of traumatic sequelae in the avoidant group). The results from these studies indicate that working models of attachment are related to how individuals respond and adapt to threatening situations in ways predicted by Bowlby's theory.

Dimensions Underlying Attachment Categories: Models of Self and Other

The literature cited above concerned attachment style differences in relationships and emotional regulation. Inferences were made as to the underlying dynamics of the internal models but the styles and models were not systematically linked and assessed with respect to interpersonal and affective outcomes. As well, separate research traditions within the attachment literature (clinical developmental [e.g., Ainsworth and Main] and personality/social cognition [e.g., Hazan and Shaver]) have caused confusion with respect to attachment style categorization

and led to inconsistent results between studies (Bartholomew & Shaver, 1998; Stein, Jacobs, Ferguson, Allen, & Fonagy, 1998). Both traditions employed similar attachment labels to what were likely somewhat different phenomena, given the differences in populations studied (infants versus adults) and methods of measurement (interviews versus self-report measures). Finally, even when studying adults, those in the developmental tradition focused on recollected relationships with parents, whereas the personality/social psychological tradition was concerned with attachment types in current romantic relationships and their association with emotional well-being (Bartholomew & Shaver, 1998).

In an attempt to integrate the disparate categorization schemes, Bartholomew (1990; Bartholomew & Horowitz, 1991) developed a new taxonomy, one more explicitly tied to Bowlby's concept of working models (although it does not permit *direct* measurement of the models [Griffin & Bartholomew, 1994a]). Bowlby suggested that working models are elaborated in two spheres, view of self and view of other. These views range along a positive/negative continuum and when combined result in four attachment classifications. Bartholomew referred to these as prototypes insofar as each pattern is "conceptualized as a theoretical ideal...with which individuals may correspond to varying degrees." (Griffin & Bartholomew, 1994a, p. 25). It also acknowledged that individuals exhibit aspects of more than one pattern and that "to assess adequately individuals' feelings, expectations, behaviours in the attachment domain, it is necessary to consider their profiles across the four attachment patterns." (p. 25). Bartholomew proposed that secure individuals are characterized by a relatively positive view of self and of other people. They are likely to be more trusting of others and comfortable with closeness. Insecure persons are characterized by negativity on one or both dimensions. Individuals with a

negative view of self but positive view of others are categorized as preoccupied (corresponding most closely to Ainsworth's anxious-ambivalent category). Such individuals gain self-acceptance through striving for the acceptance of others. They have an intense desire for closeness but are less trusting than secure individuals that others will be responsive to them. The four category model divided the avoidant attachment category into those who withdraw from others because their view of self is poor, versus those who do so because they construe other people in negative terms. The distinction is important because it accounts for the discrepancy between studies in which avoidantly attached individuals reported subjective distress and fears of intimacy (e.g., Hazan & Shaver, 1987) and other work that found them to inhibit negative affect and relational concerns (Main, 1995). Based on her review of the literature, Bartholomew (1990) concluded that Hazan and Shaver's avoidant category and Main's dismissing-avoidant group were not the same. Bartholomew suggested that individuals who view themselves negatively and experience others as unavailable or unsupportive (negative view of other) display a "fearful" attachment style. She hypothesized that they express self-doubt but avoid others in an attempt to protect their poor self-esteem from expected rejection. In contrast, those with a positive view of self and a negative view of others display "dismissing" attachment, in which a self-sufficient, independent style serves to protect against disappointment in close relationships.

Multidimensional scaling, multitrait-multimethod matrices and structural equation modelling analyses of the self versus other model of attachment have been conducted. The constructs appear valid. The two-dimensional, four-category model provides a good fit to the sample data (Griffin & Bartholomew, 1994b). The self and other models reproduced theoretically expected relationships with other attachment related variables (e.g., self-esteem,

sociability positively correlated with positive views of self and others), thus demonstrating convergent validity. This was found irrespective of response formats (self and other report, questionnaire and interview). Convergent validity was also substantiated by research demonstrating theoretically expected relationships between the four styles. Scores on continuous measures of security (positive view of self and other) should be most strongly, negatively correlated with scores on the fearful prototype (negative view of self and other). Scores for the dismissing and preoccupied prototypes should be negatively related because they reflect opposite self and other models. Attachment prototypes which share similar ratings on a particular dimension should correlate more highly. Moreover, inter-correlations among the four prototypes should be relatively low. Results of several studies have confirmed these patterns (e.g., Klohnen & John, 1998).

Issues in Attachment Research

The research cited above demonstrates the theoretical validity of attachment in adults. In general, both attachment styles and working models are related to relationship and distress variables in ways that would be predicted by Bowlby's original theory. Notwithstanding, several controversies and methodological issues have hampered the development of a cohesive theoretical and empirical literature.

Classification and Measurement Issues

As mentioned previously, measurement convergence is an issue in the field of attachment. Different methodologies (i.e., interviews, self or other reports) produce discrepant results with respect to attachment classifications and relational and affective outcomes (e.g., Bartholomew & Horowitz, 1991; Bartholomew & Shaver, 1998; Stein et al., 1998). Correlations

among attachment instruments range from low to moderate, suggesting that somewhat different constructs are being measured (Stein et al., 1998). Concordance is highest for measures that are methodologically and conceptually similar, for example self-report scales that assess attachment in current or specific romantic relationships (Scharfe & Bartholomew, 1994).

Different measurement strategies account for discrepancies in demographic differences in attachment styles. For example, sex differences in attachment are typically not found when the three category (non-continuous) attachment measures are used (e.g., Hazan & Shaver, 1987). However, a recent large-scale, representative study on attachment using the three category method also found significantly more women reported being securely attached and more men reported avoidant attachment (Mickelson, Kessler & Shaver, 1997). Sex differences emerge when adults are classified using the four category method. Based on both interview and self-report methodologies, more women are classified as preoccupied and more men are categorized as dismissing (Bartholomew & Horowitz, 1991; Scharfe & Bartholomew, 1994).

As discussed earlier, the question as to whether attachment is a dimensional or a categorical construct is an important issue in the literature. The original Hazan and Shaver (1987) instrument is a single item, forced choice between three descriptive paragraphs corresponding to each attachment style. The measure assumes a correspondence between early attachment and adult attachment (Stein et al., 1998). The categories were based on Ainsworth's (1989) descriptions of secure and insecure infants and translated in terms more appropriate to adult functioning. Respondents choose the most self-descriptive paragraph and are classified accordingly. Categorical measures are useful in determining prevalence or base rates of a phenomenon; however, relative to continuous scales they are associated with reduced statistical

power and reliability, and may overestimate or underestimate relationships with other variables.

In order to attenuate these issues, most researchers require participants to rate on a continuous scale the degree to which each paragraph is self-descriptive (Shaver & Hazan, 1993) or to rate the degree to which an attachment-related statement applies to them (e.g., Bartholomew & Horowitz, 1991; Collins & Read, 1990; Simpson, 1990). Fraley and Waller (1998) employed taxonomic procedures to data derived from attachment instruments to ascertain the validity of categorical classification. They concluded that “individual differences in adult attachment organization are quantitatively distributed at both the manifest and latent levels” (p. 99). They suggested that categorization of research participants is unnecessary when dimensional attachment measures are available.

Brennan et al. (1998) aggregated items from all available attachment instruments (interview and self-report). Factor analysis revealed two relatively independent factors which they labelled “anxiety” (about abandonment) and “avoidance (discomfort with closeness and dependency). In keeping with Bowlby’s working models and Bartholomew’s two dimensions, Brennan et al. suggested that a negative model of self is related to anxiety; whereas, a negative model of other is associated with avoidance. Other researchers have replicated similar two dimensional structures (Fraley & Waller, 1998). Based on the increasing body of evidence which suggests that attachment styles derive from underlying models, Brennan et al. concluded that to enhance the comparability of results, self-report attachment research would benefit from the use of two dimensions as opposed to categorical measures. Taken together, the work of Fraley and Waller, and Brennan et al. suggests that attachment is best represented as a continuous two dimensional model, and should be employed as such.

A third measurement issue is whether the attachment system in adults is consciously accessible (and amenable to self report) or whether it must be evoked (under specific conditions or identified indirectly through interview methods). Researchers from the social-cognition tradition who use self-report measures assume that attachment is “a highly accessible cognitive construct that will be automatically activated in memory in response to attachment-relevant events” (Collins, 1996, p. 812). This has been demonstrated insofar as predictable associations have emerged between self-reported attachment style and appropriate outcomes such as interpersonal relationships and stressful situations (Mikulincer et al., 1993; Kemp & Neimeyer, 1998; Simpson et al., 1992).

Stability and Continuity of Attachment

Bowlby (1988) proposed that attachment processes characterize relationships from “cradle to grave”. Although the validity of his theory does not necessitate temporal stability, such evidence would bridge the childhood and adult literatures and strengthen the theoretical tenet that internal working models are modifiable but generally persist across the lifespan.

In general, attachment styles are believed to be relatively stable over time (e.g., Erickson, Sroufe & Egeland, 1985; Rothbard & Shaver, 1994). Test-retest estimates for Hazan and Shaver’s (1987) single item, categorical measure are low over short periods of time; approximately 30% of participants changed their attachment style (Baldwin & Fehr, 1995). Interview and continuous self-report measures of attachment fare better, demonstrating good and moderate stability over an eight month period, respectively (Scharfe & Bartholomew, 1994). Structural equation modeling (SEM) (which corrects for measurement unreliability) indicated

that self and other dimensions underlying Bartholomew's four category model were also temporally stable (Scharfe & Bartholomew, 1994).

Most of the above research was conducted with young adults over relatively short time periods. In a 25 year longitudinal study of women, Klohnen and John (1998) found that secure, avoidant and anxious attachment types (modified from Hazan and Shaver) were quite stable over time ($r = .60$). However, stability was stronger at older age intervals compared with younger ages. Main effects were found for both attachment groups and age but no interactions between attachment and time. Specifically, as women aged there were fewer anxiously and more securely attached individuals. The authors suggested that this finding reflected developmental changes rather than generational ones; however, attrition was not addressed. It may be that anxiously attached women were less likely or unable to continue a long-term commitment to the research project. Alternatively, securely attached women may have been over-represented because they were more likely to maintain participation over time.

Bowlby (1988) believed that attachment models function as internal structures through which people organize their experience and manage distress. Secure attachment is likely to be a resource that facilitates a constructive appraisal of the situation and provides rules to cope constructively. The next section describes the links between the predominant theory of stress and coping in the literature and how models of self and other are related to conventional conceptualizations of coping styles.

Dealing with Threat: Stress, Appraisal and Coping

Bowlby's theory is inextricably linked to threat and stress. He proposed that stressful experiences activate the attachment system. Individuals with different working models of self

and other will regulate their affect and cope with the stressor in ways that reflect expectations of their own capabilities and the responsiveness of others. There are similarities between Bowlby's conceptualization of expectations and the central tenet of stress and coping theory which states that coping strategies are determined to a large degree by the appraisals that individuals hold about the stressor (Lazarus & Folkman, 1984). Lazarus and Folkman emphasized coping as a response to a specific stressful situation which reflected "constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). The model holds that an individual confronted with a stressor cognitively appraises the degree of threat and poses the primary question "how dangerous is this situation". A secondary appraisal process evaluates the availability of coping resources (e.g., social support, financial resources), cognitive and personality characteristics (e.g., hardiness, optimism, self-efficacy) (Aspinwall & Taylor, 1992; Holahan, Moos & Schaefer, 1996; Ptacek & Gross, 1997). Primary and secondary appraisal jointly determine coping behaviours and eventual adjustment.

The degree (or nature) of emotional distress, as well as how the individual copes are strongly related to the initial appraisal of the stressful situation (Folkman, Lazarus, Dunkel-Schetter, DeLongis & Gruen, 1986). Folkman and Lazarus (1988) wrote:

"The behavioral flow begins with a transaction that is appraised as harmful, beneficial, threatening or challenging. The appraisal process generates emotion. The appraisal and its attendant emotions influence coping processes, which in turn, change the person-environment relationship." (1988, p. 467).

Specific coping strategies are related to the nature of the appraisal (Folkman & Lazarus, 1988). Two general forms of coping have been identified (Lazarus & Folkman, 1984). *Problem-focused* coping reflects strategies are designed to manage or change the stressor (e.g., information-seeking). Problem-focused strategies tend to be used in situations in which the individual perceives him or herself as having some control or perceived as a challenge. *Emotion-focused* coping is aimed at managing or regulating the negative affect generated by the stressor (e.g., preoccupation, fantasy or distancing [Parker & Endler, 1996]). Situations over which the individual has little control or those appraised as threatening or harmful are associated with increased reliance on emotion-focused techniques (e.g., Chang, 1998). A specific strategy may serve as both problem and emotion-focused depending on the situation or psychological context (for example, use of anxiolytic medications).

The Lazarus and Folkman framework served to organize the research on stress and coping. Notwithstanding the organizational advantages provided, Taylor (1990) compared the state of the literature to a "three car garage filled to the rafters with junk" (p. 43) because of conceptual, measurement and methodological problems. Researchers continue to debate whether coping is a person variable, is situationally determined, or reflects an interaction between the person and situation. Several authors contend that the appraisal process and coping behaviours are much more dependent on dispositional factors than Lazarus and Folkman hypothesized (Caspi & Moffitt, 1993; Costa, Somerfield & McRae, 1996; Krohne, 1990). Caspi and Moffitt make the case for the role of personality, stating:

"Personality differences are likely to be revealed during transitions into unpredictable new situations, when there is a press to behave but no information how to behave

adaptively. Dispositional differences are thus accentuated as each person seeks to transform novel, ambiguous, and uncertain circumstances into familiar clear, and expectable social encounters" (p. 247).

The person-situation debate in psychology is extensive and convoluted; however, the relevance of personality to coping is fundamentally an issue of consistency. Are individual styles of coping cross-temporally and cross-situationally consistent?

Although few prospective studies have been conducted to clarify the issue, findings from the Baltimore Longitudinal Study of Aging suggested that coping strategies were not determined solely by situation (McCrae & Costa, 1986). Participants' responses to the Ways of Coping Questionnaire (WCQ; Folkman and Lazarus, 1988) were similar for three different stressors across time. In a prospective study of students coping with examination stressors, Bolger (1990) found considerable intrapersonal consistency over time. He concluded that "coping is personality in action under stress" (p. 525). Lazarus, himself, has recently revised his position to increase the importance of dispositional characteristics in the appraisal and coping process (1993).

A second problem in the literature is a lack of conceptual clarity in stress and coping constructs. The nature of the stressor is sometimes inferred from measures of coping style. Individual responses to a standard stressor may be confounded by emotional distress outcomes. Coping methods, especially emotion-focused strategies, are often difficult to distinguish from distress or "adaptation" outcome measures because of overlap in item content. (Krohne, 1990).

Third, because coping methods change over time even in response to the same event (e.g. chronic stressors), the timing of measurement is important (Endler, Parker, & Summerfeldt 1993). Chronic stress is not monolithic. As the stressor persists, new challenges emerge which may

entail new coping strategies. The issue is particularly relevant in the study of adaptation to stress. Maladaptive strategies measured early in the course of a stressor can produce or prolong pre-existing distress; whereas, the same strategy employed later in the process may be associated with better adaptation. In general, coping should be assessed over time to best reflect its transactional nature (e.g., Lazarus, 1993). However, there are instances when understanding the nature of coping with a very specific stressor has theoretical or clinical importance. Thus, it may be fruitful to carefully define the stressor and measure coping at a single time point to ascertain commonalities in coping or the most effective strategies for that stage (for example, patients undergoing an anxiety-provoking medical procedure). This approach may facilitate the development of specific therapeutic interventions to increase adaptation to the situation at hand (as opposed to enhancing eventual adaptation).

Finally, the stress and coping field is hampered by poor psychometric measures. The WCQ, the first instrument developed, measures eight variants of problem and emotion-focused coping. Respondents recall a stressful event and indicate to what extent they employ each strategy. The WCQ is a popular measure but has been criticized on methodological and psychometric grounds: cross-validation done with the same participants as the initial development sample, low internal consistency estimates, inconsistent factor solutions, and different items and methods of scoring. Because of the limitations of the WCQ, alternative measures have proliferated, making comparisons to and extensions of other work very difficult (Endler & Parker, 1990; Parker & Endler, 1992). An advantage of the WCQ over other measures is its context specificity; respondents identify a target of coping. Because it was important in the present project to identify and define the nature of the cancer threat as precisely as possible, a

modified WCQ was used. The version employed in this project had been factor analyzed within a large population of male and female cancer patients and exhibited adequate psychometric properties (Dunkel-Schetter, Feinstein, Taylor & Falke, 1992).

Notwithstanding the problems with the stress and coping paradigm, some consistent results have emerged. Rational and factor analytic investigations suggest that there are three basic styles of coping: problem-focused, emotion-focused, and avoidant coping (similar to earlier concepts such as "repression-sensitization" [Byrne, 1961] and "attentional diversion" [Krohne, 1986]). Some authors include social support seeking as a form of coping (e.g., Ptacek & Gross, 1997), whereas others believe social support is a coping resource rather than a strategy *per se* (e.g., Endler & Parker, 1990). Sex and age differences have been found. In general, males and older individuals have been found to utilize problem-focused coping more often than women and younger people. As men and women age, gender differences in coping strategies decrease (Diehl, Coyle & Labouvie-Vief, 1996). The ability to use more and varied strategies in response to different situations is related to increased adjustment over time (Rowland, 1989).

Suls, David and Harvey (1996) argued for the renewed importance of dispositional factors in appraisal and coping because situational factors do not account for all variation in coping behaviour. Sulz et al. suggested that research on the determinants of coping should include measures of both disposition and situation. Attachment processes seem particularly relevant, in this regard, because they are proposed to be most active under conditions of threat. Attachment style is hypothesized to shape expectations about the environment to determine the selection of particular coping strategies. Accordingly, attachment theory augments the

predominantly cognitive focus taken in the stress, appraisal and coping paradigm by accounting for differences in emotional and relational patterns that may impact one's experience of threat.

Attachment and Coping

The study of attachment is inextricably linked to the experience of stress and distress management. Adults, like infants, are motivated to obtain protection and comfort in times of stress. Stressful events are proposed to trigger internal models of attachment based on lifetime experience with interpersonal relationships. These experiences affect the experience and expression of psychological distress. In response to stressors, coping styles are enacted which are congruent with the content of the internal models. For example, securely attached individuals would be expected to employ support seeking strategies. Protection and comfort can be obtained through relationships with others. Mikulincer and Florian (1998) suggested that security is an inner resource reflecting a basic trust in the world and a general sense of competence resulting from the positive interactions that securely attached individuals have had with others over time. These experiences lead to a belief that, though painful and unpleasant, stressful events are manageable. Secure attachment, which is built on positive models of self and other, confers resilience to stress by facilitating more positive appraisals and constructive coping efforts. Consequently, those with a positive view of self and others are expected to acknowledge distress but not be overwhelmed by it. This will contribute to a sense of efficacy or controllability in dealing with the situation. Because they may have a stronger sense that they can manage the stressor, they would be expected to engage in problem focused coping strategies, or at least, in fewer emotion-focused or avoidant strategies.

Mikulincer and Florian (1998) argued that insecure attachment is a "risk factor" for poor coping because it reflects internalized experiences and expectations of instability, rejection or failure. Individuals exhibiting an insecure style are less likely to believe that they can positively influence an outcome, or that others will be responsive to their needs. Depending on the valence of their working models, insecurely attached persons are expected to differ from one another in their predominant strategies. Those with a negative view of self but positive view of other (preoccupied or "anxious" dimension) are presumed to have had inconsistent experiences with how others have responded to their distress. This history contributes to an appraisal of the world as uncontrollable or inconsistent, and a view of themselves as vulnerable. Of all the attachment styles, these individuals would be expected to exhibit the most overt distress during times of stress. The sense of vulnerability and negative self-concept leads them to seek out the assistance of others who are perceived as more powerful and competent, albeit unreliable. Because of their increased distress they would be expected to employ emotion-focused coping strategies to dissipate the negative affect. For those with a negative view of other (fearful and dismissing dimensions), early experiences of rejection lead them to view others as unavailable or unresponsive. Thus, they may be more likely to rely on strategies emphasizing autonomy, distance from others and decreased expression of negative affect. Behavioural responses are probably moderated by view of self. Autonomous strategies for those with a positive view of self (dismissing attachment) may derive from perceptions of self-efficacy. Because they are more confident in their ability to master difficulties, such persons may employ constructive, problem-focused coping strategies. They would be expected to employ avoidant or distancing coping only in the service of maintaining *interpersonal* distance. That is, they would not be

expected to use escape-type avoidant coping such as wishful thinking or drug or alcohol use. In contrast, for those with a negative view of self (fearful attachment), autonomous behaviour may reflect low self-confidence in their abilities. Thus, they may use avoidant strategies both to maintain interpersonal distance and to escape from circumstances with which they feel ill-equipped to deal.

Several studies substantiate the differential effects of attachment on coping. Lussier, Sabourin and Turgeon (1997) examined the relationship between attachment, coping and marital distress using the three category model of attachment (Hazan & Shaver, 1987). Findings regarding marital distress are beyond the scope of this discussion and are not described here. As expected, securely attached persons employed problem focused strategies. Those who exhibited anxious and avoidant attachment used emotion-focused and avoidant modes of coping, respectively. Interestingly, anxious attachment was also associated with avoidant strategies and avoidant attachment with emotion-focused methods. These results, based on the three category model, fit with what would be expected from an analysis of self and other dimensions as described above. Anxious attachment, insofar as it is similar to Bartholomew's preoccupied style, reflects a negative view of self. Negative view of self may lead to increased use of avoidant strategies as a way of escaping from overwhelming, negative feelings (much as it was hypothesized for the fearful dimension which is also associated with a negative self-view). The avoidant category in Lussier et al. (1997) comprised individuals with dismissing and fearful attachment patterns who are expected to employ differing strategies. Again, insofar as fearful and preoccupied share a negative self-view, they should employ some emotion-focused coping to help dissipate negative affect associated with their view of self. Thus, the results of Lussier et al.

are more easily understood within the framework of internal working models than by the three category model.

Ognibene and Collins (1998) employed a correlational, cross-sectional design to investigate Bartholomew's four category model of attachment and coping processes. Secure attachment was associated with increased support seeking and preoccupied attachment was positively associated with both support seeking and escape-avoidance coping. Although significant results did not emerge for dismissing and fearful patterns and coping, two trends were reported. Fearful attachment was positively related to distancing and escape-avoidance coping. Dismissing attachment was associated with less escape and avoidance. The results suggested that support seeking is a function of model of other; whereas, escape-avoidance coping is best predicted by model of self.

The effects of attachment on coping and other outcomes should be most salient under threatening or stressful conditions (e.g., Simpson & Rholes, 1994; Simpson et al., 1992). Several studies provide evidence for differential functioning of attachment style in terms of coping with a real and significant threat. Cozzarelli et al. (1998) did not evaluate coping strategies *per se* but investigated working models and "self-efficacy for coping" with abortion. Prior to the procedure women rated their self-efficacy to cope. Women with secure and dismissing attachment styles (i.e., positive view of self) reported significantly higher levels of self-efficacy and positive well-being subsequent to the abortion. Relative to model of other, the self model was more strongly related to emotional outcomes and these relationships were significantly mediated by self-efficacy.

Mikulincer, Florian and Wells (1993) were interested in the relationships between attachment, distress and coping under two threat conditions: living in a geographical region at high or low risk for Scud missile bombing during the Gulf War. The authors translated and factor analyzed a continuous version of the Hazan and Shaver (1987) measure, obtaining the expected three attachment categories. They derived four factors from the WCQ, problem-focused, emotion-focused, distancing and social support seeking. Emotional distress was significantly higher in anxiously attached students under both threat conditions, followed by avoidant and securely attached persons. Secure and avoidant individuals appraised the situation as less threatening and themselves as more competent in coping with the stressors when compared with anxious individuals. No differences were found between the three attachment styles for problem-focused coping but secure individuals used more support-seeking strategies than the other types.

Consistent with theoretical predictions, anxious individuals employed more emotion-focused coping than secure or avoidant persons. Avoidant persons reported a higher frequency of distancing. Surprisingly, only the distancing strategy was affected by high or low degree of physical threat. The lack of relationship between threat level and coping was perhaps due to the social nature of the threat. That is, the population of an entire region was at risk for bombing: no individual was at increased risk. Individuals with an avoidant attachment style have been described as exhibiting "compulsive self-reliance" (Bowlby, 1973) and low levels of social connection. Thus, their style of coping is expected to remain the same regardless of whether the threat is personal or communal. Coping strategies were correlated with measures of distress. Problem-focused strategies were associated with support-seeking and decreased emotional

distress. Due to the use of a cross-sectional design the causal relationship between coping and distress could not be established. However, several studies were conducted with Israeli military personnel (Mikulincer & Florian, 1995), students and civilians with similar results.

Birnbaum, Orr, Mikulincer and Florian (1997) extended their studies of military-related contexts to the effect of attachment style on appraisal, coping and mental health among divorcing couples. Attachment and mental health measures were compared with married control subjects. Distress was higher in the divorcing group, with anxiously attached individuals in both groups reporting the most distress. The distribution of attachment styles in the divorcing group was consistent with population base-rates (e.g., van IJzendoorn & Bakermans-Kranenburg, 1996). Anxious and avoidant individuals who were divorced reported lower levels of well-being and higher distress than their married counterparts. Furthermore, individuals exhibiting either of these styles of attachment appraised divorce as significantly more threatening than did individuals having a secure attachment style. Avoidant and secure individuals appraised themselves as more competent to deal with divorce-related stressors. Finally, with respect to coping differences, anxious and avoidant participants reported greater withdrawal and self-defeating thoughts. Anxious individuals engaged in significantly more wishful thinking than the other styles. Appraisal and coping mediated the association between attachment and emotional distress. Birnbaum et al. (1997) concluded that insecure attachment seems to predispose individuals to emotional distress which is most apparent under stressful conditions. Avoidant persons were found to inhibit their expression of emotions, while anxious individuals became preoccupied with distress and helplessness.

One of the issues in this study is the high proportion of secure attachment styles in the married control group (76%) relative to the divorcing couples. Two explanations seem possible. Marital distress or divorce may lead couples to feel (and report) more insecurity, as opposed to reflecting their attachment under normal circumstances. Alternatively, secure individuals may be more likely to become married and remain in their marriages. The work of Shaver and Hazan (1987) and Simpson et al. (1992) supports the latter explanation. Securely attached persons were more likely to be in relationships and to report a higher degree of satisfaction with their partners. Support also comes from research demonstrating that attachment styles are generally stable (e.g., Klohnen & John, 1998). Furthermore, Bowlby's theoretical position is that stress does not change attachment style, *per se*, but increases the degree to which the style is operational.

Taken together, the Mikulincer et al. studies corroborate what is expected by attachment theory and provide a significant first step in assessing attachment processes *in vivo* under conditions of threat. Interpretation of the results in terms of working models of attachment is difficult with this research because the authors employed the forced-choice version of the three category measure of attachment. Fraley and Waller (1998) argued that this instrument does not adequately reflect the nature of attachment which they determined to be distributed dimensionally, rather than categorically. Further, the three category instrument is insensitive to the two aspects of the avoidant category which have been validated by other researchers (e.g., Griffin & Bartholomew, 1994b).

Working models of attachment appear to influence the use of coping strategies for managing stress. To date, no work has addressed the relationships between the self and other dimensions and coping style under conditions of health threat. The present project advanced this

research in that it used a two-dimensional model of attachment (e.g., Brennan et al., 1998). With respect to the present project, it was expected that the manner in which an individual interpreted a health-related stressor would be determined by his or her attachment style, or internal models, which would influence his or her cognitive appraisal of the illness (see following section). These two “representational” systems serve jointly to regulate affect and activate specific modes of coping. Coping strategies, in turn, were expected to determine the types of health-related behaviours adopted.

Cognitive Appraisal of Health Threats: The Role of Illness Representations

Consistent with the Lazarus-Folkman model, Maes, Leventhal and DeRidder (1996) suggested that coping and adaptation to serious illness is predicated upon the patient’s evaluation of the stressor. In a prospective study of coping processes and affective disorders in cancer patients, Parle, Jones and Maguire (1996) reported that the appraisal process was critical in determining future emotional problems, coping and coping efficacy. High threat appraisal was independently related to future affective disorders even after the effect of coping strategy was removed.

Attachment styles are proposed to differentially influence the appraisal of the threat. Illness threat is defined on several dimensions that include previous experiences with illness, social communication (particularly interactions with physicians) and cultural notions of illness. These dimensions of illness form the basis for illness representations. Illness representations serve as the primary appraisal mechanism by which the degree of threat is determined, thereby defining the context and goals for coping (Leventhal et al., 1984). Irrespective of their health status, individuals describe the dimensions of illness in terms of symptoms or disease label, the

consequences of the disease, disease course (acute, chronic, intermittent) and the cause of the disease (e.g., Lau & Hartman, 1983). Since the initial work of Leventhal and colleagues, the dimensions have been replicated by other authors (Bishop & Converse, 1986; Lau, Bernard & Hartman, 1989; Lau & Hartman, 1983).

Factor analysis of Leventhal's four components revealed that lay individuals represent both common and serious illnesses along dimensions of (a) disease *seriousness* (b) *personal responsibility* for the illness (c) *controllability* of the illness and (d) its *changeability* (Schiaffino & Crea, 1995; Turk, Rudy, & Salovey, 1986). Leventhal et al. proposed a model in which cognitive representations of and emotional responses to an illness episode influence a host of health-related behaviours, including people's decisions to delay or seek medical treatment (Cameron, Leventhal & Leventhal, 1993; Feeney & Noller, 1994; Lau et al., 1989), cancer patients' adherence to treatment regimens (Meyer, Leventhal & Gutmann, 1985; Leventhal, Diefenbach & Leventhal, 1992) and self-care activities (Hampson, Glasgow & Toobert, 1990; Hampson, Glasgow & Zeiss, 1994). For example, patients with osteoarthritis were more likely to engage in self-management activities if they experienced ongoing symptoms of the illness and perceived their condition as "serious".

Little published work has examined the influence of other cognitive dimensions on health-related behaviours. Preliminary studies suggest that personal responsibility (Wallston & Wallston, 1982) and belief in disease controllability (e.g., Meyer et al., 1985; Aspinwall & Taylor, 1992; Taylor et al., 1984) are related to increased exercise and medical care-seeking.

The role of cognitive representations of illness and psychological adjustment has been studied more extensively. Women with cancer who perceived their illness as chronic, irrespective

of actual disease severity, reported more symptoms of depression (Heidrich, Forsthoff, & Ward, 1994; Ward, Viergutz, Tormey, DeMuth, & Paulen, 1992). Male cancer patients who reported more physical symptoms and perceived their disease as chronic had poorer adjustment (Godding, McAnulty, Wittrock, Britt, & Khansur, 1995). At the early stages of cancer diagnosis and treatment, patients' attributions of self-blame for the cause of their cancer increased their level of distress (Malcarne, Compas, Epping-Jordan & Howell., 1995). Compas, Worsham, Epping-Jordan, Grant, Mireault and Howell et al. (1994) found that psychological distress was related to appraisals of the seriousness and stressfulness of the cancer but unrelated to the actual severity of the disease. This relationship held for both patients and family members. The assessment of cognitive appraisals of illness in cancer patients is important both conceptually and clinically. Measuring appraisals facilitates the delineation of more complete models of stress, appraisal, coping and distress. The dimensions of illness representations, although related to personality dispositions, may be more amenable to therapeutic interventions than are more "characterologic" factors.

Coping with a Cancer Threat

In keeping with the Leventhal, Meyer and Nerenz (1980) position that the perceived threat of an illness is, in part based on its cultural stereotype, Rounds and Zevon, (1993) determined that cancer is one of the most frightening and stigmatized diseases. Most people are devastated by the diagnosis (e.g., Andersen, 1989; Andersen, Kiecolt-Glaser & Glaser, 1994; Taylor et al., 1984; Taylor, Lichtman, Wood, Bluming, Dosik & Leibowitz, 1985). In addition to the shock of the diagnosis, other common stressors include pain or discomfort of treatment, uncertainty of treatment outcome, and effects of the illness on the patient's family (emotional,

social or financial). Consequently, many cancer patients experience feelings of sadness, fear, and anger (Holland, 1998). Depressive affect is most common. Estimates of the prevalence of affective disturbance in cancer patients suggest that 10 to 20% of patients meet criteria for Major Depressive Disorder, and 25 to 40% experience less severe forms of depression (Andersen, 1993; Burish, Meyerowitz, Carey & Morrow 1987; Godding et al., 1995). Longitudinal research on heterogeneous cancer populations demonstrated that levels of affective disturbance fluctuate over the course of illness. Distress tends to be greatest prior to surgery to remove the tumour then decreases post surgery, increasing once more during the treatment phase (Spencer, Carver & Price, 1998). Adaptation continues beyond treatment. Physical problems, psychological distress and anxiety regarding separation and death decrease over the first year but even after five years, patients continue to report emotional and relational difficulties (Halstead & Fernsler, 1994).

A cancer diagnosis is very stressful for most people but there are individual differences in coping. Coping and adjustment to the various aspects of cancer is an active area of research in health psychology (Cooper & Faragher, 1993; Dunkel-Schetter et al., 1992; Heidrich et al., 1994; Malcarne et al., 1995; Stanton & Snider, 1993; Taylor, et al., 1984). The study of coping in cancer is important not only from the perspective of quality of life, but also because failure to cope constructively may hinder the recovery process or affect the degree to which the patient engages in healthful behaviours or participates actively in treatment (e.g., Andersen et al., 1994).

Research on coping with cancer suffers from the general methodological limitations described above. Others limitations are specific to the cancer and chronic illness context and include the use of non-validated coping instruments, focus on patients' predominant or preferred coping styles rather than actual coping behaviour, assessment not specific to illness-context,

variable timing of assessment and use of heterogeneous cancer samples with varying prognoses and treatments (e.g., Somerfield & Curbow, 1992).

The individual diagnosed with cancer is confronted with a complex set of changing demands. Research has suggested that early in the disease experience many patients utilize a "healthy denial" or other avoidant modes of coping which was thought to enable them to adjust to the shock of diagnosis. However, persistent denial or avoidance is negatively correlated with eventual adjustment (e.g., Suls & Fletcher, 1985). Stanton and Snider (1993) found that avoidant coping assessed prior to breast biopsy was related to level of distress post-biopsy and even after surgery. They argued that "the finding that cognitive avoidance was harmful across all assessment periods seemingly contrasts with reviews indicating that avoidance may be advantageous in relation to approach strategies over the short run" (p. 21).

Parle et al. (1996) assessed a large sample of cancer patients over time. They reported that emotion-focused strategies were associated with affective disorders (major depressive illness, generalized anxiety disorder or adjustment disorder) at two months post-diagnosis. No such relationship was noted at 12 month follow-up. In contrast to other research in which affective disturbance was found to abate during the first year post-diagnosis, Parle et al. reported that 14% of their sample met criteria at the first assessment and 21% at follow-up. However, participants with a history of affective disorders were not excluded. Thirty percent of patients reported having had at least one episode of anxiety or depression sufficient for them to seek help from a health professional prior to their cancer diagnosis.

Dunkel-Schetter et al. (1992) reported that perceived stressfulness of cancer was positively related to support seeking and avoidant strategies (e.g., hoped a miracle would happen,

tried to forget the whole thing, avoided other people). WCQ scales “focusing on the positive” and “seeking social support” were more likely to be used by patients who were less emotionally distressed.

Although it is difficult to ascertain the directionality of the distress-coping relationship based on cross-sectional research, findings suggest that problem-focused strategies such as seeking information, confronting the situation and emotion-focused strategies like seeking social support and invoking spiritual beliefs are associated with decreased emotional distress (Spencer et al., 1998). Avoidant coping methods (e.g., denial, fantasy) and activities (eating, alcohol use, sleeping) are related to poorer self-ratings of adjustment and emotional distress at various time points during the illness (e.g., Behen & Rodrigue, 1994; Epping-Jordan, Compas, Osowiecki, Oppedisano, Gerhardt, Primo et al., 1999; Felton & Revenson, 1984).

Psychological Factors in Colorectal Cancer

The patients in the present study were diagnosed with either colon or rectal cancer. Although separate forms, they have a similar etiology and prognosis and are considered collectively as “large bowel cancers”. Cancer of the large bowel is the fourth most commonly diagnosed cancer, ranking behind lung cancer, breast cancer in women and prostate cancer in men (Health Canada, 1996; NCIC, 1998). The five year survival rate for colorectal cancer (CRC) is very high, 91%, when detected locally (Dollinger, Rosenbaum & Cable, 1995). Survival rates decrease substantially (5 to 20%) when larger tumours or distant metastases (most commonly to the lung and liver) are discovered. Approximately one-third of deaths are due to recurrences.

The diagnosis and treatment of colorectal cancer is more homogeneous than for many other types. Staging of CRC has traditionally been done according to the Duke's system but recently, in a move toward staging consistency across cancer sites, the TNM system has been increasingly employed. The TNM system assesses size of tumour (T), degree of lymph nodes (N) affected and presence of metastases (M) (see Appendix A). Treatment for CRC is relatively uniform and is based on tumour size and spread. The standard treatment sequence is surgery to remove the tumour, followed by adjuvant therapy such as chemo and/or radiotherapy (for patients with locally advanced disease (Dukes B2, C1, or C2, equivalent to Stage II - III). The term "adjuvant therapy" is reserved for cases in which chemotherapy or radiotherapy treatments are intended to "cure" the cancer. In more advanced disease, Dukes D, in which the cancer has spread to distant sites or organs, chemotherapy and radiation are referred to as "palliative". Most Stage II-III colon cancer patients receive surgery and chemotherapy alone. Similarly-staged rectal cancer patients will require surgery, adjuvant chemotherapy and radiotherapy in combination. Chemotherapy protocols are virtually identical for colon and rectal cancers at Dukes B2, C1 and C2: typically, five days per month of intravenous 5-fluorouracil (5-FU) + leucovorin/levamisole or 5-FU + folinic acid. Side effects of CRC chemotherapy regimens are mild (primarily gastrointestinal) relative to other cancers. Because of the uniformity of treatment and prognosis, CRC provides a homogenous research population from which to examine patterns of psychological experience and behaviour.

Despite the frequency with which CRC is diagnosed, research examining the psychological experience of diagnosed patients is scarce. Colorectal cancer appears to be at least a moderate stressor for patients. Barcevic, Pasacreta and Orsi (1995) investigated the

relationship between psychological distress and functional dependence in colorectal cancer patients. Distress levels were relatively low before and after surgery but increased slightly at following adjuvant treatment. Functional dependence was assessed at three months post surgery and found to be positively related to distress at one month post surgery. The authors concluded that distress was related to stage of cancer treatment and that functional outcome was associated with distress. The level of distress in this group was quite low when compared with other studies of cancer patients using similar measures before and after surgery (Massie & Popkin, 1998; Noyes, Holt & Massie, 1998) and may be explained partially by a bias in subject selection. Specifically, only 30% of the eligible patient population completed the questionnaires ($N = 66/181$). Possibly, those with higher levels of distress declined participation. No information on non-responders was provided. There is no information presented on cancer stage or adjuvant treatment. It may be that these patients had a very low risk of recurrence or metastatic disease and that their low distress levels were related to an excellent medical prognosis. Results from this study may not generalize to other CRC patients. Distress must be investigated with a more representative sample of patients. To date no study has evaluated how patients construe the threat of CRC and how this is related to coping processes and health-related behaviours during the treatment phase of the illness.

Models of Attachment and Health

Cancer is a threat to well-being. Research conducted with male and female patients of various ages and types of cancer has found elevated levels of distress relative to non-patients (Holland, 1998). Emotional distress is most pronounced at the time of diagnosis and during periods of prognostic uncertainty (e.g., Weisman & Worden, 1976/77; Stanton & Snider, 1993).

Attachment styles account for individual differences in how people regulate negative affect and cope with anxiety-provoking situations (e.g., Cozzarelli et al., 1998; Mikulincer & Florian, 1995; Mikulincer et al., 1993). For infants, an attachment figure serves as a stable base from which to explore the environment. For adult cancer patients, internal working models of self and others may influence decision-making relative to illness and coping with illness-related stressors.

There are obvious attachment implications when death is potentially imminent. Death is salient for the colorectal cancer patients participating in the present study who face a 30 to 70% survival rate over five years. Mikulincer, Florian and Tolmacz (1990) investigated the relationship between attachment styles and fear of death in Israeli university students. Results suggested that insecurely attached individuals had a greater fear of death than did securely attached students. Anxiously attached persons exhibited more fear of death than did those who were avoidantly attached. Anxious attachment was associated with a greater fear of losing their social identity upon death (i.e., they would be forgotten). Those classified with avoidant attachment exhibited a greater fear of death under conditions of low death versus high death salience. This is not surprising given that they inhibit experiences of affect. Overt reaction to death was related to overt reactions to separation in relationships for all attachment groups. The authors concluded that individuals with a strong fear of death may display clinginess in relationships to protect themselves from death-related anxiety.

No published project has assessed attachment processes in a medical population. A few studies have demonstrated that attachment processes affect health-related behaviours such as the degree to which individuals exhibit self-care and health-risk behaviours (e.g., Cooper, Shaver &

Collins, 1998; Feeney, 1995). Cancer is a serious physical illness which poses a significant threat to well-being and is associated with emotional distress (e.g., Holland, 1998). Patterns of attachment are predictably related to the experience and expression of emotional distress under conditions of stress (e.g., Mikulincer et al., 1993; Simpson et al., 1992). Andersen et al. (1994) argued that the seriousness of cancer and concomitant negative affect may affect how patients care for themselves. The authors reasoned that patients may self-medicate with alcohol or other drugs, including tobacco and caffeine, as a means of dissipating depressive or anxious feelings. Exercise, nutrition and sleep patterns may also be affected. Poor health behaviours add to the stress of illness, placing further burdens on immune functioning and, in turn, on the body's ability to combat the disease. Thus, the relationship between models of attachment and health behaviours are important to explore.

Feeney and Ryan (1994) investigated the effects of attachment style on two health behaviours: symptom reporting and number of visits to health professionals. Briefly, they found that for college students, health behaviour was related to previous family illness experiences, insecure attachment style and negative emotion. As expected, avoidant individuals were least likely to seek medical care. Although anxious attachment was associated with increased reporting of physical symptoms, it was unrelated to the number of visits made to health care personnel. This finding seems surprising and may reflect the relative good health of the students. In a second study, Feeney (1995) used two dimensions of attachment, comfort with closeness and anxiety over relationships, to predict undergraduate students' subjective ratings of health, health locus of control and health-related behaviours (e.g., alcohol, smoking, exercise). Participants were also asked about health behaviour changes they wanted to make. Results indicated that

anxiety over relationships (related to anxious-ambivalent attachment) was associated with poorer ratings of subjective health (increased symptom reporting), concern with diet and weight, and decreased exercise. These individuals wanted to make more health behaviour changes. Comfort with closeness (similar to secure attachment) was associated with greater satisfaction with current level of health behaviours.

Cooper et al. (1998) explored attachment styles and adjustment, including risky behaviours, in a large sample of adolescents. They reasoned that the affective experience prototypical of each attachment style would mediate the relationship between attachment style and risk behaviours. Specifically, they hypothesized that generalized distress associated with anxious attachment (e.g., Kobak & Sceery, 1988) would predict use of alcohol and other substances, and sexual behaviour. Anxiously attached adolescents were most poorly adjusted of the three groups. They engaged in greater risk-taking behaviours due, in part, to higher levels of depression and hostility. Avoidant adolescents did not differ from those who were securely attached with respect to risk behaviours. This study had several limitations. For example, the researchers employed the three category model of attachment. The design was cross-sectional and, therefore, conclusions regarding causality could not be made. Finally, attachment style may have been confounded with "attachment-related distress". Despite these limitations, the study provides preliminary evidence that attachment style plays a role in health risk and possibly, by extension, self protective behaviours.

Research incorporating a dimensional view of attachment working models may advance the understanding of the relationships. A positive model of self may confer a protective effect against risk behaviours. Behaviours such as cigarette smoking, drug and alcohol use enable

individuals to avoid or escape from the "burden of the self" (Baumeister, 1991, p. 9).

Presumably, those with a positive self view are less likely to experience chronic poor self-esteem or negative emotion from which they must escape and are less apt to cope with stressors in self-defeating ways. The findings of Cozzarelli et al. (1998) described earlier demonstrated that women with positive models of self reported higher levels of well-being. Ognibene and Collins (1998) determined that college students classified as secure and dismissing were *less* likely to utilize escape-avoidance modes of coping. Regression analyses revealed that "the use of escape-avoidance strategies was primarily a function of negative models of self" (p. 340). Brennan and Shaver (1995) employed the three category model of attachment and found that binge eating, alcohol and drug use were associated with anxious and avoidant attachment patterns. The positive model of self should be associated with increased self-care. Individuals with a positive view of self should be more invested in and capable of taking care of themselves. Again, this finding is consistent with Cozzarelli et al. (1998) who found that model of self related to increased self-efficacy when coping with abortion.

It is unclear how a model of others might relate to healthful and risky behaviours. Model of other might influence a subclass of self-care behaviours, those which others (such as physicians or health care personnel) have suggested or requested. Model of other might be associated with, for example, support seeking and symptom reporting. Although the behavioural outcome may appear similar, model of other may operate differently for the two styles that possess positive other models. Secure individuals, who readily seek support, would be expected to interpret the suggestions of others as reflecting caring or interest. Consequently, they would be expected to adopt reasonable advice. On the other hand, preoccupied individuals perceive

themselves as vulnerable or incapable, view others as powerful or knowledgeable, and seek approval (Bartholomew & Horowitz, 1991; Kobak & Sceery, 1988). This dynamic may also increase adherence to the advice of others. The role of negative model of other in predicting health-related behaviours is less evident. Cozzarelli et al. (1998) reported a weak link between negative view of other and decreased well-being and increased distress. Because of the relationship between distress and health-related behaviours, negative model of others may decrease healthy activities and increase risk-taking ones.

The study of health behaviours in colorectal cancer patients is important because 70% of cancer cases are attributable to lifestyle or environmental factors. Prevention through lifestyle and health behaviour modification is critical (American Cancer Society, 1995; Health Canada, 1996) but little research has been conducted to examine health-related behaviours in cancer populations. In addition to the obvious gains in quality of life associated with a more healthful lifestyle, a focus on health promotion within the context of tertiary care (i.e., cancer treatment) holds promise for optimizing treatment benefits for patients.

Health-related behaviours are a diverse category of activities. A health behaviour has been defined as "any activity undertaken by a person believing himself to be healthy, for the purpose of preventing disease or detecting it in an asymptomatic stage" (Kasl & Cobb, 1966, p. 246). Health behaviours include health promotion/prevention activities (e.g., exercise), and risk-taking behaviours (smoking, alcohol use). Illness behaviours differ from health behaviours in that they serve a problem-solving function (Sarafino, 1994). They are typically predicated upon experience of poor health which motivates individuals to seek medical consultation and treatment

(e.g., Baum, Gatchel, Krantz, 1997; Kasl & Cobb, 1966) and include perceptions of symptoms and levels of symptom reporting and seeking medical care.

Health Behaviours

Health actions have many functions. They may serve to promote wellness (e.g., getting enough sleep, exercise), protect well-being by avoiding health risks (e.g., limiting dietary fat intake, not smoking), or treat health problems (e.g., consulting a physician) (Leventhal et al. 1985). These purposes tend to be modestly correlated ($r = 0.20$ to 0.40 ; Kirscht, 1983; Leventhal, Prohaska, & Hirschman, 1985), suggesting that high participation in one category does not necessarily entail healthy behaviour across domains. Consequently, research on health behaviours must clearly define and separately assess each category.

Recent exploratory and confirmatory factor analytic procedures indicated that health behaviours are hierarchically related (Vickers et al., 1990). Two second order factors emerged: Preventive Health and Risk Taking behaviours. Preventive Health was comprised of two first order factors: Wellness Maintenance and Enhancement activities (e.g., "I exercise to stay healthy", "I take vitamins") and Accident Control (e.g., "I learn first aid techniques", "I keep emergency numbers by the phone"). Risk Taking was further subdivided into Substance Risk (e.g., "I do not drink alcohol", "I don't smoke") and Traffic Risk (e.g., "I speed when driving"). The correlation between the two primary factors were moderate in a large sample (the average factor correlation was $<|.45|$). Empirical validation of the health behaviour construct provides a useful formulation for research questions regarding the antecedents and consequences of individual differences in health behaviours. Based on their findings, Vickers et al. (1990) developed a brief, psychometrically sound measure to assess participation in health behaviours

which was employed in the present study to assess the preventive health and risk-taking behaviours in cancer patients.

Despite the importance for cancer patients to adopt health-related behaviours, few published studies have investigated the correlates of healthful behaviour in this population. Frank-Stromborg, Pender, Noble Walker, and Sechrist (1990) developed a cognitive/perceptual theory, based on the Health Belief Model (Rosenstock, 1974), to predict whether cancer patients would engage in health promoting behaviours (exercise, nutrition, stress management and relaxation, interpersonal support). Similar to the results of other studies, patient's perception of health status, the degree to which she believed that she could control her health, demographic and disease-specific variables were found to predict health promoting behaviours. This particular investigation only assessed the role of "cognitive-perceptual" variables and overlooked the potential predictive power of emotional distress on health-related behaviours. Leventhal et al. (e.g., 1984) and Millar and Millar (1993) argued that research solely focused on cognitive dimensions typically fails to account for meaningful amounts of variance and must evaluate emotional responses to threat.

Reardon and Aydin (1993) attempted to identify a profile of women who engaged in health promoting behaviours subsequent to a diagnosis of breast cancer. The authors hypothesized that women who employed active, positive coping strategies, were satisfied with their social supports and possessed an internal locus of control, would be more likely to improve their diets and exercise habits. They also predicted that these women would report a lower level of stress and a more positive mental outlook. Results indicated that women who positively reframed their situation experienced decreased stress levels, engaged in more exercise, and made

healthful dietary changes. Satisfaction with degree of social support did not predict health promoting behaviour. Finally, internal locus of control predicted increased levels of exercise.

Mechanic and Cleary (1980) found that psychological well-being was positively correlated with the frequency of engaging in healthful behaviours and the number of behaviours adopted. Psychological distress (symptoms of anxiety or depression) was related to alcohol consumption, tobacco use, less exercise, and poorer subjective ratings of physical function. Again, models of self may moderate participation in these behaviours insofar as those with positive self views tend to report less distress (c.f., Bartholomew & Horowitz, 1991).

Illness Behaviours

Symptom reporting

A growing literature suggests that the perception and reporting of physical symptoms is highly dependent on psychological factors (e.g., Leventhal et al., 1980; Pennebaker, 1982). According to Leventhal et al. (1984), somatic experiences and symptoms are the basis on which people understand their illness. Ongoing somatic sensations are subject to both cognitive and emotional elaboration to form a more complete picture of the illness threat, which, in turn, serves as a guide to action or coping with the threat.

There are individual differences in symptom reporting. For example, Feeney and Ryan (1994) noted differences between attachment styles. Anxious attachment was more strongly related to symptom reporting than was secure or avoidant attachment. Mikulincer, et al. (1993) found that avoidant and anxiously attached persons reported higher levels of somatization.

As with many health-related variables, negative affect is related to both symptom perception and symptom reports. Cameron et al. (1993) reported that people's decisions to delay

or seek medical treatment was based jointly on the physical symptoms experienced and the degree of emotional distress generated by the experience. The degree of symptom reporting is not necessarily related to actual or long-term health (Watson & Pennebaker, 1989) but is a critical component in health maintenance because it determines, in part, decisions to seek or continue medical treatment. Both healthy and ill individuals reported higher levels of physical symptoms, including pain, when they experienced anxious or, especially, depressive feelings (e.g., Watson & Pennebaker, 1989). Although few studies have tested this relationship in seriously ill populations, the results of two controlled experiments provide indirect support. Salovey and Birnbaum (1989) assessed the effect of mood on symptom appraisal and health-related cognitions. Happy, sad and neutral moods were induced in two groups of college students, those who were healthy and those who were ill with a cold or flu. Ill students who were sad reported more physical symptoms, were more likely to go to the doctor, but less likely to believe that they could carry out health behaviours to alleviate or prevent further illness. The authors argued that compliance with treatment regimens may be lower for distressed patients. They hypothesized further that this relationship is especially likely for therapeutic protocols that demand high patient participation. Similarly, Watson and Pennebaker (1989) found that negative affect was associated with increased reporting of physical complaints, but was not strongly related to actual or future health status. They also discovered that a disposition characterized by hostility, anxiety and depression was associated with adverse reactions to stressful events. This profile was related to increased health complaints and reporting of physical symptoms, and less effective coping.

Patients report that the post-surgery treatment stage, chemotherapy or radiotherapy, of cancer is very stressful (Burish et al., 1987). For most forms of cancers, physical symptoms and pain are related to the treatment rather than to the state of the disease itself (Andersen, 1995). Thus, there are important implications for adherence and health care utilization as a result of cancer patients' symptom perceptions and reporting. Because attachment influenced different patterns of emotional distress, models of self and other may account for some of the variance in symptom reporting.

The Present Study

Every situation we meet with in life is constructed in terms of the representational models we have of the world about us and of ourselves. Information reaching us through our sense organs is selected and interpreted in terms of those models, its significance for us and those we care about is evaluated in terms of them, and plans of action conceived and executed with those models in mind. How we interpret and evaluate each situation, moreover, turns also on how we feel (Bowlby, 1982, p. 229).

It is assumed that these representational models, based on early attachment experiences but elaborated throughout life, influence attachment-relevant domains in adults by shaping cognitive, emotional and behavioural response patterns (Collins & Read, 1994). Collins and Read suggested that working models of attachment are part of a broader cognitive-motivational system that enables people to make sense of their experiences. Working models are proposed to be highly accessible cognitive constructs which are automatically triggered during attachment-relevant events (i.e., intimate relationships or situations under which security is potentially threatened). They argued that "the impact of working models on behaviour is largely mediated

by the *cognitive interpretation* of the situation along with the person's *emotional response*"

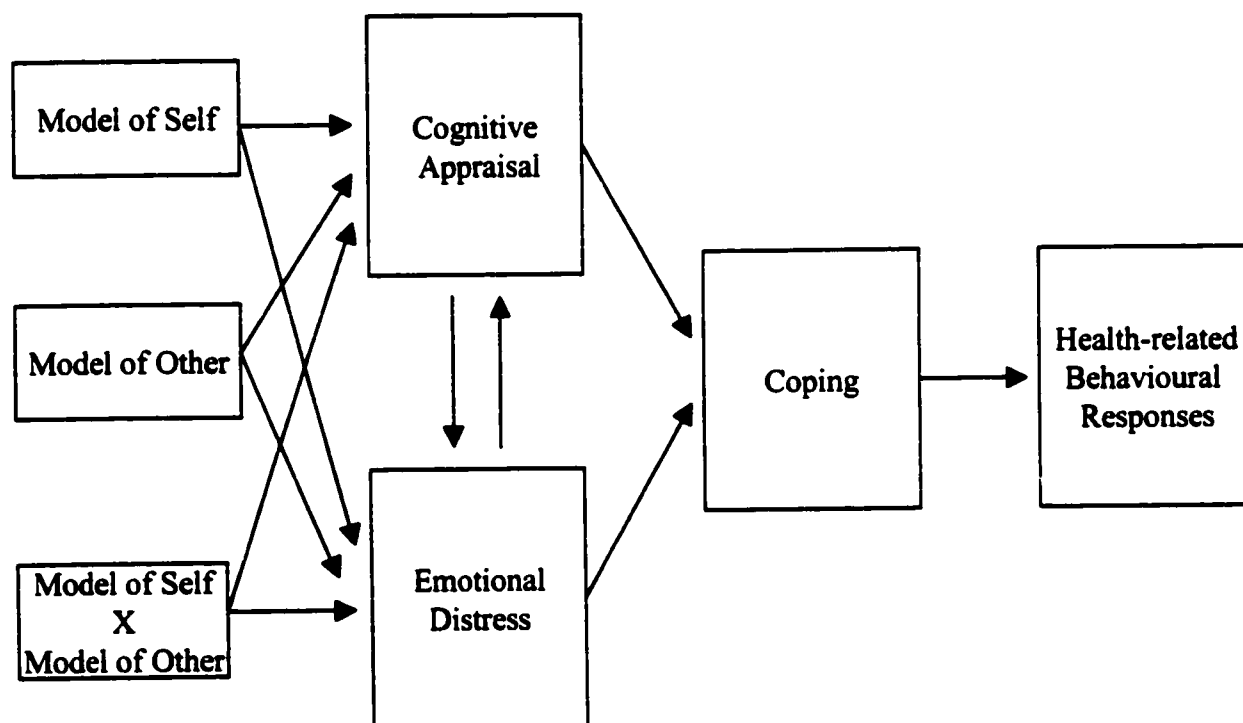
(1994, p. 70).

Collins (1996) explored the role of these structures in predicting behavioural responses within the context of close relationships. She found that attachment style was related to participants' self-reported behavioural intentions concerning a hypothetical interpersonal conflict through differences in distress level and cognitive explanations of the nature of the conflict. Collins' (1996; Collins & Read, 1994) model is primarily mediational in that it specifies the mechanism by which the effects of attachment on behaviour occur (Baron & Kenny, 1986). But it is also moderational. Within her conceptualization, attachment functions as a moderator of cognitive and emotional responses (which, in turn, mediate the behavioural endpoints). A moderator variable "affects the relationship between two variables so that the nature of the impact of the predictor on the criterion varies according to the level or value of the moderator. A moderator interacts with a predictor variable in such a way as to have an impact on the level of a dependent variable" (Holmbeck, 1998, p. 85). In other words, two independent variables interact such that the effects of either on the dependent variable depends on the level of the other (McClelland & Judd, 1993). Accordingly, view of self and view of other may interact to produce differential effects on cognitive and emotional responses (indeed, the interaction of self and other forms the basis for Bartholomew's [e.g., Bartholomew & Horowitz, 1991] four category model of attachment). Cozzarrelli et al. (1998) examined the interaction between view of self and view of other and found that the interaction term accounted for variance in relevant outcome measures, above that accounted for by each model separately.

The present study explored the moderating and mediating components of Collins' and Read's (1994) model under a condition of "real-life" threat (see Figure 1 for a diagram of the model). Moderation is statistically very difficult to detect in naturalistic research primarily due to range restriction (decreased residual variance) and concomitant low statistical power (McClelland & Judd, 1993). In light of the problems with detection, it was hypothesized that attachment working models would be at least differentially related to distress, appraisal and coping and would, possibly, moderate the relationships. In keeping with the mediational framework provided by Collins and Read (1994), models of self and other were expected to influence health-related behaviours, via appraisal, distress and coping variables.

The present project integrated disparate literatures of attachment, stress and coping and health enhancing and risk behaviours in a well-defined, medically ill population. To date, much of the research on stress and coping with cancer has been conducted on patients with varied prognoses and treatment regimens. Under such conditions biological factors predominate. Thus, designs are seldom powerful enough to detect consistent effects of psychological phenomenon (Fox, 1998). This study employed a homogeneous population of male and female colorectal cancer patients with respect to prognosis and treatment. All patients were diagnosed with a similar stage of cancer, treated for cure not palliation, and received at least one of two adjuvant treatment modalities (chemo or radiotherapy). In this way, the nature and degree of objective threat was reasonably standard. This is important in light of the criticisms of stress and coping theory which suggest that situational elements (i.e., the "content" of the stressor) are often poorly defined (Sommerfield & Curbow, 1992). The uniformity of the sample served to optimize power

Figure 1. Schematic Model Linking Working Models of Attachment with Health Behaviour Outcomes



and facilitated a clearer examination of the relationships between the patient's psychological experience and behaviour.

The present project also advanced the empirical study of Bowlby's theory beyond the study of attachment in close relationships to its second function, a means of regulating emotion under conditions of threat. This premise is consistent with the work of Mikulincer and colleagues which examined attachment and coping with a significant threat. The present project expanded upon this research by employing the two dimensional conceptualization of attachment which has been demonstrated empirically to underlie categories of attachment (e.g., Bartholomew & Horowitz, 1991; Fraley & Waller, 1998). Cozzarelli, et al. (1998) argued that testing hypotheses in terms of mental models permits researchers to more specifically "map their analytical strategy to the conceptual logic underlying their hypotheses" (p. 455). They proposed that attachment styles are heuristic and facilitate certain types of analyses but that hypotheses and the discussion of results are most usefully framed with respect to working models. Consistent with this position, the present project assessed the effects of attachment styles on the mediating and outcome variables operationalized in terms of each style's respective mental model.

Assessment instruments specific to the context of cancer were employed. There has long been controversy in the stress, appraisal and coping literature as to whether measures should be global or stressor specific. Measures which address specific stressors are recommended (e.g., Parker & Endler, 1996; Somerfield & Curbow, 1992). The argument has been raised primarily with respect to coping instruments but is as applicable to measures of appraisal. Context specificity may be less of an issue for the study of attachment; however, research suggests that individuals simultaneously hold multiple models of attachment. Differences in attachment have

been noted when individuals are asked about relationships with their mothers compared with their fathers (e.g., Main & Westen, 1981), or to think about parents versus peers (e.g., Bartholomew & Horowitz, 1991). This may also be true with respect to the emotional regulation functions of attachment: different threats may activate different models. For these reasons, a cancer-specific coping measure was used in this study. Previously published measures of attachment (Griffin & Bartholomew, 1994b) and cognitive appraisal of illness (Turk, Rudy & Salovey, 1986) were slightly modified to reflect the cancer context.

Coping must be assessed with context-specific measures but also be validated on appropriate samples. Endler et al. (1993) argued that:

“The relevance and significance of the coping activities tapped by specific items may be qualitatively different when medically ill subjects are studied. This problem should be of concern to any researcher who considers using a coping style measure validated with physically healthy adults to study coping responses in medical populations.” (p. 390).

Consequently, a measure of coping validated in a large sample of cancer patients was employed (Dunkel-Schetter et al., 1992).

The final contribution of the present research is the link between attachment processes and behavioural outcomes. Health-related behaviours, inasmuch as they reflect self-care, are relevant to models of self and other. In this study, both health maintenance and risk taking behaviours were assessed. Behaviours such as nutritional practices, exercise, and alcohol and tobacco use are of particular interest due to their implication in the development of some cancers and because these activities are the active targets of health promotion/cancer prevention campaigns. Previous research suggests that negative affect, appraisal and coping style influence

the process of adjustment to illness (e.g., Dunkel-Schetter et al., 1992; Guadagnoli & Mor, 1989; Salovey & Birnbaum, 1989; Stanton & Snider, 1993; Taylor, 1983; Taylor et al., 1985) and are related to the acquisition of healthy activities (e.g., Conn, Taylor & Hayes, 1992).

Using a cross-sectional design, the aim of this project was to provide an initial examination of attachment working models and their relationships to emotional distress, appraisal of threat, coping strategies, and healthful behaviours. The project represented a first step in the elaboration of an overall model of attachment processes and specific, relevant behavioural outcomes beyond the domain of close relationships. Contemporary models of stress and coping propose that coping is a process optimally explored through prospective, longitudinal designs; otherwise, it is impossible to determine conclusively which coping styles lead to which outcomes or which are most adaptive. Causal relationships between affect, coping and adjustment cannot be ascertained through cross-sectional designs. Compas (1999) asserted that longitudinal designs are preferable; however, he argued that they are not always practical or efficacious when assessing newly proposed models in which case, cross-sectional research is appropriate. In support of the correlational design, Huysamen (1996) wrote "much can be learned from correlations obtained if the nature of the other variables involved is kept in mind and if studies are judiciously planned" (p. 13). Notwithstanding the limitations of a cross-sectional design, the present project laid a foundation for future research employing longitudinal designs with populations under varying types and degrees of threat.

The results of the present study have clinical implications. It is important to determine how models of self and other are associated with increased treatment difficulty as well as increased well-being under threatening situations. This information may be used to identify

patients at risk for emotional distress, negligent self-care or poor adherence to treatment.

Eventually, this may lead to the development of interventions designed to modify dimensions of cognitive appraisals and coping strategies associated with increased distress or health behaviours during treatment.

Hypotheses

1) Cozzarelli et al. (1998) found that constructive appraisal of a stressor was related to positive model of self. Thus, it was expected that a positive model of self would be associated with more benign appraisals of colorectal cancer, that is, lower ratings of cancer as “serious” and “stressful”, relative to model of other.

2) Attachment research suggests that those with positive views of self (secure and dismissing styles) feel more confident and competent with respect to managing threats. Accordingly, they are hypothesized to experience less subjective distress in the face of stress. Individuals with secure or dismissing attachment styles have been found to report lower levels of psychological distress relative to the other styles (e.g., Cozzarelli et al., 1998; Kemp & Neimeyer, 1999). However, dismissing individuals tend to score lower on measures of emotional expressiveness than do secure persons (e.g., Bartholomew & Horowitz, 1991) suggesting that a belief in the availability and responsiveness of others may influence the degree to which an individual is comfortable expressing distress. Consequently, it was expected that positive model of self would be associated with less emotional distress in colorectal cancer patients and that this relationship would be moderated by view of other.

3) Attachment style differences have been found for coping (e.g., Mikulincer & Florian, 1995) but coping differences based on the underlying, dimensional working models have not

been tested explicitly. A negative model of self (preoccupied and fearful dimensions) is associated with an inability to regulate feelings of security. When confronted with stress, individuals with a negative view of self, may be left feeling overwhelmed. This should be associated with the use of emotion-focused coping strategies aimed at dissipating negative affect (e.g., Folkman & Lazarus, 1988; Lazarus & Folkman, 1984). Although fearful individuals are less expressive of their emotions than are those with a preoccupied style, these styles report more distress relative to secure or dismissing individuals (Kemp & Neimeyer, 1999). Conceivably, model of other may also impact the degree to which individuals employ emotion-focused or avoidance strategies. For example, those with a more positive view of others may employ less emotion-focused strategies and more support seeking (cf. Blain, Thompson & Whiffen, 1993; Sarason, Pierce, Shearin, Sarason, Waltz & Poppe, 1991). It was predicted that model of self would be associated with emotion-focused type coping and model of other would to be associated with support seeking.

The next set of hypotheses addresses the expectation that working models of attachment are related to health-related behavioural outcomes via a combination of distress, appraisal, and coping.

4) Review of the research (typically conducted with the three category model of attachment) has found that those with insecure attachment styles have difficulty managing negative emotions and report lower self esteem and confidence (e.g., Shaver & Clark, 1994). It has not been explicitly tested but stands to reason that view of self would be related to the degree to which individuals take care of themselves (Feeney, 1995). Negative affect is inversely related to self-care (e.g., Mechanic & Cleary, 1980) as are individuals' appraisals that they have little control

over their health (e.g., Aspinwall & Taylor, 1992). Those with a positive model of self reported increased self-efficacy and competence, and appraised stressors more constructively (e.g., Cozzarelli et al., 1998; Mikulincer & Florian, 1998; Mikulincer et al., 1993). Cozzarelli et al. found that self-efficacy appraisals mediated the relationship between attachment and distress. Those with positive models of self also engaged in less avoidant coping (Ognibene & Collins, 1998). A positive self model was expected to be related to increased healthful behaviours via lower distress, increased appraisals of personal responsibility and decreased reliance on avoidant coping methods.

5) Cooper et al. (1998) found that those with anxious attachment reported the highest levels of emotional distress and risk-taking behaviour. Risk behaviours, such as drug and alcohol use, reflect a form of escape from or avoidance of difficult or stressful situations (Baumeister, 1991). Therefore, a negative self model was expected to be related to increased risk taking behaviours via increased emotional distress and greater reliance on avoidant coping methods.

6) The impact of model of other on behavioural outcomes has not been well elaborated. Cozzarelli et al. (1998) reported a weak link between negative view of other and decreased well-being and increased distress. Because of the relationship between distress and health-related behaviours, model of other may be associated with risk-taking behaviours. This relationship may also be mediated by distress. It was predicted that a negative model of other would be related to increased risk taking behaviours via increased emotional distress.

7) The degree to which individuals report physical symptoms is often less related to the person's physical condition than to levels of emotional distress. As hypothesized earlier with respect to the expression of emotion, model of other may predict the reporting of physical

symptoms. This relationship is further hypothesized to be mediated by emotional distress and emotion-focused coping.

Method

Sample

Seventy-one, 34 male and 37 female, colorectal cancer patients were recruited from a Ministry of Health-funded cancer treatment centre over a one year period. All cancer outpatients in the region (catchment area, approximately one million residents) receive their chemotherapy and radiation treatments at this facility. Patients were recruited from the practices of three out of four medical oncologists specializing in gastrointestinal cancers at the centre. Participants represented approximately 65-70% of all CRC patients treated in the geographical region over a 12 month period. To be eligible for inclusion in the study patients had to be: comfortable reading and responding in English; younger than 80 years; diagnosed with cancer for the first time; definitively diagnosed with colon or rectal cancer within 12 months of recruitment; diagnosed at stage B2, C1, C2 (equivalent to stage II/III); undergoing adjuvant therapy: outpatient radiation therapy, intravenous chemotherapy treatment or both radiation and chemotherapy and; finished at least two of six chemotherapy treatment cycles

Participation in the study was voluntary and the majority of patients agreed to participate (97%). Approximately 83% of participants given questionnaires returned completed packages.

Participating patients ranged in age from 41 to 77 years ($M = 62.0$ years, $SD = 9.3$) (males, $M = 62.7$ years, $SD = 8.5$; females, $M = 61.4$ years, $SD = 10.1$). Fifty-one (71.8%) were diagnosed with colon and 20 (28.2%) with rectal cancer. Fifty-two (73.2%) received chemotherapy alone and 19 (26.8%) had both chemo and radiation therapy. The mean number of months from diagnosis to recruitment was 5.5 ($SD = 1.6$; range = 2.7 to 9.2 months).

Participants had completed an average of four of their six chemotherapy cycles at the time of recruitment ($Mdn = 4.0$). Other demographic and diagnostic information is presented in Table 1.

Patients in this study were similar with respect to prevalence data for colon and rectal cancer in the U.S. population on age (mean age at diagnosis, 60 and 65 years, respectively) and sex (approximately 50% each, males and females) (National Cancer Institute, 1999). There were no age differences for cancer site ($t(69) = -.14, p = ns$) or sex ($t(69) = .58, p = ns$). Patients were found to be better educated than the general public, with 54.9% having completed at least some post-secondary education.

Participants were compared with non-respondents on demographic and diagnostic variables. There were no statistically significant differences between patients who returned their questionnaire packages and those who did not with respect to sex ($\chi^2(1, N = 86) = 3.21, p = ns$), age ($t(84) = .59, p = ns$), cancer site ($\chi^2(1, N = 86) = .42, p = ns$) or disease stage ($\chi^2(2, N = 86) = 5.19, p = ns$).

Sample Size and Statistical Power

Power analyses were conducted with Sample Power, Version 1.2 (Borenstein, Rothstein & Cohen [SPSS Inc.], 1997) and formulas presented in Cohen (1993). Previous research using correlation and multiple regression analyses to examine attachment dimensions and distress and coping has demonstrated medium to large effect sizes (e.g., Collins, 1996; Cozzarelli et al., 1998; Mikulincer et al., 1999). A sample size between 28 and 84 (for large and medium effects, respectively) was required to obtain power = .80, with alpha set at .05.

Procedure

Oncologists treating colon and rectal cancer patients were contacted to obtain permission to recruit appropriate patients. With the permission of the treating oncologists, potential participants were identified by examining weekly clinic schedules. Patient files were consulted to ensure eligibility. Patients were recruited during their scheduled monthly visit with their oncologist prior to their next cycle of chemotherapy. The nature of the study and the extent of participation was explained. Participants signed consent forms to indicate their understanding of the procedure, confidentiality and voluntary nature of the study (see Appendix B). Patients who agreed to participate were given an envelope containing self-report questionnaires which required approximately 45 to 60 minutes for completion. They were permitted to take the questionnaires home but asked to complete them within two weeks and return them to the centre. Packages were stamped and self-addressed and so could be returned by mail or at the centre. A reminder letter was sent two weeks after recruitment to patients who had not returned the questionnaires.

Participants provided demographic information and responded to questions concerning attachment style, cognitive representations of illness, emotional distress, coping with their cancer diagnosis and treatment, and health-related behaviours. Patients gave permission for their medical files to be reviewed for information about the stage of their disease and to corroborate self-reports of health care utilization (e.g., missed or cancelled appointments for check-up or treatment sessions). Unless otherwise specified, patients were asked to respond to the questionnaires for the time period since their diagnosis.

Table 1.

*Demographic and Diagnostic Data**

	Men (<i>n</i> = 34)		Women (<i>n</i> = 37)			
	Frequency (%)		Frequency (%)		χ^2	<i>df</i>
Demographic data						
Relationship Status					4.81	4
single (never married)	1	(2.9)	1	(2.7)		
married/ common-law	25	(73.5)	28	(73.0)		
divorced	5	(14.7)	1	(2.7)		
widowed	3	(8.8)	7	(19.8)		
Education					9.00 [†]	3
less than high school	8	(23.5)	11	(29.7)		
high school graduate	2	(5.9)	11	(29.7)		
college/university	19	(55.9)	13	(35.1)		
post-graduate	5	(14.7)	2	(5.4)		
Employment status					7.74	3
currently working	12	(35.3)	4	(10.8)		
unemployed	0	(0)	3	(8.1)		
disability leave	2	(5.9)	3	(8.1)		
retired	20	(58.8)	25	(71.4)		
Diagnostic data						
Cancer Type					5.45 [†]	1
Colon	20	(58.8)	31	(83.8)		
Rectal	14	(41.2)	6	(16.2)		
Cancer Stage					.61	2
B2	8	(23.5)	7	(18.9)		
C1	18	(52.9)	23	(62.2)		
C2	8	(23.5)	7	(18.9)		
Treatment Regimen					8.83 [†]	3
SFU-based	20	(58.8)	24	(64.9)		
Tomudex	0	(0)	6	(16.2)		
SFU-based + radiation	13	(38.2)	6	(16.2)		
Other	1	(2.9)	1	(2.7)		

* Due to missing data, frequency columns may not sum to sample totals. [†] *p* < .05.

Measures

1) *Demographic and Diagnosis-related Variables*

Patient sex, age, marital status, education level and employment status were recorded (see Appendix C). These demographic variables have been found to be related to psychological status and to the adoption of health-related behaviours (Mechanic & Cleary, 1980; Leventhal et al, 1985). Data pertaining to the stage of cancer, date of cancer diagnosis, and type of treatment (surgery and/or chemotherapy, radiation) experienced was obtained through reviewing patients' medical charts.

2) *Attachment Dimensions*

Attachment dimensions, based on the four-category model, were assessed with the *Relationship Questionnaire* (RQ; Bartholomew & Horowitz, 1991). The RQ consists of four brief paragraphs describing the four attachment prototypes. Respondents rate on a seven-point scale the degree to which the paragraphs are self-descriptive. For the purposes of the present study, the sentences in the RQ descriptive paragraphs were divided into statements, resulting in a 17 item measure¹. Each prototype was comprised of four statements, with the exception of *secure*, which consisted of five. Using the same seven-point scale, participants rated the degree to which each statement, rather than paragraph, applied to them. Scores on items reflecting each prototype were summed then divided by the number of items associated with each. Accordingly, subscale scores for *secure*, *preoccupied*, *fearful* and *dismissing* prototypes were obtained.

¹ Simpson (1990) used this procedure to convert the Hazan and Shaver (1987) instrument from a categorical to a continuous measure of their three attachment styles.

Consistent with the paragraph version of the RQ, the range of possible scores was 1 to 7, with higher scores indicating greater prototypicality.

Scores for the two dimensions underlying the prototype model, view of *self* and *other*, were computed according to Griffin and Bartholomew (1994b). Mental models of self and other scored by this method demonstrated strong construct validity (Griffin & Bartholomew, 1994b). Scores on the self model were obtained by summing the preoccupied and fearful subscales and then subtracted from the summed secure and dismissing subscales. Dismissing and fearful subscale scores were summed and subtracted from the summed secure and preoccupied subscales to derive a score on view of other. The cutoff for both self and other scores was above and below zero for positive and negative views, respectively. For descriptive purposes in this study, the four categories of attachment were derived from the relative positions of self and other.

Because individuals may hold multiple, different mental models of attachment for different attachment figures and perhaps also for different threats, the RQ was reworded slightly to assess specific responses to an illness threat more directly (see Appendix D). Psychometric analysis of the modified instrument is presented in Results.

The RQ is a widely used measure of attachment which is significantly correlated with other self-report measures of attachment (Shaver & Bartholomew, 1998; Stein et al., 1998). Multitrait-multimethod analyses and structural equation modelling suggested that the four prototypes and the mental model dimensions possess good construct validity (Griffin & Bartholomew, 1994b). Scores are also predictably related to attachment relevant domains (for example, self concept and interpersonal factors) (Griffin & Bartholomew, 1994a).

3) *Cognitive Appraisal of Illness*

Few self-report measures have been developed to examine the dimensions on which people understand physical illness. The *Implicit Models of Illness Questionnaire* (IMIQ; Turk et al., 1986) is a 38 item questionnaire based on Leventhal et al's (1984) common-sense model of illness (see Appendix E). The original IMIQ contained 33 items which were reduced through factor analysis to 24 items. Because the instrument has not been tested extensively, participants in the present study responded to the original item pool. Respondents rated on a nine-point scale the degree to which they agreed or disagreed with a statement regarding their present illness experience. Higher scores indicated *less* agreement. For the purposes of the present study, IMIQ items were slightly reworded ("my illness" was changed to "my cancer"). Psychometric analysis of this instrument is presented in Results.

Turk et al. (1986) reported moderate construct validity for the measure based on exploratory and confirmatory factor analyses and cross-validation procedures. Four moderately correlated factors were derived. *Seriousness* (nine items; coefficient alpha = .92) refers to the gravity of the disease (e.g., "my cancer is permanent rather than temporary"). *Personal responsibility* (eight items, coefficient alpha = .91) reflects the personal locus of cause and cure (e.g., "my cancer is cured by reducing stress"). *Controllability* (five items; coefficient alpha = .79) refers to the patient's belief that their cancer is medically controllable (e.g., "my cancer is likely to come back"). *Changeability* (two items, coefficient alpha = .68) refers to the patient's belief that the course of cancer is variable (e.g., "my cancer changes over time"). Changeability was not of theoretical interest in the present study and not used. Unfortunately, the authors did not report the amount of variance accounted for by the four factors. The overall goodness-of-fit

statistic for the confirmatory factor analysis (CFA) suggested that the model was a good fit to the data ($\chi^2 (246) = 272.84, p = ns$). However, a more sensitive index (Bentler-Bonett) indicated only moderate fit (.84). The authors reported stability of the factor structure across judgements of different illnesses by respondents with various health conditions. They concluded that the IMIQ is a promising tool for understanding health cognitions in diverse health populations.

Schiaffino and Cea (1995) examined the utility of the IMIQ for assessing illness representations in samples of students and patients with rheumatoid arthritis and multiple sclerosis. They derived a slightly different four factor structure but concluded that the IMIQ offered a good baseline item pool for future studies of illness representations. In a second study, they determined that the seriousness of the illness and personal responsibility were associated with higher levels of depression (Schiaffino, Shawaryn & Blum, 1998).

4) *Emotional Distress*

Participants completed the *Profile of Mood States* (POMS; McNair, Lorr, & Droppleman, 1992) (see Appendix F). The 65 item instrument measures momentary mood state on six correlated dimensions: *tension-anxiety*; *depression-dejection*; *anger-hostility*; *fatigue-inertia*; *confusion-bewilderment*; *vigour-activity*. Scale scores are obtained from ratings of each mood-related adjective on a five-point scale (0= "not at all" to four= "extremely"). A total score for the POMS is computed by summing the first four subscales and subtracting from this the score for vigour-activity. Higher scores for both the subscales and total score indicate increased endorsement of the mood dimensions and are indicative of *poorer* psychological functioning. The total POMS score is the primary scale of interest in the present study.

Test-retest reliability coefficients range from .68-.74 (median interval=20 days) suggesting that the POMS is sensitive to the vagaries of mood. Internal consistency values are very high (.84-.95). The authors provided evidence for construct validity. The six dimensions were discerned through exploratory factor analysis. The POMS has demonstrated strong convergence with other measures of psychological distress. Sex differences have been reported: women tend to endorse higher levels of mood disturbance (McNair et al., 1992). Normative data are available for male and female college students and clinical populations.

The POMS has been used extensively with cancer patients (e.g., Dunkel-Schetter et al., 1992; Stanton & Snider, 1993; Taylor et al., 1984). Research using the instrument indicates that cancer is associated with increased levels of depression, tension-anxiety, fatigue, confusion-bewilderment and total mood disturbance relative to healthy adult populations. No differences were noted for vigour or anger-hostility in this population (McNair et al., 1992).

5) *Coping Styles*

The *Ways of Coping with Cancer* (WOC-CA; Dunkel-Schetter et al., 1992) was employed to assess cancer patients' coping strategies (see Appendix G). This instrument was modified from the WCQ (Folkman & Lazarus, 1988) and provides three types of information: (i) the nature of the cancer-related stressor; (ii) degree of cancer-related stress; (iii) coping strategies employed to manage the problem and its associated stressfulness.

Respondents are asked to identify from a list of cancer-related stressor which has been most difficult for them and, in addition, to rate how stressful the issue has been for them. They are asked to this stressor in mind, they then respond to 52 item descriptions of coping strategies. The individual rates his or her use of the strategy on a five-point scale (0 = "never" to 4 = "very

often"). Factor analysis revealed five coping styles: *seek and use social support* (11 items); *cognitive escape and avoidance* (9 items); *distancing* (12 items); *focus on the positive* (8 items); *behavioral escape and avoidance* (9 items). Higher scores indicate greater endorsement of the strategy.

Based on preliminary results, the construct validity of this relatively new measure seems adequate. Items were subjected to exploratory factor analysis and factor loadings for each subscale were acceptable (mean loadings = .50). Unfortunately, the authors did not present factor loadings for items on all five factors nor did they report the amount of variance accounted for by the five factor model. This structure needs to be substantiated using confirmatory factor analysis. Internal consistency (coefficient alpha) values for the five scales of the WOC-CA were good (.74 to .86). Dunkel-Schetter did not categorize their scales in terms of problem and emotion focused strategies; however, the factor structure was theoretically consistent with stress and coping theory. As theory would predict, the subscales were moderately correlated (.41 to .57). The subscales were also related to measures of distress in a theoretically consistent way. For example, coping by social support was inversely related to emotional distress.

The WOC-CA was developed on a large sample of cancer patients. Although it was heterogeneous with respect to age, education and time since diagnosis, most of the respondents were female (78%) and breast cancer patients (42%). Thus, the psychometric properties of the instrument may not generalize to all cancer patients. Dunkel-Schetter et al. (1992) argued for representativeness insofar as the factors obtained were consistent with those identified in previous research. Stanton and Snider (1993) employed the WOC-CA and reported similar internal consistency values and inter-correlations among subscales.

6) *Health and Health Risk Behaviours*

Health Behavior Marker Scales (HBMS; Vickers et al., 1990) is a 27 item measure of health-related behaviours (see Appendix H). Items are answered on a five-point scale (1 = “disagree strongly” to 5 = “Agree Strongly”). The instrument is comprised of two higher order factors: *preventive health* and *risk taking*. Preventive Health is further subdivided into *wellness maintenance and enhancement* (10 items; e.g. “I exercise to stay healthy”) and *accident control* (6 items; “I keep emergency numbers by the phone”); while Risk Taking is comprised of *substance risk* (4 items; “I don’t drink alcohol”) and *traffic risk* (7 items; “I speed while driving”) subscales. Higher scores on the scales indicate more agreement.

The HBMS were developed using recommended procedures for test development (Nunnally & Bernstein, 1998). An item pool was created from previous research on health-related behaviours and by expert consensus. Items were subjected to exploratory factor analysis from which the four first order factors were extracted. Next, the four factor solution was analyzed from a confirmatory perspective. CFA procedures revealed the two higher order factors. The model provided only an adequate fit to the data. Finally, the structure was cross validated. Based on these procedures, internal consistency (coefficient alpha) values were demonstrated to be moderate, ranging from .50 for substance risk to .82 for wellness maintenance. The authors acknowledged that the validation sample was very specific (US military personnel) and, therefore, the factor structure and normative data may not generalize to other populations. The instrument has demonstrated predictive validity. Booth-Kewley and Vickers (1994) used the HBMS to explore the role of personality in health behaviours and found that health behaviours

were significantly associated with the Agreeableness and Conscientiousness dimensions of five-factor theory.

Although the HBMS was developed and validated on a US military population, it was chosen for use in the present study because it is one of the few validated, self-report instruments to assesses comprehensive health behaviours. The psychometric properties in a cancer population are presented in Results.

7) *Physical Symptom Reports*

Usually the physical symptoms reported by cancer patients are related to the treatment regimen rather than to the disease itself (Burish, et al., 1987). A measure of physical symptoms, side effects, was developed for the present study using a modification of a procedure described by Richardson, Levine and Marks (1988) and Nerenz, Leventhal and Love (1982). Respondents were required to indicate on a 5-point scale (1="never" to 5= "always") how often they experienced 12 commonly-reported side effects of treatment for colorectal cancer in the previous four weeks (e.g., nausea, hair loss, fatigue) (see Appendix I). In addition, patients were asked to rate, on average, how difficult the symptoms have been for them (1= "not at all difficult" to 5 = "extremely difficult"). Higher scores indicate greater symptom severity. Richardson et al. (1988) found that their measure of symptom reports was significantly, positively correlated with adherence to chemotherapy. Psychometric analysis appears in Results.

Results

The results are presented in several sections. First, preliminary analyses were conducted to ascertain whether there were group differences between males and females and colon and rectal cancer patients on the main dependent measures. Previous research on attachment, appraisal, distress, and coping found sex differences and it was also possible that patients with different cancers might have responded differently on these variables. Second, several of the measures employed in this project have not been used in similar research. Thus, preliminary analyses were also performed to determine the psychometric adequacy of the instruments. In the final section, results based on the main hypotheses are presented.

Preliminary Analyses

All statistical analyses were conducted using SPSS, Version 8.0 (SPSS Inc., 1998). Prior to analyses, the data were examined for missing values. Overall, there were few missing data. One patient did not complete the IMIQ or RQ, stating that they did not apply to her because she “no longer had cancer”. Participants’ mean scores for the subscale containing the missing item were imputed when at least 50% of the items on the subscale were completed. Sample size varied slightly for analyses in which missing values could not be imputed (range, 67 to 71). Pair-wise deletion was employed.

Analyses were conducted to assess assumptions relevant to the statistical tests (e.g., multicollinearity or singularity, outlying cases or variables, linearity, homogeneity of variance) prior to the main analysis. Cases were considered outliers if they exceeded $z = 3.29$ ($p < .001$, two-tailed) (Tabachnick & Fidell, 1996). There were few univariate outliers in the data set.

Details of data screening procedures for each hypothesis are reported in Appendix J . Unless noted otherwise, all analyses were considered statistically significant at $\alpha = .05$, two-tailed.

Subgroup Differences

Univariate *t*-tests were conducted to determine whether data from males and females, colon and rectal patients, and the four treatment types could be pooled for analysis. The significance level was set at $p < .10$ so that trends toward group differences could be discerned. Overall, few sex differences were found (see Table 2). Relative to women, men utilized cognitive escape and avoidance coping to a greater degree and engaged in more risk taking behaviours. Several differences emerged for colon compared with rectal cancer patients (see Table 3). Colon cancer patients reported significantly more positive views of self and other. They also reported a lower level of stress on the WOC-CA and employed less behavioural escape and avoidance coping relative to rectal cancer patients. Next, differences on the dependent variables were examined by type of cancer treatment. Because treatment type is predominantly determined by the type of cancer (i.e., only rectal cancer patients received radiotherapy) results of this analysis were identical to those found for cancer type.

A chi-square analysis was conducted to determine significant differences between cancer type and stage. None were found. The three cancer stages were distributed similarly across both types of cancer ($\chi^2(2, N = 71) = .25, p = ns$). Spearman-rank order correlations with the main dependent measures indicated that cancer stage was significantly related to healthful behaviours ($r_s = .28, p < .05$) and was used as a covariate for analyses with this variable.

Table 2

Group Differences on Study Variables: Males and Females

Dependent Variable	Males (<i>n</i> = 34)		Females (<i>n</i> = 37)		<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Attachment						
Model of self	2.20	2.88	2.45	2.08	-.42	68
Model of other	1.45	2.52	1.25	2.38	.35	68
Cognitive Appraisal						
Seriousness	32.26	6.19	32.65	5.37	-.28	67
Personal responsibility	62.94	7.85	61.20	12.89	.68	56.43 ^a
Controllability	16.82	5.64	18.17	8.03	-.80	61.04 ^a
Emotional Distress						
POMS total score	21.94	29.02	20.40	25.23	.24	68
Coping						
Degree of cancer stress	2.96	.91	3.24	1.32	-1.01	66
Seek/ use social support	19.21	7.79	21.83	8.34	-1.37	69
Focus on the positive	11.65	5.72	13.32	9.11	-.92	61.21 ^a
Distancing	26.02	6.12	25.11	8.34	.53	65.90 ^a
Cognitive escape/ avoidance	14.50	4.92	18.18	7.28	-2.52*	63.56 ^a
Behavioral escape/ avoidance	8.94	4.28	8.94	4.43	.05	69
Health Behaviours						
Preventive Health	55.45	5.20	57.44	6.35	-1.42	67
Risk taking	24.75	5.28	20.83	4.43	3.33*	67
Symptom Reporting						
Symptom severity	23.08	6.52	24.70	6.31	-1.06	69
Symptom difficulty	2.77	.99	2.91	1.01	-.59	66

Note. * Significance level was set at $p < .10$ in order to identify trends toward group differences.
^a*df* is based on unequal variances for the two samples.

Table 3

Group Differences on Study Variables: Colon and Rectal Cancer Patients

Dependent Variable	Colon Cancer (<i>n</i> = 51)		Rectal Cancer (<i>n</i> = 20)		<i>t</i>	<i>df</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Attachment						
Model of self	2.70	2.36	1.42	2.64	1.98*	68
Model of other	1.73	2.51	0.40	1.98	2.12*	68
Cognitive Appraisal						
Seriousness	32.00	5.61	33.65	6.05	-1.10	67
Personal responsibility	62.00	11.18	62.25	9.55	-0.09	67
Controllability	17.79	6.95	16.80	7.02	0.54	67
Emotional Distress						
POMS total score	18.62	24.57	27.45	31.96	-1.24	68
Coping						
Degree of cancer stress	2.92	1.15	3.67	.97	-2.44*	66
Seek/ use social support	20.39	8.47	21.05	7.36	-.30	69
Focus on the positive	12.02	7.84	13.80	7.25	-.88	69
Distancing	24.71	7.53	27.70	6.43	-1.57	69
Cognitive escape/ avoidance	15.98	6.84	17.56	5.51	-.91	69
Behavioral escape/ avoidance	8.01	4.04	11.20	4.29	-2.93*	69
Health Behaviours						
Preventive Health	57.08	6.14	55.05	5.04	1.31	67
Risk taking	22.18	5.29	24.00	4.88	-1.32	67
Symptom Reporting						
Symptom severity	24.13	6.61	23.40	6.01	.43	69
Symptom difficulty	2.91	1.03	2.68	.86	.87	66

Note. * Significance level was set at $p < .10$ in order to identify trends toward group differences.

There were no differences between men and women and colon and rectal cancer patients with respect to age or time since diagnosis. Neither age nor the length of time since the patient received the cancer diagnosis was related to the main variables in the model (working models of attachment, emotional distress, coping strategies and health-related behavioural outcomes). Because the proportion of women with colon cancer was much higher than women with rectal cancer, the equivalence of dependent variables was evaluated for the interaction of gender and cancer site. No differences were found for the sex by cancer interaction. These results are presented in Table 4. Due to differential responses of patients by sex and by cancer site, analyses for sex, cancer type and cancer stage were run separately or included as control variables, as appropriate.

Psychometrics of Questionnaires: Respecification of Indicators

Several of the measures in the present study were developed or modified from their original format (or context) for use in this study. Psychometric analysis revealed problems with some of the instruments. In order to test the hypotheses, respecification of certain indicators was necessary. Psychometric data for the original and respecified measures are presented in Table 5 and Table 6, respectively.

The RQ, modified from paragraph to item format demonstrated adequate internal consistency for the working models dimensions. Values for both the working models dimensions and attachment prototype continua were consistent with those of other studies using the Relationship Scales Questionnaire (e.g., Ognibene & Collins, 1998). The scales were normally distributed and linear. Self and other dimensions were more highly correlated ($r = .23, p < .05$) than previously reported but similar in magnitude to Cozzarelli et al. (1998) ($r = .18, p < .01$).

Table 4

Sex by Cancer Site Group Differences on Study Variables: Male Rectal Patients and Female Colon Cancer Patients

Dependent Variable	Male Rectal (<i>n</i> = 14)		Female Colon (<i>n</i> = 31)		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Attachment					
Model of self	1.37	3.11	2.64	2.19	-1.56
Model of other	.01	1.73	1.24	2.41	-1.68
Cognitive Appraisal					
Seriousness	35.00	6.59	33.10	5.67	.97
Personal responsibility	62.71	8.64	61.21	13.22	.39
Controllability	15.35	6.19	17.75	8.07	-.98
Emotional Distress					
POMS total score	28.00	34.26	19.23	24.85	.96
Coping					
Degree of cancer stress	3.33	.98	3.03	1.32	.71
Seek/ use social support	18.71	6.85	20.93	8.52	-.86
Focus on the positive	12.50	6.41	12.64	9.16	-.05
Distancing	28.78	5.56	25.09	8.51	1.48
Cognitive escape/ avoidance	15.42	4.43	17.35	7.45	-.89
Behavioral escape/ avoidance	10.57	4.62	8.17	4.28	1.69
Health Behaviours					
Preventive Health	54.57	4.78	57.7	6.50	-1.60
Risk taking	24.78	5.02	20.57	4.46	2.81*
Symptom Reporting					
Symptom severity	22.42	6.22	24.51	6.57	-1.01
Symptom difficulty	2.53	.87	2.90	1.00	-1.10
Adherence					
General Treatment Scale	90.57	9.99	92.28	10.20	-.52

* Significance level was set at $p < .10$ in order to identify trends toward group differences.

Table 5.

Descriptive Statistics for Primary Measures and Subscales

Scale	No. items	<i>M</i>	<i>SD</i>	Range	Skew	Kurtosis	Internal Consistency
RQ (<i>n</i> = 70)							
Self	17	2.33	2.49	-3.8 to 7.6	.00	.13	.72
Other	17	1.35	2.43	-2.9 to 6.7	.28	-.53	.72
Secure	5	4.83	1.20	1.8 to 7.0	-.37	.23	.77
Preoccupied	4	3.60	1.17	1.0 to 6.5	.31	.42	.62
Fearful	4	3.00	1.39	1.0 to 7.0	.78	1.16	.89
Dismissing	4	4.09	1.00	1.7 to 6.5	-.04	-.21	.52
IMIQ (<i>n</i> = 69)							
Seriousness	9	32.46	5.75	19 to 48	.20	.42	.09
Personal Responsibility	8	62.62	9.67	31 to 72	-1.33	1.25	.80
Controllability	5	17.50	6.94	5 to 33	.03	-.61	.55
Change	2	12.74	3.92	2 to 18	-.30	-.08	.59
POMS							
Total score (<i>n</i> = 70)	65	21.14	26.95	-17 to 98	1.00	.79	.92
WOC-CA (<i>n</i> = 71)							
Cancer-related distress	1	3.11	1.15	1 to 5	.06	-.74	--
Seek/use Social Support	11	20.58	8.10	0 to 38	-.42	-.01	.82
Distancing	9	25.54	7.32	8 to 44	-.04	.44	.71
Focus on Positive	8	12.52	7.67	0 to 30	.13	-.49	.87
Cognitive Escape/Avoid	9	16.42	6.49	0 to 32	.02	.25	.71
Behavioral Escape/ Avoid	9	8.92	4.33	0 to 17	-.28	-.47	.46
HBS (<i>n</i> = 69)							
Preventive Health	16	56.49	5.87	42 to 69	-.59	.01	.61
Risk Taking	11	22.71	5.21	12 to 35	.15	-.78	.62
Symptom Reports (<i>n</i> = 71)							
Symptom Severity	12	23.93	6.41	12 to 37	-.06	-.72	.76
Symptom Difficulty	1	2.85	.99	1 to 5	.11	-.49	--

Note. RQ= Relationship Questionnaire; IMIQ= Implicit Models of Illness Questionnaire; POMS=Profile of Mood States; WOC-CA= Ways of Coping with Cancer; HBS =Health Behavior Scales.

Table 6

Descriptive Statistics for Revised Scales

Revised Scale	No. of items	<i>M</i>	<i>SD</i>	Range	Skew	Kurtosis	Internal Consistency
Seriousness							
IMIQ item 19 ^a	1	1.44	.62	1.0 to 3.0	1.26	.47	--
IMIQ item 27 ^a	1	1.78	.70	1.0 to 3.0	.32	-.98	--
Personal Responsibility	8	.79	.45	0 to 1.6	-.42	-.88	.80
POMS total score	65	5.74	2.29	0 to 10.7	-.07	.00	.92
Emotion/avoidance coping							
Emotion/avoidance coping	18	25.33	9.43	0 to 47.0	-.25	.25	.74
Healthful Behaviours	15	3.10	.78	1.0 to 4.7	.00	.11	.71

Note. IMIQ= Implicit Models of Illness Questionnaire; POMS = Profile of Mood States.

^a IMIQ19, IMIQ26 remained non-normally distributed.

Because the wording of the RQ was modified to reflect the cancer context, the homogeneity of the variances of the four subscales was evaluated to ensure that participants responded consistently across the subscales. No differences between the subscales were found ($F(69, 69) < F_{critical}$). Internal consistency based on all 17 items was adequate (coefficient alpha = .72). For purposes of comparison with other studies, the following proportions of attachment prototypes were found: secure, 62.0%; preoccupied, 8.5%; fearful, 4.2%; dismissing, 23.9%.

Three of the four IMIQ subscales exhibited very low internal consistency. Perceived seriousness was particularly poor (coefficient alpha = .09). One item was removed from this scale, “the symptoms of my cancer are similar to the common cold”, which slightly improved subscale reliability (coefficient alpha = .28). Item deletions or substitutions did not improve the internal consistency estimates for controllability and change. Principal components analysis with varimax rotation was conducted to clarify the underlying dimensions. An eight component solution with eigenvalues greater than 1.0 was produced, accounting for 69.9 % of the variance. IMIQ items were assigned to components based on their loadings but there was no subsequent improvement in internal consistency. Due to the poor psychometric properties of the three IMIQ subscales, they could not be used as planned and were dropped from further analyses. Perceived seriousness was an important variable in this study and so was replaced by two IMIQ items: “My cancer is serious” (item 19) and “My cancer has serious implications for me” (item 27).

Although the content of these items is appropriate, the respecification was not optimal because the items were positively skewed ($z = 5.88, p < .001$; $z = 2.29, p < .05$, respectively) and single item measures may be less reliable than multiple item scales. Square root transformations slightly improved the distributions ($z = 4.37, p < .001$; $z = 1.10, p = ns$, respectively). The two

items were significantly but not highly intercorrelated ($r_s = .35, p < .01$). Mann-Whitney U tests did revealed no sex or cancer type differences on IMIQ item 19 (sex: $U = 545.5, p = ns$; cancer type: $U = 441.5, p = ns$) or IMIQ item 27 (sex: $U = 581.0, p = ns$; cancer type: $U = 374.5, p = ns$).

The personal responsibility subscale was retained. Internal consistency was good (coefficient alpha = .80). The distribution of scores was significantly negatively skewed ($z = -4.57, p < .001$) (i.e., most participants did not believe themselves to be responsible for the onset of their cancer). After the removal of one outlying case, the scale was successfully transformed by taking the logarithm of the reflected score (Tabachnick & Fidell, 1996). Reflection is accomplished by subtracting scores from a constant (usually the highest score in the distribution plus 1) which reverses the direction of the interpretation of scores (Tabachnick & Fidell, 1996). That is, higher scores on personal responsibility now reflected a *greater* sense of responsibility for the illness. No differences were found for sex ($t(60.32) = .96, p = ns$) or type of cancer ($t(66) = -.33, p = ns$).

Emotional distress was assessed using the POMS total score. In this sample, the distribution was positively skewed ($z = 3.48, p < .001$) but was successfully transformed by the square root method (Tabachnick & Fidell, 1996). Patients exhibited relatively mild levels of emotional distress. Ten percent scored one standard deviation above the mean for a non-clinical adult population and 2% scored in excess of two standard deviations (McNair et al., 1992). Colorectal cancer patients reported a similar level of distress to male and female patients with chronic medical conditions (McNair et al., 1992) and post-surgical breast cancer patients

(Stanton & Snider, 1993). No differences for distress were found for sex ($t(68) = .06, p = ns$) or type of cancer ($t(66) = -.90, p = ns$).

With the exception of one subscale, the WOC-Ca scales had adequate to good internal consistency and were normally distributed. The scales were significantly intercorrelated (mean $r = .46, p < .01$). Behavioral escape and avoidance from the WOC-Ca had low internal consistency (coefficient alpha = .46). Inspection of items suggested problems with content validity insofar as many items incorporated both emotion-focused and avoidant coping strategies (e.g., "Tried to make myself feel better by eating, drinking, smoking or drug use"). In order to increase reliability and expand the content domain, this scale was combined with cognitive escape and avoidance. The subscales were significantly correlated ($r = .50, p < .001$) and met the requisite assumptions outlined by Ghiselli, Campbell and Zedeck (1981) to form additive, composite variables. That is, the subscales were based on the same metric of measurement, were linear and normally distributed. The resulting scale, termed emotion/avoidance coping, demonstrated adequate internal consistency (coefficient alpha = .74) and was normally distributed and linear. *T*-tests revealed no sex differences on this composite scale ($t(69) = -1.64, p = ns$) but rectal cancer patients were significantly more likely to engage in emotional/avoidance than were colon cancer patients ($t(69) = -1.95, p < .10$). With respect to the stressor for which patients based their responses to the coping inventory, 51% indicated that fear and uncertainty were most difficult. Twenty percent reported coping with "limitations in physical ability, appearance or lifestyle due to cancer". Only 7% reported coping with "acute pain, symptoms, or discomfort from illness or treatment".

Using the measure of proportional scoring described by Dunkel-Schetter et al. (1992), in which the patient's total coping effort is computed and the relative proportion of each subscale determined, primary coping strategies could be described. Distancing was found to be most commonly used, comprising, on average, 32% of participants' coping efforts. The remaining proportion of total coping was composed of emotion/avoidance coping (29%), seeking and using social support (23%), maintaining a focus on the positive (13%).

The two HBS subscales, preventive health and risk behaviours, demonstrated low internal consistency (coefficient alpha = .61 and .62, respectively). Principal components analysis with varimax rotation was conducted but a solution failed to converge. However, an adequately reliable healthful behaviours subscale was constructed by adding three items from Vickers et al.'s original item pool: "I eat a balanced diet", "I get enough sleep" and "I choose my spare time activities to help me relax". Four items were removed from the original scale: "I learn first aid techniques", "I use dental floss regularly", "I take vitamins" and "I take health food supplements". Internal consistency was .71. The scale was moderately negatively skewed ($z = -2.48, p < .05$) but was successfully transformed by taking the square root of the reflected score (Tabachnick & Fidell, 1996). Because of reflection, high scores on healthful behaviours now referred to *less* healthful behaviour. No sex differences were found but colon and rectal cancer patients differed ($t(67) = -.36, p < .10$) on the respecified measure. A similar procedure was attempted for risk taking behaviours but the reliability was not improved. Risk taking behaviours and attachment have not been well-studied in the literature. Therefore, despite its low reliability, it was elected to retain the variable but to consider the results tentatively. Healthful and risk behaviours were uncorrelated ($r = .18, p = ns$).

Physical symptom reporting possessed adequate internal consistency. The scale was normally distributed and linear.

Data Analytic Strategy

The goal of the present study was to assess general relationships between the components of Collins' (1996) and Collins' and Read's (1994) model. Arguably, path analysis is an appropriate strategy and has several advantages. First, all relationships (paths) in the model are estimated simultaneously. It is a parsimonious method which capitalizes less on chance. Second, when the model is tested as a whole its fit to the data can be determined.

Notwithstanding the advantages of path analysis, multiple regression (MR) was chosen as the analytic strategy. The contra-indications for using path analysis in the present project are its increased statistical assumptions concerning measurement unreliability and sample size. Several of the measures in this project were preliminary and demonstrated modest reliability. Of course, measurement error is also a problem for MR procedures, resulting in a downward bias in the estimation of R^2 . Endler et al. (1993) argued that measures in health psychology are notoriously problematic, suggesting that this is the reason for poor R^2 values typically found. Path analysis, which combines model specification and estimation, represents an extension of MR (Pedhazur, 1997; Chinn & Newsted, 1999) and is a more complex procedure. Inadequate construct validity increases specification error. Lomax argued that the "theory-driven nature of (modelling procedures) renders (them) unsuitable for all but the most mature of research areas in which measurement and conceptual issues have been clearly delineated" (p. 387) (as cited in Endler et al., 1993). Given the relative "newness" of the proposed model in a health psychology context

combined with the error in measurement, MR seemed a more appropriate first step than path analysis.

The sample size in the present study was small ($N = 67$ to 70 , depending on the analysis). It was large enough to meet the statistical assumptions of MR (i.e., 10 to 15 participants per independent variable [Stevens, 1996]) but not for testing a path model where fewer than 100 participants is considered “small” (Kline, 1998; Ullman, 1996)¹. Path analysis is based on covariance, rather than correlation matrices (as in MR). With small samples (or measures with greater error) covariance structures are prone to inadmissible solutions, for example, negative variances and out of range covariances (Kline, 1998). Chou and Bentler (1995) argued that small N s lead to poor parameter estimates and model test statistics. Path analysis employs maximum likelihood (ML) statistics to estimate model parameters. The performance of the chi-square test statistic derived from this method is much less reliable in small samples (e.g., Ullman, 1996). Multiple regression uses ordinary least squares (OLS) to determine the best fit of the regression line, a method less affected by small samples (Chou & Bentler, 1995).

Because of the preliminary nature of the model and the statistical assumptions of path analysis, a MR strategy was chosen. Once the theoretical relationships in this model are more clearly delineated and the measures better defined, path analytic or SEM procedures are an appropriate next step in testing the model proposed in this project.

¹Ullman (1996) stated that a 10:1 ratio (participants per estimated parameter) may be sufficient if expected effects are large and measured variables normally distributed. In the present project medium effects were expected and the variables were reasonably normal. The model had a ratio of 7:1 participants to estimated parameter.

Main Hypotheses

1. *Model of self would be associated with more benign appraisals of colorectal cancer, that is, lower ratings of cancer as "stressful" and "serious", relative to model of other.*

The data were analyzed by hierarchical multiple regression, using scores on the WOC-CA stressfulness item as the dependent variable and self and other scores as independent variables. Due to differences between colon and rectal cancer patients on view of self and other scores, cancer type was entered first in the first step and self and other entered as a block in the second step. Data were checked for assumptions relevant to multiple regression analysis (see Appendix J). Zero-order correlations among the variables are displayed in Table 7.

This hypothesis was partially supported. Results of the multiple regression, including unstandardized regression coefficients (B), standardized regression coefficients (β), squared semipartial correlations (sr^2) after entry of all independent variables, and multiple R , change in R^2 , and adjusted R^2 following each step are presented in Table 8. R was significantly different from zero ($F(3, 67) = 5.14, p < 0.01$). Model of self contributed a significant amount of variance to stressfulness once the effects of cancer type were controlled. As predicted, a more positive self view was associated with lower cancer-related stress ($t(67) = -2.72, p < .01$). Every unit increase in self scores was associated with a .32 unit decrease in stressfulness ratings. Model of other had no effect on stressfulness ($t(67) = -.70, p = ns$).

Similar analyses were conducted to ascertain the contribution of models of self and other to patients' perception of the seriousness of their illness as assessed by the two IMIQ seriousness

Table 7.

Zero-Order Correlations between Cancer Type, Model of Self, Model of Other and Cancer-related Stressfulness^a

Subscale	1	2	3	4
1. Cancer type	1.00	-.22	-.25*	.29*
2. Self		1.00	.25*	-.39**
3. Other			1.00	-.22
4. WOC-CA Stressfulness				1.00

Note. ^a Cancer site was coded 0 for colon cancer and 1 for rectal cancer. WOC-CA= Ways of Coping with Cancer. * $p < .05$. ** $p < .01$.

Table 8

Hierarchical Multiple Regression of Cancer-related Stressfulness on Models of Self and Other

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer Type	.46	.19	1.60	.032	.28	.07	.08
Step 2							
Self	-.14	.31	-2.72**	.090			
Other	-.03	.05	-.70	.005	.43**	.11*	.15

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

items². Results of assumption testing for multiple regression appear in Appendix J. Spearman Rank-order correlations among the variables appear in Table 9.

Self and other scores did not contribute significantly to the variance in patient's perceived seriousness of cancer in this analysis ($t(67) = .07, p = ns$; $t(67) = -1.99, p = .05$, respectively). The overall F for the regression indicated that R was not significantly different from zero ($F(3, 67) = 1.62, p = ns$) (see Table 10). Using the second IMIQ item as a measure of cancer seriousness, R was not significantly different from zero ($F(3, 67) = 2.39, p = ns$) (see Table 11). However, model of self was a significant predictor of scores on the seriousness item ($t(67) = 2.20, p < .05$). Contrary to expectations, a more positive view of self was associated with a greater perception of the seriousness of cancer. Model of other was unrelated ($t(67) = -.78, p = ns$). Although the use of two single item measures is not optimal and the magnitude of the relationships was quite low, the *patterns* of relationships were similar for both items. In both cases, model of self was positively related and model of other inversely related to perceived seriousness.

Hypothesis 2 Positive model of self would be associated with less emotional distress in colorectal cancer patients and that this relationship would be moderated by view of other.

Moderator effects were tested using hierarchical multiple regressions (Aiken & West, 1991; Baron & Kenny, 1986; Holmbeck, 1997). Main effects for the model of self and other and cancer type were entered first, followed by the product of the main effects for self and other (i.e.,

²The two items were non-normally distributed which weakens but does not invalidate the analysis (Tabachnick & Fidell, 1996).

Table 9

Spearman Rank Order Correlations between Cancer Type^a, Model of Self, Model of Other and IMIQ Seriousness Items

Subscale	1	2	3	4	5
1. Cancer type	1.00	-.20	-.27*	-.09	-.19
2. Self		1.00	-.26*	-.04	.27*
3. Other			1.00	-.20	.05
4. IMIQ item 19 ^b				1.00	.35**
5. IMIQ item 27 ^c					1.00

Note. ^a Cancer type was coded 0 for colon cancer and 1 for rectal cancer. ^b Implicit Models of Illness item, "My cancer is serious". ^c Implicit Models of Illness item, "My cancer has serious consequences for me". * $p < .05$. ** $p < .01$.

Table 10

Hierarchical Multiple Regression of Patient Perceptions of Cancer Seriousness^a on Models of Self and Other

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer Type	-.22	-.16	-1.35	.026	.10	.01	.01
Step 2							
Self	.00	.01	.07	.000			
Other	-.06	.03	-1.99	.053	.26	.06	.03

Note. ^a Implicit Models of Illness Questionnaire item 19.

Table 11

Hierarchical Multiple Regression of Patient Perceptions of Cancer Seriousness^a on Models of Self and Other

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer Site	-.22	-.14	-1.12	.017	.17	.03	.03
Step 2							
Self	.08	.27	2.20*	.063			
Other	-.03	-.10	-.78	.089	.31	.07	.06

Note. Implicit Models of Illness Questionnaire item 27. **p* < .05.

the interaction term). The predictor and moderator variables were centered (deviation score form) to avoid multicollinearity with the first order terms (Aiken & West, 1991).

Tests of the assumptions relevant to hierarchical multiple regression are presented in Appendix J. Zero-order correlations are presented in Table 12. As can be seen from Table 13, working models of attachment were related to emotional distress in the direction consistent with attachment theory. Those with more positive views of self and other reported less emotional distress ($t(64) = -3.68, p < .001$ and $t(64) = -2.10, p < .01$, respectively). Together with the control variable, they accounted for approximately 27% of the variance in emotional distress. Model of self was the stronger predictor, uniquely accounting for 15.2% of the variance, compared with 5.1% for model of other. R differed significantly from zero at this step ($F(4, 64) = 6.27, p < .001$).

Contrary to the hypothesis, model of other did not moderate the relationship between model of self and emotional distress. The interaction term at the second step was not significant ($t(64) = .97, p = ns$). Power analysis indicated that the present sample size was sufficient to detect interaction effects (based on power .80, medium effect size, $\alpha = .05$). However, Aiken and West (1991) discussed the reduction in the power to detect interaction effects with increased measurement error. With reliability estimates in the range of those used for this analysis (.70), sample size requirements may be tripled. Consequently, it is unlikely that the present sample size was sufficiently powerful to detect the interaction between model of self and other.

Table 12

Zero-order Correlations between Model of Self, Model of Other and Emotional Distress^a

Subscale	1	2	3
1. Self	1.00	-.29*	-.49***
2. Other		1.00	-.36**
3. Emotional distress			1.00

Note. ^a Higher scores on this variable denote *increased* distress.

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

Table 13

Hierarchical Multiple Regression of Emotional Distress on Model of Self, Model of Other and the Interaction between Models of Self and Other

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer type	-.04	-.01	-.07	.000			
Self	-.37	-.42	-3.68**	.151			
Other	-.21	-.24	-2.10*	.050	.52**	.27	.29
Step 2							
Interaction term	.04	.10	.97	.010	.53**	.01	.24

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

Hypothesis 3- *It was predicted that model of self would be associated with emotion/avoidant coping and model of other would be associated with support seeking.*

This hypothesis was tested with separate hierarchical multiple regressions. In the first, emotion/avoidance coping was regressed on models of self and other. In the second, support seeking was regressed on the working models. Because colon and rectal cancer patients differed in terms of models of self and other, cancer type was included at the first step for both regression equations. Emotional distress was strongly related to stress and coping and, thus, was also included as a control variable. The inclusion of distress facilitates a clearer understanding of the unique contribution of model of self and other.

Assumptions relevant to multiple regression were checked and the results appear in Appendix J. The correlation matrix for the attachment dimensions, coping and distress is presented in Table 14.

In order to ascertain the unique contributions of working models to coping, regression equations were first run without controlling for emotional distress. Overall, the regression model relating model of self and other (controlling for cancer type) to emotion/avoidance coping was significant ($R = .41, p < .01$), explaining 17.0% of the variance. Consistent with expectations, model of self was significantly inversely related to the use of emotion/avoidance coping strategies ($t(63) = -2.90, p < .01$). It uniquely accounted for 11.1% of the variance. Model of other did not contribute significantly to the overall relationship ($t(63) = 1.54, p = ns$).

To see how the role of model of self on coping was affected by emotional distress, the analysis was re-run controlling for distress. Results from this regression were very different and are presented in Table 15. The overall R remained significantly different from zero ($R = .54, p <$

Table 14

Zero-order Correlations between Models of Self and Other, Emotional Distress^a and Coping Strategies

Subscale	1	2	3	4	5
1. Self	1.00	.26*	-.54***	-.36**	.11
2. Other		1.00	-.20	.05	.36**
3. Emotional Distress			1.00	.47***	.13
4. Emotion/Avoidance				1.00	.38**
5. Support Seeking					1.00

Note. ^a Higher scores reflect increased distress. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 15

Hierarchical Multiple Regression of Emotion/Avoidance Coping on Models of Self and Other Controlling for Emotional Distress.

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer type	3.89	.20	1.79	.036			
Emotional distress	1.60	.41	3.27*	.122	.49**	.24	
Step 2							
Self	-.53	-.14	-1.08	.039			
Other	.78	.21	1.87	.013	.54**	.05	.24

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

.001). However, when distress was entered first, the impact of model of self on coping was reduced to non-significance ($t(63) = 1.08, p = ns$). Increased emotional distress was significantly related to the use of emotion/avoidance coping ($t(63) = 3.28, p < .001$), uniquely accounting for 12.2% of the variance. Model of other was less affected by the inclusion of the distress variable with the test of its regression coefficient remaining about the same as in the first analysis ($t(63) = 1.87, p = ns$). Thus, it seems that the role of model of self are almost completely accounted for by patients' scores on emotional distress.

It appeared that emotional distress mediated the relationship between model of self and emotion/avoidance coping. The significance of mediation was tested as a follow-up to this analysis using the procedure outlined in Baron and Kenny (1986) and Kenny (2000).

Four steps are required to establish mediation: Step 1, the independent variable must be correlated with the outcome variable; Step 2, the independent variable must be correlated with the mediator; Step 3, the mediator must affect the outcome variable; Step 4, the mediator must reduce the relationship between the independent and outcome variable³. In order to test these requirements, three regression equations are estimated (Steps 3 and 4 are tested simultaneously). First, the dependent variable (emotion/avoidance coping) was regressed on the independent variable (model of self). Second, the mediator (emotional distress) was regressed on the independent variable (model of self). Third, the dependent variable was regressed on the independent variable and the mediator. Mediation is established if, after controlling for the effects of the mediator on the outcome, the relationship between the predictor and outcome is

³Kenny (2000) reordered Steps 1 and 2 from the original Baron and Kenny (1986) procedure.

reduced. Baron and Kenny (1986) provided a significance test for the resulting regression coefficients.

Results for the test of mediation are presented in Table 16. Criteria for Steps 1 and 2 were met. Model of self was significantly related to emotional/avoidance coping ($t(64) = -2.60, p < .01$) and to the mediator, emotional distress ($t(64) = -4.80, p < .001$). Emotional distress was significantly related to coping ($t(64) = 3.11, p < .01$) in Step 3. Results from Step 4 (presented under Step 3 in Table 16) clearly demonstrated that the effect of model of self on emotional avoidance coping was reduced when the mediator was included in the analysis. The regression coefficient for model of self was no longer significant ($t(63) = -.77, p = ns$). Because the criteria for mediation were established, the significance of the effect was tested following the recommendations of Baron and Kenny (1986) and Kenny (2000). Kenny (2000) showed that the reduction in the effect of the independent variable on the dependent variable due to the mediator is equal to the regression coefficient of the path between the independent variable to the mediator multiplied by the regression coefficient of the path from the mediator to the dependent variable (i.e., the indirect effect). Further, the null hypothesis for mediation is that this path is equal to zero. The indirect effect between model of other and symptom reporting was tested using Sobel's formula outlined in Baron and Kenny (1986). The relationship between model of self and emotional/avoidance coping was significantly mediated by emotional distress ($z = 2.67, p < .01$).

The second part of Hypothesis 3 addressed the relative contributions of model of self and other to support seeking coping. As in the previous analysis, multiple regressions were first conducted without controlling for emotional distress. Overall, the regression model relating

Table 16

Tests of the Effects of Mediation between Model of Self and Emotion/Avoidance Coping

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>R</i>	Adjusted <i>R</i> ²
Step 1: DV regressed on IV						
Cancer	3.13	2.30	.16	1.35	.21	
Self	-1.15	.44	-.31	-2.60*	.37**	.11
Step 2: Mediator regressed on IV						
Cancer	.08	.54	.02	.14		
Self	-.51	.10	-.52	-4.81***	.52***	.25
Step 3: DV regressed on IV and Mediator						
Cancer	3.01	2.16	.15	1.40		
Self	-.38	.49	-.09	-.77		
Emotional distress	1.53	.50	.40	3.10**	.50***	.21

Note. DV = dependent variable; IV = independent variable. * $p < .05$. ** $p < .01$. *** $p < .001$.

model of self and other (controlling for cancer type) to support seeking coping was significant ($R = .35, p < .05$), explaining 12.4% of the variance. As predicted, model of other was significantly and positively related to the use of support seeking ($t(63) = 2.86, p < .01$). It uniquely accounted for 11.3% of the variance. Model of self did not contribute significantly to the overall relationship ($t(63) = .20, p = ns$). See Table 17.

Next, emotional distress was included as a control variable (along with cancer type). Results of the two analyses were very similar, suggesting that emotional distress is less a function of model of other than of model of self. The overall R was significantly different from zero ($R = .42, p < .05$). When distress was entered first, the impact of model of other on support seeking remained significant ($t(63) = 3.01, p < .01$). Model of other independently contributed 12.3% of the variance. Emotional distress was unrelated to the use of support seeking ($t(63) = 1.99, p = ns$). This suggests, consistent with stress and coping theory, that those with high distress do, indeed, employ more emotion-focused type coping strategies.

To provide a context for the above finding, relationships between models of self, other, distress and the remaining coping scales were examined. Conceivably, focus on the positive and distancing would be related to models of self and other, respectively. Results did not support this. The two coping styles were significantly inter-correlated but there were no other significant relationships (see Table 18).

The next set of hypotheses presumed that one attachment model but not the other was implicated in the proposed relationships. In the interest of conceptual clarity and maintaining congruence with attachment theory, both model of self and other were included in the analyses, even if predictions were not specified for the second dimension.

Table 17

Hierarchical Multiple Regression of Support Seeking Coping on Models of Self and Other Controlling for Emotional Distress.

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer type	1.42	.08	.69	.006			
Emotional distress	.92	.27	1.99	.052	.13	.02	
Step 2							
Self	.54	.16	1.16	.018			
Other	1.21	.37	3.04**	.012	.42*	.16**	.12

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

Table 18

Zero-order Correlations between Models of Self and Other, Emotional Distress^a and Focus on the Positive and Distancing Coping

Subscale	1	2	3	4	5
1. Self	1.00	.26*	-.54**	-.03	-.02
2. Other		1.00	-.20	.09	.01
3. Emotional Distress			1.00	-.01	.19
4. Focus on the Positive				1.00	.57**
5. Distancing					1.00

Note. ^a Higher scores reflect *increased* distress. * $p < .05$. ** $p < .001$.

Hypothesis 4. *Model of self was expected to be related to healthful behaviours via distress, an appraisal of personal responsibility and decreased reliance on avoidant coping methods.*

The mediational role of appraisal, distress and coping between attachment and healthful behavior were tested according to the procedure used in Hypothesis 3.

Results of assumption testing for multiple regression procedures for this analysis appear in Appendix J. Zero-order correlations among the variables are presented in Table 19. As expected there was a significant direct effect of model of self on healthful behaviours. That is, a more positive view of self was associated with increased participation in healthful behaviours⁴. Model of other was not significantly related. As can be seen in Table 19, personal responsibility was not significantly correlated with either the independent variable, model of self, or the outcome, healthful behaviours. Thus, it did not meet criteria for possible mediation and was dropped from further analysis. Examination of the correlation matrix also indicates that, despite significant correlations with model of self, neither proposed mediator was associated with the outcome variable as required for the Step 3 in mediation testing. Further testing of the mediational hypothesis was inapplicable, suggesting that the relationship between model of self and healthful behaviours was not mediated by emotional distress or emotion/avoidance coping.

The direct relationship between model of self and healthful behaviours was explored in more detail (Table 20). The contribution of model of other and the interaction between model of self and other was also examined. The healthful behaviours variable was regressed on model of

⁴Due to the type of transformation procedure applied to healthful behaviours, high scores reflect *less* endorsement.

Table 19

Zero-order Correlations between Attachment Models, Emotional Distress, Personal Responsibility, Emotion/Avoidance Coping and Healthful Behaviours^a

Subscale	1	2	3	4	5	6
1. Self	1.00	.25*	-.51***	-.18	-.35**	-.25*
2. Other		1.00	-.24	.05	-.02	.01
3. Emotional distress			1.00	.22	.47***	.16
4. Personal Responsibility				1.00	.33**	-.09
5. Emotion/Avoidance					1.00	-.12
6. Healthful Behaviours						1.00

Note. ^a Due to the transformation of the variable, higher scores reflect *less* endorsement of healthful behaviours. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 20

Hierarchical Multiple Regression of Healthful Behaviours on Attachment Models

Variable	<i>B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i>	<i>R</i> ² change	Adjusted <i>R</i> ²
Step 1							
Cancer type	-.07	-.04	-.37	-.04			
Cancer stage	-.39	-.33	-2.92**	-.33	.27	.08	.08
Step 2							
Self	-.10	-.31	-2.64**	.30			
Other	-.02	.06	.49	-.01	.40*	.09*	.13
Step 3							
Interaction term	-.01	-.05	-.40	-.04	.41*	.00	.13

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

self and model of other (controlling for cancer type and stage), then on the interaction term. R differed significantly from zero ($F(5, 65) = 2.62, p < .05$). Overall, 13.0% of the variance in healthful behaviours was accounted for by these variables. Model of self uniquely contributed a significant amount to the overall variance (R^2 change = .09; $F(2, 66) = 3.56, p < .05$) and, as mentioned, positive self view was associated with increased healthful behaviours ($t(67) = -2.64, p < .01$). Neither model of other nor the interaction term contributed significantly to the prediction of health behaviours.

Hypothesis 5. Model of self was expected to be related to risk taking behaviours via emotional distress and avoidant coping

The measure of risk taking behaviour demonstrated modest internal consistency so the results of this analysis are considered tentative. The data were examined to see if they met the assumptions for multiple regression analysis. Results appear in Appendix J.

The correlation matrix for model of self, other, distress, coping and risk taking behaviours appears in Table 21. As can be seen, there were no significant relationships between the dependent variable, risk taking behaviour, and any of the proposed mediators or independent variable. Thus, there was no evidence for the mediation by distress and coping between model of self and risk taking behaviour.

Preliminary analyses had revealed sex differences on risk taking behaviours. The sample was split by sex to ascertain if there were significant relationships for this variable, which would suggest that the analyses be rerun by group. Model of self remained unrelated to the criterion, risk taking. One difference was noted: risk taking was significantly associated with

Table 21

Zero-order Correlations between Attachment Models, Emotional Distress^a, Emotion/Avoidance Coping and Risk Taking Behaviours

Subscale	1	2	3	4	5
1. Self	1.00	.25*	-.50***	-.34**	-.15
2. Other		1.00	-.24	-.02	-.21
3. Emotional distress			1.00	.37**	.10
4. Emotion/Avoidance coping				1.00	-.10
5. Risk taking behaviour					1.00

Note. ^a Higher scores on this variable denote *increased* distress. ** $p < .01$. *** $p < .001$.

emotion/avoidance coping for men ($r = .40, p < .05$) but not for women ($r = -.19, p = ns$).

Significant relationships were found separately for both sexes between model of self and distress and coping measures. That is, consistent with results in Hypothesis 3, higher scores on model of self were related to lower emotional distress and emotion/avoidance coping.

Hypothesis 6. Model of other was expected to be related to risk taking behaviours via emotional distress.

As was the case in Hypothesis 5, there were no significant relationships between risk taking behaviours, emotional distress or the attachment models. The mediational hypothesis could not be tested further. A more negative view of other was associated with increased emotional distress. The correlation matrix is presented in Table 22.

No significant relationships among risk taking, emotional distress and model of other emerged when the sample was split by sex. The pattern of correlations were the similar for men and women with one exception. Model of other was significantly, inversely related to emotional distress for males but not for females ($r = -.38, p < .05$ and $r = -.07, p = ns$, respectively).

Hypothesis 7. Model of other was expected to predict the reporting of physical symptoms, mediated by emotional distress and emotion-focused coping.

Results for the tests of assumptions for this analysis appear in Appendix J. Mediation was tested using the procedure described earlier. Zero-order correlations among the variables in the analysis are presented in Table 23. Although model of self was not hypothesized to be related to symptom reporting it was included in order to maintain consistency with

Table 22

Zero-order Correlations between Attachment Models, Emotional Distress^a and Risk Taking Behaviours

Subscale	1	2	3	4
1. Other	1.00	.25*	-.28*	.24
2. Self		1.00	-.50**	-.15
3. Emotional distress			1.00	.12
4. Risk taking behaviour				1.00

Note. ^a Higher scores on this variable denote *increased* distress. * $p < .05$. ** $p < .001$.

Table 23

Zero-order Correlations between Attachment Models, Emotional Distress^a, Emotion/Avoidance Coping and Physical Symptom Reports

Subscale	1	2	3	4	5
1. Other	1.00	.25*	-.27*	.03	-.11
2. Self		1.00	.50***	-.34**	-.09
3. Emotional distress			1.00	.36**	.43***
4. Emotion/Avoidance coping				1.00	.31**
5. Physical Symptom Reports					1.00

Note. ^a Higher scores on this variable denote *increased* distress.

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

Bartholomew's conceptualization of attachment models. Examination of the correlation matrix revealed significant relationships between models of other and self and one of the proposed mediators, emotional distress. Emotion/avoidance coping was only significantly related to model of self. More positive scores on the attachment models were associated with less distress⁵. Both proposed mediators were significantly and positively related to the outcome variable, degree of symptom reporting. Increased symptom reporting was associated with increased distress and emotion/avoidance coping. These relationships met the requirements for testing mediation (Steps 2 and 3 outlined in Hypothesis 3). Step 1 of the procedure was not met because model of other scores were not significantly related to symptom reporting. However, Kenny (2000) stated with respect to meeting all the requirements for mediation:

“Certainly, Step 4 does not have to be met unless the expectation is for complete mediation. Moreover, Step 1 is not required, but a path from the initial variable is implied if Steps 2 and 3 are met. If (the path between the independent and outcome variable) is opposite in sign to (the paths between the independent variable to the mediator and from the mediator to the outcome variable), then it could be the case that Step 1 is not met, but there is still mediation. In this case, the mediator acts like a suppressor variable. So the essential steps in establishing mediation are Steps 2 and 3” (p. 1).

Based on Kenny's (2000) recommendations, tests of mediation were conducted. Model of self was removed from further analyses at this point because it was unrelated to symptom

⁵ Higher scores on the POMS reflect *increased* distress.

reporting and the hypothesis was based on theoretical predictions for model of other. Results of the three regression equations for testing mediation are presented in Table 24 .

Baron and Kenny (1986) and Kenny (2000) instructed that regression coefficients be used to assess the effects of mediation. Therefore, to obtain these values for Step 1, symptom reporting was regressed on model of other. As indicated by the correlation matrix. Model of other was not significantly related to symptom reporting ($t(65) = -1.10, p = ns$).

To test Step 2, the proposed mediators, emotional distress and emotion/avoidance coping, were regressed on the independent variable, model of other. Cancer type was entered into the equation first as a control variable. The criterion for Step 2 was met. Model of other remained significantly related to emotional distress after the effects of cancer type were taken into account ($t(65) = -2.16, p < .05$). R was not significantly different from zero ($F(2,65) = 2.48, p = ns$).

Next, symptom reporting was regressed on emotional distress (Step 3). With the effects of cancer type taken into account, emotional distress was related to symptom reporting ($t(64) = -3.68, p < .001$). R was significantly different from zero ($F(3,64) = 5.09, p < .01$).

Because the criteria for Steps 2 and 3 were met, following the recommendations of Baron and Kenny (1986) and Kenny (2000), the significance of the effect was tested. The hypothesis that the relationship between model of other and symptom reporting is mediated via emotional distress was not supported. The indirect effect approached but did not attain significance ($z = 1.94, p = .05$). Because the effect approached significance (as per Kenny, 2000), zero-order and semipartial correlations were examined for evidence of suppression. Zero-order correlations were larger, suggesting that model of other did not function as a suppressor variable in the relationship between emotional distress and symptom reporting (Pedhazur, 1997).

Table 24

Tests of the Effects of Mediation between Model of Other and Physical Symptom Reporting

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>R</i>	Adjusted <i>R</i> ²
Step 1: DV regressed on IV						
Cancer	-1.46	1.78	-.10	-.82		
Other		-.37	.34	-.14	-1.10	.15.01
Step 2: Mediator regressed on IV						
Cancer	-.03	.58	-.01	-.06		
Other	-.24	.11	-.27	-2.16*	.27	.04
Step 3: DV regressed on IV and Mediator						
Cancer	-1.42	1.63	-.10	-.87		
Other		-.05	.33	-.02		-.17
Emotional distress	1.29	.35	.43	3.68***	.44	.16**

Note. DV = dependent variable; IV = independent variable. * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

Attachment theory has evolved from early work on infant-caregiver relationships to the impact of attachment on close relationships in adults. Most recently, it has been explored in stressful contexts beyond close relationships. Bowlby (1973, 1988) proposed that attachment processes should be most activated under conditions of threat. Thus, attachment is, fundamentally, a theory of adaptation. Research has demonstrated effects of attachment style on the perceived stressfulness of an experience, coping, and adjustment under situations of varying degrees of threat from minimal to catastrophic (e.g., Cozzarelli et al., 1998; Mikulincer et al., 1999).

Threat is difficult to simulate experimentally and so naturalistic settings provide external and ecological validity. Serious illness constitutes a significant, yet relatively commonplace, threat that most people will confront. A large body of research has examined how individuals understand, experience, and cope with threats to their health (e.g., Leventhal et al., 1984; Stanton & Snider, 1993; Taylor et al., 1984). Collins and Read (1994) proposed a model in which working models of attachment shape cognitive appraisals and emotional responses which, in turn, influence behavioral responses. Consistent with a stress and coping framework in which appraisals have been found to be related to emotional distress and coping styles (e.g., Folkman & Lazarus, 1988), Collins and Read argued that "Attachment style differences in [attachment-relevant] behavior result from a combination of biased cognitive processing and emotional response tendencies" (p. 79). The present study was conducted to assess the role of working models of attachment with respect to stress, appraisal and coping processes, and to relevant behavioural outcomes under the condition of a homogeneous health threat. These processes were

studied in similarly staged colon and rectal cancer patients undergoing standard adjuvant treatments. Health-related behaviours were chosen as outcome measures because they are implicated in the etiology of cancer and because of their relevance to adaptation to illness (Andersen et al., 1994). Self-care behaviour is also germane to working models of attachment (e.g., Brennan & Shaver, 1995; Cooper et al., 1998).

The participants in this study were similar in age and sex to those identified in epidemiological surveys of colorectal cancer patients (NCI, 1999). They were more educated than the general population; fifty-five percent had attained at least some post secondary education. Participation and completion rates were high (97% and 83%, respectively).

*Associations between Working Models of Attachment and Cognitive
and Emotional Responses, and Behavioural Outcomes*

Several hypotheses corresponding to the relationships of attachment to cognitive, emotional and behavioural responses in the Collins and Read (1994) model were tested. In addition to examining the direct linkages of the model, it was proposed that distress, appraisal and coping processes would mediate the relationship between working model of attachment and health-related behavioural outcomes. The results of this study provided partial support for the predictions made from the framework of the model and were consistent with the findings of similar studies.

Rectal cancer patients rated their degree of cancer-related stress significantly higher than did colon cancer patients. This result was not expected and could not be explained by stage of cancer or treatment side effects. That is, rectal cancer patients did not have a worse prognosis, nor did they report increased severity of side effects. Differences may have been due to increased

treatment demands. Rectal cancer is treated with both chemotherapy and radiotherapy. Even though they did not experience more side effects, rectal cancer patients attend more treatment appointments thereby increasing the disruption to their daily lives and, likely, increasing perceived stressfulness.

As hypothesized, colon and rectal cancer patients with a more positive view of self reported lower levels of cancer-related stress. Contrary to expectations, these patients perceived their cancer as being more serious and having greater serious consequences for them. There were limitations to the single item measure used to assess the seriousness construct, however, the results make sense in the context of attachment theory.

Individuals with a positive self view (secure and dismissing attachment in terms of the four prototype model) are proposed to be more confident and self-sufficient (e.g., Bowlby, 1988; Hazan & Shaver, 1987). Positive view of self is related to self-efficacy and, at least in one study, was almost redundant with the construct of self-esteem (Cozzarelli et al., 1998). Most of the patients had been given a reasonably serious diagnosis of Stage C1 or C2 cancer. Those with more positive views of self seemed able to perceive the seriousness of their condition accurately. It may be, then, that patients with a positive model of self were able to perceive their health condition realistically because of their basic self-confidence that they are capable of dealing with the threat. That is, due to a sense of efficacy and control they could simultaneously appreciate and tolerate the seriousness of the situation without becoming overwhelmed with distress. This explanation fits with the results from other hypotheses in the present study that indicated that model of self was inversely related to emotional distress.

Mikulincer and Florian (1998) suggested that security was a resource which helped people positively appraise stressors and cope constructively. Present findings indicate that a positive view of self may be the central component of the experience of security when facing a health threat. Based on the results presented here, it seems that individuals with a positive self view do not need to appraise the stressor more positively, only realistically. Their confidence and sense of well-being enable them to function effectively.

Studies using the four prototype model of attachment have found differences in the degree to which each expresses emotion. Some studies have found that dismissing and secure attachment (positive self model) are similar to one another and different from preoccupied and fearful attachment (negative other model) with respect to reporting emotional distress. Dismissing attachment is the least emotionally expressive (Cozzarelli et al., 1998; Kemp & Neimeyer, 1999). These results “cross” the working model dimensions, thus the second hypothesis of the present study was that there might be an interaction between models of self and other which better explains these findings. It was hypothesized that model of other would be implicated insofar as a belief in others being available and responsive could, conceivably, influence the need to express emotion.

Consistent with predictions, positive working models of self and other were inversely related to self-reported emotional distress. A moderation effect for working models of attachment was not found. McClelland and Judd (1993) demonstrated that interaction terms are statistically difficult to detect in non-experimental designs due to, among other issues, measurement error and low power. They also argued that the actual effects of the independent variables on the outcome measures in naturalistic research are rarely as strong as predicted in

theory. Aiken and West (1991) outlined how, when measurement instruments have less than perfect reliability, sample size estimates are dramatically increased. Thus, it may be that the expression of emotional distress is moderated by working models of attachment but that the sample size in the present project was not large enough, nor the measures sufficiently reliable to detect it.

The next hypothesis concerned the differential relationships between attachment working models and coping styles. It was predicted that model of self would be related to emotion/avoidance type strategies, and model of other related to social support seeking. The hypothesis was supported. Negative model of self was associated with increased use of emotion/avoidant strategies, whereas model of other was unrelated to this style of coping. However, when emotional distress was included in the prediction of coping, the hypothesized impact of model of self was significantly reduced. Emotional distress mediated the relationship between view of self and coping style. To use Baron and Kenny's (1986) terminology, emotional distress appeared to be the "generative mechanism" through which model of self influences emotion/avoidant coping. This finding is consistent with Bowlby's contention that the attachment system is activated under conditions of distress. It is unclear whether this finding is due to conceptual overlap between the constructs of emotional distress and model of self or if the mediational relationship is a product of conceptual overlap between emotional distress and emotion-focused coping.

Clearly, there is conceptual overlap among the constructs. Some researchers have suggested that model of self and self-esteem (at least when examined at a global level) appear to be the same (e.g., Bylsma, Cozzarelli & Sumer, 1997; Cozzarelli et al. 1998). Bartholomew's

own work demonstrated that “At the level of latent variables, the positivity of an individual’s attachment self-model was highly (in fact, almost perfectly) related to the positivity of his or her self concept” (Griffin & Bartholomew, 1994b, p. 442). Model of self and self concept were also strongly related to a measure of distress. Griffin and Bartholomew cautioned that these relationships do not imply that self-esteem is equivalent to the attachment self model. They argued that self-esteem (and, by extension, distress) is simply a marker variable of the self model dimension.

Model of self, emotional distress and emotion/avoidant coping are similar and related but are likely not redundant. We know that model of self is related to self-esteem and that self-esteem is related to emotional distress. Folkman and Lazarus (e.g., 1988) have demonstrated a link between different forms of emotional distress and particular coping styles. Emotion-focused coping is predicated on the experience of emotional distress, its very purpose being to dissipate negative affect. Research employing the four category model of attachment (or that which incorporates the moderation effects of the self and other models) may, in some situations, have better discrimination ability than does the self model alone. For example, fearful and preoccupied individuals share a negative self model but demonstrate different levels and types of distress, as well as different behavioural coping styles.

Perhaps the attachment self model, emotional distress and emotion-focused coping style reflect, respectively, cognitive, affective and behavioural manifestations of the overall self-concept. However, these elements cannot be differentiated given the methodology and design of the present study. The interrelationships may have been due to shared method variance (i.e, self-report measures). Interview methods or collateral reports could provide some discrimination. A

longitudinal design would permit an examination of how these variables are related over time. It may be that the relationships are strongest at the onset of a stressful situation but weaken or vary over the course of the experience. In fact, the impact of attachment models in predicting relational and other outcomes is hypothesized to vary by degree of threat. The inclusion of a control group might also have facilitated a clearer understanding of the relationships between model of self, distress and coping. Consistent with this line of reasoning, Bylsma, et al. (1997) found that model of self and self-esteem were strongly associated when global self-evaluations were assessed but were unrelated when more specific domains (e.g., academic competence) were examined. This finding suggests that the constructs are different. Given that the relationships varied under different conditions even within the same individuals, they would be expected also to differ across groups. Analysis of between group data might provide more specific information about the conditions under which the constructs diverge.

Social support seeking was found to be uniquely and significantly related to model of other. Model of self was unrelated. This result is consistent with previous research findings that individuals with secure and preoccupied attachment style seek support (e.g., Ognibene & Collins, 1998). Ognibene and Collins also reported that those with preoccupied attachment perceived less support but sought it, nonetheless. They investigated, but did not find, a moderating effect for attachment style on social support seeking (however, their sample size was small). Results of the present investigation also suggest that support seeking may be a function of model of other. That is, social support seeking seemed to depend more on beliefs about the qualities of the caretaker (i.e, that he or she is strong or capable to deal with the threat) than on beliefs about the worthiness of the self (i.e, to be cared for).

This finding appears to contradict the results of other researchers. For example, Blain et al. (1993) reported that in young adults, model of self and others interacted to predict perceptions of social support from family and friends. Having a negative model of either self or other was associated with decreased perceptions of social support. Sarason et al. (1991) employed an atypical measure of attachment and found that students' self-perceptions were positively correlated with perceived social support and satisfaction with that support. Although the results of the two studies suggest that model of self is implicated in perceptions and satisfaction with social support, neither examined participant's reported support seeking behaviour. Perceptions of social support, satisfaction with support and support seeking behaviours are related but they are not redundant (Sarason, Shearin, Pierce & Sarason, 1987). Thus, it may be that actual support seeking behaviour is more related to model of other than it is to model of self.

Social support is a multidimensional construct which includes elements of emotional (e.g., "I have people to listen to me when I am upset") and instrumental support (e.g., "I have people I can call in case of an emergency"). It likely reflects an interaction of influences of both model of other and model of self. Although it was not tested in the present study, it may be that emotional social support is related to a belief that the self is worthy². Instrumental support may be more associated with a belief that others are capable and willing to help. It is possible that the cancer patients in the present study responded to the support seeking items on the coping questionnaire in terms of instrumental aspects of social support. They reported some, but not a clinical level of, emotional distress and may have felt that they were more "debilitated" in terms

² Bartholomew, Cobb and Poole (1997) suggested that social support behaviours in adults parallel *proximity seeking* in children

of performing daily activities (due to fatigue or other physical symptoms) than they were emotionally. In this case, instrumental supports would be more applicable. Consistent with this speculation, social support seeking in this sample was unrelated to level of emotional distress. Asking participants to respond to questions about both emotional and instrumental aspects of social support could provide a more definitive answer regarding the relative contributions of attachment models. Finally, models of self and other, and emotional distress were unrelated to the other styles of coping (distancing and focusing on the positive).

Next, several hypotheses were proposed to examine the linkages between components of the Collins and Read (1994) model. Working models of attachment were expected to influence health-related behavioural outcomes via cognitive appraisals and emotional responses. In the context of the present model, these were operationalized as appraisals of illness and emotional distress. Coping strategies were included as an intermediary link (see Figure 1.).

Overall, the hypothesized mediating relationships were not supported. Based on findings from the attachment and health psychology literatures, model of self was expected to be related to healthful behaviour through patients' appraisals of personal responsibility, their level of emotional distress and their engagement in emotion/avoidant coping. As predicted, there was a direct effect of model of self on healthful behaviour. Those who viewed themselves more positively were more likely to engage in positive health behaviours. None of the proposed mediators affected this relationship. In fact, none was related to healthful behaviours. Neither model of other nor the interaction between attachment models was related to healthful behaviours.

It is unclear as how to interpret this result. It may be that feeling “good” about oneself is directly related to the degree to which one takes care of oneself, with no mediation required. This fits with the health behaviour literature that suggests that self-esteem and positive affect are related to healthful behaviours (e.g., Sarafino, 1997). It is also consistent with the findings of Cozzarelli et al. (1998) that model of self and self-esteem were strongly related. Notwithstanding, there were psychometric problems with the measures used to test the mediating variables. Specifically, the IMIQ subscales had poor to moderate internal consistency and poor construct validity. Lack of mediation due to measurement error cannot be ruled out.

The next two hypotheses examined the effects of model of self and other on risk taking behaviours. Because few studies have looked at attachment dimensions and risk taking, it was elected to proceed with testing the hypotheses despite the less than desirable psychometric properties of the risk taking measure. Results of these analyses were considered to be exploratory. Internal consistency estimates should be greater than .70. Nunnally and Bernstein (1994) argued that “lower standards of reliability are tolerable for preliminary forms of construct-validated measures... because a construct is more likely to be used to obtain correlations and less likely to be used to make decisions about individuals” (p. 318). The argument against using measures with reliability estimates less than .70 is that even significant results may be unreliable, by definition. However, there are many examples in the published literature of measures with less than desirable properties that have contributed to theory building. Indeed, studies employing the four category model attachment routinely report and analyze results based on the dismissing subscale (which consistently exhibits coefficient alpha values around .41) (e.g., Bartholomew & Scharfe, 1994; Stein et al., 1998). Despite the low value, consistent and coherent results have

emerged regarding characteristics associated with dismissing attachment. There are very few published measures of health risk behaviours; thus in the interests of preliminary model building the measure was analyzed.

Neither model of self nor other was related to risk taking. Nor were any of the proposed mediators related to the criterion. There is no strong theoretical context in which to place these results. Cooper et al. (1998) reported that anxiously attached adolescents engaged in greater drug and alcohol use, and sexual behaviour. This relationship was mediated by depression. Using a locally-developed measure of risk taking, Scharfe and Eldredge (in press) found that for college students in relationships, security was negatively related and fearfulness positively related to risk-taking behaviours. Differences between the present sample and that of Cooper et al. and Scharfe and Eldredge (e.g., age, education and health status) render it difficult to compare the results. Young adults, especially college students, are confronted with an array of behavioural choices as they learn about themselves and explore their environments. Given the developmental tasks of this age, models of attachment could impact the choices that young adults make with respect to health and risk behaviours. Older adults are at a different developmental stage. They have, presumably, adopted health habits over their lifetime and attachment models may play less of a role. However, a health crisis provides additional developmental challenges for patients from which opportunities for behavioural choices are presented. Models of self and other seem relevant to this reconceptualization process. Unfortunately, in the present project, the risk taking measure lacked sufficient reliability and construct validity to provide an adequate test of this hypothesis. Development and use of a different risk behaviour measures may provide a less equivocal test of the relationships.

Supplemental analyses were conducted because mean differences on risk taking had been found for men and women. The predicted relationships between attachment models and risk-taking were not found in the split sample. One interesting result was noted. Positivity of other model was associated with decreased emotional distress for men; whereas the two variables were unrelated for women. This finding is inconsistent with results reported in an earlier hypothesis which indicated that emotional distress was exclusively a function of the self model. Moreover, no mean sex differences on models of self, other or emotional distress had been found in preliminary analyses. One speculation is that because of men's socialization processes (i.e., they are reinforced from childhood to be less emotional and emotionally expressive) their distress levels may be less based on a model of self. It is unclear why their distress would be more related to model of other. Perhaps men's distress is related to social-role functioning which is, presumably, a function of model of other. This would be consistent with findings of large scale studies that have demonstrated that marriage has a more protective health effect for men than it does for women. Women living on their own have higher rates of adjustment and longevity than do single men (e.g., Stack & Eshleman, 1998).

Finally, with respect to testing attachment and behavioural responses as outlined in the Collins and Read (1994) model, it was expected that attachment models would be related to the degree to which patients reported physical symptoms. It was presumed that those who believed others to be responsive or capable would be more likely to report physical symptoms. Again, this relationship was expected to be mediated by emotional distress and coping responses. This was not found. Positive view of other was not directly related to symptom reporting. One explanation for the non-significant result may be the nature of the sample and the situational

demands of cancer treatment. Patients attended a clinic appointment with their oncologist prior to beginning their next treatment cycle. The purpose of the appointment was to ascertain any symptoms which might preclude commencement of the next round of treatment. Thus the context “pulls” for symptom reporting. Furthermore, patients were recruited during these clinic appointments. It seems likely that effects of attachment processes would be vitiated under such compelling circumstances. Model of self was also unrelated to symptom reporting. Support for this explanation is the finding that symptom reporting was related to emotional distress and emotion/avoidant coping. These relationships have been demonstrated consistently in previous literature (e.g., Cameron et al., 1993; Watson & Pennebaker, 1989) and are, presumably, unaffected by the situational demands of cancer treatment. Thus, distress and coping may, indeed, mediate the relationship between model of self and symptom reporting but the cancer clinic context did not provide the most appropriate test of the hypotheses.

Contributions

This study provided a conceptual integration of attachment and stress and coping theory. Bowlby (1988) asserted that attachment is fundamentally a response to threat and functions to regulate negative affect. Further, he proposed that attachment processes should be activated under any threatening situation. Only recently have researchers investigated the emotion regulation function of attachment outside the domain of interpersonal relationships. Many studies have experimentally manipulated conditions of stress (e.g., Simpson et al., 1992), required respondents to generate vignettes or memories of stressful situations (e.g., Kemp & Neimeyer, 1998; Ognibene & Collins, 1998), or studied attachment processes under conditions of catastrophic threat (e.g., Mikulincer et al., 1993). The contribution of the present study was that

it explored attachment models under conditions of a significant but common threat, serious illness.

Specifically, the project provided a preliminary test of the model of Collins and Read (1994) which proposed that attachment working models affect behavioural responses through a combination of cognitive and emotional responses. It was one of the first studies to link attachment processes to relevant behavioural outcomes, in this case, health-related behaviours. These outcomes, inasmuch as they reflect self-care, seem relevant to working models of attachment. Although several of the hypotheses designed to test components of the model were not supported, some relationships among the variables were in the direction predicted by theory.

The present study employed a conceptualization of attachment based, not on categories, but on the working models proposed to underlie these styles (i.e., models of self and other). Theoretical and empirical research have demonstrated that a two dimensional model of attachment provides the best fit (e.g., Griffin & Bartholomew, 1994a, 1994b; Brennan et al., 1998; Fraley & Waller, 1998). To date, few studies have looked at working models of attachment under stressful conditions (cf., Cozzarelli et al., 1998). Results from research in attachment and stress and coping have been inconsistent across studies because of different theoretical models of attachment (e.g., three vs four category model). Results have also been difficult to compare or conceptualize because three category models cannot distinguish between the two aspects of the avoidant attachment (i.e., fearful and dismissing attachment). Thus, studying the dimensions proposed to underlie the styles facilitates a theoretically coherent context in which results can be interpreted. There are methodological advantages as well. For example, testing the two dimensional model precludes the need for very large sample sizes in

order for each attachment style to be adequately represented. Overall, results from the present project indicated that model of self and other were useful constructs in the context of health and should be explored further with respect to relevant outcomes. Due to conceptual overlap with potentially relevant variables, more discrimination may be produced by “crossing” the dimensions (that is, including both self and other models and their interactions in hypotheses and analyses). Again, the development of psychometrically sound measures will facilitate further theory building of the role of attachment outside the domain of close relationships.

The present study employed a narrowly-defined sample of male and female cancer patients undergoing adjuvant treatment for their disease. All patients had been diagnosed with cancer for the first time, were within one year of diagnosis, had very similar prognoses and underwent standard treatment protocols. Response and participation rates were very high. The homogeneity of the stressful situation was advantageous for several reasons. First, it provided a relatively uniform “threat” from which attachment-related differences could be more clearly examined. Second, a criticism of the stress and coping literature has been its theoretical overemphasis on situational determinants of coping, coupled with an empirical neglect to clearly define the situations or stressors (e.g., Somerfield & Curbow, 1993). Finally, much of the research on stress and coping with cancer has been conducted on patients with varied prognoses and treatment regimens, thereby making it difficult to ascertain the relative roles of psychological and medical variables. It was expected that the sample would be homogeneous given the uniform threat but it was not. This finding demonstrates clearly the diversity even amongst cancer patients with similar prognoses and treatment protocols which future studies must consider.

The final contribution of the present study was that it employed instruments specific to the cancer or health context. Parker and Endler (1996) and Somerfield and Curbow (1992) have suggested that healthy and ill individuals may respond differently. They recommended that when conducting research with health populations, measures should be context and stressor specific. Unfortunately, some of the instruments proved to possess less than optimal psychometric properties (see *Limitations* below).

Limitations

Notwithstanding the contributions of the present project, there were several theoretical and methodological limitations.

Theory

Bowlby (1988) believed that attachment processes in infants were most active under conditions of separation from the caregiver or when the child was threatened, afraid or sick. In comparable research with adults, the most robust results for the effects of attachment style on coping and adjustment processes have come from the work of Mikulincer and colleagues (e.g., 1993, 1995) who have most frequently examined attachment under conditions of extreme and unusual threat (e.g., SCUD missile attacks). Results are not as strong in other work employing less severe stressors (e.g., Kemp & Neimeyer, 1998; Ognibene & Collins, 1998). In the present project it was assumed that cancer would constitute a significant threat to health and that attachment processes would, consequently, be activated. Most of the hypothesized relationships between working models of attachment, distress, appraisal and coping were in the predicted directions; however, when it came to predicting outcomes from these variables, few associations were noted. Measurement problems were most likely responsible (see subsection on

Measurement below) but it was also possible that undergoing adjuvant treatment for colorectal cancer was not sufficiently threatening. Patients did not report a clinical degree of emotional distress at the time of recruitment, scoring slightly above the average for healthy populations. Perhaps a better test of the model would have been under a “stronger” condition of threat such as in the case of a recurrent cancer or metastasis, or at a different point in the course of the disease (e.g., immediately post-diagnosis). Patients with metastatic or recurrent disease were excluded from this study because of their varying treatment regimens and schedules, and vastly different prognoses. Heterogeneity may have been, at least partially, attenuated by statistically controlling disease-related factors from the psychological variables of interest.

A second potential theoretical problem was that Collins and Read’s (1994) model was proposed to predict “attachment-relevant” behavioural responses from emotional and cognitive responses. Health behaviours were expected to be relevant because of previous research linking personality, distress, appraisal and coping characteristics to health-related outcomes. In the present study, few relationships emerged. It may be, simply, that health behaviours are so multi-determined that working models of attachment are not strong single predictors. However, given the limitations of the present project, it is premature to conclude that attachment models are irrelevant.

A third theoretical issue is the nature of the attachment self model. Model of self was found to be the best predictor of perceived stressfulness, avoidant coping and emotional distress and healthy behaviours. This finding is testament to the pervasiveness and robustness of the influence of self-perceptions on affective experience and behaviours. It reflects its *descriptive* utility but also suggests that the construct has poor *explanatory* power or utility with respect to

theory building. The construct may not be sufficiently discriminating to advance knowledge of the role of personality in health outcomes.

Design

The design of this project was cross-sectional and did not employ a control group. Although the aim of the project was to provide information about the relationships among the variables within the framework of Collins and Read's (1994) model, the methodology could not provide an appropriate test of the model as a whole.

The primary limitation of the design is that it can make no assumptions about the causal ordering of the variables; that is, knowing that the variables are correlated provides no information about whether one causes the other. Cross-sectional, correlational designs (especially those that are uncontrolled) "cannot render rival hypotheses implausible" (Cook & Campbell, 1979, p. 296). For example, it may have been that physical symptoms associated with cancer treatment affected how patients coped with the stresses. It is also possible that symptoms or emotional distress affected how patients appraised themselves and other people. Self and other models may have been "effects" rather than "causes" in the appraisal and distress chain. The design of the present project makes it impossible to rule out these explanations.

Related to the above point, Cook and Campbell (1979) emphasized that effects follow causes in time. Cross-sectional designs cannot incorporate this important dimension. To ascertain whether a particular coping style leads to health risk behaviours, for example, necessitates that these constructs be measured over time. Similarly, the testing of mediating and moderating effects implies a sequence or temporal ordering. A longitudinal design would permit these elements to be modelled appropriately.

Longitudinal designs are particularly applicable for examining the coping construct. It is well-accepted that coping is a process which unfolds over time. Individuals' appraisals of stressors change, as do their preferred strategies. These changes are associated with changes in distress and adaptational outcomes. For example, model of self may have been related to emotion/avoidant coping during treatment stages but not at three month follow-up (at which point prognosis may have been the best predictor). In the present study, the timing of recruitment may have attenuated the findings for some relationships. For example, if patients had been recruited immediately post diagnosis (when distress is often highest) perhaps the mediating role of distress and coping between attachment models and health-related behaviours would have emerged.

Scharfe and Bartholomew (1994) found that attachment models were stable across stressful life events of a non-interpersonal nature. However, because the present study was cross-sectional, it is impossible to confirm that patients' attachment models did not change as a result of their cancer diagnosis. If attachment styles were found to change over the illness, it would suggest a more complicated model than that proposed by Collins and Read (1994). Finally, given the conceptual overlap of attachment models, distress and coping noted in the present project, it is critical to assess the relationships over the course of the disease for evidence of divergent validity.

The second methodological limitation of the present project was the lack of a control group. It is impossible to know whether the pattern of results was specific to having cancer or whether it would generalize to other threatening situations. The cancer context was chosen for study because, as an example of a significant but not extraordinary stressor, attachment processes

were presumed relevant to behavioural responses (i.e., health-related behaviours, which were also presumed to be relevant to the recovery of cancer patients). The inclusion of one, or more, control groups under varying conditions of stress would have helped determine whether this was the case. Using the present design, it is difficult to establish the theoretical importance of attachment in health related behaviour: is attachment a relevant construct? Other studies provide a theoretical rationale upon which to speculate that attachment may be important (Feeney & Ryan, 1994; Mikulincer et al., 1993) (only Mikulincer was controlled and neither study was longitudinal) in affecting health behaviours under conditions of threat. Based on the present design, it cannot be ruled out that the results were due simply to being diagnosed with colorectal cancer.

The purpose of the present study was to lay the foundation for an integration of the attachment and health psychology literatures as a means of better understanding the processes by which individuals deal with health threats. Notwithstanding these significant limitations, this design seemed appropriate for the purpose of the present study and has been employed in similar research. The links between the literature domains and the variables in the model were previously untested and the purpose of the project was not to make sample-specific generalizations; thus a cross-sectional analysis seemed to be a reasonable first step (e.g., Compas, 1999).

Sample

Although the sample was homogeneous with respect to the nature of the threat and the participation rate was high, only patients who chose to take treatment for their cancer had the possibility to be recruited. Individuals who elect not to take adjuvant treatment may have different attachment working models, be more distressed or engage in different coping strategies

and health behaviours than those who take treatment. This may explain the lower than expected level of emotional distress in the sample. It may also be that such patients are less likely to see their physicians upon encountering physical symptoms and so that when they are eventually diagnosed it is at a more advanced stage. Such patients were ineligible for participation in the present project.

The sample was selected to be homogeneous with respect to degree of threat. All patients were diagnosed at similar stages of disease (with respect to prognosis) and were undergoing standardized treatments. As it turned out, the sample was less similar than expected. Rectal and colon cancer patients responded quite differently on key variables. Group differences may have “washed out” or attenuated relationships, thus explaining some of the non-significant results in the present project.

The sample was very well-educated. Given that education level is related to participation in health-related behaviours, this group may not be representative of the general population. However, the purpose of the present project was to examine attachment models under a defined, relatively common stressor, not to make comparisons to other cancer groups.

Although correlations among many of the variables in this study were significant, the magnitude of effects were quite small. Likely this was due to the degree of measurement error in some of the psychological instruments. It may have also been due to restriction of range on the attachment dimensions. The proportions of the four attachment categories differed from previous research: precoccupied and fearful attachment (negative model of self) were underrepresented (8.5% and 4.2%, respectively). This suggests that model of self scores may have been inflated, resulting in correlations of low magnitude and lower scores on the measure of emotional distress.

Statistical power may have been a problem. Previous attachment literature demonstrated medium to large effect sizes. The sample size in the present project, 71 patients, was larger than required to detect large effects but about 15% too small to detect medium effects. If the relationships among the variables in this study were, in fact, in the medium range, they may not have been detectable. Certainly, the sample size was too small to test hypotheses concerning moderation or to test Collins' and Read's model as a whole. Error associated with many of the measures likely further decreased the power to find associations

Measures

Measurement error was a problem in this study and may explain some of the non-significant findings. As mentioned, error severely decreases the power to find effects. Several of the measures demonstrated low reliability and questionable construct validity. In part, this speaks to the state of measurement in attachment, coping, and health psychology (Stein et al., 1998; Endler et al., 1993; Sarafino, 1997). The measures chosen were among the best available. In the case of the health behaviour measure, it was the *only* published instrument of its kind. Efforts were made to use instruments which were context specific and had been factor analyzed. Some of the instruments were reworded for the cancer context but the properties remained comparable with the originals.

The RQ was divided into statements and reworded for the cancer context. Its psychometric properties were similar to the RQ paragraph format and the RSQ. It seemed to possess convergent and divergent validity insofar as models of self and other were related to distress, coping and healthful behaviours in theoretically predicted ways.

The measure of illness appraisals was problematic. Consequently, the relationships between the variables of interest in the model could not be tested adequately. Tests of one of the hypotheses were conducted using a single IMIQ item. Although single item measures can be very good, they are vulnerable to systematic error and may be unreliable. Internal consistency for three of the four subscales was poor and could not be analyzed as planned. There is abundant evidence to suggest that individuals perceive illness along the dimensions of the IMIQ (e.g., Lau & Hartman, 1983), but the IMIQ requires reworking and cross-validation before it can be considered a useful instrument (Schiaffino & Crea, 1995).

In the present cancer sample, the WOC-CA (Dunkel-Schetter et al., 1992) had reasonable psychometric properties. Two subscales were combined to create a measure of emotion/avoidant coping. WOC-CA subscales were quite highly intercorrelated, suggesting problems with discriminant and factorial validity (Nunnally & Bernstein, 1998). The overlap makes it difficult to conclude that attachment dimensions are associated with characteristic coping patterns. In the present study, the subscales were differentially related to the measures of interest in theoretically predicted directions. For example, emotion/avoidant coping was strongly and positively related to emotional distress, whereas seeking and using social support was not.

There were problems with measuring the behavioural outcomes. The subscales were re-specified but psychometric properties did not improve. Based on previous research, it was expected that working models of attachment would be related to healthful and risk behaviours, mediated by distress, appraisal and coping. None of the predictions was supported. The HBS had been subjected to confirmatory factor analysis and cross-validated but did not perform well in this sample. The validation sample consisted of military recruits and navy personnel; a very

different sample to colorectal cancer patients. Recently Wasylikiw and Fekken (2000) used the measure with a student sample and reported reliabilities slightly higher to those of the present study. Similar to the results from the present study, risk taking behaviours had poor reliability (coefficient alpha = .48). Many of the items on the HBS may have been irrelevant to assessing health-related behaviours in a medical population (e.g., accident control items). Health behaviour measures should be constructed that are specific to the purpose of the study and intended population.

Finally, self-report was used in this study. Participants may have attempted to present themselves favourably, especially with respect to healthful and risk behaviours. Most people have a reasonable sense of what is healthy behaviour (at least with respect to smoking, overuse of alcohol and exercise), and given the treatment setting, there may have been a reluctance to be forthcoming on the questionnaires. It may also be the case that attachment styles are differentially vulnerable to social desirability biases in reporting health behaviours (Scharfe & Eldredge, in press). For example, those with a negative other model may expect criticism and be less likely to admit to poor health behaviours. The inclusions of a measure of social desirability could have addressed these issues.

Future Directions

The present project served as a preliminary step in integrating attachment and stress and coping theory within the framework of Collins' and Read's model. An unexpected finding in this study, which should be further explored, were the differences between colon and rectal cancer patients on many of the variables of interest. These groups are comparable medically but may not be as psychologically similar as they were believed to be. Future researchers should

consider recruiting them separately, or at least balancing the numbers of each type so that their responses could be analyzed adequately.

There is abundant research to suggest that attachment models are relevant in predicting behaviour in interpersonal situations. The study of attachment in the context of stress is less well-established but findings suggest that models are good global predictors. In order to advance theory, future research should look beyond global, descriptive relationships. For example, including measures of model of self and self-esteem under both at both general and more domain-specific levels could provide evidence for divergent and criterion-related validity. In the case of model of other, its relationship to social support should be investigated in more detail. Social support is a multi-dimensional construct which includes perceptions of instrumental and emotional support, satisfaction with that support and support seeking behaviours. Model of other may be differentially related to these aspects. Understanding of the moderating relationships between model of self and other may also be advanced by such investigations.

Psychometrically valid measures are lacking. Cognitive appraisal, coping and health-related behaviours could not be adequately assessed. Leventhal et al.'s (e.g., 1984) conceptualization of common-sense models of illness, wherein individuals appraise illness across four dimensions (symptoms/disease label, disease consequences, disease course, disease cause), fits well with the work of Lazarus and Folkman (e.g., 1984) and has potential for predicting health-related outcomes. Respecification of the IMIQ, or the development of a new instrument based on Leventhal is important to the further exploration of these ideas. Appraisal is a critical component of the Collins and Read (1994) model (as it is in stress and coping theory) and requires adequate measurement. In lieu of measuring Leventhal's dimensions, the Folkman et al.

(1986) measure of cognitive appraisal (i.e., threat versus challenge) may be useful. Coping measures with more distinct factorial validity are required to provide clearer information about the relationships between specific coping strategies and specific adaptational outcomes. Unfortunately, measurement strategies have not been well-developed in the health behaviour domain. Future instruments must be context specific and relevant to the assessment.

Results from the present study suggested that working models of attachment were meaningfully related to constructs from health psychology in a well-defined medical sample. In order to better understand the impact of threat on attachment processes, a next step would be to explore the model across different illness populations or levels of severity of illness. A longitudinal study with different illness groups would provide a valid test of Bowlby's contention that attachment processes are most relevant under conditions of threat.

Finally, the large body of research on attachment in close relationships would be enhanced by assessing interpersonal functioning under conditions of a health threat. Serious health conditions impact not only the patient but his or her significant relationships. Given that model of other was implicated in the degree to which patients in this study reported seeking support, it would be interesting to look at the working models of their partners. There is likely an interaction between the models of both partners. It may be that partners' working models influence their abilities to be supportive when their significant other is seriously ill which may, in turn, impact the patient's self-care behaviours.

Based on findings from the present project and other studies, attachment dimensions are promising theoretical constructs in predicting individuals' cognitive, emotional and behavioural responses in stressful situations, such as health threats. Use of a longitudinal design with one or

more control-groups would provide the most comprehensive test of the Collins and Read (1994) model. Given sufficient sample size, the potential moderating functions of model of self and other on coping, distress and relevant behavioural outcomes may have emerged. With a larger sample, the data could be analyzed using a structural modelling procedure. Alternate models could be proposed and their fit to the data examined. Results from studies incorporating some of the strategies described above would advance the theory and methods of both attachment and stress and coping domains.

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APPENDICES

APPENDIX A

**DISEASE STAGING FORM
SITE: COLON AND RECTUM**

INSTRUCTIONS:

As per ORCC policy, disease staging is required for all new registered diseases within 3 months of initial registration. Please a tick in the appropriate clinical or pathological columns to indicate the appropriate T, N & M codes and Staging Grouping and Grade codes if applicable. Please indicate on the diagram on the reverse side, primary tumor and regional nodes involved.

CHRONOLOGY OF CLASSIFICATION:

CLINICAL (Use all data prior to first treatment)

PATHOLOGIC (if definitely resected specimen available)

DEFINITIONS

Date of Diagnosis: _____

- Primary Tumor (T)**
- TX Primary tumor cannot be assessed
 - T0 No evidence of primary tumor
 - Tis Carcinoma *in situ*: intraepithelial or invasion of lamina propria
 - T1 Tumor invades submucosa
 - T2 Tumor invades muscularis propria
 - T3 Tumor invades through muscularis propria into subserosa, or into nonperitonealized pericolic or perirectal tissues
 - T4 Tumor directly invades other organs or structures, and/or perforates visceral peritoneum
- Lymph Node (N)**
- NX Regional lymph nodes cannot be assessed
 - N0 No regional lymph node metastasis
 - N1 Metastasis in 1 to 3 pericolic or perirectal lymph nodes
 - N2 Metastasis in 4 or more pericolic or perirectal lymph nodes
 - N3 Metastasis in any lymph node along course of a named vascular trunk, and/or metastasis to apical node(s) (when marked by the surgeon)

- Distant Metastasis (M)**
- MX Presence of distant metastasis cannot be assessed
 - M0 No distant metastasis
 - M1 Distant metastasis

Stage Grouping				Dukes	TNM
<input type="checkbox"/>	<input type="checkbox"/>	Stage 0	Tis N0 M0		
<input type="checkbox"/>	<input type="checkbox"/>	Stage I	T1 N0 M0	A	T ₁
			T2 N0 M0		T ₂
<input type="checkbox"/>	<input type="checkbox"/>	Stage II	T3 N0 M0	B ₁	II ₁
			T4 N0 M0	B ₂	II ₂
<input type="checkbox"/>	<input type="checkbox"/>	Stage III	Any T N1 M0	C ₁	III ₁
			Any T N2 M0	C ₂	III ₂
			Any T N3 M0	C ₃	III ₃
<input type="checkbox"/>	<input type="checkbox"/>	Stage IV	Any T Any N M1	D	IV

- Histopathologic Grade (G)**
- GX Grade cannot be assessed
 - G1 Well differentiated
 - G2 Moderately differentiated
 - G3 Poorly differentiated
 - G4 Undifferentiated

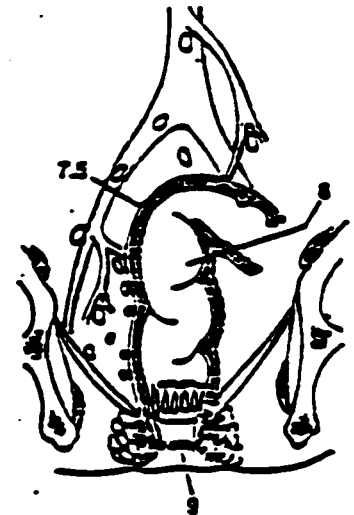
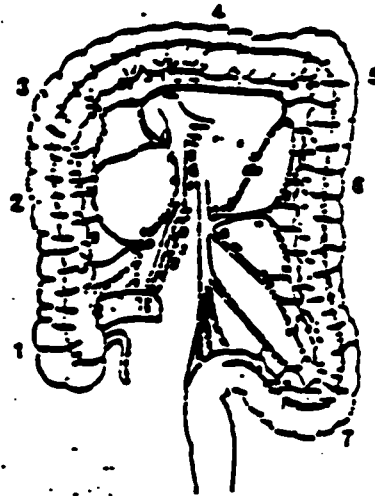
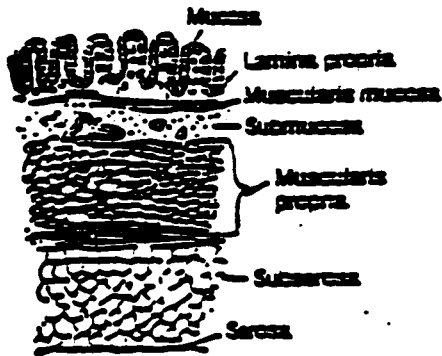
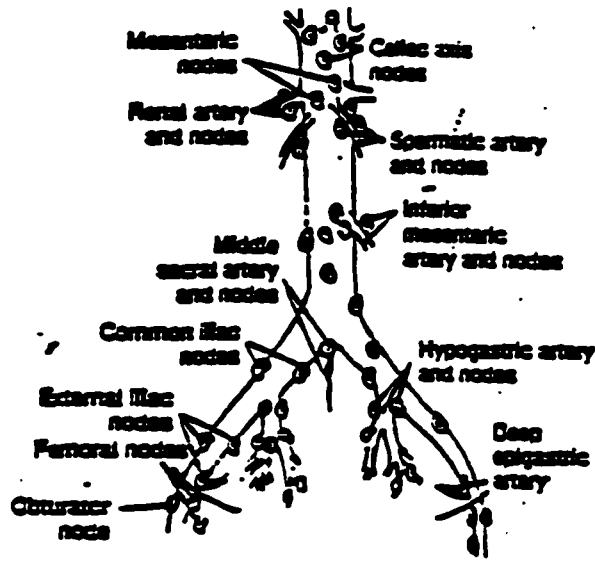
Histopathologic Type

This staging classification applies to all carcinomas that arise in the colon and rectum appendix.

- Adenocarcinoma *in situ*
- Adenocarcinoma
- Mucinous adenocarcinoma
- Signet cell carcinoma
- Squamous cell carcinoma
- Small cell carcinoma
- Undifferentiated carcinoma
- Carcinoma, NOS

Colon and Rectum (continued)

Illustrations



For anatomic areas corresponding to numbers, see list below. Indicate on diagram primary and regional nodes involved.

Anatomic Areas of Colon and Rectum

- | | | | |
|----|------------------|-----|------------------|
| 1. | Cecum | 6. | Descending colon |
| 2. | Ascending colon | 7. | Sigmoid |
| 3. | Hepatic flexure | 7.5 | Rectosigmoid |
| 4. | Transverse colon | 8. | Rectum |
| 5. | Splenic flexure | | |

Completed By
(Attending Oncologist)

Date

APPENDIX B

PATIENT CONSENT FORM

CONSENT/INFORMATION FORM

We would like you to participate in a study about how people view and adapt to the diagnosis and treatment of cancer. This investigation is being conducted by the School of Psychology at the University of Ottawa and the Department of Psychology at the Ottawa Hospital, General and Civic Campuses.

The purpose of this study is to gain a better understanding of the experience of cancer patients undergoing treatment. If you agree to participate, you will be asked to complete a package of questionnaires which ask you about how you view your illness, how you are feeling following your diagnosis and surgery. They will also ask about the types of everyday activities you engage in which you find helpful in dealing with cancer. The questionnaires will take approximately 45 minutes of your time to complete and are confidential.

In addition to completing the questionnaires, we also ask that you permit members of the research team to have access to your medical file for information relevant to this research project. All medical information will be kept **STRICTLY CONFIDENTIAL**.

There are no risks to you if you participate and the benefits of the information you provide will increase our knowledge about the experience of cancer patients that may eventually be used to help other patients cope better with the disease.

Please read the following paragraph and, if you agree to participate, please sign below.

I understand the information I give will be regarded as confidential and the results of the study will not identify me, personally, as a participant. I have been assured that my participation in this study is totally voluntary and that I may withdraw from participation at any time. I understand that if I decide not to participate my treatment will not be affected in any way.

In the event that I have concerns or complaints about this study, I have been told that I may express my concern to Jane Gayton, Department of Psychology (737-8628) or Dr. S. Colletta, Director of Psychology, Ottawa Hospital (737-8039). I may also contact the Research Ethics Board of the Ottawa Hospital at 737-8930.

Thank you for your interest in taking part!

Signed _____ Date _____

Investigator _____ Date _____

APPENDIX C

PATIENT INFORMATION FORM

GENERAL INFORMATION FORM

Please complete the following general information sheet. Please note that this information is confidential, do not include your name.

Where did you complete these questionnaires

At home _____

At the clinic _____

Other (please specify) _____

Today's date: _____

1. Date of birth: _____

What is your present or most recent occupation?

2. Male _____

Female _____

3. Relationship status
_____ single (never married)

_____ common-law

_____ married

_____ divorced

_____ widowed

6. Which type of cancer have you been diagnosed with?

_____ breast cancer

_____ colon/rectal

_____ prostate

4. Highest level of education

_____ elementary

_____ some high school

_____ high school graduate

_____ some post-secondary

_____ college/university

_____ post-graduate

7. When were you diagnosed with cancer (indicate date if possible)?

8. On what date did you have your surgery?

5. Present employment status
_____ currently working/student

_____ unemployed

_____ disability leave

_____ retired

9. Since you have been diagnosed with cancer, have you visited a naturopath or alternative medicine practitioner? (If yes, approximately how often?)

_____ yes _____ no

How often? _____

10. Have you ever cancelled or postponed (for any reason) a treatment session or

a check-up at the Cancer Clinic.
(If yes, approximately how often?)

_____yes _____no
How often? _____

Since your cancer diagnosis, have any of the health care personnel that you have seen suggested to you that you should modify any of the health behaviours below?

- | | |
|--|--|
| 1. Eat a balanced diet
_____yes _____no | 6. Do regular aerobic or strenuous exercise
_____yes _____no |
| 2. Limit food additives and preservatives
_____yes _____no | 7. Participate in recreational activities
_____yes _____no |
| 3. Limit intake of sugar and fats
_____yes _____no | 8. Avoid excess use of alcohol
_____yes _____no |
| 4. Take vitamins
_____yes _____no | 9. Avoid smoking
_____yes _____no |
| 5. Watch or lose weight
_____yes _____no | |

If the behaviour changes were suggested to you, have you been able to make these changes and which behaviour did you change?

_____yes I changed _____behaviour(s)

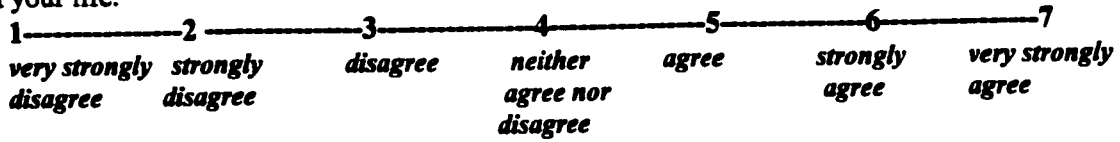
_____no, I haven't made any changes

APPENDIX D

RELATIONSHIP QUESTIONNAIRE

RELATIONSHIP QUESTIONNAIRE

On the scale below, please **CIRCLE** the degree to which the following statements describe you at this point in your life.



- | | |
|--|--|
| <p>1. Despite the demands of my illness, it is easy for me to be emotionally close to others
1 2 3 4 5 6 7</p> <p>2. Despite the demands of my illness, I am comfortable depending on others
1 2 3 4 5 6 7</p> <p>3. Despite the demands of my illness, I am comfortable having others people depend on me.
1 2 3 4 5 6 7</p> <p>4. Despite my health problems, I don't worry about being alone
1 2 3 4 5 6 7</p> <p>5. Despite my health problems, I don't worry about other people not accepting me
1 2 3 4 5 6 7</p> <p>6. During this time in my life, I want to be completely emotionally intimate with others
1 2 3 4 5 6 7</p> <p>7. During this time in my life, I find others are reluctant to get as close as I would like
1 2 3 4 5 6 7</p> <p>8. During this time in my life, I am uncomfortable being without close relationships
1 2 3 4 5 6 7</p> <p>9. During this time in my life, I worry that other people don't value me as much as I value them
1 2 3 4 5 6 7</p> | <p>10. During this time in my life, I am uncomfortable getting close to others.
1 2 3 4 5 6 7</p> <p>11. During this time in my life, I want emotionally close relationships but I find it difficult to trust others
1 2 3 4 5 6 7</p> <p>12. During this time in my life, I find it difficult to depend on others
1 2 3 4 5 6 7</p> <p>13. During this time in my life, I worry that I will be hurt if I allow myself to become too close to other people
1 2 3 4 5 6 7</p> <p>14. During this time in my life, I am comfortable without close emotional relationships.
1 2 3 4 5 6 7</p> <p>15. During this time in my life, It is very important to me to feel independent and self-sufficient
1 2 3 4 5 6 7</p> <p>16. During this time in my life I prefer not to depend on others
1 2 3 4 5 6 7</p> <p>17. During this time in my life, I prefer not to have others depend on me
1 2 3 4 5 6 7</p> |
|--|--|

APPENDIX E

IMPLICIT MODELS OF ILLNESS QUESTIONNAIRE

IMIQ

Please respond to the following statements about your experience with cancer. Put an "X" in the most appropriate space to show how much you agree or disagree with the statement.

1. My cancer is controllable

strongly agree: _____: strongly disagree

2. My cancer requires medical attention

strongly agree: _____: strongly disagree

3. My cancer is chronic (long lasting) rather than acute (short lived)

strongly agree: _____: strongly disagree

4. My cancer is disabling

strongly agree: _____: strongly disagree

5. My cancer is caused by changes in the weather

strongly agree: _____: strongly disagree

6. My cancer is painful

strongly agree: _____: strongly disagree

7. The symptoms of my cancer are similar to the common cold

strongly agree: _____: strongly disagree

8. My cancer is permanent rather than temporary

strongly agree: _____: strongly disagree

9. My cancer is cured by reducing stress

strongly agree: _____: strongly disagree

10. My cancer is caused by stress or nerves

strongly agree: _____: strongly disagree

11. My cancer will go away on its own

strongly agree: _____: strongly disagree

12. My cancer is caused by my behaviour

strongly agree: _____: strongly disagree

13. My cancer is cured by proper eating habits

strongly agree: _____: strongly disagree

14. I can control my cancer

strongly agree: _____: strongly disagree

15. The presence of my cancer is related to something that I did

strongly agree: _____: strongly disagree

16. My cancer is contagious

strongly agree: _____: strongly disagree

17. My cancer is caused by germs or viruses
strongly agree: _____: disagree strongly

18. My cancer is caused by lack of rest
strongly agree: _____: disagree strongly

19. My cancer is serious
strongly agree: _____: disagree strongly

20. My cancer is likely to come back
strongly agree: _____: disagree strongly

21. My cancer is changeable
strongly agree: _____: disagree strongly

22. My cancer is caused by a poor diet
strongly agree: _____: disagree strongly

23. My cancer changes over time
strongly agree: _____: disagree strongly

24. My cancer is cured by physical exercise
strongly agree: _____: disagree strongly

25. My cancer is cured by rest
strongly agree: _____: disagree strongly

26. My cancer is curable
strongly agree: _____: disagree strongly

27. My cancer has serious consequences for me
strongly agree: _____: disagree strongly

28. My cancer requires hospitalization
strongly agree: _____: disagree strongly

29. My cancer can be cured by medication
strongly agree: _____: disagree strongly

30. My cancer could be avoided
strongly agree: _____: disagree strongly

31. My cancer affects many parts of my body
strongly agree: _____: disagree strongly

32. The symptoms of my cancer are constant
strongly agree: _____: disagree strongly

33. No one is responsible for the start of my cancer
strongly agree: _____: disagree strongly

APPENDIX F

PROFILE OF MOOD STATES

APPENDIX G

WAYS OF COPING WITH CANCER

WAYS OF COPING WITH CANCER

Of the following problems listed below, please **CIRCLE** the one which has been most difficult for you. If none applies, please choose your own and briefly describe it in the space below.

- (a) fear and uncertainty about the future due to cancer
- (b) limitations in physical ability, appearance or life style due to cancer
- (c) acute pain, symptoms, or discomfort from illness or treatment
- (d) problems with family or friends related to cancer treatment

(e) other, please describe _____

Since your diagnosis, how stressful has this problem been for you?

1	2	3	4	5
not at all stressful				extremely stressful

WAYS OF COPING WITH CANCER

When we experience stress in our lives, we usually try to manage it by trying out different ways of "coping". Sometimes our attempts are successful in helping us solve a problem, and other times they are not.

The next set of items concerns the ways of coping you may have used in trying to manage the most stressful part of your cancer. **Please read each item below and indicate *how often you tried this* since your cancer diagnosis in attempting to cope with the specific problem circled above.**

	never (not applicable)	rarely	sometimes	often	very often
1. Concentrated on the next step	0	1	2	3	4
2. The only thing to do was to wait	0	1	2	3	4
3. Did something just to do something	0	1	2	3	4
4. Talked to someone to find out more	0	1	2	3	4
5. Criticized or lectured myself	0	1	2	3	4
6. Tried not to close off options	0	1	2	3	4
7. Hoped a miracle would happen	0	1	2	3	4
8. Went along with fate	0	1	2	3	4
9. Went on as if nothing was happening	0	1	2	3	4
10. Tried to keep my feelings to myself	0	1	2	3	4
11. Looked for the silver lining, looked on the bright side	0	1	2	3	4
12. Slept more than usual	0	1	2	3	4
13. Tried for sympathy or understanding	0	1	2	3	4
14. Was inspired to be creative	0	1	2	3	4
15. Tried to forget the whole thing	0	1	2	3	4
16. Tried to get professional help	0	1	2	3	4
17. Changed or grew as a person in a good way	0	1	2	3	4

Ways of Coping with Cancer page 3

		never (not applicable)	rarely	sometimes	often	very often
18.	Waited to see what would happen before acting	0	1	2	3	4
19.	Made a plan of action and followed it	0	1	2	3	4
20.	Let my feelings out somehow	0	1	2	3	4
21.	Came out of the experience better than before	0	1	2	3	4
22.	Talked to someone who could do something	0	1	2	3	4
23.	Tried to make myself feel better by eating, drinking, smoking or drug use	0	1	2	3	4
24.	Took a big chance and did something risky	0	1	2	3	4
25.	Tried not to act too hastily	0	1	2	3	4
26.	Found new faith	0	1	2	3	4
27.	Rediscovered what is important in life	0	1	2	3	4
28.	Change something so things will turn out	0	1	2	3	4
29.	Avoided being with people	0	1	2	3	4
30.	Didn't let it get to me; refused to think about it	0	1	2	3	4
31.	Asked a friend or relative for advice	0	1	2	3	4
32.	Kept others from knowing how bad things were	0	1	2	3	4
33.	Made light of it; refused to get too serious	0	1	2	3	4
34.	Talked to someone about how feeling	0	1	2	3	4
35.	Took it out on other people	0	1	2	3	4
36.	Drew on past experience from similar situations	0	1	2	3	4

Ways of Coping with Cancer page 4

	never (not applicable)	rarely	sometimes	often	very often
37. Knew what had to be done, so I tried harder	0	1	2	3	4
38. Refused to believe it would happen	0	1	2	3	4
39. Came up with different solutions	0	1	2	3	4
40. Tried to keep my feelings from interfering	0	1	2	3	4
41. Changed something about myself	0	1	2	3	4
42. Wished the situation would go away or be over	0	1	2	3	4
43. Had fantasies/wishes about how it might turn out	0	1	2	3	4
44. Prayed	0	1	2	3	4
45. Prepared for the worst	0	1	2	3	4
46. Went over in my head what I should say or do	0	1	2	3	4
47. Thought of how a person I admire would react	0	1	2	3	4
48. Reminded myself how much worse things could be	0	1	2	3	4
49. Tried to find out as much as I could	0	1	2	3	4
50. Treated the illness as a challenge	0	1	2	3	4
51. Depended mostly on others to handle things	0	1	2	3	4
52. Lived one day at a time/took one step at a time	0	1	2	3	4

Please describe any other method of coping that you have used besides those mentioned

APPENDIX H

HEALTH BEHAVIOR MARKER SCALES

LIFESTYLE ACTIVITIES QUESTIONNAIRE

Please indicate on the following scale how much you agree with the statements. Answer the statements for the time period *since your cancer diagnosis*

1. I eat a healthy diet

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

2. I get enough sleep

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

3. I keep emergency numbers by the phone

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

4. I choose my spare time activities to help me relax

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

5. I take chances when crossing the street

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

6. I have a first aid kit in my home

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

7. I destroy old or unused medications

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

8. I see a doctor for regular checkups

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

9. I pray or live by principles of religion

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

10. I avoid getting chilled

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

11. I watch my weight

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

12. I carefully obey traffic rules so I won't have accidents

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

13. I watch for signs of major health problems

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

14. I exercise to stay healthy

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

15. I cross the street against the stop light

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

16. I avoid high crime areas

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

17. I don't smoke

- 1 2 3 4 5
strongly disagree neutral agree strongly agree
18. **I don't take chemical substances which might injure my health (e.g., food additives, drugs, stimulants)**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
19. **I check the condition of electrical appliances, the car etc., to avoid accidents**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
20. **I stay away from places where I might be exposed to germs**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
21. **I fix broken things around my house right away**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
22. **I see a dentist for regular checkups**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
23. **I limit my intake of foods like coffee, sugar, fats, etc.**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
24. **I avoid over-the-counter medications**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
25. **I take vitamins**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
26. **I do not drink alcohol**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
27. **I wear a seat belt in the car**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
28. **I cross busy streets in the middle of the block**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
29. **I avoid areas with high pollution**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
30. **I discuss health with friends, neighbours and relatives**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
31. **I gather information on things that affect my health by watching television and reading books, newspapers, or magazine articles**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree
32. **I use dental floss regularly**
- 1 2 3 4 5
strongly disagree neutral agree strongly agree

33. I speed while driving

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

38. I take more chances doing things than the average person

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

34. I brush my teeth regularly

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

39. I drive after drinking

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

35. I take health food supplements (e.g., ginko bilboa, ginseng, lecithin etc)

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

40. I engage in activities or hobbies where accidents are possible (e.g., motorcycle riding, skiing, using power tools, etc.)

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

36. I learn first aid techniques

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

37. I get shots to prevent illness

1	2	3	4	5
strongly disagree	disagree	neutral	agree	strongly agree

APPENDIX I

PHYSICAL SYMPTOM REPORTS

SYMPTOM EXPERIENCES

The following is a list of unpleasant physical effects that you may have experienced due to your illness, medication, or some other cause since your diagnosis.

PLEASE CIRCLE HOW OFTEN YOU HAVE EXPERIENCED THESE PROBLEMS IN THE PAST 4 WEEKS

		Never	Seldom	Sometimes	Often	Always
1.	bleeding	1	2	3	4	5
2.	chills	1	2	3	4	5
3.	fever	1	2	3	4	5
4.	hair loss	1	2	3	4	5
5.	loss of appetite	1	2	3	4	5
6.	nausea	1	2	3	4	5
7.	pain	1	2	3	4	5
8.	skin irritation	1	2	3	4	5
9.	susceptibility to infection	1	2	3	4	5
10.	tiredness	1	2	3	4	5
11.	vomiting	1	2	3	4	5
12.	weakness	1	2	3	4	5

Please circle how difficult, on average, these symptoms have been for you

- | | | | | |
|-------------------|---------------------|-------------------|--------------------|------------------|
| 1 | 2 | 3 | 4 | 5 |
| not at all | a little bit | moderately | quite a bit | extremely |

APPENDIX J

TESTS OF ASSUMPTIONS FOR STATISTICAL TESTS

*Details of Statistical Assumption testing**Hypothesis 1***a. Stressfulness**

Substitution with the sample mean was employed for two cases with missing values on the dependent variable and one case missing self and other scores. The final sample size was 70. The ratio of cases to independent variables was 23:1, above the 10 to 15 participants to each variable as recommended by Stevens (1996). No univariate or multivariate outliers were identified. Inspection of scatterplots and standardized residuals suggested that assumptions of linearity and normality were met. There was no evidence for redundant relationships between predictor variables.

b. IMIQ19

Substitution with the sample mean was employed for one case with missing values on the dependent variable and the case with missing self and other scores. No univariate or multivariate outliers were identified. The final sample size was 70, adequate to test a multiple regression equation with three predictors. Inspection of scatterplots and standardized residuals suggested that assumptions of linearity and normality were met. There was no evidence for redundant relationships between predictor variables.

c. IMIQ27

Substitution with the sample mean was employed for one case with missing values on the dependent variable and the case with missing self and other scores. No univariate or multivariate outliers were identified. The final sample size was 70. Inspection of scatterplots and standardized residuals suggested that assumptions of linearity and normality were met. There was no evidence for redundant relationships between predictor variables.

Hypothesis 2.

One case was missing values on the attachment measure. No univariate outliers were found. Two bivariate outliers were identified and removed. No multivariate outliers were identified. Final sample size was 68. The scatterplots and plots of residuals suggested that the variables were reasonably linear and normally distributed. There was no evidence for multicollinearity or singularity.

Hypothesis 3.

One case was missing for the attachment measure and was substituted using the sample mean. No univariate outliers were identified. Two bivariate outliers were found. Analysis of their effects on the data suggested that they should be removed. Mahalanobis' distance revealed the presence of two multivariate outliers These were removed. The final sample size was 67. After removal of outlying cases, the variables were normally distributed and reasonably linear. There were no redundant relationships between independent variables.

Hypothesis 4.

Sample mean substitution was employed for two cases missing scores on personal responsibility and for one case missing model of self scores. There were no univariate outliers any of the variables. Mahalanobis distance estimates and the examination of standardized residuals suggested that there were no multivariate outliers. The final sample size was 70 which was adequate for a model with four predictor variables. Inspection of bivariate scatterplots and standardized residuals indicated no substantial deviation from normality. There were no redundant relationships between independent or mediator variables.

Hypothesis 5.

Two cases were missing for risk taking behaviours, one case was missing model of self and one case was missing for the distress measure. In the regression analyses the values were imputed with the sample means. No case exceeded $z = |3.29|$ on any of the variables of interest. Five multivariate outliers

were identified through examination of scatterplots and were removed from the analysis. Final sample size was 66. Plots of standardized residuals indicated that the distribution was reasonably linear. There was no evidence for multicollinearity or singularity among the variables.

Hypothesis 6.

Two cases were missing on risk taking, one on model of other and one on the emotional distress measure. No case exceeded $z = |3.29|$ on any of the variables. Four multivariate outliers were identified and removed. The final sample size for this analysis was 66. Assumptions of linearity, multicollinearity and singularity were met.

Hypothesis 7.

One case was missing scores on model of other and one case was missing on the distress measure (POMS total score). These values were substituted using the sample mean. Examination of standard scores revealed no univariate outliers. Inspection of scatterplots and standardized residuals suggested that there were four multivariate outliers. These cases were removed. The final sample size was 67, sufficient for testing a regression model with three predictor variables. The variables were normally distributed and reasonably linear.