COGNITIVE AND BEHAVIOURAL RESPONSES TO ILLNESS INFORMATION

IN HEALTH ANXIETY

by

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Abstract

A cognitive-behavioural theory (CBT) has been put forth to explain hypochondriasis and less extreme forms of health anxiety (Warwick & Salkovskis, 1990). The extent to which less extreme forms of health anxiety are relevant for understanding illness behaviour remains unclear, however. Further, the independence of health anxiety from a more general construct of negative affectivity, as well as response styles is not known. The CBT of health anxiety predicts that in response to illness information health anxious individuals will show a characteristic cognitive (e.g., attend to and misinterpret information) and behavioural (e.g., avoidance and reassurance seeking) response. Although the predictions are supported by clinical observations, rigorous and systematic contrasts of health anxious and non-health anxious individuals to the same objective health related information have not yet been carried out. Further, there are a number of additional issues that need to be clarified with respect to the theory, including: (a) Are there additional cognitive and behavioural responses involved in health anxiety not predicted by the CBT?; (b) Are health anxious individuals deficient in there use of certain adaptive responses to illness information?; and (c) Are the cognitive and behavioural responses shown by health anxious individuals moderated under certain circumstances?

In the present study, students scoring either within normal or nonclinically high ranges on a measure of health anxiety underwent a physiological test ostensibly examining risk for medical complications and were randomly assigned to receive positive, negative, or ambiguous test results. They then underwent a cold pressor task ostensibly to examine physiological activity and were asked questions tapping their responses to the diagnostic information and painful procedure. They were also judged for facial expressiveness.

Unmistakable support was found for a dysfunctional cognitive (e.g., negative interpretational focus) and behavioural (e.g., reassurance seeking) response style among health anxious individuals. Little support was found for either cognitive or behavioural avoidance in health anxiety. Not anticipated by the CBT, as time went on health anxious individuals became more expressive of their pain; this may have important implications, since increased expressiveness could result in an increase in the felt emotional experience. Adding to the CBT, evidence was found to suggest that health anxious individuals may have a deficit or be deficient in their use of a positive concrete somatic monitoring strategy. Finally, the results suggested that there are statistically and clinically significant differences among nonclinically health anxious individuals and normals that can not be accounted for by differences in negative affectivity or response styles.

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Introduction

A cognitive-behavioural theory (CBT) of hypochondriasis has been proposed recently (Warwick &

Salkovskis, 1990). This theory attempts to account for the development and maintenance of hypochondriasis, as

well as less extreme forms of health anxiety (Salkovskis & Warwick, 1986). The model takes a dimensional view

of hypochondriasis which suggests that patterns of behaviour associated with hypochondriasis can be represented

along a continuum. Individuals scoring at one end of the continuum are characterized as having little or no

anxiety about their health, whereas those scoring at the other end of the continuum are characterized as being

health anxious and often hypochondriacal (Hitchock & Mathews, 1992).

Hypochondriasis, or health anxiety in its extreme form, has tended to be the focus of research and

clinical attention. As a result, the extent to which health anxiety in its less extreme forms is relevant for

understanding illness related behaviour is not yet well understood. It is expected that health anxiety, even its

lesser forms, will dictate when individuals will seek medical attention, as well as how they will respond to illness

related cues, such as bodily sensations and diagnostic test results.

One question regarding health anxiety that has not been addressed adequately in the literature is how

health anxiety differs from non-specific negative affectivity. Negative affectivity is defined as "a broad

dimension of individual differences in the tendency to experience negative, distressing emotions and to possess

associated behavioral and cognitive traits" (Costa & McCrae, 1987, p. 301). Negative affectivity like health

anxiety is associated with subjective health complaints (Costa & McCrae, 1987). Examining differences between

the constructs of health anxiety and negative affectivity is especially important when studying health anxiety as a

continuous dimension as compared to a discrete psychiatric category. It is quite possible that when studying

lesser forms of health anxiety, differences among health anxious and non-health anxious can be more readily

explained by differences in negative affectivity, in general. The CBT proposes that negative affect will be related

to health anxiety and may actually serve to exacerbate health anxiety, but can not on its own explain findings

concerning health anxiety (Warwick & Salkovskis, 1990).

A further question that has not been addressed in the literature is whether commonly observed

differences between health anxious and non-health anxious individuals can be accounted for by differences in

response styles, such as the self-deceptive and impression management response styles proposed by Paulhus

(1988). Self deception refers to honest but positively biased reports, whereas impression management refers to

the deliberate positive self-presentation to an audience (Paulhus, 1991). The construct of health anxiety would be seriously questioned, and thus theories of health anxiety, if response styles could account for findings concerning health anxiety.

The CBT of health anxiety takes the position that cognitive variables play a primary role in the development of health anxiety, but behavioural, and physiological factors, in addition to cognitive factors, serve to maintain and exacerbate the condition (Hitchcock & Mathews, 1992; Warwick & Salkovskis, 1990). Cognitively, high health anxiety is believed to be associated with an attentional bias to notice illness related information, and an interpretative bias to misinterpret information in a catastrophic and personally threatening manner. Behaviourally, individuals who show high health anxiety are expected to attempt to avoid illness related information whenever possible. When this is not possible, however, in order to reduce their anxiety, health anxious individuals are expected to seek reassurance that they are still in good health via symptom checking or seeking medical attention. Interestingly, clinical observations (Salkovskis & Warwick, 1986) suggest that although reassurance may help temporarily to reduce health anxiety, it frequently exacerbates the condition in the long run by providing individuals with even more health related information to be misinterpreted. In effect, then, under some circumstances, health anxious individuals are expected to show avoidance behaviour, whereas under other circumstances they are expected to show approach behaviour (e.g., reassurance seeking). Finally, physiologically, health anxiety is expected to be associated with increased arousal, which in turn is expected to be misinterpreted frequently by the health anxious individual as confirming illness.

The predictions of the CBT are primarily based on clinical observations and questionnaire studies which suggest that health anxious individuals have more fears and false beliefs than non-health anxious individuals (e.g., Kellner, Abbott, Winslow, & Pathak, 1987). Although both sources of information support the CBT, more direct support in favor of the theory is needed. Very little rigorous and systematic experimental research has been carried out to study how health anxious and non-health anxious individuals respond or cope when confronted with the same illness related information. This is especially true of the cognitive and behavioural responses of health anxious individuals to illness related information, and thus these response systems are the focus of the present research.

In general, the predictions of the CBT are global and a number of questions remain to be answered. The model, for instance, tends to emphasize the role of dysfunctional cognitive and behavioural patterns in

exacerbating and maintaining health anxiety. No attention has been given to the possibility that health anxious individuals may have a deficit or be deficient in the use of adaptive and functional response patterns. In others words, deficits or deficiencies in adaptive patterns may contribute to the problem of health anxiety as well.

This raises the question of what is an adaptive response? It would seem that what is considered to be adaptive will vary depending on the type of illness information the individual is confronted with. Recent studies of non-health anxious individuals have studied response patterns which seem to protect individuals from health anxiety when confronted with diagnostic test results. Researchers, for example, have explored the way in which samples of normal undergraduates respond to either positive, negative or ambiguous diagnostic test results (Cioffi, 1991a; Croyle & Sande, 1988; Jemmott, Ditto, & Croyle, 1986; McCaul, Thiesse-Duffy, & Wilson, 1992). Individuals who receive clear no-disease diagnoses tend to accept test results at face value and have no doubt about the test's validity (Jemmott, Croyle, & Ditto, 1986). With respect to this finding, researchers have commented on how this response pattern appears to protect the individual from health anxiety (Cioffi, 1991a). Individuals who receive a clear-disease diagnosis also show a number of self protective responses. On the one hand, they tend to deny having the disease by minimizing the seriousness of the condition and seriously doubting the validity of the test results (Ditto et al., 1988). On the other hand, they report more symptoms related to the disease over the past month suggesting they are seeking to confirm the disease (Croyle & Sande, 1988). They also report more problem focused coping suggesting they are taking the possibility of having a disease quite seriously (McCaul et al., 1992). It has been suggested that minimizing the seriousness of the disease is adaptive since it allows individuals to remain calm and engage in problem focused coping. Although some research (Cioffi, 1991a) has examined how individuals respond to ambiguous test results, this research is difficult to interpret given the nature of the ambiguous diagnostic feedback that was actually given.

The CBT has ignored the possibility that along with dysfunctional response patterns, health anxiety may be exacerbated by the absence of adaptive response patterns. In the above example, health anxious individuals' coping efforts may be compromised because they do not readily dismiss negative findings, or deny the seriousness of positive test results in order that they can more effectively apply problem focused coping strategies. In these instances, health anxiety may be exacerbated not so much by what health anxious individuals are doing, but by what they are not doing in this particular situation.

Under other circumstances, health anxious individuals may be lacking in other adaptive responses. For instance, when health anxious individuals are actually exposed to distressing somatic sensations they may fail to use a strategy that protects them from health anxiety. As an example, evidence suggests that among non-health anxious individuals, positive concrete monitoring of somatic symptoms is an effective strategy for coping with distressing somatic sensations (Cioffi, 1991b). The strategy seems to work by helping individuals understand pain in a relatively neutral and non threatening way. In this way individuals do not ignore information that may be important to their health, but nor do they over-interpret the meaning of benign but distressing somatic information. It is quite possible that a deficit or a deficiency in this strategy contributes to health anxiety. In general, the CBT ignores the possibility that additional variance in health anxiety may be explained by the fact that health anxious individuals are not engaging in effective coping strategies.

Other questions to consider with regard to the CBT concern the nature of the dysfunctional cognitive and behavioural patterns that are proposed to be used by health anxious individuals. The theory predicts behavioural avoidance. That is, it predicts that health anxious individuals will whenever possible actively avoid illness information. It remains unclear, however, whether cognitive avoidance is also relevant. That is, whether health anxious individuals when they are confronted with this information will attempt to avoid it via cognitive strategies such as suppression and distraction. Among non-health anxious individuals, distraction and suppression have been found to be generally ineffective for coping with pain (Cioffi & Holloway, 1993). Research suggests that attempting to suppress thoughts of pain has the effect of actually increasing thoughts of pain. It may be that cognitive avoidance, in addition to other dysfunctional cognitive patterns, contributes to the problem of health anxiety.

An additional area that has not been addressed by the CBT of health anxiety concerns the role of nonverbal expressions of emotion in health anxiety. There are two very different predictions regarding the relation of nonverbal expressiveness to health anxiety that can be made. One prediction is that nonverbal suppression of emotion will be related to health anxiety. This hypothesis is derived from suggestions that nonverbal suppression has been found to be associated with the increased physiological activity and symptom reporting (Berry & Pennebaker, 1993). The nonverbal suppression of emotion, by increasing physiological activity, may in turn increase health anxiety.

An alternative prediction that can be made is that nonverbal expressiveness will be positively associated with health anxiety. This prediction is consistent with clinical observations of health anxious individuals which suggest that these individuals are overly expressive of their concerns. Increased expressiveness could be associated with health anxiety for a number of reasons. First, increased expressiveness could reflect heightened sensitivity in health anxious individuals. Alternatively, increased expressiveness could reflect an attempt on the health anxious individual's part to gain attention from health care professionals. If increased expressiveness is observed it could have important implications for the assessment of health anxiety and pain by health care professionals who are known to rely on nonverbal expressions in their assessment of pain (Kahn, 1966). Increased nonverbal expressivity could also have important implications for the individual's functioning. Some researchers have suggested, for instance, that facial feedback is important in the subjective experience of emotion (Adelmann & Zajonc, 1989; Tomkins, 1962). Supporting the view, research suggests that changes in facial grimaces may cause changes in emotion (Colby et al., 1977; Kopel et al., 1974). The mechanisms believed to underlie this finding could be many. Changes in blood flow, temperature, and sensory thresholds on the skin, as well as changes in facial muscles through feedback to the brain could cause changes in the felt experience (Tomkins, 1981). Alternatively, it could be that overt behaviours signal certain attitudes, and beliefs to the individual (Bandler, Madaras & Bem, 1968). In this way, increased expressiveness could signal increased pain and concern, which could then result in an actual change in the felt experience. In general, the implication of this research would seem to be that if health anxious individuals show more or less of an emotion, they could actually come to experience an amplification or diminution of that emotion as a result.

It should be noted that the CBT predicts conflicting responses on the part of health anxious individuals. On the one hand, the theory suggests that health anxious individuals avoid illness related information, whereas on the other hand the theory suggests that health anxious individuals attend to and catastrophize about the implications of illness related information. This is not necessarily a problem; however, the theory needs to be more specific regarding the occurrence of the cognitive and behavioural responses. It is possible that health anxious individuals use both avoidant and monitoring strategies, but under different circumstances or at different stages. A number of variables could potentially moderate the cognitive and behavioural response systems. Moderator variables essentially specify when certain effects will hold (Baron & Kenny, 1986). It may be that cognitive and behavioural avoidant strategies are the strategies of choice whenever avoidance is a viable option,

but if avoidance is impossible, negative somatic monitoring and reassurance seeking may come into play. As an example, health anxious individuals may be more likely to use an avoidant strategy when receiving negative test results, and a monitoring strategy when receiving positive and ambiguous test results. It is also possible that the type of strategy varies over time. That is, that timing may also act as a moderator variable. Initial attempts to cope with illness related information may involve avoidant strategies, and later, when the attempts are unsuccessful (as research generally suggests they will be (e.g., Cioffi, 1991b)) the health anxious individual may turn to negative somatic monitoring strategies. Sex may also be an important moderator variable. Certain cognitive and behavioural patterns may be more likely among males as compared to females. Females are known to be more likely to engage in emotion focused coping (Vingerhoets & Van Heck, 1990), and, therefore, health anxious females may be more likely to engage in negative monitoring and report catastrophising cognitions than health anxious males. Females are also known to be more frequent users of health care resources (Rosenstock & Kirscht, 1979), and therefore health anxious females may be more likely to respond behaviourally by seeking reassurance compared to health anxious males who may respond more frequently by employing avoidance tactics. In general, then, cognitive and behavioural response patterns may be moderated by the type of illness information, the length of exposure to illness information or the sex of the individual.

The aim of the study was to rigorously and systematically contrast responses of non-clinical health anxious individuals and non-health anxious individuals to the same objective illness related information, namely a painful procedure and diagnostic test results. The hope was that a greater understanding of health anxiety would be gained, and a more precise, somewhat modified cognitive-behavioural theory of health anxiety would be articulated. The study was designed, in particular, to examine: (a) the relationship between health anxiety and the presence of dysfunctional cognitive and behavioural response patterns, as well as the absence of functional response patterns; (b) potential moderators of the cognitive and behavioural response patterns (e.g., varying illness information, time and sex); and (c) the role of negative affectivity as well as response styles in health anxiety. In order to address these questions, individuals scoring one standard deviation above the mean on a health anxiety scale were compared with individuals scoring within the normal range of health anxiety. Individuals were presented with varying diagnostic information and their cognitive and behavioural reactions to the diagnostic test results as well as a standardized pain task, after having received diagnostic information, were assessed.

Literature Review

Conceptualizations of Hypochondriasis - Past and Present

Early conceptualizations. According to Kellner (1985), interest in hypochondriasis dates back to the time of the Ancient Greeks. At that time, the term hypochondrium was used to refer to an area under the ribcage where physical and emotional symptoms arose supposedly from what one ate (Kenyon, 1976; Ladee, 1966). Hypochondriasis was essentially a disorder of the digestive organs. In the 17th Century, physicians noted the ambiguity of the symptoms of hypochondriasis and described their frustration with its diagnosis and assessment (Kellner, 1986). In the 18th and 19th Century advances in scientific understanding led to increased understanding of many abdominal disorders. With increased understanding, hypochondriasis essentially came to be associated with any physical symptoms that were left unexplained by science (Barsky, Wyshak, & Klerman, 1986). Finally, in the early 19th Century, hypochondriasis was described as the false belief in or morbid preoccupation with an impaired state of health (Kellner, 1986; Kenyon, 1965) and came to be known as a psychological disorder. Although theories of hypochondriasis are continuously changing, the notion that hypochondriasis represents a false belief in an impaired state of health has remained quite constant since this time.

Psychiatric/Categorical view. Hypochondriasis is presently defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (III-R) as "a preoccupation with the fear of having, or the belief that one has, a serious disease, based on the person's interpretation of physical signs or sensations as evidence of physical illness" (1980, p. 261). In order to obtain the diagnosis, the patient's concerns must also be disproportionate to any demonstrable medical problem and not readily relieved by normal reassurance. In addition, the duration of the disturbance must be at least six months, and the fear cannot be of delusional intensity.

The DSM-III-R diagnostic criteria largely reflect the early work of Pilowsky (1967) who was among the first researchers to systematically examine the dimensions of hypochondriasis. He administered a standardized questionnaire to 100 individuals diagnosed with hypochondriasis and 100 control subjects. The responses were subjected to a principal components analysis and three factors were identified reflecting three dimensions of hypochondriasis: bodily preoccupation, disease phobia and conviction of the presence of disease with non-response to reassurance.

Currently, hypochondriasis is an Axis I disorder placed in the group of somatoform disorders. Its diagnosis requires the absence of other Axis I disorders. This presents a diagnostic problem at times since hypochondriasis can be difficult to differentiate from other somatoform disorders which share in common an absence of underlying physical pathology to account for the symptomatology (Kellner, 1985). The distinguishing feature to keep in mind when differentiating hypochondriasis from conversion disorder is the presence in conversion disorder of actual loss or alteration in functioning, which is not consciously produced and in which psychological factors are judged to be etiologically relevant. The distinguishing feature to keep in mind when differentiating somatoform pain disorder and hypochondriasis is the preoccupation with pain rather than illness in somatoform pain disorder. Hypochondriasis can be distinguished from somatization disorder in theory as well. Somatization disorder involves a history of at least 13 physical symptoms from a list of 35 before the age of 30, rather than a preoccupation with or fear of illness. In reality, it is quite common to find a strong relationship between somatization disorder and hypochondriasis (Barsky, Wyshak, & Klerman, 1992). The lifetime prevalence of DSM-III-R somatization disorder in hypochondriasis has been found to be 21.4% compared to 0% in a medical control sample of non-hypochondriacal patients (Barsky et al., 1992). Further, when the diagnostic criteria for somatization disorder were lowered to 6 symptoms for women and 4 for men, sub threshold somatization disorder was 82.9% for the hypochondriacal sample and 19% for the controls. In general, the results suggest that a large percentage of hypochondriacal patients report functional somatic symptoms.

The differential diagnosis of hypochondriasis from other Axis I disorders other than somatoform disorders can also be difficult. Hypochondriacal symptoms, for instance, occur in the course of a number of psychiatric problems, including depression, anxiety and schizophrenia (Barsky & Klerman, 1983). A common belief in the literature is that hypochondriasis may simply be a symptom of depression or, in other words, that hypochondriasis is part of an affective state (Fisch, 1987; Kenyon, 1965). This conclusion reflects the high percentage of patients with hypochondriasis who are in fact depressed (Barsky, Wyshak, & Klerman, 1986; Kenyon, 1964). A major proponent of the view that hypochondriasis is little more than depression is Kenyon (1964, 1965, 1976). Kenyon (1964) examined case notes of patients and designated patients as showing either primary ($\underline{n}$ = 301) or secondary hypochondriasis ($\underline{n}$ = 211). He then compared the patients on a number of variables and found no differences between groups. This, he thought, supported his supposition that the two disorders were one of the same. The research, however, is problematic for a number of reasons. First, the

diagnoses were retrospective in nature, and second there were no operationally defined criteria for assigning patients to primary or secondary cases (Warwick & Salkovskis, 1990).

In general, conclusions that hypochondriasis and depression are one and the same seem premature since the high rates of depression in hypochondriasis may largely reflect a sampling bias (e.g., patients are typically drawn from psychiatric settings and depression may result from feeling that the perceived physical illness is not being treated) (Warwick & Salkovskis, 1990). Further, the hypothesis that hypochondriasis reflects depression requires that an affective disorder underlies the problem even in hypochondriacal cases where no manifest depression exists (Craig, in press). It is possible that some patients could indeed fail to recognize affective distress, but it is not likely that this accounts for all patients who show hypochondriacal symptoms but no depressive symptomatology. The relationship between depression and hypochondriasis although quite high is by no means perfect (Barsky, Wyshak, & Klerman, 1986), and there is a large number of hypochondriacal patients without depression who need to be accounted for. Also contradicting the notion that depression and hypochondriasis are the same are results from a study by Pilowsky (1970). He compared cases of primary hypochondriasis to hypochondriasis that was secondary to another disorder. Doing this, he showed that primary hypochondriasis was not as related to depression compared to secondary hypochondriasis. More specifically, he found that the primary cases had longer histories of hypochondriasis, fewer suicide attempts and had received fewer treatments for depression (e.g., electro-convulsive therapy, anti-depressant and sedative medication).

Dimensional view. A number of investigators are moving away from the psychiatric or categorical view of hypochondriasis to a dimensional view of the construct (Hitchcock & Mathews, 1992; Salkovskis, 1989; Warwick & Salkovskis, 1990). It has been suggested, for instance, that the patterns of behaviour associated with hypochondriasis (e.g., worry and preoccupation about health, seeking reassurance and medical attention, focusing on sensations) can be represented along a continuum, with mild to no concern about bodily sensations at one end and preoccupation with and fear of bodily symptoms at the other (Salkovskis & Warwick, 1986). The latter end would include individuals with a diagnosis of hypochondriasis according to DSM III-R (Salkovskis & Warwick, 1986). This continuum is variously defined as a continuum of health anxiety or hypochondriasis. In the present review health anxiety will be used interchangeably with hypochondriasis. Hypochondriasis will primarily be used when referring to the extreme end of the continuum, and health anxiety will be used when referring to the entire dimension. Health anxiety in many ways seems to be the better term since it does not have

the same pejorative connotations and multiple meanings that are associated with the term hypochondriasis. On the other hand, using the term hypochondriasis gives continuity to the literature.

Support that a characteristic is dimensional is found when the characteristic is distributed along a continuum throughout the population and is present to varying degrees in different individuals (Barsky, Wyshak, & Klerman, 1986). Data collected by Barsky and colleagues (1986) provides at least partial support for a dimensional model of hypochondriasis. In this study, two different approaches were used to determine whether hypochondriacal patients should be considered a distinct group. First, the researchers examined the distributions of components of hypochondriasis (e.g., disease conviction, disease fear, bodily preoccupation, somatic symptoms, illness and sick role behaviours, disability, absence of medical disease, absence of other psychiatric disorders) assessed by self-report, interviewing, and medical review in a sample of 92 patients attending a general medicine outpatient clinic and a medical walk-in clinic. They found no evidence of a bimodal distribution. Their second approach was to determine if the most hypochondriacal individuals differed from those less hypochondriacal. Essentially, even the most hypochondriacal individuals did not show striking discontinuities on the variables from the rest of the population. That is, in no case did hypochondriacal individuals behave in strikingly different ways from non-hypochondriacal individuals. The tendency was for health anxious individuals to show more or less of a behaviour or attitude.

A further issue to consider in characterizing hypochondriasis as being dimensional in nature, is whether this dimension can be differentiated from the dimension of negative affectivity. Trait negative affectivity has been defined as "a broad dimension of individual differences in the tendency to experience negative, distressing emotions ..." (Costa, & McCrae, 1987, p. 301). It "represents the extent to which a person is feeling upset or unpleasantly engaged rather than peaceful and encompasses various aversive states including upset, angry, guilty, afraid, sad, scornful, disgusted and worried; such states as calm and relaxed best represent lack of negative affectivity" (Clark & Watson, 1991; p. 321). The construct has been measured by many scales and has been referred to as neuroticism, trait anxiety and general maladjustment (Watson & Clark, 1984). Individuals who are high on negative affectivity tend to dwell on their failures, and have been found to experience significant levels of distress at all times even in the absence of overt stress (Watson & Clark, 1984).

Interestingly, it has been found that, like the dimension of hypochondriasis, negative affectivity correlates with the tendency to complain about symptoms (Watson & Pennebaker, 1989). It also seems that the

tendency to complain of pain among those high on negative affectivity can not be accounted for by a greater incidence of physical problems (Watson & Pennebaker, 1989) or by lowered pain threshold or tolerance (Miro & Raich, 1992). One must wonder whether individual differences in negative emotionality underlie commonly observed findings concerning health anxiety. That is, are differences that are observed between those high and low on health anxiety actually attributable to a more general trait of negative affectivity?

Evidence to support the similarity of the constructs comes from the moderately high correlations (.46 - .49) that have been observed between measures of hypochondriasis and measures of negative affectivity (Hitchcock & Mathews, 1992; Thordarson, 1993). Other evidence suggests that there may be differences between those who are high on hypochondriasis and those who are high on negative affectivity. Watson and Pennebaker (1989), for instance, found that, although those who are high on negative affectivity tend to report more symptoms, they are not more likely to seek reassurance or medical attention. This is not true of those high on hypochondriasis. The tendency to seek reassurance represents a major aspect of hypochondriasis. Also suggesting that the dimension of hypochondriasis represents more than negative emotionality is evidence that the tendency to catastrophize about illness accounts for a significant proportion of the variance in hypochondriasis after negative affectivity has been controlled for (Hitchcock & Mathews, 1992). That is, in a stepwise regression analysis, negative emotionality was found to enter first and account for 26% of the variance. At the same time, however, catastrophic thoughts about illness entered the equation second and accounted for an additional 11% of the variance in hypochondriasis. This would seem to suggest that trait emotionality is certainly involved in hypochondriasis, but that significant variance is contributed by specific anxiety about illness as well (Hitchcock & Mathews, 1992). The question still remains as to whether aspects of health anxiety other than catastrophising may be attributable to negative emotionality.

In considering the construct of health anxiety, it also seems important to distinguish the dimension from common response styles, such as the self-deceptive and impression management response styles described by Paulhus (1988). The self-deceptive response style refers to the tendency to respond in an honest, but positively biased manner, whereas the impression management response style refers to the tendency to deliberately present oneself in a positive light to an audience (Paulhus, 1991). It is possible that both response styles are related to health anxiety. It may be, for instance, that health anxious individuals' tendency to complain of symptoms at a more basic level reflects an attempt to manage their impression. Health anxious individuals, for instance, could

be using their symptoms as an excuse for poor performance in an effort to present themselves favorably to others. This possibility has been investigated (Smith, Snyder, & Perkins, 1983) and will be discussed more below. It is also reasonable to expect that the self-deceptive response style will relate to health anxiety. The self-deceptive response style, for instance, tends to be related negatively to measures of neuroticism and depression and positively to measures of self-esteem (Paulhus, 1991). It could be that health anxious individuals obtain low scores on measures of the self-deceptive response style, and that it is the tendency to provide negatively biased, but honest, self reports that actually accounts for findings concerning health anxiety. In general, the construct of health anxiety should be seriously questioned if response styles can account for findings concerning health anxiety.

Prevalence and Scope of the Problem

In general, the prevalence of DSM III-R hypochondriasis has been found to be quite low ranging from about 4.2% to 6.3% in a general medical clinic (Barsky, Wyshak, & Latham, 1990). When one is concerned with hypochondriacal tendencies, however, such as thoughts or worry about illness and failure to respond to reassurance, estimates of the prevalence are far greater and range from about 9 to 20% (Kellner, 1986).

Problems of health anxiety, in general, are believed to constitute a major drain on health care resources. Supporting this supposition, hypochondriacal individuals have been found to consume a disproportionately large fraction of diagnostic and therapeutic resources (Barsky & Klerman, 1983; Beaber & Rodney, 1984).

The focus of most clinical and research attention until recently has almost entirely been on health anxiety in its extreme form, namely hypochondriasis. As a result, relatively little is known about how lesser forms of health anxiety influence illness behaviour and the individual's psychological well being. For the most part, it is simply assumed that health anxiety even in its lesser forms will have a significant impact on both the medical system and the individual's well being and illness behaviour.

In general, when one thinks of health anxiety, one thinks of its relevance to the assessment and management of patients who have no underlying physiological problems, but who are concerned with normal bodily sensations. It is recommended, however, that health anxiety be considered in treating all conditions, whether there seems to be an underlying physiological or anatomical basis for the complaints or not. Warwick and Salkovskis (1990), for instance, reported that debilitating health anxiety occurs in a significant proportion of

patients who are physically ill. Other researchers have noted that health anxiety frequently contributes directly or indirectly to the patient's distress and presenting problem (Beaber & Rodney, 1984; Salkovskis, 1989).

Other times when it may be relevant to consider the dimension of hypochondriasis or health anxiety include when the patient is undergoing painful medical procedures, and when the patient is being provided with diagnostic feedback. In the latter case, how the individual responds to diagnostic feedback may have important implications for future illness related behaviour, as well as psychological functioning (Cioffi & Holloway, 1993). In the case of responses to painful procedures, health anxiety may be relevant for a number of reasons. First, health anxiety may influence whether an individual is willing to undergo a certain procedure. Second, health anxiety may undermine how an individual copes or responds to the medical procedure. Finally, the medical procedure may itself serve as a trigger for health anxiety and feed into the individual's worry about health.

Health anxiety, in general, also seems to be important in determining global perceptions of health. Supporting this, studies have found that one of the best predictors of one's global perception of health are scores on measures of hypochondriasis. In fact, it has been found that once factors such as hypochondriasis, somatization, and disability have been entered into equations predicting perceived health status, factors such as actual medical morbidity no longer explain any of the variance in perceived health status (Barsky, Cleary, & Klerman, 1992).

Theories of Hypochondriasis

Explanations of hypochondriasis have been offered from a variety of theoretical perspectives (Kellner, 1986). Support for the theories, however, is scant. In reviewing the field it is clear that there has been a dearth of systematic investigation into the nature of hypochondriasis and an over-reliance on clinical observation (Barsky & Klerman, 1983). It seems clear that the theories have a difficult time satisfactorily explaining the whole clinical picture of hypochondriasis. Only the most recent CBT of hypochondriasis takes many factors into account in attempting to explain the development and maintenance of hypochondriasis (Warwick & Salkovskis, 1990). In addition, this is the only theory which views hypochondriasis as one end of a continuum and attempts to devise a theory which explains not only hypochondriasis, but lesser forms of health anxiety as well.

Psychodynamic views. From a psychodynamic perspective, hypochondriasis has been conceptualized in at least two different ways (Nemiah, 1985). First, it has been suggested that the symptoms of hypochondriasis represent an acceptable alternative expression of unacceptable unconscious sexual, aggressive or oral drives

(Hyler & Sussman, 1984). Brown and Vaillant (1981), for instance, have suggested that the hypochondriacal individual transforms aggressive and hostile feelings toward others into physical complaints stating "in lieu of openly complaining that others have ignored or hurt him the hypochondriac settles on belaboring those present with his genuinely felt, but misplaced, bodily pains or discomfort" (p. 724). In support of this position, the inhibition of anger has been found to be associated with hypochondriasis (Bianchi, 1973). It is important to keep in mind, however, that this is a correlational finding that does not imply causation. Although the inhibition of anger may cause hypochondriasis it is also possible that hypochondriasis causes the individual to inhibit anger, or that a third variable (e.g., family factors) causes both hypochondriasis and anger inhibition.

Second, from a psychodynamic perspective, it has been suggested that hypochondriacal symptoms are an ego defense against guilt or low self-esteem (Nemiah, 1985). In this respect, Lipsitt (1970) has observed that hypochondriacal symptoms may provide the individual with an excuse for failure and poor performance (e.g., an athlete may attribute failure to injury or illness), or they may serve as atonement for perceived transgressions. It is important to note that these observations are primarily impressionistic derived from clinical observations and not from systematic research. In general, the psychodynamic formulations suffer from imprecise terminology, and non rigorous uncontrolled research designs (Barsky & Klerman, 1983).

A Social Psychological explanation. From a social psychological perspective, it has been suggested that hypochondriacal individuals strategically use their symptoms to protect their self-esteem (Smith, Snyder, & Perkins, 1983). Symptoms, apparently, serve as a self-handicapping strategy, or an excuse for possible failure which enables the hypochondriacal individual to avoid the negative implications of poor performance. If failure occurs it can easily be attributed to the symptoms, rather than the individual's lack of ability; if success occurs the individual's level of ability is augmented because he or she succeeded in spite of poor health. This hypothesis in some ways parallels the psychodynamic perspective that was discussed earlier concerning the use of hypochondriacal symptoms as an ego defense. The main difference appears to be that the current perspective does not make any assumptions about whether the use of hypochondriacal symptoms to protect self esteem reflects a conscious or an unconscious process.

Supporting the social psychological perspective, research by Smith and colleagues (1983) has shown that hypochondriacal individuals report more physical symptoms in an evaluative setting in which poor health could serve as an excuse for poor performance than in an evaluative setting in which poor health could not serve

as an excuse for failure. Non-hypochondriacal individuals did not show evidence of this pattern of symptom reporting. Because self-esteem was not assessed it is unclear whether the strategic use of symptoms was actually effective in protecting the individual's self-worth. Nevertheless, the research does suggest that self-handicapping may contribute to hypochondriacal behaviour.

In an extension of the above study, Rezak and Leary (1990) examined whether hypochondriacal individuals would actually use their symptoms to escape or avoid an evaluative task. Hypochondriacal subjects were told either that they would be randomly assigned to take an evaluative test, or that they would only be asked to take the test if they were in good health. Contrary to expectations, hypochondriacal individuals were no more likely than non-hypochondriacal subjects to use their symptoms to avoid the potentially threatening evaluation. Further, only in the condition where they were being randomly assigned to take the test did they express apprehension and derogate the validity of the test. The results were taken to suggest that in the case where individuals were armed in advance with the belief that they would not do well if they were ill, subjects with hypochondriacal tendencies were less apprehensive and had less need to derogate the validity of the test (Rezak & Leary, 1990).

Learning views. Classical and operant conditioning have also both been hypothesized to play a role in the development and maintenance of hypochondriasis. From a classical conditioning perspective, it has been suggested that certain environmental (internal and external) triggers come to elicit health anxiety in much the same way as unconditioned triggers of health anxiety. Supporting this notion, it has been shown that anxiety can be conditioned to cues in the environment (Lacey, Smith, & Green, 1955).

From an operant conditioning viewpoint, reinforcement is predicted to play a role in the development and maintenance of hypochondriacal behaviour. For instance, interest shown by other members of the family is predicted to reinforce selective attention to somatic sensations and hypochondriacal behaviour. Further, both positive (e.g., sympathy, encouragement, attention, support and assistance) and negative (e.g., being excused from duties and responsibilities) reinforcement are then predicted to maintain hypochondriacal behaviour. Indirect evidence in support of this perspective has been found by Parker and Lipscombe (1980). They found that individuals who scored high on a measure of hypochondriasis described their fathers as highly overprotective and their mothers as highly caring. During periods of illness, compared to control subjects, they described both parents as more sympathetic and their mothers as more likely to call the physician. Similarly, Barsky and

Mersky (1982) also found that maternal over-protection was reported more frequently in hypochondriacal patients compared to controls. This evidence may suggest that the individual's illness behaviour was reinforced by attention and care.

To the extent that pain complaints represent a major component of hypochondriacal problems more direct evidence supporting the operant perspective can be seen in recent research on pain. Research with pain patients suggests, for instance, that the verbal report of pain is reinforced by attention from medical staff (Redd, 1980) and attention from significant others (Block, Kremer, & Gaylor, 1980; Flor, Kerns, & Turk, 1987). Some evidence also suggests that the verbal report of pain is influenced by financial incentives as well (e.g., compensation, disability payments, and litigation awards) (Brena & Chapman, 1981). Drawing from this research, one would expect that if the verbal report of pain is susceptible to operant conditioning principles, more general hypochondriacal complaints would also be susceptible to these influences.

A social learning/modeling perspective of hypochondriasis has also been proposed. This view suggests that in the family and other social settings, we learn vicariously how to behave when injured and suffering (Craig, 1983). The view predicts that if the expression of symptoms and seeking help is permissible and encouraged, persons will be more likely to show hypochondriacal behaviour. The social learning view also suggests that socialization (e.g., cultural background, socioeconomic status) will be related to hypochondriacal complaints (Mechanic, 1972). Partial confirmation of this research comes from findings suggesting that the tendency to express emotional distress in terms of bodily sensations is related to culture, education and socioeconomic status (Crandell & Dohrenwend, 1967; Mechanic, 1972).

Psychophysiological perspectives. Finally, psychophysiological theories of hypochondriasis have also been put forth. Barsky and Wyshak (1992), for instance, have suggested that although many factors may be involved in hypochondriasis, amplification, or a characteristic heightened sensitivity to somatic and visceral sensation, plays a primary role in the pathogenesis of hypochondriasis. More clearly, amplification is believed to involve the tendency to experience somatic and visceral sensations as intense, noxious and disturbing.

Evidence to support the role of perceptual sensitivity or amplification in hypochondriasis does exist. It has been found, for instance, that individuals scoring high on a measure of hypochondriasis show greater two-flash fusion sensitivity (Hanback & Revelle, 1978). Two-flash fusion sensitivity is the time between two flashes of light needed for subjects to perceive the flashes as two rather than one flash. In another study, kinesthetic

augmentation (i.e., the tendency to overestimate the size of objects placed in one's hands when blindfolded) was found to be associated with hypochondriasis (Petrie, 1978). Also suggestive of heightened sensitivity in hypochondriasis is evidence to suggest that hypochondriacal patients (as well as anxious patients) estimate their heart rate more accurately than other patients (Tyrer, Lee, & Alexander, 1980). Partial confirmation of the theory also comes from research showing that disease phobia is associated with low pain threshold and tolerance in experimentally induced pain (Mersky & Evans, 1975). Finally, Barsky, Wyshak, and Klerman (1990) found that scales of hypochondriasis correlate with a measure of somatosensory amplification, which assesses the respondent's perceived sensitivity to 10 uncomfortable bodily sensations most of which are not pathological symptoms of serious diseases. Interestingly, although supportive evidence for amplification has been found, it is generally believed that this state is neither necessary nor sufficient to account for the clinical picture of those who present with hypochondriasis (Warwick & Salkovskis, 1990). It seems that a tendency to experience increased physiological symptoms cannot solely account for the propensity of the individual to misinterpret sensations. That is, correlation does not imply causation. An alternative explanation is that heightened sensitivity is caused by being hypochondriacal or that a third variable causes both hypochondriasis, and somatic amplification. A further problem with this area is that many of the studies confound sensitivity with a willingness to complain.

A Cognitive-Behavioural Theory (CBT) of Health Anxiety

Of particular interest in the present study is the cognitive-behavioural theory (CBT) of the origin and maintenance of health anxiety which was recently proposed (Salkovskis, 1989; Salkovskis & Warwick, 1986; Warwick, 1989; Warwick & Salkovskis, 1990). As mentioned earlier, the theory proposes to explain not only hypochondriasis but lesser forms of health anxiety as well. According to this model, cognition plays a primary role in the development of health anxiety. The model holds that knowledge and past experience (e.g., experiencing illness in self or in others, or being exposed to information about disease through the media or other forms of communication) lead to the formation of specific assumptions and beliefs about symptoms, disease and health. An example of a problematic assumption would be "bodily symptoms are always an indication of something wrong" (Warwick & Salkovskis, 1990, p. 111). According to the model, dysfunctional beliefs are typically activated by critical incidents, but in certain individuals they may be a constant source of anxiety. Critical incidents include, but are not limited to, hearing details of illness in others, being exposed to new information about an illness, or experiencing normal bodily sensations, symptoms of physical disease or somatic

aspects of anxiety (Warwick, 1989). Once dysfunctional beliefs are activated, individuals are prone to interpret health related information as threatening, and thus experience health anxiety (Salkovskis, 1989; Salkovskis & Warwick, 1986; Warwick & Salkovskis, 1990).

Supporting a CBT of health anxiety, several investigators have used questionnaires to examine the beliefs and attitudes of individuals who score high on measures of health anxiety (Kellner et al., 1987; Pilowsky, 1967). In general, they have found that health anxious individuals do show more dysfunctional beliefs and assumptions about health than non-health anxious individuals. As an example, Kellner and colleagues (1987) found that hypochondriacal patients differed from anxious and depressed psychiatric patients by reporting more fears of and false beliefs about disease, more attention to bodily sensations, more frequent fears of death and more distrust of physicians' opinions. Studies such as this one support a CBT, but do not of course demonstrate a causal relation between dysfunctional health beliefs and health anxiety.

The above conceptualization of hypochondriasis draws very much upon a similar cognitive-behavioural framework for understanding panic disorder (Warwick & Salkovskis, 1990). The CBT of panic is that the disorder arises from the catastrophic misinterpretation of autonomic bodily sensations (Clark, 1988) and leads to avoidance of situations which are likely to trigger panic attacks. Similar to panic patients, individuals with health anxiety also are thought to catastrophically misinterpret bodily sensations. In health anxiety, however, the symptoms that are misinterpreted are more likely to be produced by repeated checking or physical manipulation of sore areas than by the autonomic nervous system (Warwick & Salkovskis, 1990). A second difference between panic disorder and hypochondriasis concerns the time at which the feared catastrophe is expected to occur. Panic patients tend to believe that the catastrophe is happening right at that moment, whereas hypochondriacal patients tend to believe that the symptoms are indicative of a more insidious course. The theoretical link between panic disorder and hypochondriasis is supported by evidence suggesting that the two disorders are often comorbid. Salkovskis, Warwick, and Clark found that 59% of hypochondriacal patients also fulfilled the DSM-III criteria for panic disorder (unpublished data, cited in Warwick & Salkovskis, 1990). Other researchers have found that panic disorder patients with agoraphobia show levels of hypochondriacal concerns comparable to patients with a diagnosis of hypochondriasis (Fava, Kellner, Zielezny, & Grandi, 1988).

Components of Health Anxiety

The CBT emphasizes cognition in the development of health anxiety. Once developed, however, the model recognizes that physiological and behavioural factors in addition to cognitive factors may play a role in maintaining or exacerbating the condition (Warwick & Salkovskis, 1990). In general, the perspective emphasizes that to understand health anxiety, much like other forms of anxiety, one must consider physiological, behavioural and cognitive systems. This parallels the three systems conceptualization of fear reactions as comprising three loosely coupled components or response systems- behavioural, physiological, and verbal- which are interactive yet partially independent (Lang, 1971). As such, the systems are able to respond with different intensities at any given time and with different rates of change over time (Rachman & Hodgson, 1974).

Physiological. Like other types of anxiety, health anxiety is proposed to have a physiological component. The perception of health threat is predicted to lead to an increase in autonomically mediated sensations. Support for the idea that the perception of health threat can effect physiological responding has been found. In one study, for instance, individuals scoring high on the hypochondriasis subscale of the MMPI were found to show a sustained increase or slower return to baseline heart rate during imagery of threatening auditory illness scenes, whereas the controls or even high users of medical facilities returned to baseline much more quickly (Brownlee, Leventhal, & Balaban, 1992).

Increases in autonomic activity that result from health anxiety are expected to be interpreted as evidence of health problems or physical disease and thus are predicted to perpetuate the problem. As an example, Warwick and Salkovskis (1990) presented the case of an anxious patient who reported an increase in sweating. This patient, rather than attributing the sweating to anxiety, interpreted it as a sign of a serious hormonal imbalance. In turn, anxiety about the sweating actually increased the sweating, which provided further evidence of the suspected disturbance in the patient's mind.

Variations in normal bodily sensations unrelated to anxiety can also be a source of increased health anxiety (Warwick & Salkovskis, 1990). In general, any benign symptom may become the focus of health anxiety. The most common organ systems that are feared in health anxiety, however, are the gastrointestinal, musculoskeletal, and central nervous systems; the most common areas for health anxious individuals to complain about are the head and neck, abdomen and chest, and the most common symptom for them to complain of is pain (Barsky & Klerman, 1983).

<u>Behavioural</u>. Health anxiety is also believed to be associated with a wide range of behaviours designed to help the individual avoid exposure to anxiety provoking cues. Salkovskis (1989) proposes that avoidance represents the patient's attempt to cope with or prevent a perceived illness or catastrophe. As an example, patients may restrict physical effort in order to avoid physical sensations and hence health anxiety. Indeed, there is some evidence to suggest that individuals scoring high on measures of hypochondriasis do have a tendency to cope with their perceived illnesses by limiting their activity (Jones, Mabe, & Riley, 1989). Alternatively, patients may make long term alterations in behaviour in order to prevent the occurrence of a feared illness (Warwick & Salkovskis, 1990). These avoidance tactics are predicted to increase health anxiety in the long run since patients are expected never to learn that what they fear will never actually happen.

Patients seldom have the option of completely avoiding anxiety-provoking stimuli altogether (e.g., physical sensations, contact with diseases) so resort instead to behaviours designed to minimize bodily discomfort or reduce health anxiety once it has occurred. As an example, patients frequently seek medical attention or reassurance. By seeking reassurance the individual is provided with evidence that he or she is not ill and thus at least temporarily reduces health anxiety. Reassurance can take many forms including repeated checking of bodily appearance, functions, and symptoms, frequent visits to the hospital to ensure that nothing is wrong, or reading medical textbooks in order to ensure that one does not meet criteria for the feared disease (Warwick & Salkovskis, 1990).

Behaviours such as bodily checking and reassurance seeking, designed to decrease anxiety, paradoxically seem to increase anxiety and health preoccupation (Salkovskis & Warwick, 1986). In two case reports, for instance, it was found that reassurance produced an immediate but transient reduction in anxiety. Later, however, it appeared to result in increased anxiety and negative cognitions, as well as the urge to seek reassurance again. The prevention of attempts to seek reassurance has been found to be followed by clear clinical improvement (Salkovskis & Warwick, 1986).

By what process could reassurance actually increase health anxiety? Warwick and Salkovskis (1990) have suggested a number of ways in which reassurance may serve to increase rather than decrease anxiety. First, reassurance seeking behaviours actually keep the patient's attention focused on the perceived health problem. Second, patients never learn that the things they fear will not actually happen. Third, reassurance seeking behaviours tend to increase anxiety by increasing the range and scope of the individual's catastrophic

interpretations. Finally, many of the behaviours carried out by patients in order to reduce health anxiety may have deleterious physical consequences which in turn may feed into the patient's health anxiety. As an example, frequent requests for medical consultation and investigations may actually be successful and be followed through on. That is, physicians may be persuaded to use more drastic medical interventions (e.g., surgery or powerful medication) that may produce more symptoms and consequently increase health anxiety. It is also important to note that operant conditioning principles may also be operating to exacerbate health anxiety in the case of reassurance. That is, reassurance may serve as positive reinforcement of hypochondriacal behaviour.

It is interesting to note that reassurance in health anxiety functions in much the same way as compulsions do in obsessive compulsive disorder. Compulsions (e.g., checking) are essentially instituted to reduce or neutralize obsessional thinking (e.g., thoughts about whether one has left the stove on or locked the door) (de Silva & Rachman, 1992), much like reassurance is pursued to reduce health anxiety. Although initially reducing anxiety and obsessional thoughts, in the long run compulsions serve to maintain the disorder since the patient never learns that what he or she fears will never actually happen (de Silva & Rachman, 1992).

Cognitive. By far the greatest attention in the CBT has been given to cognitive aspects of health anxiety. In particular, the CBT suggests that health anxiety is associated with a number of cognitive biases (Warwick & Salkovskis, 1990). To begin, the perspective suggests that health anxiety can lead the patient to selectively attend to information which appears to confirm the idea of having an illness and to selectively ignore or discount evidence indicating good health. The selective attentional bias is not limited to bodily sensations, but will also influence how conversations, written material and the like are processed.

The CBT also suggests that individuals with health anxiety will have a tendency to catastrophically misinterpret ambiguous information as threatening. As above, the tendency to misinterpret information not only refers to bodily signs and symptoms, but also to other sources of information (e.g., information obtained from books or health care professionals). Thus, health anxiety is also predicted to be associated with thoughts that represent personally catastrophic interpretations of the bodily sensations or illness related information. Individuals who have health anxiety are expected to have recurring intrusive thoughts about the possible causes of symptoms, as well as thoughts about what will or will not happen if they do not consult a physician. As part of the interpretational bias, the CBT also suggests that health anxious individuals will have an inflated sense of perceived vulnerability (Warwick & Salkovskis, 1990). Perceived vulnerability is thought to be an important

predictor of health related behaviour. That is, the more vulnerable the individual feels, the more frequent health related behaviours are expected to be.

Support for attentional biases in health anxiety has been found. In a simple questionnaire study, Pilowsky (1967), for instance, found that hypochondriacal individuals reported a tendency to focus on or attend to symptoms more so than other psychiatric patients who had no hypochondriacal tendencies. Similarly, Jones, Mabe, and Riley (1989) have found that scores on measures of health anxiety are associated with measures of symptom vigilance (e.g., the tendency to focus on, observe, or read about perceived symptoms). These studies have the disadvantage that they rely on self-reported differences and thus are subject to demand characteristics (Hitchcock & Mathews, 1992).

Evidence to suggest an attentional bias, however, has been found in other studies where it is less likely that demand characteristics could be operating. Tyrer and his colleagues (1980), for instance, examined the awareness of pulse rate in individuals who had hypochondriasis, anxiety neurosis, or phobic anxiety. Subjective ratings of pulse rate were compared with ECG recordings taken during films designed to induce varying levels of anxiety. There was a significantly higher correlation between subjective and measured pulse rates in cases of hypochondriasis and anxiety neurosis than in cases of phobic anxiety. Patients who originally expressed cardiac concern had the highest awareness of pulse rate. The accuracy of the hypochondriacal patients is suggestive of the notion that individuals who are hypochondriacal are focusing on their physiological responses.

The role of attention in hypochondriasis was explored in another study (Hitchcock & Mathews, 1992). Subjects were presented with sentences some of which implied social threats and others which implied illness threats. Later, subjects were asked to indicate whether a given word had been presented in the sentence. They found that subjects with high levels of hypochondriacal concern endorsed illness words that occurred in the sentences more rapidly than other words. This latter result provides evidence of a specific enhanced attentional sensitivity to information relevant to illness in hypochondriasis. It is hard to know whether this is a cause or consequence of hypochondriacal anxiety or both. Enhanced sensitivity to illness related information, however acquired, could play a maintaining role in hypochondriacal anxiety.

Finally, research attention has explored the role of interpretational biases in health anxiety. In general, questionnaire studies support a relationship between measures of health anxiety and obsessive worry about symptoms the patients or others have (Jones, Mabe, & Riley, 1989). Evidence also has been found in support of

the notion that health anxious individuals have an increased sense of perceived vulnerability. Thordarson (1993), for instance, found that perceived vulnerability toward illness significantly predicted scores on a health anxiety scale. This relationship, however, was significantly reduced when depression was entered as a covariate. Other investigators have more directly examined the purported interpretive biases in individuals scoring high on measures of hypochondriasis (Hitchcock & Mathews, 1992). In one study, individuals high and low on hypochondriasis were asked to decide among several interpretations of bodily sensations as to which came to mind most readily when imagining ambiguous bodily sensations. Among the several types of interpretations to choose from in the study there was a catastrophic interpretation, a non-emergency illness interpretation, and two non-illness interpretations, one emotional and one neutral. These investigators found that health anxiety correlated most highly with the catastrophic interpretation (.43), and then the non-emergency illness interpretation (.36) and the emotional interpretation (.28). The correlation with neutral thoughts was not significant. The above research supports the notion that those with greater health anxiety think about illness differently than do individuals without these concerns.

In a second study (Hitchcock & Mathews, 1992), low and high health anxious subjects were presented with sentences describing ambiguous social or illness threats. By including socially threatening events they planned to determine whether the interpretative bias was specific to illness-related stimuli or was only a manifestation of a more general sensitivity to all potential danger. Subjects' interpretations of the sentences were unobtrusively assessed later by tapping their recognition for disambiguated versions of the sentences. They had to rate the degree of similarity of the original sentence to four disambiguated sentences which were all structurally similar to the original and began with the same few context setting words. Among the four alternatives there were two plausible versions and two foil versions that contained factual changes. One of the plausible alternatives was threatening, whereas the other was benign. The results suggested that the individuals scoring high on health anxiety were significantly more likely to endorse all threat interpretations whether they were from social or illness related sentences. The investigators interpreted the results as suggestive of a tendency among health anxious individuals to interpret ambiguous events as threatening, rather than specifically to interpret illness related information as threatening. This research comes back to a point made earlier. Does health anxiety differ from a more general trait of negative affectivity? It may be that on tasks such as this one, with fairly low external validity, it is not possible to discriminate between the two constructs.

Summary of the Cognitive-Behavioural Theory

The CBT makes specific predictions regarding how health anxious individuals will respond to illness related information. In particular, the theory predicts that in response to threatening health related information (e.g., bodily signs and symptoms, information from health care professionals) the responses of the health anxious individual can be understood by examining physiological, behavioural, and cognitive systems. The health anxious individual is predicted to show increased physiological activity, which in turn is expected to exacerbate health anxiety. Further, the health anxious individual is predicted to show behaviour that is designed to reduce anxiety. This may involve attempting to escape or avoid health related information, or may involve seeking reassurance that a health threat does not in fact exist. Both of these responses, in turn, are expected to increase health anxiety. Finally, cognitively, the model predicts that the health anxious individual will show an attentional bias perhaps monitoring signs and symptoms of disease, as well as an interpretational bias, tending to catastrophically misinterpret health related information as personally threatening.

Although the model makes specific predictions regarding how health anxious individuals will respond to health threats, very few attempts have been made to directly verify these hypotheses and systematically compare the responses of health anxious and non-health anxious individuals to the same objective health threats. For the most part the model is based on uncontrolled clinical observations and self-reported differences between those scoring high and low on measures of hypochondriasis. There have only been a few innovative studies attempting to better understand health anxiety. Even these, however, have tended to lack external validity and one must question the clinical implications of the findings.

In addition to the general lack of rigorous research supporting the CBT, a number of questions remain regarding the cognitive and behavioural predictions proposed by the theory. Each of the issues will be addressed more thoroughly below, but can be summarized as follows:

1) The CBT tends to emphasize the role of dysfunctional cognitive and behavioural patterns in exacerbating and maintaining health anxiety. No attention has been given to the possibility that the problem of health anxiety may be additionally exacerbated or maintained by the absence of adaptive or functional response patterns.

2) A number of issues remain to be clarified with respect to the dysfunctional patterns of cognition and behaviour that are proposed to be associated with health anxiety. Additional clarity of the use of avoidance among health anxious individuals is needed. The theory suggests that behavioural avoidance is commonly used among health anxious individuals when confronted with illness related information. The extent to which cognitive avoidance (e.g., suppression, distraction) is also used is not specified. An additional area that has not been addressed by the CBT concerns the expression of health anxiety. Learning more about the expression of health anxiety is important from both a theoretical and clinical perspective.

3) In general, the theory predicts contradictory responses to illness related information. On the one hand, the theory predicts avoidance of illness information, whereas on the other hand it predicts attention to and misinterpretation of illness related information. This is not a problem in and of itself, however, more attention needs to be given to variables which may moderate the cognitive and behavioural responses in order to better understand the circumstances under which these competing responses will occur.

Expansion of the CBT to Include Deficits or Deficiencies in Adaptive Responses to Illness Information

Adaptive responses for coping with diagnostic feedback. Recently, researchers have begun to investigate how non-health anxious individuals respond when faced with the threat of having a disease (e.g., when they are provided with feedback from a diagnostic test). Investigators have found that patients who receive positive test results tend to respond by minimizing the seriousness of the disorder (Croog et al., 1971; Jemmott et al., 1988). Croog and others (1971), for instance, studied men under treatment after having their first myocardial infarction. They noticed that a common reaction among these men was to deny the seriousness of their conditions as evidenced by their tendency to minimize their symptoms, and the effects of their symptoms on their life and work. As another example of this research, Jemmott and colleagues (1988) asked students who had experienced a health disorder to judge the seriousness of their disorder. They found that undergraduates who had experienced a health disorder judged it as less serious than those who had not experienced the same health disorder. They

also found that the students judged the disorder to be more prevalent; it has been suggested that judging a

disorder to be more prevalent is a way of minimizing the seriousness of a disorder (Ditto & Jemmott, 1989).

Researchers have tended to interpret the minimization that occurs in response to receiving positive

diagnostic feedback as a coping mechanism for dealing with the health threat. In effect, it has been suggested

that minimizing the extent of the disorder helps individuals cope more effectively with the disorder. An

alternative explanation, however, is that the minimization may reflect the patient's actual experience with the

disorder (Croyle & Sande, 1988). Subjects in these studies may minimize the disorder because they have more

information available to them or because based on their experience they really believe that the symptoms and

course of the illness are relatively benign.

In order to gain more control, and in the hopes of being able to eliminate alternative explanations

Jemmott, Ditto, and Croyle (1986) developed an experimental procedure for studying how individuals respond to

diagnostic feedback. They brought healthy undergraduates into the lab and told them they were testing for a

thioamine acetylase (TAA) deficiency. All subjects were told that TAA was found in saliva and that people who

lack TAA seem to be susceptible to a mild, but irritating pancreatic disorder. Subjects were asked to self-

administer a TAA test which involved rinsing their mouth with mouthwash, spitting into a cup and dipping a

piece of TAA test paper into the saliva. Unbeknownst to the subjects, the mouthwash they swallowed had a small

amount of glucose in it and the test paper was glucose sensitive so it automatically turned green from its normal

yellow color when dipped in saliva.

Some may wonder about the ethics of the procedure. It is generally judged to be ethically sound, since

subjects are only deceived for a short period of time, and are thoroughly debriefed afterward; further, subjects are

only told that they are at risk for a mild disorder, not that they have a harmful disease (Croyle & Ditto, 1990).

Some may also wonder whether the procedure is externally valid. That is, just how realistic is it to give positive

diagnostic test results to individuals who are not experiencing any symptoms. This does not seem to present a

problem since it is common to find that people have disorders or are at risk for a disease even though they do not

experience symptoms (e.g., silent ischemia) (Croyle & Ditto, 1990). It has also been found that physical

symptoms tend to be prevalent and ambiguous (Pennebaker, 1982) and that once individuals receive a diagnostic

label they notice symptoms that were not given more than a moment's attention prior to receiving the diagnosis

(Bloom & Monterossa, 1981; Pennebaker & Skelton, 1981).

Using the TAA procedure, additional evidence to that found in naturalistic settings (Jemmott et al.,
1988) has been found to support the hypothesis that minimization is a common response to positive diagnostic
test results. It has been found, for instance, that individuals who were advised that they were positive for the
TAA deficiency tended to judge the problem as less serious than those who were told they were negative for the
deficiency (Jemmott et al., 1986). Further, subjects who were told they were positive for the deficiency tended to
question the validity of the test results more than those who were told they were negative for the deficiency
(Jemmott et al., 1986).

The experimental research has the advantage that subjects were randomly assigned to conditions and
had no previous experience with the disorder. This rules out, at least to some extent, the hypothesis that subjects
tended to minimize the significance of their disorder because they had more experience or knowledge of the
disorder than those who tested negative for the disorder. It is important to note that the above explanation is only
partially ruled out, however, since subjects who received the positive diagnosis did in some ways still hold
knowledge not shared by other subjects. That is, because the study employed healthy subjects, individuals who
received a positive test result might discount the seriousness of the disorder because they were unable to recall
having experienced symptoms in the recent past (Croyle & Sande, 1988).

Although the above problem exists with the TAA design there is other evidence which also suggests that
minimization occurs more as a result of coping with the diagnosis than as a result of increased information. In a
study by Ditto, Jemmott, and Darley (1988) subjects were assigned to risk or no-risk conditions and perceptions
of how easy it was to treat the disorder were manipulated. As above, those who tested positive for the disorder
claimed that the test was less valid and that the disease was less serious. Interestingly, the above finding was
especially true among subjects who tested positive and were told that there was little that could be done to treat
the disorder. If subjects were simply minimizing the seriousness of the disorder because they had increased
knowledge there would be no way to explain the latter finding. However, if subjects were minimizing the
seriousness of the disorder in an attempt to cope with the diagnosis, it would make perfect sense why subjects
testing positive, who believed there was no way to treat the disorder, minimized the disorder more than subjects
testing positive who believed the condition was easily treated.

The results are compelling and suggest that subjects use minimization as a method of coping with a
positive diagnosis. Interestingly, there is another coping strategy that is frequently used by normals when they

are confronted with a health threat. In a study conducted by Croyle and Sande (1988), subjects were told they tested positive or negative for the TAA deficiency. Subjects who tested positive not only minimized the seriousness of the condition as was found above (e.g., they judged the enzyme deficiency as less serious, less likely to be accurate and more prevalent when presented with positive test results), but they also tended to show a confirmatory bias. That is, subjects who were given positive test results subsequently reported or recalled more behaviours that had been labeled as risk factors, and reported more deficiency related symptoms than subjects who had not received the diagnosis. It is important to note that they recalled only more deficiency related symptoms, not symptoms overall. It should also be noted that these data also support the supposition that minimization occurs as a form of coping rather than as a result of knowledge of the disorder. That is, given that subjects who tested positive reported more disease symptoms they also should have reported the disease to be more serious, but in fact the opposite was found. In general, the investigators interpreted the data to suggest that subjects in response to the diagnosis not only cope by minimizing the significance of a disorder, but cope by attempting to gain a greater understanding of the disorder. It seems then that personally threatening information can initiate two very different coping processes: minimization and a confirmatory search of relevant memory to understand the disorder.

An additional strategy that normals tend to engage in when faced with a health threat is problem focused coping (McCaul, Thiesse-Duffy, & Wilson, 1992). In a recent study, subjects were told randomly that they were positive, negative or at risk for gum disease. Similar to the above studies, subjects who were positive or at risk for gum disease were more likely to minimize the seriousness of the disorder, judge the disease to be more prevalent, and report more symptoms consistent with the diagnosis than those who were told they did not have gum disease. In addition, however, those told that they had gum disease or were at risk for gum disease as compared to those told they did not have gum disease tended to seek out more information from the hygienist immediately after being diagnosed (although this difference was not significant), worried more about gum disease during the next two days, and planned to engage in more protective health behaviours. The authors suggested that it is possible that minimizing the disorder allows subjects to experience enough control over negative affect that they can engage in problem focused steps such as performing protective health behaviours.

Cioffi (1991a) has also studied how patients process and respond to diagnostic information. Unlike other investigators, Cioffi (1991a) studied the effect of receiving ambiguous diagnostic information. It was found

that when subjects received a clear no-disease diagnosis they accepted the results at face value and limited the number of tests they thought they would do in the future. What was striking here was the almost total under consideration of the possibility that the diagnosis could be wrong. Subjects who received a clear disease diagnosis responded very similarly to subjects in other studies. They were skeptical of the results of the tests, and intended to seek a second opinion.

Subjects receiving an ambiguous or uncertain disease diagnosis (e.g., their results were ambiguous and indicated neither that they had a disease nor that the results were invalid) exhibited several beliefs that devalued the consequences of their diagnosis. They selectively inferred good health from perceptions of their diagnosis, and they tended not to believe that the enzyme was a risk factor for that disease. Subjects given results that indicated uncertain wellness (e.g., their results fell between wellness and an invalid test) showed an interesting pattern as well. The subjects tended to infer a greater possibility of illness from their results than subjects in the other uncertain condition, despite the fact that the same amount of uncertainty existed. Further, the unclear non-disease group exhibited the most doubt about the test's validity, yet showed increased concern about their health over repeated tests, a large degree of perceived vulnerability to the disease and a strong desire for treatment.

Although the above study by Cioffi (1991a) took an interesting direction by exploring responses to ambiguous diagnostic test results, the nature of the ambiguous test result manipulation leaves much to be desired. It seems that being told that one's diagnostic test results are neither invalid nor positive nor negative lacks external validity. Perhaps a better test of patients' responses to ambiguous diagnostic test results would be to simply tell patients that the meaning of the test results are ambiguous or unclear and further testing needs to be carried out in the future.

Taken together, the results suggest that even among normals the provision of diagnostic test results can lead to a complex set of responses. In response to negative diagnostic information, individuals seem to protect themselves from health anxiety by being overconfident in the test's validity and reliability. In response to ambiguous test results, the pattern of responses among non-health anxious individuals remains unclear. In response to positive diagnostic information, non-health anxious individuals show an interesting pattern of results. They tend to minimize the seriousness of the condition, but at the same time attempt to gain additional information about the disorder. At first glance, minimizing the seriousness of the condition may seem maladaptive since it may lead individuals to fail to take appropriate action. Upon closer examination, however,

the minimization of the seriousness of the disorder is accompanied by seeking additional information about the disorder. This suggests that minimizing the implications of the disorder actually helps the individual remain calm and facilitates coping efforts.

In general, the above research begs the question of whether the absence of these adaptive response patterns could play a role in the exacerbation and maintenance of health anxiety. Interestingly, the process of responding to diagnostic information has not yet been explored among health anxious individuals. This is surprising since it has clearly been shown that these individuals more frequently seek out this information than non-health anxious individuals (Kellner, 1986). Further, health anxious individuals frequently carry out their own informal diagnostic tests. That is, every time they notice, label, and respond to a physical sensation they are in a sense carrying out a diagnostic test (Cioffi, 1991a).

As the CBT stands, no attention has been given to deficits or deficiencies health anxious individuals may have in their responses to illness related information. The CBT predicts that health anxious individuals respond to positive test results in many of the same ways as non-health anxious individuals (e.g., they are expected to focus on their symptoms, and seek reassurance). In other ways, however, their response is expected to be quite different. They are expected to show an interpretational bias, interpreting the meaning and implications of the results to be much greater than non-health anxious individuals. This response, in turn, may compromise their coping efforts, perhaps leading them to seek more medical attention than is necessary which may in turn feed into and increase their health anxiety.

In response to negative test results, the CBT would suggest that health anxious individuals will respond quite differently to this diagnostic information compared to those who are non-health anxious. The model would suggest that in response to negative test results health anxious individuals may be temporarily reassured by this information, but will eventually show an increase in health anxiety as a result of the information. Further, it is expected that negative diagnostic information will actually add to anxiety rather than reduce anxiety by giving health anxious individuals more information to be worried about and increasing the number of catastrophic misinterpretations that can be made. The CBT, in general, predicts that health anxious individuals will be more likely than non-health anxious individuals to misinterpret the nature of ambiguous test results, responding to ambiguous information as if it were positive diagnostic feedback.

Adaptive responses for coping with pain. Under other circumstances a different adaptive response pattern may be absent from the health anxious individual's repertoire of behavioural responses. Research suggests that among non-health anxious individuals there are a number of adaptive responses that help individuals cope with the actual experience of somatic sensations and discomfort. Once again, the CBT has not considered the possibility that health anxiety could in part be related to deficits or deficiencies in adaptive functional coping responses to ambiguous somatic sensations. The CBT of health anxiety instead suggests that health anxiety is associated with a negative appraisal of one's ability to cope with pain and ambiguous physical sensations, and is exacerbated by the use of ineffective strategies for coping with perceived threats to health (Warwick & Salkovskis, 1990).

Recent research suggests that non-health anxious individuals' attempts to cope with noxious stimuli are frequently aided by objectively and positively monitoring somatic sensations. In a recent study, for instance, during a cold pressor task subjects were instructed either to concentrate on their room at home (distraction), to pay close attention to their hand sensations (monitoring), or to remove awareness of those sensations from mind (suppression) (Cioffi & Holloway, 1993). Two minute post pressor pain ratings showed that monitoring produced the most rapid recovery from the pain and that suppression produced the slowest. Suppression also contaminated the interpretation of subsequent somatic stimulation (i.e., later in the experimental hour, subjects who had suppressed their cold pressor discomfort, rated an innocuous vibration as more unpleasant than did other subjects). This research appears to suggest that avoiding pain through attentional diversion or suppression may serve to prolong pain instead of helping to reduce it. In contrast, a certain type of concrete sensory focusing, although initially resulting in discomfort, results in rapid recovery from pain.

The above research does not stand alone. Suls and Fletcher (1985), for instance, in a meta-analysis of this research found that attention is better than distraction especially when the stressor is chronic, and when the sensory strategy focuses on the concrete characteristics of the physical sensation rather than on diffuse physical states (e.g., fatigue, tension) or emotional and cognitive responses. More specifically, it has been found that having subjects monitor or focus on their physical sensations increases pain tolerance (Ahles et al., 1983) as well as pain threshold (Blitz & Dinnerstein, 1971). This research also seems to generalize to clinical settings. It has been found, for instance, that distress during chemotherapy, medical procedures, and childbirth can be reduced

by focusing attention on the concrete, sensory aspects of the experience rather than on one's emotions or on distracting images or tasks (Johnson, Kirchoff, & Endress, 1975; Nerenz, Leventhal, Love, & Ringler, 1984).

The effectiveness of sensory monitoring is not limited to coping with pain. A high degree of sensory awareness has also been found to enhance exercise efficiency; it seems to help athletes to accurately understand their physiological state and avoid sensations of pain and fatigue (Cioffi, 1991c). In one study (Cioffi, 1991c) supporting this notion, some subjects were told to scan their physical sensations in detail while on an exercise bike; the other half were given control information about the equipment without attentional instructions. The former group of subjects reported a large number of discrete physical sensations, rated them as highly noticeable, but were not at all distressed by them; they even rated the sensations positively. Those given no attentional strategy rated their perceived sensations more negatively and found them more distressing if they were highly noticeable. The non-monitoring group also attributed a larger proportion of their physical sensations to pathological sources such as possible health problems or to being extremely out of shape, whereas monitoring subjects labeled their sensations as appropriately exercise induced.

There is research which on the surface seems to contradict the notion that monitoring is an effective strategy for coping with pain and other stressors. This research has been concerned with monitoring as a dispositional style as measured by the Miller Behavioural Style Scale (MBSS) (Miller, 1987). Essentially, what is found in this research is that high monitors (individuals who typically scan for threat relevant information) as compared to low monitors (individuals who typically ignore threat relevant information) come to physicians with less severe medical problems, and yet complain of equivalent levels of discomfort, dysfunction and distress compared to low monitors (Miller, Brody, & Summerton, 1988). In addition, it is found that low monitors react less strongly and are able to tolerate a cold pressor task for longer periods of time compared to high monitors (Efran, Chorney, Ascher, & Lukens, 1989). On the surface, this research would appear to suggest that monitoring is an ineffective strategy for coping with health problems and pain. There is reason to believe, however, that monitoring referred to in this research is unlike the monitoring in the research described above. Investigators, for instance, have reported that monitoring on the MBSS correlates with the tendency to focus on emotions (Carver, Scheier, & Weintraub, 1989) as well as with the tendency to worry (Davey, Hampton, Farrell, & Davidson, 1992). It seems that the monitoring that is measured by the MBSS involves not only monitoring of concrete informational aspects of a situation as in the research described by Cioffi and Holloway (1993), but also

involves monitoring of negative and emotional reactions to the situation biasing the individual to experience pain and distress (Cioffi, 1991b). As noted previously, monitoring of the emotional, cognitive components of one's reaction to a painful stimulus does not confer the same benefits as monitoring one's sensory reaction under the same circumstances (Suls & Fletcher, 1985).

There are several theories regarding the mechanisms which underlie somatic monitoring (Cioffi, 1991b). Interestingly, one hypothesis is that self-monitoring works via distraction (Cioffi, 1991b). This view suggests that self-monitoring functions by serving to distract the patient or subject from distressing interpretations of the physical stimulus (Leventhal H., Brown, Shacham, & Engquist, 1979). In other words, this view suggests that by focusing on the sensory aspects of the physical sensation the patient avoids or replaces any higher order (e.g., emotional) interpretation of the stimulus (Cioffi, 1991b).

Another view of concrete self-monitoring is that it works by helping the individual elaborate on the meaning of the pain in a relatively neutral or non threatening way (Cioffi & Holloway, 1993). Sensory monitoring it seems produces a relatively neutral perception of the sensation precluding a more negative and emotional interpretation of it. Similarly, it has also been proposed that self monitoring may help by providing useful self-regulatory information to the individual experiencing pain or discomfort (Leventhal, E. Leventhal, H., Shacham, & Easterling, 1989). That is, focused somatic attention may allow individuals to gain information about actual physiological states that would not be available otherwise. This in turn may result in more appropriate self-regulatory behaviours and an increased ability to cope with the pain (E. Leventhal et al., 1989).

It has also been suggested that self monitoring may work via self control. Acknowledging and searching for sensory information in response to a stimulus may not actually result in increased control over the sensations, but may provide subjects with an increased sense of self-control anyway. This idea comes from research with headache sufferers where there is some evidence to suggest that improvements in headache activity result frequently from feelings of increased control following biofeedback training, rather than from changes in EMG activity (Holroyd et al., 1984).

Finally, sensory monitoring may in part be effective because it increases the patient's feelings of mastery (Cioffi & Holloway, 1993). Sensory-monitoring as a strategy is very easy to carry out. Success in using the technique is likely since it comes with mere awareness of one's sensations. Failure in using the technique is

much less frequent, since it occurs when one's mind drifts away from painful sensations which is highly unlikely given the compelling nature of pain.

From the above discussion it should be clear that there are many competing views regarding the mechanisms underlying concrete positive somatic monitoring. No firm conclusions can be drawn supporting one view over the other. Generally, however, there is no reason to think that any one single view can account for all observations that have been made (Cioffi & Holloway, 1993).

The implications of the above research for the CBT are quite clear. It could very well be that a deficit or deficiency in this type of concrete positive monitoring of sensations contributes to the problem of health anxiety. This is not to say that the proposed dysfunctional cognitive and behavioural responses are not important in health anxiety, it is only to suggest that an absence of adaptive responses, such as the positive self monitoring of somatic sensations, may also contribute to the problem. This possibility will be explored in the present study.

Additional Cognitive and Behavioural Responses in Health Anxiety

The role of avoidance. The CBT suggests that health anxious individuals will attempt to avoid information related to illness whenever possible (Warwick & Salkovskis, 1990). Patients may avoid certain settings or they may restrict physical effort in order to avoid physical sensations and hence health anxiety. Alternatively, patients may make alterations in behaviour in order to prevent the occurrence of a feared illness.

In general, although the CBT refers to behavioural avoidance, little attention is given to the use of cognitive forms of avoidance, such as ignoring sensations, or the use of distraction, in coping with perceived health threats. The research on the effectiveness of avoidant strategies is very complex. In some instances, avoidant strategies have indeed been found to be effective. In many other instances, however, avoidant strategies have been found to be ineffective for coping with pain, and could very well play a role in maintaining and exacerbating health anxiety.

In a meta-analysis of 16 studies in which attentional coping styles or instructions were compared, Mullen and Suls (1982) concluded that distraction from an acute noxious stimulus is more effective than strategies that involve focusing attention on the stressor or on one's own reaction to it. Similarly, McCaul and Malott (1984) found that for relatively mild and short lived pain, distraction is more effective than no attentional instructions and the strategy's effectiveness increases with an increase in attentional capacity of the task. Suls and Fletcher (1985) in a meta-analysis found that when a stressor is acute, focusing attention on some other

absorbing stimulus ameliorates distress and facilitates tolerance more than does no instruction, self-focused attention or stressor focused attention. Finally, many clinical observations also support the use of distraction for pain management (Fernandez & Turk, 1989).

Although the above description suggests that distraction works better than other attentional strategies, the research on which these conclusions are based suffers from several limitations. According to McCaul, Monson, and Maki (1992), for example, in a number of studies on distraction, the manipulation of distraction is contaminated. That is, many of the studies on distraction use pleasant imagery as the method of distraction, and as a result it is impossible to determine whether distraction or positive mood is responsible for the patient's increased ability to cope. Another problem with this research that is noted by McCaul and others (1992) is that untreated control subjects are compared to subjects who are asked to use neutral imagery as a method of distraction. In these studies distraction is not confounded with pleasant imagery, but one must wonder whether neutral imagery actually qualifies as an avoidant strategy, as well as whether expectancy effects account more for the differences between groups than treatment conditions (McCaul, Monson, & Maki, 1992).

Other research also calls into question the efficacy of avoidant strategies. It has been found, for instance, that distraction seems to lose its advantage after some minutes of stimulation (McCaul & Haugtvedt, 1982). For instance, during a 4 minute cold pressor trial, distraction is typically found to be more effective than other strategies during the first 2 minutes, but in the last 2 minutes its benefits are found to rapidly diminish and other strategies are found to be more effective. Turner (1991), in a review of clinical studies, also found evidence to suggest that attempts to ignore pain, and divert attention were associated with greater pain and disability. Additional research evidence (Cioffi & Holloway, 1993) that was reviewed above comparing the effect of monitoring versus suppression suggests that physical discomfort may in some instances be prolonged by attempting to distract oneself from pain, and that even worse than distraction for prolonging the pain is an attempt to suppress thoughts of pain altogether.

The mechanisms underlying the above findings are far from clear. Cioffi (1991b) has reviewed this literature thoroughly and suggests that a number of alternative processes may be operating. One possible explanation for the ineffectiveness of avoidant strategies is that these strategies are physiologically taxing (Pennebaker & Chew, 1985). Increased physiological reactivity may in turn make it more difficult for subjects or patients to cope with the physical stimulus. In the long run, the increase in physiological reactivity due to

avoidant strategies may result in the development or the exacerbation of health problems (Pennebaker & Beale, 1986).

Alternatively, the ineffectiveness of suppression may stem from the very nature of the strategy. It has been found, for instance, that instructions to suppress or inhibit thoughts of pain lead subjects to a disorganized, sporadic, nonfocused and consequently ineffective search for distractors (Wegner, Schneider, Carter, & White, 1987). Another explanation for the ineffectiveness of suppression as a strategy is the possibility that suppression may in fact cause thoughts to occur more frequently than if they had not been suppressed (Wegner et a., 1987). Research by Wegner and colleagues (1987), for instance, suggested that subjects may initially be successful in suppressing thoughts, but that suppression later produced a rebound effect of more subsequent occurrences of the thought than if the individual had not suppressed the thought in the first place. The ineffectiveness of suppression as a coping strategy may also be linked to perceived self-efficacy (Cioffi & Holloway, 1993). Given the nature of pain, one is much less likely to be successful at suppressing thoughts of pain or attempting to distract oneself from pain, than one will be at self-monitoring. Failure in carrying out coping attempts or feelings of inefficacy may in turn doom the subject to be ineffective in coping with pain. Overall, the above findings suggest that cognitive avoidance can under many (but not all) circumstances be detrimental to coping efforts. In the present study, the role of cognitive avoidance in health anxiety will be explored.

The role of nonverbal expressiveness in health anxiety. An additional area that has not been addressed by the CBT of health anxiety concerns the nonverbal expression of health anxiety. Clinical observations of health anxious individuals suggest that these individuals are overly expressive of their concerns. No controlled research, however, has actually been carried out. Increased expressiveness could occur for a number of reasons. First, health anxious individuals could actually be experiencing more discomfort. Second, from a behavioural perspective, health anxious individuals could be using nonverbal expressions of distress to gain attention from others (Craig, 1992). This is possible since there is considerable evidence to suggest that individuals have control over their expressions of pain, in that they can both effectively mask and exaggerate pain (Hadjistavropoulos & Craig, 1994) as well as fake pain (Craig, Hyde, & Patrick, 1991).

Regardless of why nonverbal expressions occur, if they do occur they could actually serve to increase the felt experience. This hypothesis stems from theoretical discussions that suggest that facial feedback is important in the subjective and physiological experience of emotion (Adelmann & Zajonc, 1989; Tomkins, 1962). The

implication is that if an individual shows more or less of an emotion, he or she may actually come to experience an amplification or diminution of that emotion. As an example of research supporting this position, Colby and colleagues (1977) had subjects pose high, moderate, and no pain on different shock trials. They found that when posing more extreme pain subjects' galvanic skin responses actually increased. Similar to this, Kopel and Arkowitz (1974) compared subjects who either role-played a calm or upset reaction during shock to a no role-play condition. Those posing an upset reaction reported more pain and had a lower pain threshold than controls. Those acting calm reported less pain and a higher threshold than controls. It seems, therefore, that changes in facial expression may lead to changes in both physiological and subjective reactions to pain.

The mechanisms believed to underlie these findings could be many. Changes in blood flow, temperature, and sensory thresholds on the skin as well as changes in muscles (Tomkins, 1981) could trigger neurochemical alterations in the brain and cause changes in the felt experience. Alternatively, it could simply be that attitudes, and beliefs are inferred from behavioural responses (Bandler, Madaras, & Bem, 1968) and thus with increases in facial expressivity health anxious individuals actually come to experience an increase in pain. In general, the implication of the research, regardless of the underlying mechanisms, would seem to be that if health anxious individuals show more or less of an emotion, they could actually come to experience an amplification or diminution of that emotion as a result.

Although there is considerable reason to believe increased expressiveness will be associated with health anxiety, there is still some reason to believe that the opposite could be true and that suppression of emotion actually could be associated with health anxiety. This hypothesis stems from work by Berry and Pennebaker (1993) who suggested that individuals may benefit from nonverbally expressing their distress. More specifically, these researchers have suggested that there are stable individual differences in nonverbal expressivity (e.g., whereas some individuals tend to internalize their emotions, other individuals tend to externalize their feelings and make them observable to others), and that patterns of expressivity are associated with distinct physiological profiles and health consequences (Berry & Pennebaker, 1993). Supporting this supposition, individuals who tend not to show their emotions show higher levels of skin conductance and heart rate than individuals who tend to externalize their emotions nonverbally (Lanzetta & Kleck, 1970). Similar to this, Pennebaker and Chew (1985) found that when participants in their study attempted to inhibit spontaneous facial behaviours their skin conductance levels increased from baseline. Drawing from this research, it could be that the suppressing emotion

could be associated with an increase in health anxiety given its tendency to be associated with increased physiological activity and somatic symptoms.

How health anxious individuals express their discomfort will have important implications for the assessment of pain and other conditions in these individuals. It is known, for instance, that health care professionals pay particular attention to nonverbal information in assessing another's condition (Kahn, 1966). There is considerable evidence to suggest that health care professionals and lay persons alike attribute more or less distress depending on the extent of facial activity that is present (Hadjistavropoulos, Ross, & von Baeyer, 1990; Poole & Craig, 1992). If health care professionals are unaware of natural differences that may exist, their assessment of the health anxious individual may be led astray. If health anxious individuals, for instance, are overly expressive of their discomfort, health care professionals could potentially attribute more pain and distress to these individuals. If, on the other hand, health anxious individuals are suppressive of their discomfort health care professionals may underestimate and even ignore significant pain and distress in these individuals.

In general, it appears that there are a number of significant reasons for exploring the role of nonverbal expressions of emotion in health anxious individuals. Because this is a relatively new area, the relationship between health anxiety and nonverbal emotional expression will be explored in the present study, but no firm hypotheses will be made.

Moderators of Health Anxiety

The CBT of health anxiety predicts vastly different and incompatible responses to health threatening information on the part of the health anxious individual. On the one hand, the theory predicts that health anxious individuals will avoid illness related information whenever possible. The focus of attention in the CBT tends to be given to behavioural avoidance, but as discussed above cognitive avoidance may also play a role. At the same time that the theory predicts avoidance, the theory also predicts that when confronted with a trigger or health threat, individuals with health anxiety will likely engage in a period of negative monitoring (vigilantly attending and worrying about cues that may threaten their well-being) as well as a period of reassurance seeking.

Predicting incompatible responses is not necessarily a problem. However, the CBT needs to clarify the circumstances under which the cognitive and behavioural responses will be employed. Health anxious individuals, for instance, may be using these strategies at different stages of coping or in response to different circumstances. Certain variables could potentially moderate or specify when avoidance versus approach

behaviours will come into play. It may be that health anxious individuals will use avoidance whenever this is a possibility, and negative monitoring and reassurance seeking when escape is improbable. As an example, in response to negative test results health anxious individuals may use avoidance as a coping strategy, whereas in response to positive and ambiguous test results (which they are expected to interpret as positive), health anxious individuals may be monitoring their sensations as well as catastrophising regarding the nature and implications of the sensations. In either case health anxiety will increase, but the mechanisms will be different. Further, it may be that over time the strategies in use change. When first exposed to health threatening information, health anxious individuals may attempt to avoid the information. When this does not work, which according to the above literature review (e.g., Cioffi, 1991b) is quite likely, health anxious individuals may turn to a negative monitoring strategy.

A final variable that may moderate the relation between health anxiety and the cognitive and behavioural responses is the sex of the individual. Females are found to be more frequent users of the health care system than males, both in terms of frequency of physician visits and the number of hospitalizations (Rosenstock & Kirscht, 1979). Females are also found to respond to pain more frequently using emotion focused coping strategies (Vingerhoets & Van Heck, 1990). The result, therefore, may be that health anxious females will be more likely respond to illness information by negatively interpreting the cues, and seeking reassurance, whereas health anxious males may be more likely to respond to illness information using cognitive and behavioural avoidance strategies.

Summary and Purpose of the Study

Patterns of behaviour associated with hypochondriasis have been conceptualized along a continuum with little anxiety about health at the one end, and extreme health anxiety, such as hypochondriasis, at the other (Costa & McCrae, 1985). Little research attention has explored the importance of health anxiety, especially in its lesser forms, for understanding illness behaviour. Further, the extent to which this dimension is independent from a more general negative affective state as well as the relationship between health anxiety and response styles has not been addressed adequately in the literature.

Considerable time has been spent elaborating a CBT of how health anxious individuals will respond when faced with illness related information (Warwick & Salkovskis, 1989). Little rigorous and systematic research has actually been carried out to compare and contrast the responses of health anxious and non-health

anxious individuals to the same objective health threats. Further, although the CBT has come a long way from previous theories of health anxiety numerous issues remain to be addressed including: (1) the role of deficits or deficiencies in adaptive or functional responses in health anxiety; (2) the role of additional cognitive (e.g., cognitive avoidance) and behavioural (e.g., nonverbal expressivity) responses in health anxiety; and (3) the circumstances under which conflicting and competing responses come into play (e.g., monitoring versus avoidant strategies) and the variables which may moderate these response systems.

In order to address these issues, the responses of individuals scoring either within normal or high, but nonclinical, ranges on a measure of health anxiety were examined in response to the same objective diagnostic information, namely a painful procedure, and diagnostic test results. The impact of this information on cognitive and behavioural responses was explored. Measures of negative affect and response styles were given in order to rule out the possibility that either of these variables could account for the relations between health anxiety and the cognitive and behavioural variables.

Hypotheses

Cognitive and behavioural responses to the painful stimulus. Health anxious individuals were expected to show the presence of a dysfunctional coping style, and the absence of a functional or adaptive coping style in response to illness information. Further, the nature of the dysfunctional coping style was expected to vary over time, as well as in response to varying diagnostic information. The possibility that the responses would also vary as a function of sex was also explored, but no firm hypotheses were made a priori.

Health anxious individuals were hypothesized to have negative expectations regarding their ability to cope with the cold pressor compared to non-health anxious individuals. Further, health anxious individuals receiving positive and ambiguous diagnostic feedback were expected to have the greatest doubts about their ability to cope compared to health anxious individuals receiving negative diagnostic feedback. Non-health anxious individuals' expectations were predicted to be little influenced by the diagnostic feedback.

A number of hypotheses were made about the types of spontaneous strategies health anxious and non-health anxious individuals would use to cope with pain. Health anxious individuals were expected to show more evidence of cognitive avoidance than non-health anxious individuals. Among health anxious individuals, use of avoidance was expected to be particularly common among those individuals receiving negative diagnostic information. It was also expected to be more frequent in the very beginning of the cold pressor experience

compared to the end. Health anxious individuals compared to non-health anxious individuals were also expected to show more evidence of a negative somatic monitoring strategy. This type of coping was expected to be particularly prominent among health anxious individuals receiving positive and ambiguous test results. Further, it was expected to increase as exposure to the cold pressor increased. In general, concrete positive somatic monitoring was expected to be virtually absent among health anxious individuals, and prominent among non-health anxious individuals, especially those receiving positive diagnostic test results.

A number of similar hypotheses were made concerning how health anxious and non-health anxious individuals would respond to the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983). Health anxious individuals were expected to report more catastrophising cognitions, especially when given positive and ambiguous feedback compared to negative feedback. Non-health anxious individuals were expected to show very little evidence of catastrophising. On measures of avoidance (e.g., distraction and ignoring) health anxious individuals were expected to obtain higher scores than non-health anxious individuals, especially when receiving negative diagnostic feedback compared to positive and ambiguous feedback. On measures of cognitive coping and reinterpretation, non-health anxious individuals were expected to obtain higher scores than health anxious individuals, especially when given positive diagnostic feedback. Finally, on measures tapping perceived control over the pain, non-health anxious individuals were expected to report significantly greater control than health anxious individuals.

Main effects were expected for health anxiety on measures of coping effectiveness. In particular, health anxious individuals were expected to have a much lower tolerance for the task than non-health anxious individuals. Further, they were expected to take much longer to recover from the experience, and to rate the pain as more intense upon withdrawal than non-health anxious individuals. Finally, health anxious individuals were expected to use more sensory, affective, and evaluative words to describe their pain than non-health anxious individuals. Diagnostic feedback was not expected to interact with health anxiety on these measures. It was thought that during the cold pressor experience health anxious individuals would no longer be reassured by negative test results, and would actually come to believe they may be at risk as much as those who had receive positive and ambiguous test results.

Analyses regarding the expression of emotion were primarily exploratory. In line with clinical observations, however, there was some expectation that health anxious individuals would be more expressive of

their discomfort than non-health anxious individuals. Over the course of the cold pressor experience health anxious individuals were predicted to become more expressive, whereas non-health anxious individuals were predicted to show the same amount of expressiveness throughout. There was also some expectation that health anxious individuals would be more expressive when given positive and ambiguous test results as compared to negative test results.

Cognitive reactions and behavioural intentions after receiving diagnostic feedback. Health anxious individuals were expected to show a maladaptive cognitive and behavioural response to the diagnostic information, whereas non-health anxious individuals were expected to show an adaptive response pattern to the diagnostic information. Overall, health anxious individuals were expected to be more likely to be concerned over the nature of the results (e.g., show greater concern, perceive greater seriousness, and see disorder as less common and therefore more serious), and to be more likely to seek reassurance (e.g., want more information, more testing, have more questions, and a greater desire to learn how to reduce their risk) than non-health anxious individuals. This response was expected to be strongest when health anxious individuals were exposed to positive and ambiguous test results compared to negative test results. After undergoing the cold pressor task, however, all health anxious individuals were expected to obtain similar scores on measures of concern and reassurance seeking. This was expected to reflect the tendency of health anxious individuals to initially respond to reassurance or negative test results, but to later actually evidence an increase in health anxiety. Also reflecting a maladaptive response to diagnostic information, when the results were positive and ambiguous, health anxious individuals were expected to perceive the test results to be more valid (e.g., more reliable and accurate, and to have greater confidence in the test results and the experimenter) than when the results were negative. Regardless of the type of diagnostic information, health anxious individuals were expected to report more general symptoms and more symptoms related to the diagnosis than non-health anxious individuals.

Reflecting an adaptive functional response to diagnostic information, non-health anxious individuals receiving positive test results compared to negative or ambiguous test results were expected to report less concern (e.g., less concern, perceive the test results to be less serious, and the risk as more common) over the results, and more doubt about the validity of the test results (e.g., question the accuracy and reliability of the study, and the competence of the experimenter). At the same time, they were expected to increase reassurance seeking behaviour (e.g., have more questions, want more information, more testing), and confirmatory symptom

searching behaviour (e.g., non-health anxious individuals receiving positive test results were expected to report more symptoms related to the diagnosis than other non-health anxious individuals).

Trait anxiety and response styles. The above relations were expected to hold even when trait anxiety and response styles (e.g., impression management and self-deception) were controlled.

Method

Participants

Participants were 218 undergraduate students enrolled in first and second year psychology courses. The students had a mean age of 19.79 (SD = 2.33). Very roughly, 42% of the sample appeared to be Caucasian, while the remainder appeared to be Asian. Subjects who reported that they had a serious medical condition were excluded from participating in the study. Eighteen participants reported minor medical problems including: (a) allergies (n = 9); (b) musculoskeletal problems (n = 8); and (c) headaches (n = 2). Subjects (n = 16) who were found to be health anxious at the time of screening, but not at the time of the study, were excluded from the analyses. Also excluded from consideration in the analyses were subjects (n = 10) who upon questioning at the end of the study were suspicious of the diagnostic feedback they were given. The remaining sample consisted of 66 males and 126 females.

Apparatus

Simulated physiological recording device. Electrodes were attached to the thumb, third digit, and index finger of the participant's dominant hand. Also on the dominant side of the body, two electrodes were attached to the underside of the participant's forearm, and one electrode was attached to the participant's ear. A Beckman Type R polygraph supposedly recorded subjects' responses prior to and after a painful experimental procedure.

Diagnostic feedback. Attached to the polygraph was a computer, and monitor. After 3 minutes of recording baseline responses, the experimenter keyed in the command for the computer to ostensibly integrate the physiological test results. In reality, the experimenter simply keyed in the command for the computer to display one of three graphs (see Appendix A) indicating the subject's likelihood of experiencing medical complications.

Cold pressor apparatus. Subjects were asked to undergo the cold pressor task, ostensibly to explore physiological problems that they may have when exposed to pain. The cold-pressor apparatus consisted of a cooler divided into two compartments by a plexiglass barrier with ice on one side and ice-free water on the other. Contained in the ice compartment was a circulating pump with a plastic hose feeding into the water

compartment. The pump served to circulate water thereby maintaining a fairly constant low temperature and preventing local warming of the water near the skin surface of the immersed hand. The lid of the container had a small hole cut through the cover allowing the subject's hand to enter the cold water compartment. Prior to each session, ice cubes were added to the ice compartment to bring the temperature down to 1 degree C. The water temperature was always checked after each session to ensure no temperature rise greater than 1 degree C had occurred.

A metal flange consisting of one L-shaped piece of metal attached to a velcro strip was attached to the subject's non-dominant arm at the elbow joint. The flange and tank were set up such that, for each subject the fingertips to a point 15 cm below the elbow joint entered the water. When the arm was inserted and withdrawn from the tank, subjects were asked to ensure that the edges of the metal flange made contact with a metal strip surrounding the opening in the cover of the cold pressor. This completed a circuit, activating a battery operated relay device in the adjacent room which produced an audible click upon insertion and withdrawal of the subject's hand. A microphone attached to the video camera near the relay device recorded the clicks on the audio channel of the videotape recorder, providing a precise account of the duration of the subject's exposure to the cold water tank.

Videotape equipment. The subject's face and shoulders during the cold pressor task were video-taped from behind a one-way mirror in the adjacent room. The recordings were recorded on Fuji video cassettes using a NEC VHS movie record/playback camcorder system with auto focus. Following the recording, an RCA video time/date generator, model TC-1440-B, was used to provide the videotapes with a digital time display (minutes, seconds, 60ths of a second). This allowed different segments of the video to be selected and edited for the coding of facial expressivity. For coding purposes the selected segments were played back using a Panasonic 1/2 inch VHS video cassette recorder on a RCA model JD-975 VW 19 inch television monitor.

Measures of Anxiety

Illness Attitudes Scales (IAS; Kellner, Abbott, Winslow, & Pathak, 1987; see Appendix B). The IAS were developed by Kellner (1986) to tap fears, beliefs, attitudes and abnormal illness behaviour related to health anxiety. The scales were derived from factor analyses of various items on earlier scales carried out by Pilowsky (1967) and Bianchi (1973). The IAS consist of 29 questions. There are three questions to assess each of the following areas: (a) Worry about illness; (b) Concerns about pain; (c) Health habits; (d) Hypochondriacal beliefs;

(e) Thanatophobia; (f) Disease phobia; (g) Bodily preoccupation; and (h) Effects of symptoms. The questions are self-rated on 5 point scales (scored 0 to 4) with no, rarely, sometimes, often and most of the time as response options. There are an additional five questions which are used to obtain additional information that are not used in the scoring of the IAS.

The test-retest (rank order) correlation in two groups of normals after 1 month and 2 weeks, respectively, ranged from .62 for the hypochondriacal beliefs subscale to 1.00 for the disease phobia subscale; the median test-retest correlation was .87. The scale has been found to differentiate between patients with DSM III-R diagnosed hypochondriasis and various other groups, including normal controls, other psychiatric patients, and general medical outpatients (Kellner, 1987). In one sample, hypochondriacal patients obtained a mean score of 61.7, whereas employee controls received a mean score of 17.5 (Kellner, 1987). The two best scales for discriminating the groups were the hypochondriacal beliefs scale and the disease phobia scale. Kellner (1987) suggests that high scores on these scales alone may be suitable for the detection of hypochondriacal fears and beliefs.

Hitchcock and Mathews (1992) used the IAS to measure health anxiety as an individual difference dimension. They administered the measure to two samples of undergraduate psychology students and in both cases found scores to range from 3 to 74 with a mean of 33.2 ($\underline{SD}$ = 13.2). In a recent study by Thordarson (1993) undergraduate students obtained scores ranging from 6 to 72, with a mean of 29.72 ($\underline{SD}$ = 11.30). The scale was also found in this study to have high internal consistency (alpha = .88), and there was no evidence that the internal consistency of the scale would be substantially increased by eliminating any of the items. The scale had nonsignificant correlations with age and sex. Supporting the construct validity of the scale, it was found to have higher correlations ($\underline{r}$ = .71) with another health anxiety scale (The Whitely Index; Pilowsky, 1967) than with general measures of anxiety ($\underline{r}$ = .46) and depression ($\underline{r}$ = .39).

The Trait Anxiety Scale (Spielberger, 1984, 1985; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; see Appendix C). The trait anxiety scale is part of a larger questionnaire called the State-Trait Anxiety Inventory which contains an additional 20 items that assess state anxiety. In conceptualizing the scale, trait anxiety was thought to be a relatively stable personality characteristic of anxiety proneness, whereas state anxiety was thought to refer to anxiety which a person experiences in response to certain specific conditions (Spielberger, 1985).

The trait anxiety scale consists of 20 items on which the individual indicates the degree to which each statement is an accurate description of him or herself using four response categories (almost never, sometimes, often and almost always). To obtain a score for trait anxiety each response is given a score ranging from 1 to 4 (some items are reversed such that 4 indicates the presence of a high level of anxiety), and scores for the 20 items are summed.

The test-retest reliability over a 6 month period has been found to be .73 and .77 for male and female college students, respectively (Buros, 1978). The internal consistency of the scale ranges from .83 to .92 (Buros, 1978). Construct validity has been demonstrated by showing that patients who would be expected to have high scores (e.g., patients with anxiety disorders) do in fact have high scores, whereas patients who would be expected to have low scores (e.g., patients diagnosed with psychopathic personality disorder) do in fact have low scores (Spielberger, 1985).

Several studies have demonstrated that the scale has high correlations with other measures of anxiety, depression, and maladjustment (Gotlib, 1984; Watson & Clark, 1984). The conclusion of these studies has been that the measure should be viewed as a measure of the single more general dimension of negative affectivity.

Measure of Response Style

The Balanced Inventory of Desirable Responding (BIDR-Version 6) (Paulhus, 1988) (Appendix D). This measure was used to assess self deception (honest, but positively biased reports) and impression management (deliberate positive self-presentation to an audience) (Paulhus, 1991). The scale consists of 40 items, 20 items measuring each construct. It requires subjects to rate their agreement with each statement on a 7-point scale. The scales are balanced for direction of keying. After keying the items, subjects are given one point for each extreme response (6 or 7) they have, thus ensuring that high scores are conservative.

In a sample of 433 college students, Paulhus (1988) found a mean of 7.5 (_SD_ = 3.2) and 6.8 (_SD_ = 3.1) for males and females respectively on the self-deception measure. In the same sample a mean of 4.3 (_SD_ = 3.1) and 4.9 (_SD_ = 3.2) for males and females respectively was found on the impression management measure. Paulhus (1991) has provided considerable evidence supporting both the reliability and validity of the self-deception and impression management scales. Both scales are found to have adequate internal consistency and test-retest correlations. The impression management scale correlates highly with similar scales (e.g., MMPI Lie scale), and is particularly responsive to experimental manipulations for impression management (e.g., private

versus public conditions). The self-deception scale also correlates highly with other self-deception measures (e.g., repressive coping style), and experimental studies provide support for the validity of the construct (i.e., subjects scoring high on this measure after a failure experience show a higher degree of self-serving bias than those not scoring high on this measure). Individuals who score high on self deception also tend to have high self-esteem as well as low neuroticism, depression, and social anxiety scores suggesting that self-deception may contribute to positive adjustment.

Measures of Pain Experience

Duration of pain experience. The length of time that individuals kept their hand in the water was recorded in seconds. This was possible by noting the time on the video-tape when the first and last audible click were heard indicating that the participant had placed his or he hand in the water, and then had withdrawn his or her hand from the water.

Visual Analogue Postpressor Pain Ratings (see Appendix E). Subjects in the present study made ratings of their pain on a visual analogue scale 150 mm long. The visual analogue scale was anchored with the words no pain at the left pole and the words pain as severe as it could be at the right pole. The ratings were made by the subjects immediately upon removing their hand from the cold pressor and every 20 seconds thereafter until 2 minutes had elapsed.

The pain upon immediately withdrawing from the cold pressor experience was of interest in the present study. This was examined by measuring the distance in millimeters between the subject's mark and the no pain endpoint on the first VAS. In general, evidence suggests that visual analogue scales are reliable and valid ratio measures of pain intensity for both experimental and chronic pain, and can be used for both within and between group comparisons (Price, McGrath, Rafii, & Buckingham, 1983). The visual analogue scale has been found to be positively related to other self-report measures of pain, as well as to observed pain behaviour (Jensen & Karoly, 1992). One advantage of this type of scale is the high number of response categories (e.g., because they are usually measured in mm) which makes the scale potentially more sensitive to changes in pain intensity (Jensen & Karoly, 1992). A further advantage of this type of scale is that it can be used and scored quickly with minimal instruction (Chapman et al., 1985).

The VAS were also scored for rate of recovery. This was done by examining the scales for the interval at which subject's began using the lower third of the scale. For example, if they began using the lower third of

the scale immediately their score was 1, if they began using it after 20 seconds their score was 2, and so on until if they began using the lower third of the scale at the 2 minute mark they received a score of 7. If at the 2 minute mark they were using the middle third of the scale they were assigned a score of 8. Alternatively, if at this point they were still using the upper third of the 150 mm VAS they were assigned a score of 9.

The McGill Pain Questionnaire (MPQ; Melzack, 1975; see Appendix F). This measure consists of 20 groups of words that yield measures of the affective, sensory, and evaluative dimensions of pain. It was administered to subjects within 5 minutes of withdrawing their hand from the cold pressor. Subjects were encouraged to ask for clarification if they were uncertain about the meaning of the words; they were also told to pick one word from each subscale, and if no words applied to leave the subscale blank. Rank values of the words were summed for the sensory, affective and evaluative categories, separately.

The MPQ was developed by Melzack and Torgeson (1971). They compiled a large list of pain words and asked subjects to classify the words into small groups that described varying aspects of pain. The pain descriptors were reliably classified into three groups (16 subgroups) representing different dimensions of pain: sensory, affective, and evaluative. With different subjects they found that there was significant agreement on the rank order of descriptors within the 16 subscales. This was so despite the varying cultural, socioeconomic, and educational backgrounds of the subjects. These 16 subscales along with four other miscellaneous subscales, that were added to give a full description of pain, now make up the MPQ.

The degree to which the MPQ reflects the three dimensions of pain has been questioned and a variety of studies using various pain populations have arrived at different factor solutions ranging from the original three to seven (Reading, 1983). Reading (1983) in a review of this literature suggested that the results taken together confirm the distinction between sensory and affective dimensions of pain, as well as the evaluative dimensions of pain, although he admits that this latter distinction is not as consistent. The wide variability in factor structure has in part been attributed to the different patient populations on which data has been collected (Melzack & Katz, 1992). The internal structure of the MPQ also appears to be quite sound. Reading, Everitt, and Slemere (1982) replicated the original adjective grouping and scaling.

Reliability over assessment intervals has been demonstrated for the MPQ (Melzack, 1975; Graham, Bond, Gerkousch, & Cook, 1980). The MPQ also has been shown to have considerable diagnostic power (Dubuisson & Melzack, 1976; Hunter & Philips, 1981; Kremer & Atkinson, 1981; Leavitt, Garron, D'Angelo, &

McNeill, 1979; Reading, 1982; Veilleux & Melzack, 1976) as well as to be a sensitive descriptor of differences in pain experience (Agnew & Mersky, 1976; Reading & Newton, 1977). Evidence of the scale's convergent validity comes from studies showing that the affective scales on the MPQ are related to affective distress (Atkinson et al., 1982; Kremer & Atkinson, 1981), anxiety (Van Buren & Kleinknect, 1979), and MMPI profiles (McCreary, Turner, & Dawson, 1981).

Measures of Coping Strategies

Structured Interview of Coping Strategies (Appendix G). A structured interview similar to that described elsewhere (Turk, Meichenbaum, & Genest, 1983; Spanos, Radtke-Bodorik, Ferguson, & Jones, 1979) was used in the present study to examine the extent to which subjects used certain spontaneous strategies to cope with the cold pressor pain. Specific times were used as cues to help subjects describe what they were thinking, feeling, doing, and experiencing at different moments during the exposure: (a) before immersing their hand in the cold water bath; (b) just after they immersed their hand; (c) at about the mid point before they withdrew their hand; (d) just before they withdrew their hand. The interview procedure is such that it ensures that the statements are self-generated and that experimenter bias is at a minimum (Genest & Turk, 1981).

The subject's answers to the questions were tape recorded and transcribed. The experimenter served as the primary coder and a research assistant provided reliability coding. The subject's retrospective thoughts about what they were thinking of prior to placing their in the cold water were coded on a 1 to 7 expectancy scale, where higher scores reflected positive expectations about the subject's ability to cope with the experience (see Appendix G). The intra class correlation coefficient measuring reliability between judges was found to be .81.

Subjects' retrospective thoughts during the actual cold pressor were scored on a 0 to 4 scale for each of the following categories: (a) avoidance; (b) positive concrete somatic monitoring; and (c) negative somatic monitoring. Appendix G outlines the scoring criteria in more detail. A score of 0 on the scale reflected no occurrence of the category, 1 reflected some elements of the category, 2 at least one clear occurrence of the category, 3 at least two examples of the category or the implication that this category was more than isolated incident, and finally a score of 4 was used when that particular category appeared to predominate. Reliability was found to be satisfactorily high on all of the categories regardless of segment scored. The intra-class correlation coefficients for the beginning, middle and end segments were .87, .78, and .92 for the avoidant

category, .74, .99, and .99 for the negative somatic monitoring category, and .75, .76, and .76 for the positive

concrete somatic monitoring category.

The Coping Strategies Questionnaire (CSQ; Rosenstiel & Keefe, 1983; see Appendix H). Coping was

also assessed using a modified version of the Coping Strategies Questionnaire (Keefe et al., 1990) as was done in

a study by Geisser, Robinson and Pickren (1992). The CSQ has 44 items and was designed to assess coping

strategies in chronic pain patients (Rosenstiel & Keefe, 1983). The scale in its original form assesses patients'

perceived control over pain and ability to reduce pain on two 0 to 6 point scales. These two scales are typically

combined to reflect one measure of control over pain (Lawson, Reesor, Keefe & Turner, 1990). The CSQ also

measures seven different strategies including: Diverting Attention, Reinterpreting Pain Sensations, Coping Self-

Statements, Ignoring Pain Sensations, Praying / Hoping, Catastrophising, and Increasing Behavioural Activity.

Each strategy is tapped by six items rated on a scale from 0 to 6, with 0 meaning never do that, 3 meaning

sometimes do that and 6 meaning always do that.

For use in the present study, subjects were asked to rate the strategies they used to cope with their pain

on the cold-pressor task. Each of the descriptions was phrased in the past-tense, and the items from the

increasing behavioural activity scale were dropped since they were not relevant to the present situation. One item

had to be significantly modified (item 20 on the present scale was changed from "I have faith in doctors that they

can cure my pain" to "I had faith that the experimenter would come and help me"). Rosenstiel and Keefe (1983)

have found the subscales of the CSQ to have reliability coefficients ranging from .71 to .85. These results have

been replicated (Keefe et al., 1987).

Measures of Responses to Diagnostic Information

A question booklet similar to those used in other studies (Cioffi, 1991a; Croyle & Sande, 1988; McCaul,

Thiesse-Duffy, & Wilson, 1992) was used to assess whether health anxious and non-health anxious individuals

differentially responded to the diagnostic information (see Appendix I). The CSQ was also included in the

beginning of the questionnaire package.

Manipulation check. Two questions tapped the effectiveness of the manipulation. One question was

open ended asking subjects what the nature of their diagnostic test results were. A second question asked

subjects to indicate their likelihood, according to the test results, of experiencing medical complications in the

future. Subjects marked their responses on a 9 point scale with labeled endpoints and midpoint (not at all likely, moderately likely, and extremely likely).

Minimizing/Catastrophising. Three questions tapped the extent to which subjects responded to the diagnosis by minimizing the significance of the results. Recent research suggests that a more prevalent disease is perceived to be a less serious disease (Ditto & Jemmott, 1989), therefore subjects were asked to estimate the percentage of students they believed were at risk for experiencing medical complications. They marked this on an 11 point scale ranging from 0% to 100%. Other questions asked subjects how serious they perceived the complications to be and how concerned they were with the test results. Responses to these questions were be made on a 9 point scale ranging from not at all to moderately to extremely.

Validity. A number of questions tapped the perceived validity of the test results. Subjects were asked, for instance, how competent they perceived the experimenter to be, how accurate they believed the test results were, how confident they were in the results and what they believed the chances were that the recording devices were unreliable. Responses were be made on a 9 point scale ranging from not at all to moderately to extremely. The latter question concerning reliability was reversed scored such that higher scores indicated greater perceived reliability.

Information seeking. A number of questions asked whether subjects were interested in more information. In one of these questions, subjects were simply asked to write down any questions they had about the nature of the test results, or the physiological recordings that were taken. The number of questions were tallied. Three other questions asked subjects if they would like additional information, if they would like to undergo more elaborate testing, or if they would like to learn how to reduce their risk for medical complications. Responses were made on a 9 point scale ranging from not at all to moderately to extremely.

Perception of symptoms. In the question booklet subjects were presented with two symptom checklists. On the first checklist, subjects were simply asked to indicate how intensely over the past month they experienced 21 common benign symptoms. They made these ratings on a 5 point scale anchored with the words not at all, moderately, and extremely. The symptoms on the checklist were derived from the Hopkins Symptom Checklist (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) and from a symptom checklist used in a study by Bloom and Monterossa (1981). On the second checklist, subjects were asked to indicate how frequently they experienced a number of symptoms that have been found to be associated with being at high risk for experiencing

medical complications. The symptoms on the checklist consisted of the 12 symptoms from the somatic scale of the Hopkins Symptom Checklist (Derogatis et al., 1974). They made their ratings on a 5 point scale anchored with the words not at all, moderately, and almost always.

Post Experimental Inquiry

Two final questions (see Appendix J) were included in the questionnaire package tapping subjects' awareness of the experimental hypotheses. The first item asked subjects to state the purpose of the test as they understood it. The second item asked if there was anything about the procedure that was puzzling or unusual.

After the experimental debriefing, subjects were asked to complete a seven item questionnaire tapping their perceptions of the study (Appendix K). The questions were scored such that negative perceptions of the study were given higher scores on a 7-point scale. The questions were summed to give one index of attitude toward the study. Inter-item reliability of the scale was adequate (alpha = .67).

Expressiveness

Four segments from subject's continuous video-recording of their cold pressor experience were dubbed onto a master tape, with order of event randomized within subjects. The segments were: (a) 10 seconds prior to placing their hand in the water; (b) 10 seconds immediately after placing their hand in the water; (c) 10 seconds at the midpoint of the cold pressor experience; and (d) 10 seconds prior to withdrawing their hand from the water. Each subject's video recording began with a subject number which was then followed by the randomized video clips separated by 10 seconds of blank space.

Eight students viewed and judged the edited videotapes. In order to reduce judgement error due to fatigue, judges viewed the subjects over a course of three sessions, with an even number of subjects being viewed during each session (e.g., 64 subjects per session). As in other studies (Malatesta, Jonas, & Izard, 1987) the video segments were judged for the degree of emotional expressivity on a 9-point scale, with 1 signifying not at all expressive and 9 signifying extremely expressive (see Appendix L). The mean rating of the judges for each segment served as the subject's expressiveness score for a given segment. This was justified given the extremely high reliability of the judges' ratings, ICC (2, 8) = .88, .96, .96, and .96 for the segment prior to cold pressor, and the immediate, middle, and end segments, respectively.

Screening Procedure

Male and female students were approached in undergraduate psychology classes or they were contacted through the bulletin board in the Psychology building (see Appendix M for advertisement). They were asked to complete the Illness Attitude Scales questionnaire (IAS; Kellner et al., 1987) (Appendix B), a measure of health anxiety, and to return it with the understanding that they may be contacted in the future to come to the lab for course credit to learn more about their health (see Appendix N for consent to complete screening questionnaire). The screening questionnaire was completed by 782 students.

Group Assignment

A female research assistant selected subjects from those who completed the screening questionnaire who had high health anxiety scores, and an equal number of randomly selected subjects with health anxiety scores falling within the normal range. As mentioned above health anxiety was measured using the Illness Attitudes Scales (IAS; Kellner et a;, 1987) (see Appendix B). Participants were considered health anxious when they obtained scores at least one standard deviation above the mean (M = 29.72, SD = 11.34) on the IAS using norms that were obtained from a previous sample of undergraduates at the University of British Columbia (Thordarson, 1993). Subjects were not included in the health anxious sample if they were more than 3 standard deviations above the mean (M > 64). This excluded subjects who were extremely health anxious. Subjects were considered non-health anxious when they fell anywhere below one standard deviation above the mean (M < 41.06). A second research assistant randomly assigned health anxious and non-health anxious subjects, matched for sex, to the experimental conditions.

Experimental Procedure

Ethics approval was obtained prior to carrying out the study (see Appendix O). Subjects selected for participation were contacted by the experimenter. The study took approximately one hour to complete and subjects received course credit in exchange for their participation. Upon arrival at the lab, subjects were informed of the nature of the study and consent to participate was obtained (Appendix P). Subjects were told that we would examine their degree of risk for experiencing physiological medical complications during painful medical procedures or illness. They were told that their risk for experiencing medical complications would be derived by having a computer program examine and integrate their physiological responses during a resting period. All subjects were told that the computer program was currently being used in hospital settings to predict

and anticipate complications an individual may have in response to varying medical procedures or illness. Finally, subjects were told that in order to learn more about the program and what it means to be at risk for medical complications we would like to explore their physiological and psychological responses to a cold pressor procedure.

After obtaining consent, subjects completed a background information questionnaire (see Appendix Q), the Illness Attitudes Scales (Kellner et al., 1987) (Appendix B), the Trait Anxiety Inventory (Spielberger et al., 1983) (Appendix C), and the Balanced Inventory of Desirable Responding (Paulhus, 1984, 1988) (Appendix D). Next subjects were introduced to the polygraph. They were told that the instrument takes standard physiological measures such as heart rate, electrodermal activity, muscle activity, and blood volume. Subjects were asked to remove all jewelry, and electrodes were attached to the subject, remaining there until after the cold-pressor procedure. The experimenter then turned on the polygraph. Subjects were left alone while the machine ostensibly took the baseline recordings. After three minutes of recording, the experimenter activated a switch making the polygraph emit a sound; subjects were informed that this sound indicated that the computer had enough information for the test results to be examined.

The experimenter re-entered the room and typed in several commands on the computer supposedly resulting in the integration of the test results. A graphics display was then generated indicating either positive, negative, or ambiguous results. In the negative test result condition, subjects were told that their physiological activity was such that it put them at very low risk for experiencing medical complications. In the positive test result condition, subjects were told that the physiological readings were such that they suggested that they may be among those individuals who are at high risk for experiencing medical complications. In the ambiguous condition, subjects were told that the results were ambiguous and that it was not clear whether they were or were not at risk for experiencing physiological medical complications (see Appendix A). Following the feedback, subjects were asked two questions simply tapping how concerned they were with the test results and whether they would like more information about their test results. Their responses were recorded on a 1 to 9 scale anchored by the words not at all, and extremely at the end points and moderately at the mid point.

Next subjects were introduced to the cold pressor procedure. They were assured that the cold pressor task has been used frequently in research and although discomforting has not been found to cause any physical harm. The cold pressor rested on a small table with wheels and was placed such that the opening to the cold

water compartment was at an accessible height and distance to the seated subject. The flange arm-cuff was placed around the subject's non-dominant arm and subjects were informed that when cued by the experimenter over an intercom they should place their hand in the water and bring the flange in contact with the metal strip on the lid of the cold pressor. They were told that this would activate a timer measuring the duration of their exposure to the cold water. They were urged to keep their hands in the water until asked to remove it so that the experimenter could get accurate and stable physiological readings. After taking their hands out of the water they were told that they would be cued to rate the intensity of their discomfort over the intercom. The nature of the visual analogue scale (Appendix E) for measuring their pain was explained to them prior to the cold pressor task.

After these instructions were given, the experimenter left the room and from behind a one-way mirror began video-recording the subject capturing his or her shoulders and head on the camera. Over an intercom subjects were instructed to place their hand in the cold water. After 300 seconds of recording, if subjects had not already done so, they were cued to withdraw their hand and make their first rating. Over the intercom they then heard a pre-recorded tape cueing them to rate their pain every 20 seconds until 2 minutes had elapsed. Immediately after this, the experimenter re-entered the room and had subjects complete the McGill Pain Questionnaire (Melzack, 1975; see Appendix F).

The electrodes were then removed and subjects were interviewed regarding their use of coping strategies during the cold pressor procedure (Appendix G). Subjects were then given a questionnaire package which included questions tapping their use of coping strategies (Appendix H) and their responses to the diagnostic information (Appendix I) as well as a number of questions exploring their awareness of the experimental hypotheses (Appendix J).

Upon completion of the above measures, special care was taken to conduct a sensitive and thorough debriefing of all study participants (see Appendix R). The debriefing session followed the recommendations of Mills (1976) and Ross, Lepper and Hubbard (1975). A discussion of the rationale underlying the use of deception in the experiment was given special attention. All subjects were informed of the purpose of the study and were told that they were randomly assigned to the feedback instructions. Subjects were also made aware of the video recordings and were given the opportunity to have their tape erased. Subjects were asked to imagine how their reactions might have differed if they had been asked to role play or imagine rather than actually undergo the experience of receiving diagnostic information. Subjects' beliefs about the experiment were explored

and their questions were answered before they left the experimental setting. Subjects also were asked to complete a short questionnaire asking about their attitudes toward the study after having learned about the use of deception in the study (Appendix K).

Experimental Design

The independent variables of interest in the study were: (a) health anxiety (health anxious versus non-health anxious); (b) diagnostic feedback (positive, negative, versus ambiguous test results); and (c) sex of the participant. The dependent variables were grouped into the following areas for conceptual clarity: (a) cognitive and behavioural responses to cold pressor (spontaneous coping strategies; cued coping strategies; expressiveness; effectiveness of coping); and (b) cognitive and behavioural responses to diagnostic information (concern and information seeking before and after cold pressor; general minimization and behavioural intentions; validity of test results; symptom perception).

In general, dependent variables grouped together were analyzed using MANOVA. When Wilk's lambda was significant the multivariate tests were followed by examination of univariate F-tests, and Tukey's post hoc analyses when necessary. When significant relations were found between health anxiety and a dependent variable, partial correlation coefficients controlling for trait anxiety, and self-deception alone and together were carried out.

Results

Preliminary Analyses

Prior to analysis, all of the variables in the study were examined for accuracy of data entry and missing values. Missing values were found on the following measures for two subjects: (a) pain ratings made immediately following the cold pressor task; and (b) frequency of at risk symptoms. One missing value was found on each of the following measures: (a) perceived percentage of individuals at high risk for experiencing physiological complications; (b) intensity ratings of benign symptoms; and (c) self-reported cued coping strategies used throughout the cold pressor experience. The missing values were replaced with the group mean value.

Examination of the distributions of the variables revealed some variables were best considered to be dichotomous variables. The duration of exposure to the cold pressor experience, for instance, was bi-modally distributed, and as a result subjects were either classified as having completed or not completed the task. The

number of questions individuals had about the test results and recordings was reconceptualized as a dichotomous variable as well, with individuals either considered to have none or at least one question. Examination of the distribution of negative somatic monitoring, positive concrete somatic monitoring, and avoidance during the cold pressor task revealed that these variables were best considered to be trichotomous, with 0 reflecting no occurrence of the category, 1 and 2 reflecting some indication that the strategy was used, and 3 and 4 reflecting considerable use of the strategy.

Examination of the distributions of other variables revealed that a number of variables had non-normal distributions when examined over the entire sample. These variables, therefore, were transformed in order to reduce skewness and eliminate outliers. Skewness values before and after transformations are presented in Table 1 for the variables found to have significant skewness using the method recommended by Tabachnick and Fidell (1989). In all cases, when analyses were carried out on the skewed variables, they were carried out on the variables after transformation. To make interpretation easier, however, when the means are reported on the skewed variables they are reported on the variables prior to transformation. The means and standard deviations on all of the variables measured in the study are presented in Appendix S.

In order to examine the impact of transforming the variables Appendix T contains a correlation matrix showing the correlations of all the variables in the study with the significantly skewed variables both before and after they were transformed. As can be seen in the appendix, the transformations tend to either slightly increase or decrease existing relationships.

Following the transformations of the significantly skewed variables, univariate outliers within groups were examined for all variables in the study. No outliers were found among groups of health anxious and non-health anxious individuals, men and women, or individuals receiving positive, negative, or ambiguous diagnostic feedback.

Manipulation Checks

An ANOVA with health anxiety as the independent variable of interest and scores on the IAS as the dependent variable of interest was carried out to examine whether health anxious and non-health anxious individuals had significantly different scores on the IAS as was intended. Table 2 presents the results of this analysis as well as the means and standard deviations for the health anxious and non-health anxious groups on the IAS. As can be seen there a significant main effect for health anxiety was found. Examination of the means

Table 1

Skewness Values Before and After Transformations

Variable Name[a]	Skewness	
	Before	After
Squared Transformations		
Withdrawal Pain Rating	-.85	-.18
Evaluative Pain Rating	-.40	-.05
CSQ Cognitive Coping	-.84	-.19
CSQ Control	-.56	.17
More Info. Requested (Time 1)	-.71	-.07
More Info. Requested (Time 2)	-.63	.02
Desire to Reduce Risk	-.56	-.03
Experimenter Competence	-1.08	-.36
Square Root Transformations		
Self Deceptive Response Style	.89	.24
Impression Management	.77	.07
Affective Pain Rating	1.04	.44
CSQ Distraction	.35	.01
Diagnostic Reliability	.34	-.14
Log 10 Transformations		
Benign Symptom Rating	.85	-.01
High Risk Symptom Rating	.61	.26
Baseline Expressiveness	1.50	.33
Immediate Expressiveness	1.18	.25
Middle Expressiveness	1.60	.55
End Expressiveness	1.31	.51
Negative Perception of Study	.66	-.09

[a] $\underline{n}$ = 192.

Table 2

Results of Univariate F-test and Means and Standard Deviations Examining Differences among Health Anxious

and Non-Health Anxious on the Illness Attitudes Scales

| | Health Anxiety | | | | |
	Normal[a]	High[a]	$\underline{Df}$	$\underline{F}$	$\underline{p} <$
$\underline{M}$	26.21	48.26	1, 190	483.52	.0001
$\underline{SD}$	7.86	5.89			

Note. Scores on the IAS can range from 0 to 96.

[a] $\underline{n} = 96$.

confirms that dividing subjects into health anxious and non-health anxious groups resulted in the health anxious group having a significantly greater score on the IAS than the non-health anxious group. It should be noted that as was intended, the health anxious group's mean score fell far below the mean that is typically found in clinical samples ($M = 61.7$) (Kellner, 1987).

A 2 X 3 X 2 ANOVA was carried out to determine the impact of health anxiety, diagnostic feedback, and sex on perceived likelihood of experiencing medical complications. The main purpose of this analysis was to determine whether the varying diagnostic feedback had the impact it was supposed to have. The results of the analysis are presented in Table 3. As can be seen there, main effects for diagnostic feedback and health anxiety were found. No main effect for sex was found. As well, no interactions were found.

Table 4 presents the means showing the effect of diagnostic feedback and health anxiety on perceived medical risk. Tukey's post hoc analyses examining the means on perceived medical risk for individuals receiving positive, negative, or ambiguous diagnostic feedback confirmed that the diagnostic feedback was effective. Individuals who were given positive diagnostic feedback perceived themselves to be at greater than average risk for experiencing medical complications compared to individuals receiving either ambiguous or negative feedback who perceived themselves to be at lower than average risk (with those receiving negative diagnostic feedback perceiving their risk to be the least of all).

The means presented in Table 4 also demonstrate that health anxious individuals believed that they at a greater risk for experiencing medical complications than non-health anxious individuals. At the same time however, it should be noted that scores for both health anxious and non-health anxious individuals fall within range which would suggest that both groups perceived themselves to be at moderate risk.

Demographic Variables

Due to the non-random assignment of health anxiety and sex, it was important to examine whether were any important background differences among the groups. A 2 X 2 (health anxiety X sex) ANOVA was used to examine whether there were differences among health anxious and non-health anxious groups and women with respect to age. No main effects or interactions were found. Chi square analyses examine whether race and the report of minor medical conditions were differentially associated with health anxiety sex, or the interaction of the two. Once again no relationships were found.

Table 3

Results of Multivariate Analysis of Variance Examining Group Differences in Perceived Medical Risk

	$\underline{Df}$	$\underline{F}$	$\underline{p}<$
Main Effects			
Health Anxiety	1, 180	6.97	.009
Diagnostic Feedback	2, 180	43.48	.0001
Sex	1, 180	.41	.52
Interactions			
HA X Diag	2, 180	.37	.69
HA X Sex	1, 180	.02	.88
Diag X Sex	2, 180	.16	.85
HA X Diag X Sex	2, 180	.50	.61

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 4

Means and Standard Deviations Showing Perceived Risk for Experiencing Medical Complications as a Function

of Diagnostic Feedback and Health Anxiety

| | Diagnostic Feedback | | | Health Anxiety | |
	Positive[a]	Ambiguous[a]	Negative[a]	Normal[b]	High[b]
$\underline{M}$	6.02	4.08	3.09	4.05	4.74
$\underline{SD}$	1.87	1.67	1.52	2.07	2.03

Note. Perceived risk was rated on a 1 to 9 scale, with high scores indicating greater risk.

[a] $\underline{n} = 64$.

[b] $\underline{n} = 96$.

Cognitive and Behavioural Response Patterns to Cold Pressor Pain

Spontaneous coping and appraisal. A 2 X 3 X 2 ANOVA examined whether health anxiety, diagnostic feedback, and sex influenced subjects' appraisal of the cold pressor task. It should be recalled that appraisal was assessed during the interview by asking subjects to recall what they were thinking before putting their hand in the water. Subjects' responses were rated on a 1 to 7 expectancy scale, where higher scores indicated a positive appraisal of the subject's ability to cope and tolerate the pain. The hypotheses that were made with respect to this variable are presented in Appendix U. The results of the analysis are presented in Table 5 where it can be seen that none of the expected main effects or interactions were found.

A 2 X 3 X 2 repeated measures MANOVA was carried out to examine whether health anxiety, diagnostic feedback, and sex influenced the use of coping strategies (i.e., avoidant, negative somatic monitoring, positive concrete somatic monitoring) subjects reported when their hand was in the water at various points during the cold pressor experience (e.g., beginning, middle and end of cold pressor). The hypotheses made concerning these variables are outlined in Appendix U. The results of the analysis are presented in Table 6. Multivariate F-tests revealed main effects for health anxiety, sex, and time. No other main effects or interactions were found.

Univariate F-tests were carried out to examine the main effect for health anxiety further. These results showed that health anxiety significantly influenced the use of both negative and positive somatic monitoring. Examining the means in Table 7 it appears that health anxious individuals showed a clear occurrence of negative somatic monitoring and a clear absence of positive concrete somatic monitoring to cope with the pain. Non-health anxious individuals showed the exact opposite pattern. There was no support for the hypothesis that health anxious individuals would be more likely to use avoidant strategies.

Univariate F-tests were carried out to examine the main effect that was found for sex. The results suggested that men and women differed in their use of negative somatic monitoring, but not in their use of positive somatic monitoring or avoidant strategies. Examining the means in Table 7 it appears that women were more likely to show a clear occurrence of negative somatic monitoring than men.

Univariate F-tests were also examined to explore the main effect that was found for time. The results suggested that over time there was a change in the reporting of strategies. Tukey's post hoc analyses on the means for each of these strategies at the various time periods (see Table 7) demonstrated that subjects were more likely to report the use of both avoidant strategies, and positive concrete somatic monitoring strategies during the

Table 5

Results of Analysis of Variance Examining Group Differences in Appraisal of Cold Pressor Pain

	Df	F	p <
Main Effects			
Health Anxiety	1, 180	.00	1.00
Diagnostic Feedback	2, 180	.34	.71
Sex	1, 180	1.11	.29
Interactions			
HA X Diag	2, 180	.38	.69
HA X Sex	1, 180	1.40	.24
Diag X Sex	2, 180	.02	.98
HA X Diag X Sex	2, 180	.60	.55

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 6

Results of Multivariate Analysis of Variance Examining Group Differences in Spontaneously Reported Coping
Strategies

	Df	F	$p <$
Multivariate Main Effects Followed by Univariate F-tests			
Health Anxiety	3, 178	7.03	.0001
Avoidance	1, 180	2.72	.10
Positive Monitoring	1, 180	6.57	.01
Negative Monitoring	1, 180	18.01	.0001
Diagnostic Feedback	6, 356	.78	.59
Avoidance	2, 180	1.55	.22
Positive Monitoring	2, 180	.10	.90
Negative Monitoring	2, 180	.72	.49
Sex	3, 178	8.53	.0001
Avoidance	1, 180	3.32	.07
Positive Monitoring	1, 180	.00	1.00
Negative Monitoring	1, 180	21.31	.0001
Time	6, 716	9.34	.0001
Avoidance	2, 360	2.85	.06
Positive Monitoring	2, 360	2.97	.05
Negative Monitoring	2, 360	21.39	.0001

Interactions

HA X Diag X Sex X Time	12, 947	1.38	.17
Diag X Sex X Time	12, 947	1.21	.27
HA X Sex X Time	6, 716	.65	.69
HA X Diag X Time	12, 947	.65	.80
HA X Diag X Sex	6, 356	1.93	.08
Sex X Time	6, 716	1.46	.19
Diag X Time	12, 947	1.61	.08
HA X Time	6, 716	1.47	.19
Diag X Sex	6, 356	.99	.43
HA X Sex	3, 178	1.64	.18
HA X Diag	6, 356	.85	.53

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 7

Means and Standard Deviations Showing Use of Spontaneous Coping Strategies as A Function of Health

Anxiety, Sex, and Time

		Health Anxiety		Sex		Time		
		Normal[a]	High[a]	M[b]	F[c]	Imm[d]	Mid[d]	End[d]
Negative	M	.99	1.25	.90	1.23	1.41	.92	1.03
Monitoring	SD	.50	.52	.53	.48	.72	.75	.88
Positive	M	1.07	.82	.94	.94	.87	1.12	.85
Monitoring	SD	.73	.70	.65	.76	1.10	1.22	1.15
Avoidant	M	.56	.37	.58	.40	.42	.55	.42
Strategy	SD	.68	.55	.71	.57	.88	1.03	.85

Note. Participants self-reports were scored as 0 (no occurrence), 1 (minimal occurrence), or 2 (significant

occurrence) on each variable.

[a] $n = 96$.

[b] $n = 66$.

[c] $n = 126$.

[d] $n = 192$.

middle of the cold pressor experience compared to either the beginning or the end of the experience. Negative somatic monitoring, on the other hand, tended to occur more frequently in the very beginning of the cold pressor test compared to both the middle and the end segments. Differences between the latter two periods were not significant, although the trend was for negative somatic monitoring to increase at the end compared to the middle.

At this point, it should be noted that the predicted interactions between health anxiety and time for the avoidant and negative somatic monitoring styles were not found. It was thought that health anxious individuals would be more likely to use avoidant strategies in the beginning of the cold pressor task compared to the middle and end; non-health anxious individuals were predicted not to use this strategy at all throughout. This was not found, however. It was also thought that during the middle and end periods of the cold pressor experience health anxious individuals would be more likely to use negative somatic monitoring; non-health anxious individuals were expected not to use the strategy at all. This interaction was also not found.

The expected interactions between health anxiety and diagnostic feedback in the use of coping strategies were also not found. It was hypothesized that in response to negative diagnostic feedback health anxious individuals would be more likely to use an avoidant strategy compared to other health anxious subjects; non-health anxious individuals were not expected to use this strategy. In response to positive and ambiguous diagnostic information it was thought that health anxious individuals would be more likely to use negative somatic monitoring compared to other health anxious subjects; non-health anxious individuals were not expected to use negative somatic monitoring at all. Finally, in response to positive diagnostic information it was thought that non-health anxious individuals would show the greatest usage of positive somatic monitoring compared to other non-health anxious subjects; health anxious subjects were not expected to use the positive concrete somatic monitoring strategy. None of the expected interactions were found.

Cued coping strategies. A 2 X 3 X 2 MANOVA examined whether health anxiety, diagnostic feedback, and sex influenced responses on the scales of the Coping Strategies Questionnaire (i.e., distraction, ignoring, reinterpretation, coping, control, praying, and catastrophising). The hypotheses that were made with regard to these variables are presented in Appendix U. The results of the analysis are presented in Table 8. The multivariate F-tests showed a main effect for health anxiety and for sex. No other main effects or interactions were found.

Table 8

Results of Multivariate Analysis of Variance Examining Group Differences in Cued Coping Strategies

	Df	F	p <
Multivariate Main Effects followed by Univariate F-tests			
Health Anxiety	7, 174	3.19	.003
Distraction	1, 180	.36	.55
Ignoring	1, 180	1.31	.26
Reinterpretation	1, 180	.45	.50
Coping	1, 180	.13	.72
Praying	1,180	.06	.80
Control	1, 180	9.05	.003
Catastrophising	1, 180	15.86	.0001
Diagnostic Feedback	14, 358	.56	.89
Distraction	2, 180	1.01	.37
Ignoring	2, 180	.39	.68
Reinterpretation	2, 180	.15	.86
Coping	2, 180	.52	.60
Praying	2, 180	.19	.82
Control	2, 180	.18	.84
Catastrophising	2, 180	.73	.49
Sex	7, 174	3.14	.004
Distraction	1, 180	2.26	.13
Ignoring	1, 180	1.65	.20
Reinterpretation	1, 180	1.53	.22
Coping	1, 180	.14	.71
Praying	1, 180	9.02	.003
Control	1, 180	8.06	.005
Catastrophising	1, 180	3.77	.05

Interactions

HA X Diag X Sex	14, 348	1.09	.37
Diag X Sex	14, 348	.93	.52
HA X Sex	7, 174	.94	.48
HA x Diag	14, 348	1.38	.32

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Follow up univariate $\underline{F}$-tests examining the main effect for health anxiety indicated that health anxiety influenced the report of catastrophising cognitions and the perception of control over pain. Examining the means in Table 9 it appears that scores for both health anxious and non-health anxious individuals were in the range that would indicate that catastrophising occurred at close to a moderate level for both groups, although at the same time at a significantly higher rate for health anxious individuals. On the variable measuring control, both groups obtained a score that would indicate they felt some control over their pain, although once again, it seems that health anxious individuals experienced significantly less control than non-health anxious individuals.

Note that the expected main effects for health anxiety on the measures of distraction, ignoring, cognitive coping, and reinterpretation were not found. That is, health anxious individuals were no more likely to use avoidant strategies than non-health anxious individuals. Further, non-health anxious individuals were no more likely to use cognitive coping and reinterpretation than non-health anxious individuals.

Also important to note is that the expected interactions between health anxiety and diagnostic feedback were not found in the present study. That is, diagnostic feedback did not influence the type of strategy that was used by health anxious and non-health anxious individuals. It was thought that in response to negative diagnostic information health anxious individuals would be more likely to use avoidant strategies, whereas in response to positive and ambiguous diagnostic information, health anxious individuals would be more likely to report catastrophising cognitions compared to all other subjects. Non-health anxious individuals, on the other hand, were expected to use cognitive coping and reinterpretation especially when confronted with positive diagnostic information compared to all other subjects. No support, however, was found for the expected interactions.

Follow up univariate $\underline{F}$-tests were carried out to examine the main effect for sex. These tests suggested that sex influenced the report of catastrophising cognitions, the use of praying to cope with pain, and the perception of control over the pain (see Table 8). Sex did not influence responses to the other CSQ scales. Examination of the means in Table 9 demonstrates that the nature of these findings was such that women showed a greater tendency to catastrophise and to use praying to cope with their pain than men. Scores for both groups on both variables were in a range that would indicate low to moderate usage of the strategies for both men and women, with women, however, using them slightly more than men. Also apparent from Table 9 is that men tended to report experiencing greater control over their pain than women. Scores for both groups on the variable

Table 9

Means and Standard Deviations Showing the Use of Cued Coping Strategies as a Function of Health Anxiety and

Sex

Variable		Health Anxiety		Sex	
		Normal[a]	High[a]	Males[b]	Females[c]
Catastrophising	M	2.04	2.80	2.18	2.55
	SD	1.31	1.24	1.29	1.26
Control	M	3.58	3.21	3.65	3.27
	SD	1.17	1.05	1.21	1.06
Pray	M	---	---	1.87	2.37
	SD	---	---	1.02	1.15

Note. Scores on the scales range from 0 to 6.

[a] $n = 96$.

[b] $n = 66$.

[c] $n = 126$.

measuring control were such that both men and women felt some control over their pain, although men felt significantly more than women.

Pain reaction. A 2 X 3 X 2 MANOVA was used to examine the effect of health anxiety, diagnostic feedback, and sex on pain tolerance, pain intensity upon withdrawal from the cold pressor, recovery interval, and use of sensory, affective, and evaluative words to describe the pain. The predictions with regard to these variables are presented in Appendix U. The results of the analysis are summarized in Table 10. Multivariate F-tests indicated that there were main effects for both health anxiety and sex. No other main effects or interactions were found.

Univariate F-tests were carried out to examine the main effect found for health anxiety further (see Table 10). The univariate F-tests suggested that health anxiety influenced pain tolerance, pain intensity ratings upon withdrawal from the cold pressor, and the use of affective and evaluative words to describe the pain. Health anxiety did not influence the recovery interval or the use of sensory words to describe the pain experience, although the latter finding was marginally significant. Examination of the means in Table 11 helps explain the nature of the significant findings. It appears that health anxious individuals compared to non-health anxious individuals were less likely to complete the cold pressor task, but yet they more likely to describe the pain with greater intensity immediately upon withdrawing their hand from the water. Health anxious individuals, on average, kept their hand in the water for 198 seconds, whereas non-health anxious individuals kept their hand in the water for 249 seconds. Examining the means in Table 11 also reveals that health anxious individuals were more likely than non-health anxious individuals to use affective and evaluative words to describe their pain.

Univariate F-tests were also carried out to examine the main effect that was found for sex (see Table 10). The results of the univariate F-tests revealed that the sex of the subject influenced pain tolerance, recovery interval, reported pain intensity and the use of evaluative words to describe the pain. Examining the means presented in Table 11 reveals the nature of the significant findings. Women as compared to men were more likely to withdraw their hand earlier from the cold pressor and to describe their pain as more intense immediately upon removing their hand from the cold pressor. The means in Table 11 also revealed that women recovered at a later interval compared to men and tended to use more evaluative words to describe their pain.

Nonverbal reaction to pain. A 2 X 3 X 2 repeated measures ANOVA was used to examine whether health anxiety, diagnostic feedback, and sex influenced facial expressiveness at various points throughout the

Table 10

Results of Multivariate Analysis of Variance Examining Group Differences in Pain Reaction

	Df	F	$p <$
Multivariate Main Effects followed by Univariate F-tests			
Health Anxiety	6, 175	2.87	.01
Tolerance	1, 180	7.09	.008
Withdrawal Pain Rating	1, 180	3.72	.05
Recovery Interval	1, 180	1.21	.27
Sensory	1, 180	3.70	.06
Affect	1, 180	8.09	.005
Evaluative	1, 180	8.77	.003
Diagnostic Feedback	12, 350	.44	.95
Tolerance	2, 180	.64	.53
Withdrawal Pain Rating	2, 180	.16	.85
Recovery Interval	2, 180	.23	.79
Sensory	2, 180	1.23	.30
Affective	2, 180	.05	.95
Evaluative	2, 180	.02	.98
Sex	6, 175	4.77	.0001
Tolerance	1, 180	10.90	.001
Withdrawal Pain Rating	1, 180	7.40	.007
Recovery Interval	1, 180	12.42	.001
Sensory	1, 180	3.53	.06
Affect	1, 180	1.86	.17
Evaluative	1, 180	6.76	.01

Interactions

HA X Diag X Sex	12, 350	1.75	.06
Diag X Sex	12, 350	.53	.90
HA X Sex	6, 175	.91	.49
HA x Diag	12, 350	1.21	.27

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 11

Means and Standard Deviations Showing Pain Reaction Variables as a Function of Health Anxiety and Sex

Variable		Health Anxiety		Sex	
		Normal[a]	High[a]	Males[b]	Females[c]
Tolerance (0-1)	M	.76	.55	.81	.58
	SD	.43	.50	.40	.48
Recovery	M	---	---	4.31	5.72
Interval (1-9)	SD	---	---	2.59	2.62
Withdrawal Pain	M	93.60	105.93	90.39	104.67
Rating (0-150)	SD	40.55	35.60	39.17	37.45
Evaluative (0-5)	M	2.52	3.25	2.45	3.11
	SD	1.78	1.60	1.76	1.68
Affective (0-14)	M	2.21	3.15	---	---
	SD	2.63	2.75	---	---

Note. Minimum and maximum scores for the variables are given in brackets beside the variable name.

[a] $n = 96$.

[b] $n = 66$.

[c] $n = 126$.

cold pressor task. The hypotheses regarding expressiveness were fairly tentative, and are presented in Appendix U.

The results of the analyses are presented in Table 12. As can be seen there a main effect for event emerged. No other main effects were found. In particular, the main effect for health anxiety that was expected was not found. Tukey's post hoc tests examining the nature of the main effect for event suggested that all subjects were judged to be the most expressive during the first 10 seconds of the ice water immersion compared to all other segments. As can be seen by the ratings, however, very low expressiveness ratings were given to all subjects in general.

The results of the analyses reported in Table 12 also show that a number of interactions were significant. In particular, there was a significant interaction between event and health anxiety and event and sex. It should be noted that the expected interaction between health anxiety and diagnostic feedback did not emerge. That is, health anxious individuals did not show greater expressiveness when they were given positive and ambiguous test results compared to when they were given negative test results and compared to non-health anxious individuals.

Simple effects analyses were used to explore the nature of the interactions that were found (see Table 12). Simple effects analyses examining differences among health anxious and non-health anxious groups at each time expressiveness was judged showed that health anxious individuals did not differ from non-health anxious individuals until the end of the cold pressor task. By examining the means presented in Table 13 it is clear that at the end of the cold pressor task, health anxious individuals were significantly more expressive than non-health anxious individuals.

Simple effects analyses also revealed that both health anxious and non-health anxious individuals responded with differential activity at different points during the cold pressor experience. Tukey's post hoc comparisons on the means revealed that non-health anxious individuals tended to be the most expressive prior to the cold pressor and in the first 10 seconds of their response to the cold pressor. On the other hand, Tukey's post hoc comparisons examining how health anxious individuals responded to the events revealed that health anxious individuals were considerably more expressive throughout the cold pressor experience compared to the baseline segment.

Simple effects analyses were also carried out to examine differences among men and women at each time expressiveness was judged (see Table 12). These analyses showed that women did not differ from men until

Table 12

Results of Multivariate Analysis of Variance Examining Group Differences in Expressiveness

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	Df	F	$p <$

Main Effects

Health Anxiety	1, 180	2.95	.09
Diagnostic Feedback	2, 180	.47	.63
Sex	1, 180	1.23	.27
Time	3, 540	3.07	.03

Interactions When Significant Followed by Simple Effects

HA X Diag X Sex X Time	6, 540	1.39	.22
Diag X Sex X Time	6, 540	.80	.57
HA X Sex X Time	3, 540	.23	.88
HA X Diag X Time	6, 540	.60	.73
HA X Diag X Sex	2, 180	.61	.54
Diag X Time	6, 540	1.40	.21
Sex X Time	3, 540	3.28	.02
Sex @ Baseline	1, 188	.13	.72
Sex @ Immediate	1, 188	1.12	.29
Sex @ Middle	1, 188	.01	.94
Sex @ End	1, 188	6.30	.01
Time @ Male	3, 564	1.93	.12
Time @ Female	3, 564	5.40	.001

HA X Time	3, 540	2.92	.03
HA @ Baseline	1, 188	.01	.93
HA @ Immediate	1, 188	2.13	.15
HA @ Middle	1, 188	2.97	.09
HA @ End	1, 188	10.25	.002
Event @ HA	3, 564	4.73	.003
Event @ Non-HA	3, 564	2.76	.04
Diag X Sex	2, 180	.59	.56
HA X Sex	1, 180	1.13	.29
HA x Diag	2, 180	.63	.54

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 13

Means and Standard Deviations on Facial Expressivity as a Function of Time, Health Anxiety, and Sex

Variable		Health Anxiety		Sex	
		Normal[a]	High[a]	Males[b]	Females[c]
Before CP	M	2.80	2.82	2.83	2.79
	SD	1.24	1.44	1.26	1.42
Immediate	M	2.94	3.34	3.01	3.27
	SD	1.29	1.76	1.49	1.62
Middle	M	2.73	3.15	2.94	2.93
	SD	1.49	1.81	1.67	1.67
End	M	2.58	3.36	2.60	3.33
	SD	1.29	1.87	1.29	1.99

Note. Expressiveness ratings were made on a 1 to 9 scale with higher scores signifying greater expressivity.

[a] n = 96.

[b] n = 66.

[c] n = 126

the end of the cold pressor task. Examining the means presented in Table 13 it appears that women were significantly more expressive than men at the end point. Simple effects analyses also revealed that women, but not men, responded with varying degrees of facial activity depending on the point in time expressiveness was measured. Tukey's post hoc analyses on the means for the different time periods for women revealed that women were the most expressive at the very beginning and at the very end, and the least expressive prior to the cold pressor and in the middle of the experience.

Cognitive and Behavioural Reactions to Diagnostic Feedback

Concern and information seeking. A repeated measures MANOVA examined the impact of health anxiety, diagnostic feedback, and sex on concern and desire for more information. The purpose of the repeated measure was to determine whether concern and desire for more information changed after participants experienced the cold pressor pain. The hypotheses concerning these variables are outlined in Appendix U.

The results of the MANOVA are presented in Table 14. As can be seen there, the multivariate F-tests revealed main effects for health anxiety, diagnostic feedback, sex and time. No interactions were found.

Univariate F-tests were carried out to examine the nature of the main effect for health anxiety. The results suggested that health anxiety influenced both concern and desire for more information. The means in Table 15 were examined to explore the nature of the significant findings. It was found that health anxious individuals scored in a range indicating greater than moderate concern for the test results, whereas non-health anxious individuals scored in a range that indicated less than moderate concern for their test results. Both health anxious and non-health anxious individuals wanted additional information about the testing, however, health anxious individuals were significantly more interested in this information than non-health anxious individuals. At this point it is important to note that the expected interactions on measures of concern and desire for more information between health anxiety and diagnostic feedback before and after the cold pressor experience were not found.

Univariate F-tests were also carried out to examine the nature of the main effect that was found for diagnostic feedback (see Table 14). These tests revealed diagnostic feedback influenced concern and desire for more information. Tukey's post hoc tests on the means to explore these significant findings showed that individuals receiving positive feedback were more concerned and desired more information than individuals

Table 14

Results of Multivariate Analysis of Variance Examining Concern and Desire for More Information Before and

After the Cold Pressor

	Df	F	$p <$
Multivariate Main Effects Followed by Univariate F-tests			
Health Anxiety	2, 179	13.19	.0001
Concern	1, 180	26.47	.0001
More Info	1, 180	4.76	.03
Diagnostic Feedback	4, 358	9.08	.0001
Concern	2, 180	18.66	.0001
More Info	2, 180	5.25	.006
Sex	2, 179	4.26	.02
Concern	1, 180	4.87	.03
More Info	1, 180	6.88	.009
Time	2, 179	7.72	.001
Concern	1, 180	14.42	.0001
More Info	1, 180	.26	.61

Interactions

HA X Diag X Sex X Time	4, 358	.59	.67
Diag X Sex X Time	4, 358	1.61	.17
HA X Sex X Time	2, 179	2.39	.10
HA X Diag X Time	4, 358	1.40	.23
HA X Diag X Sex	4, 358	1.02	.40
Sex X Time	2, 179	.67	.51
Diag X Time	4, 358	.98	.42
HA X Time	2, 179	.02	.99
Diag X Sex	4, 358	.21	.93
HA X Sex	2, 179	.10	.91
HA X Diag	4, 358	.52	.72

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 15

Means and Standard Deviations Showing Concern and Desire for More Information as a Function of Health

Anxiety, Sex, Time, and Diagnostic Feedback

Variable		Health Anxiety		Sex		Time		Diagnostic Info		
		Normal[a]	High[a]	M[b]	F[c]	1[d]	2[d]	Pos[e]	Neg[e]	Ambig[e]
Concern	M	4.54	5.89	5.60	5.01	5.01	5.42	6.30	4.25	5.09
	SD	2.04	1.83	1.96	2.08	2.22	2.09	1.59	2.14	1.88
Info	M	6.21	6.77	6.96	6.24	---	---	7.16	5.88	6.41
	SD	1.95	1.85	1.72	1.98	---	---	1.39	2.37	1.67

Note. Ratings were made on a 1 to 9 scale, with higher ratings signifying greater concern and a greater desire

for information.

[a] $n = 96$.

[b] $n = 66$.

[c] $n = 126$.

[d] $n = 192$.

[e] $n = 64$.

receiving either negative or ambiguous test results. The differences between the latter two conditions were nonsignificant.

Univariate F-tests were carried out to examine more thoroughly the nature of the main effect that was found for sex as well. The results (see Table 14) showed that sex of the participant influenced both concern and desire for additional information. Examining the means in Table 15 to explore these significant findings it was clear that men were more concerned about their test results and wanted more information than women. Both sets of scores, however, fell in a range that would indicate that both men and women were concerned and wanted additional information.

Univariate F-tests were carried out to examine the nature of the main effect for time. The results suggested that time influenced the amount of concern, but not the desire for additional information. Examining the means presented in Table 15 it appears that subjects showed slightly more concern for their test results over time. Immediately after testing subjects were moderately concerned with their test results, whereas after having experienced the cold pressor task they were slightly more than moderately concerned with the test results.

A number of other questions were asked that tapped subjects' concern for the test results and desire for more information, including: (a) the percentage of others they believed were at risk for experiencing physiological complications; (b) how serious they perceived being at risk to be; (c) whether they would like to learn how to decrease their risk; (d) the number of questions they had about the testing or test results; and e) whether they would like more testing. These variables were entered together into a 2 X 3 X 2 (health anxiety X diagnostic feedback X sex) MANOVA. The results are reported in Table 16. Multivariate F-tests revealed main effects for health anxiety and diagnostic feedback. No other main effects or interactions were found.

Univariate F-tests examining the nature of the main effect for health anxiety were carried out and showed that health anxiety influenced perceptions of risk for experiencing medical complications. Health anxiety also appeared to influence the desire to learn more about how to reduce one's risk, although this finding was only marginally significant. Examining the means in Table 17 it appears that health anxious individuals felt that more people were at risk (45%) for experiencing medical complications compared to non-health anxious individuals (36%). Health anxious individuals and non-health anxious individuals alike were more than moderately interested in learning how to reduce their risk, but health anxious individuals were slightly more interested in reducing their risk than non-health anxious individuals.

Table 16

Results of Multivariate Analysis of Variance Examining Cognitive Reaction and Behavioural Intentions

Following Diagnostic Feedback

	Df	F	p <

Multivariate Main Effects followed by Univariate F-tests

	Df	F	p <
Health Anxiety	5, 176	3.74	.003
Percentage	1, 180	13.34	.0001
Seriousness	1, 180	1.50	.22
Learn more	1, 180	3.51	.06
More questions	1, 180	.70	.40
More testing	1, 180	1.26	.26
Diagnostic Feedback	10, 352	3.00	.001
Percentage	2, 180	3.05	.05
Seriousness	2, 180	.64	.53
Learn more	2, 180	6.73	.002
More questions	2, 180	.11	.90
More testing	2, 180	2.49	.09
Sex	5, 176	1.41	.22
Percentage	1, 180	.33	.56
Seriousness	1, 180	.02	.89
Learn more	1, 180	3.77	.05
More questions	1, 180	3.70	.06
More testing	1, 180	2.07	.15

Interactions

HA X Diag X Sex	10, 352	.93	.50
Diag X Sex	10, 352	1.00	.44
HA X Sex	5, 176	.38	.86
HA x Diag	10, 352	.74	.68

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 17

Means and Standard Deviations Showing Estimated Percentage Risk and Desire to Lower Risk as a Function of

Health Anxiety and Diagnostic Feedback

		Health Anxiety		Diagnostic Feedback		
		Normal[a]	High[a]	Positive[b]	Negative[b]	Ambiguous[b]
Percent	M	35.52	44.77	44.80	36.06	39.58
At Risk	SD	18.10	18.32	17.60	17.64	19.39
Reduce	M	6.48	6.96	7.44	6.33	6.39
Risk	SD	1.81	1.76	1.47	1.94	1.77

Note. Percentage risk was scored on an 11 point scale ranging from 0 to 100%, whereas desire to reduce risk was

rated on a 1 to 9 scale with higher scores indicating greater desire.

[a] $n = 96$.

[b] $n = 64$.

Health anxiety did not influence ratings of seriousness. Nor did it influence the number of questions subjects had or their desire to have more testing carried out. Health anxiety also did not interact with diagnostic feedback in the way it was expected to. That is, non-health anxious individuals receiving positive diagnostic information compared to negative and ambiguous information were expected to have lower seriousness ratings, and higher risk ratings (indicating less seriousness), but at the same time more questions and a greater desire for more testing and information. These expected interactions were not found.

Univariate F-tests were carried out to examine the main effect that was found for diagnostic feedback (see Table 16). The results of these tests demonstrated that diagnostic feedback influenced perception of risk, as well as desire to reduce risk for experiencing medical complications. Tukey's post hoc tests were carried out to understand the nature of these findings further. These tests revealed that individuals receiving positive diagnostic feedback believed that the risk for experiencing medical complications was much higher than individuals receiving ambiguous and negative test results. Those receiving positive diagnostic feedback thought that approximately 45% of individuals would be at risk for experiencing physiological medical complications, whereas those receiving negative and ambiguous test results felt that only 38% of individuals would be at risk. Tukey's post hoc tests on the mean scores for desire for additional information revealed that individuals receiving positive diagnostic test results were more likely to be interested in learning how to reduce their risk for experiencing medical complications than individuals receiving either ambiguous or negative test results. It should be noted, however, that all scores are well above average for all groups.

Validity of results. In general, it is interesting to note that subjects rated the test results on a 1 to 9 scale as being moderately accurate (M = 5.65, SD = 1.38) and they were moderately confident in the test results (M = 5.5, SD = 1.53). On a variable measuring experimenter competence (prior to transformation), subjects rated the experimenter as being more than moderately competent (M = 7.36, SD = 1.19) on a scale ranging from 1 to 9. Further, all subjects believed that there was a greater than average chance that the results were reliable (M = 5.83, SD = 1.24).

A 2 X 3 X 2 MANOVA examined whether health anxiety, diagnostic feedback and sex influenced subjects' perceptions of the validity of the test results. The hypotheses concerning the variables are presented in Appendix U. The results of the analyses are presented in Table 18. Multivariate F-tests revealed main effects for health anxiety and diagnostic feedback. No other main effects or interactions were found.

Table 18

Results of Multivariate Analysis of Variance Examining Reliability, Accuracy, Confidence, and Competency Ratings

	Df	F	$p <$
Multivariate Main Effects followed by Univariate F-tests			
Health Anxiety	4, 177	2.46	.05
Accurate	1, 180	6.24	.01
Reliability	1, 180	.12	.73
Confidence	1, 180	.04	.85
Competence	1, 180	.07	.79
Diagnostic Feedback	8, 354	3.27	.001
Accurate	2, 180	3.54	.03
Reliability	2, 180	8.69	.0001
Confidence	2, 180	5.30	.006
Competence	2, 180	.64	.53
Sex	4, 177	.86	.49
Accurate	1, 180	.12	.73
Reliability	1, 180	.30	.58
Confidence	1, 180	1.97	.16
Competence	1, 180	.41	.52
Interactions			
HA X Diag X Sex	8, 354	.72	.68
Diag X Sex	8, 354	.95	.48
HA X Sex	4, 177	1.27	.28
HA x Diag	8, 354	1.03	.41

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Univariate F-tests were carried out to examine the nature of the main effect that was found for health anxiety (see Table 18). The results revealed that health anxiety influenced perceptions of test accuracy. Examining the means it appears that the nature of this finding was such that health anxious individuals perceived the test results to be more accurate than non-health anxious individuals, although both groups of subjects saw the test results as having a greater than average chance of being accurate (see Table 19). Health anxiety did not influence perceptions of experimenter competence, confidence, or reliability.

Univariate F-tests were also carried out to examine the nature of the main effect that was found for diagnostic feedback. As can be seen in Table 18, diagnostic feedback influenced how accurate and reliable the test results were perceived to be. Further, diagnostic feedback influenced confidence in the test results. Tukey's post hoc tests were performed to examine these findings further, and showed that individuals receiving ambiguous test results perceived the test results to be less accurate than individuals receiving either positive or negative test results. Post hoc analyses also showed that individuals receiving both ambiguous and positive test results perceived the test results to be less reliable and were less confident in the test results compared to individuals receiving negative test results.

Note that the expected interactions between health anxiety and diagnostic feedback did not occur. That is, health anxious individuals receiving positive and ambiguous test results did not perceive the test results to be more valid than health anxious individuals receiving negative test results. Further, non-health anxious individuals receiving negative test results did not perceive the test results to be more valid than non-health anxious individuals receiving positive and ambiguous test results.

Symptom perception. A 2 X 3 X 2 MANOVA was carried out to examine whether health anxiety, diagnostic feedback, and sex influenced the report of general symptoms, as well as at risk symptoms. The hypotheses regarding these variables are presented in Appendix U, and the test results are summarized in Table 20. Multivariate F-tests indicated that there was a main effect for health anxiety. No other main effects or interactions were found. Univariate F-tests were carried out to examine the nature of the main effect found for health anxiety. The results are presented in Table 20 and suggest that health anxiety influenced both the perception of general symptoms and at risk symptoms. Examining the means in Table 21 clarifies the nature of this finding and suggests that health anxious individuals compared with non-health anxious individuals were more likely to report general symptoms as well as at risk symptoms.

Table 19

Means and Standard Deviations Showing Accuracy, Reliability, and Confidence Ratings as a Function of

Diagnostic Feedback and Health Anxiety

Variable		Diagnostic Feedback			Health Anxiety	
		Positive[a]	Negative[a]	Ambiguous[a]	Normal[b]	High[b]
Accuracy	M	5.80	5.94	5.22	5.37	5.93
	SD	1.49	1.23	1.26	1.41	1.31
Reliable	M	5.53	6.48	5.48	---	---
	SD	1.60	1.40	1.51	---	---
Confidence	M	5.52	5.98	5.02	---	---
	SD	1.63	1.35	1.48	---	---

Note. Ratings were made on a 1 to 9 scale with higher ratings indicating greater accuracy, reliability, and

confidence.

[a] $n = 64$.

[b] $n = 96$.

Table 20

Results of Multivariate Analysis of Variance Examining General and At Risk Symptom Reports

	Df	$\underline{F}$	$\underline{p} <$
Multivariate Main Effects followed by Univariate F-tests			
Health Anxiety	2, 179	25.77	.0001
General	1, 180	51.37	.0001
At Risk	1, 180	28.32	.0001
Diagnostic Feedback	4, 358	.70	.60
General	2, 180	.88	.42
At Risk	2, 180	1.41	.25
Sex	2, 179	.92	.40
General	1, 180	.28	.60
At Risk	1, 180	1.39	.24
Interactions			
HA X Diag X Sex	4, 358	1.07	.37
Diag X Sex	4, 358	.59	.67
HA X Sex	2, 179	.01	.99
HA x Diag	4, 358	.91	.46

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 21

Means and Standard Deviations Showing General and At Risk Symptoms as a Function of Health Anxiety

| Variable | | Health Anxiety | |
		Normal	High
General	M	1.67	2.15
Symptoms	SD	.43	.48
At Risk	M	1.62	2.01
Symptoms	SD	.42	.55

Note. Scores on variables range from 1 to 5.

[a] n = 96.

The interaction that was expected between health anxiety and diagnostic feedback on the measure of at risk symptoms was not significant. That is, non-health anxious individuals given a positive diagnosis were no more likely to report at risk symptoms than non-health anxious individuals given a negative and ambiguous diagnosis.

Attitude Toward Study

A 2 X 3 X 2 ANOVA was carried out to determine whether health anxiety, diagnostic feedback, and sex influenced subjects' perceptions of the study. The results of the analysis are reported in Table 22. This analysis revealed no main effects. However, an interaction between diagnostic feedback and sex emerged.

The interaction was examined further using simple effects analyses and showed that men and women differed in how they responded to the positive diagnostic feedback only (see Table 22). Examining the means in Table 23 it is clear that men were significantly more negative when receiving positive diagnostic feedback than women. Simple effects analyses also revealed that the attitude toward the study was significantly related to the diagnostic feedback, but only among men (see Table 22). Tukey's post hoc tests on the means revealed that men reported a significantly more negative attitude toward the study after having received positive test results as compared to negative or ambiguous test results.

In general, it should be noted that all subjects were positive toward the study. The mean rating on the attitude variable was 2.09 (SD = .65) on a scale ranging from 1 to 7, where higher scores indicated more negative attitudes. Even men receiving positive diagnostic information described the study more in the positive range than the negative range (M = 2.41, SD = .58).

Trait Anxiety and Response Styles

In this sample, health anxiety was significantly correlated with trait anxiety, r (192) = .41, p < .01, as well as with the self deceptive response style measure, r (192) = -.29, p < .01. It did not correlate with a measure of impression management, p > .05.

Health anxious men and women obtained mean scores of 49.09 (SD = 8.28) and 47.59 (SD = 8.34) on the trait anxiety measure, respectively. These scores correspond to the 87th and 81st percentile of college students according to the norms provided in the manual for the State-Trait Anxiety Inventory (Spielberger et al., 1983). Non-health anxious men and women, on the other hand, obtained mean scores of 40.45 (SD = 8.84) and

Table 22

Results of Multivariate Analysis of Variance Examining Attitude Toward Study

	Df	F	$p <$
Multivariate Main Effects followed by Univariate F-tests			
Health Anxiety	1, 180	2.56	.11
Diagnostic Feedback	2, 180	.83	.44
Sex	1, 180	.36	.55
Interactions			
HA X Diag X Sex	2, 180	2.13	.12
Diag X Sex	2, 180	4.73	.01
Sex @ Positive	1, 180	6.47	.01
Sex @ Negative	1, 180	1.60	.21
Sex @ Ambiguous	1, 180	.04	.84
Diag @ Male	2, 180	3.59	.03
Diag @ Female	2, 180	1.24	.29
HA X Sex	1, 180	1.09	.30
HA x Diag	2, 180	.48	.62

Note. HA = Health Anxiety and Diag = Diagnostic Feedback.

Table 23

Means and Standard Deviations Showing Attitude Toward Study as a Function of Sex and Diagnostic Feedback

Sex		Positive[a]	Diagnostic Feedback Negative[a]	Ambiguous[a]
Males[b]	M	2.41	1.93	2.02
	SD	.58	.51	.58
Females[c]	M	1.98	2.18	2.08
	SD	.72	.71	.61

Note. Scale ranges from 1 to 7, with higher scores signifying a more negative attitude.

[a] $n = 64$.

[b] $n = 66$.

[c] $n = 126$.

40.73 ($\underline{SD}$ = 8.10) on the trait anxiety measure, respectively. These scores correspond to the 60th and 53rd percentiles of college students.

The means on the self-deceptive response style measure for health anxious men and women were 3.48 ($\underline{SD}$ = 2.00) and 4.05 ($\underline{SD}$ = 2.69) respectively. On this same measure, non-health anxious men and women obtained mean scores of 6.03 ($\underline{SD}$ = 3.47) and 5.76 ($\underline{SD}$ = 3.74) respectively. Comparing these scores to scores that have been obtained in undergraduate samples (Paulhus, 1988), it seems that health anxious individuals were significantly less likely to have a positively biased, but yet honest, response style.

Given the strong relations between health anxiety and the trait anxiety measure and health anxiety and the self-deceptive response style measure, it was decided to explore whether these latter two variables could account for relations between health anxiety and the dependent variables. This involved correlating health anxiety with the dependent variables found to be significantly related to health anxiety in the multivariate analyses described above, while partialling out the trait anxiety and the self deceptive response style measures first alone and then together.

The results are reported in Table 24 and largely suggest that although trait anxiety and the self-deceptive response style measure can account for some of the variance in health anxiety, these variables can not account for all of the variance. With regard to trait anxiety, it appears that correlations between health anxiety and the variables largely remain even when trait anxiety is controlled. There are some exceptions, however. The relations between health anxiety and the use of affective words and pain upon withdrawing the hand from the cold pressor are no longer significant once trait anxiety is accounted for. Also the relation between health anxiety and positive somatic monitoring is only marginally significant when trait anxiety is controlled. The results appear very similar when the self-deceptive response style is partialled out instead of the trait anxiety measure. That is, most of the relationships between health anxiety and the dependent variables remain, save for those between health anxiety and positive concrete somatic monitoring and pain intensity upon withdrawal from the cold pressor.

Table 24

Correlations of Health Anxiety With Significant Dependent Variables Controlling for Trait Anxiety and Self Deception

| Variable[a] | Correlations with Health Anxiety | | | |
	Simple	Trait Anxiety Controlled	Self Deception Controlled	Both Vars. Controlled
Positive Monitoring	-.16**	-.10m.s.	-.09	-.08
Negative Monitoring	-.25***	.22***	.23***	.22**
Catastrophising	.29***	.18**	.22**	.17**
Control	-.20**	-.14*	-.15*	-.13*
Tolerance	-.22***	-.18**	-.19**	-.17**
Sensory	.13*	.12*	.15*	.13*
Evaluative	.20**	.14*	.18**	.14*
Affective	.18**	.09	.16**	.10
Withdrawal Pain	.16**	.10	.10	.09
Facial Exp (End)	.22***	.19**	.19**	.18**
Concern (T1)	.30***	.21**	.27***	.21**
Concern (T2)	.33***	.23**	.29***	.23***
Percent	.24***	.18***	.20**	.17**
More Info (T1)	.16**	.16*	.17**	.16**
More Info (T2)	.11*	.14*	.14*	.15*
Learn	.14*	.17**	.17**	.18**
Accuracy	.20**	.16**	.19**	.17**
General Symptoms	.48***	.34***	.42***	.33***
At Risk Symptoms	.38***	.24***	.33***	.24***

m.s. = marginally signif. * p < .05. ** p < .01. *** p < .001.

[a] n = 192

<center>Discussion</center>

Overall, the results of the study provide strong support for the cognitive-behavioural theory (CBT) of health anxiety, especially with regard to the proposed cognitive and behavioural responses to illness information. At the same time, the present findings also suggest some important modifications to the theory. In particular, the results suggest that health anxious individuals may have either a deficit or deficiency in their employment of a concrete somatic monitoring strategy when faced with potentially threatening stimuli. Further, they may also have a lower sense of perceived control. The present findings also suggest that nonverbal expressivity could play a role in maintaining or exacerbating health anxiety. That is, health anxious individuals were found to become increasingly expressive of their discomfort over time. This could influence the assessment of health anxiety, as well as potentially result in an increase in felt discomfort through facial feedback. In general, many questions still abound as to the role of avoidant strategies in health anxiety and the possibility that monitoring and avoidant strategies may come into play under different circumstances.

Evidence for Dysfunctional Cognitive Responses

Negative focus and interpretation. The CBT of health anxiety suggests that health anxiety is associated with a maladaptive cognitive pattern, involving an attentional bias to focus on somatic information, and an interpretational bias to perceive illness related information as being catastrophically and personally threatening. Strong support for a maladaptive cognitive style was found in the present study. When undergoing a painful procedure to ostensibly examine problems that individuals may have in their physiological responses to stress, health anxious individuals were considerably more likely to spontaneously report having used a negative somatic monitoring style. This style involves focusing on one's negative reactions to pain, and having catastrophic thoughts about the meaning and implications of the sensations. As a selective example, one health anxious individual with a negative monitoring style reported, "I am in science, so I started thinking about umm how they tell you about your cells, and how if not enough blood gets to your cells, your cells die and that is why you can't feel your hand. All this hypothermia stuff started going through my head ... It is too cold, I got to take it out now." When cued with a questionnaire, health anxious individuals also reported more catastrophic cognitions during their pain experience, such as "it was terrible and I thought it was never going to get any better" and "I felt like I couldn't go on". Keep in mind that these are selective examples.

Other evidence suggesting a dysfunctional tendency among health anxious individuals to focus on and negatively interpret illness information was found. Health anxious individuals used significantly more affective and evaluative words to describe their cold pressor pain. Health anxious individuals as compared to non-health anxious individuals also described their pain at the end of the task as being significantly more intense. They did this despite their tendency to withdraw their hand from the water prior to completing the task significantly more frequently than non-health anxious individuals.

Additional evidence supporting a dysfunctional cognitive style was found. In response to the diagnostic information, health anxious individuals were more concerned with the test results and perceived themselves to be at greater risk for medical complications than non-health anxious individuals. Further, they also reported more benign general symptoms and more at risk symptoms, which may reflect their tendency to negatively focus on illness information. This latter finding could also potentially reflect greater illness in health anxious individuals. This seems unlikely, however, since previous research generally suggests that measures of somatic concern are not related to actual organic disease (Costa & McCrae, 1985). Further, in the present study there were no differences among health anxious and non-health anxious individuals in their report of minor medical problems.

In general, the present findings complement previous findings in the area. Using questionnaire data, for instance, it has been found that health anxious individuals report a tendency to focus on and feel vulnerable to illness more than non-health anxious individuals (Jones et al., 1989; Pilowsky, 1967). They also fit with other findings that suggest health anxiety is associated with obsessive worry about symptoms (Jones et al., 1989). The major advantage of the present study over these questionnaire studies, is that it is now unmistakably clear that the negative monitoring style occurs in response to the same objective health information, and is associated with a negative outcome (e.g., poorer response to the painful procedure).

Cognitive avoidance. In the present study, the possibility that health anxiety may be associated with a tendency to use avoidant cognitive strategies (e.g., distraction, suppression) was also explored. Avoidant cognitive strategies were conceptualized as dysfunctional based on recent findings within the pain literature (Cioffi, 1991b). This literature suggests that avoidant strategies frequently result in longer recovery intervals from pain and the subsequent report of non-noxious stimulation as painful. The idea that health anxious individuals may be using cognitive avoidant strategies did not seem far removed given that the CBT predicts that health anxious individuals frequently use behavioural avoidance to cope with illness information.

Generally, no support for a relationship between cognitive avoidance and health anxiety was found in the present study. It is possible that the lack of findings regarding avoidance could reflect a measurement problem (e.g., subjects were not actually aware or able to report on what they were thinking). However, every attempt was made to overcome this by exploring cognitive styles using both an interview procedure, examining spontaneous strategies, and a questionnaire package, cueing subjects about their tendency to both suppress thoughts of pain and search for distractors. The possibility still remains, however, that cognitive avoidance is used, but perhaps among different groups of health anxious individuals or under different circumstances. With regard to the former possibility, it is plausible that there are two types of health anxious individuals, those who tend to use avoidance and those who tend to use negative somatic monitoring. The former group of health anxious individuals may simply not have volunteered to participate in the study due to their avoidant style. After reading the screening questionnaire they may have simply chosen not to participate in a study of health in order to avoid exposure to illness related information. In general, the incidence of avoidance among health anxious individuals may be quite substantial, but we may never substantiate this because these individuals avoid medical attention.

A further possibility is that avoidance was not found in the present study due to limitations in the design. It may be that when confronted with pain, avoidance is no more likely among health anxious than among non-health anxious individuals. Under other circumstances, however, cognitive avoidance may be more likely, for instance, in response to fleeting thoughts of ill health or easily avoided information about illness and disease. It is also possible that temporally, avoidance comes into play much later than it was possible to assess using the current design. Strategies in the present study were only examined over the course of 5 minutes. If responses were studied later, avoidance may have predominated.

In general, cognitive avoidance should not be excluded as a possible response among health anxious individuals until further research is carried out. Should cognitive avoidance be observed among health anxious individuals, however, a further issue needs to be addressed. This concerns whether avoidance is in fact dysfunctional and serves to maintain and exacerbate health anxiety. In the present study it was assumed that avoidance would be a dysfunctional strategy because in previous research it has been found to result in a longer recovery from painful stimulation, and the subsequent report of nonpainful sensations as unpleasant (Cioffi, 1991b). It also seems that avoidant strategies have the effect of actually increasing rather than decreasing

unwanted thoughts (Wegner, Schneider, Carter, & White, 1987). Other research, however, has suggested that at least under some circumstances avoidance can be effective for coping with pain and other discomforting situations. For example, it seems for some mild and short-lived pain experiences focusing on an absorbing stimulus can facilitate tolerance (McCaul & Malott, 1984) and coping. Therefore, it seems that if avoidance is in fact found to relate to health anxiety in future studies, attention needs to be given to whether it really does play a dysfunctional or maintaining role in the problem.

Evidence for a Dysfunctional Behavioural Pattern

The CBT of health anxiety not only suggests that a dysfunctional cognitive pattern is associated with health anxiety, but also that a dysfunctional behavioural style is present (Warwick & Salkovskis, 1990). In particular, the theory suggests that whenever possible the individual will attempt to avoid illness information. Once threatened, however, the theory predicts that health anxious individuals will attempt to reduce their health anxiety by seeking reassurance or medical information to ensure they are not at risk of disease or illness.

Avoidance. Some evidence for avoidant behaviour was found in the present study in that health anxious individuals were more likely to withdraw their hand from the cold water than non-health anxious individuals. This could be viewed as an attempt to avoid experiencing discomforting and distressing physical sensations. At the same time, however, the tendency to withdraw from the water may actually reflect an increased physiological sensitivity to pain, so its meaning in the present study is ambiguous. On other measures, there was no tendency for health anxious individuals to avoid illness information. As mentioned above, the failure to find avoidance may reflect a sampling bias in that health anxious individuals using this type of strategy may not have volunteered for the study. It may also reflect the nature of the study. Under other circumstances (e.g., visits to hospitals, health care professionals) avoidance may be a common response.

Reassurance seeking. More convincing evidence was found for reassurance seeking behaviour. As predicted by the theory, health anxious individuals as compared to non-health anxious individuals were significantly more concerned about the diagnostic information and were more likely to seek additional information about the test results regardless of the diagnostic feedback they received. They were also more likely to report that they would like to learn how to reduce their risk for experiencing medical complications.

It seems, then, that in response to the same objective illness information, health anxious individuals were more likely to engage in reassurance seeking than non-health anxious individuals. It is not possible to

determine from the present findings the extent to which this response is dysfunctional. The cognitive-behavioural theory posits that this behaviour will increase health anxious individuals' concern further, and result in still more reassurance seeking behaviour. This possibility was not explored in the present study, but seems like a potential avenue for future research that could easily be studied by extending the present paradigm.

Nonverbal expressiveness. A third potentially dysfunctional behavioural response, namely nonverbal pain behaviour, was of interest in the present study. The CBT, much like other theories of health anxiety, attends little to how individuals will nonverbally express their emotions in response to illness related information. Clinical observations, however, suggest that health anxious individuals are more expressive of their concerns than non-health anxious individuals. Support for this observation was found in that health anxious individuals were found to become more emotionally expressive as the cold pressor task progressed. This may reflect their increasing concern over the somatic sensations they were experiencing, or an actual lowered ability to tolerate pain, or both. Alternatively, increased expressiveness could reflect health anxious individuals' desire to signal their discomfort and need for attention to the experimenter. This latter hypothesis is quite plausible. That is, although subjects were not told directly that they were being observed, they were sitting in front of a partially open one-way mirror, and many subjects asked if they were being observed.

The increase that was observed in expressiveness could have important implications. Nonverbal behaviours as mentioned previously are frequently used in the assessment of an individual's problems (Kahn, 1966). If health care professionals are unaware of subtle changes that occur among health anxious individuals, changes in facial expressions could lead health care professionals astray in their assessment and management of pain and other conditions. Increases in facial expression are generally judged to reflect increases in the felt experience of pain (Hadjistavropoulos, Ross, & von Baeyer, 1991; Poole & Craig, 1992). Alternatively, if health care professionals are attending to the cues, nonverbal information could potentially provide valuable information about increments and decrements in the patient's anxiety (Craig, 1993).

Increased expressiveness may be important for another reason. That is, increased expressiveness could actually result in an increase in felt pain. There is some research, for instance, to suggest that there may be a feedback loop between expressiveness and pain, such that the more an individual expresses pain, the more he or she will actually begin to feel pain (Colby et al., 1977; Kopel et al., 1974). In general, it would seem that more

attention needs to be given to the potential maintaining or exacerbating role that nonverbal expressiveness could play in health anxiety.

A final point worth mentioning is that there was no evidence to support a relation between nonverbal suppression and health anxiety in the present study. Recall that Berry and Pennebaker (1993) suggested that nonverbal suppression is associated with increased autonomic arousal, while nonverbal expression is associated with decreases in autonomic arousal. This led us to suggest that there may also be a relation between nonverbal suppression of emotion and health anxiety. It was thought that increased physiological activity, caused by nonverbal suppression of emotion, could be viewed by health anxious individuals as evidence confirming illness. No evidence for this later relation was found. This does not rule out Berry and Pennebaker's (1993) observations, however, since in the present study physiological activity was not actually assessed. It is quite possible that the relation between nonverbal suppression of emotion and autonomic activity actually exists, but that this does not feed into health anxiety.

<u>Deficits or Deficiencies in Adaptive Responses to Illness Information</u>

<u>Control and concrete somatic monitoring</u>. The CBT has paid little attention to the possibility that health anxious individuals may actually suffer from deficits or deficiencies in adaptive or functional responses to illness related information. Evidence in support of a deficiency or deficit was found in the present study. Non-health anxious individuals approached the task with a sense of control and feeling that they could decrease the pain. Health anxious individuals, on the other hand, reported feeling significantly less control over their ability to withstand the pain.

Non-health anxious individuals also were found to utilize a positive concrete somatic style while undergoing the cold pressor test. The positive concrete somatic style involvs noticing and attending to the concrete characteristics of the sensations, as well as elaborating on the meaning of the pain, but in a relatively neutral and nonthreatening way. An example of this type of approach is seen in the following statement: "I knew that the rest of my body was not cold and that this was only a small fraction of my body". Attending to the sensations in this way appeared to provide useful information to many individuals who made comments such as, "After a while I could tell that it would not increase", or "I thought that it was cold water, but that I had placed my hand in something colder before". Keep in mind that these are selected examples of the strategy.

The effectiveness of the above positive concrete somatic monitoring strategy is well established in the literature. For instance, laboratory research has found that concrete somatic monitoring results in a rapid recovery from pain (Cioffi & Holloway, 1993) and increased pain tolerance (Ahles et al., 1983) as well as pain threshold (Blitz & Dinnerstein, 1971). In clinical settings, concrete positive monitoring of sensations is found to reduce distress during chemotherapy, medical procedures, and childbirth (Johnson et al., 1975; Nerenz et al., 1984).

It would seem, then, that health anxious individuals are either reluctant to use this strategy or they actually do not know how to employ the strategy. It is difficult to disentangle which of these possibilities is most likely in the present study. The mean score on this variable for health anxious individuals was below one suggesting that they were not even minimally using the strategy. Future studies could perhaps explore whether health anxious individuals are able to use the strategy and whether benefits result when they do employ it.

Minimization and questioning. Previous research suggests that an effective method for coping with diagnostic test results, especially positive test results, may be to minimize the seriousness of the condition and question the validity of the test results (Croyle & Ditto, 1990). Minimizing the seriousness of the problem appears to help individuals get on with the business of coping. The possibility was explored in the present study that perhaps health anxious individuals lack these adaptive responses. It was predicted that non-health anxious individuals compared to health anxious individuals would express less concern and be more likely to question the validity of the test results, especially when given positive diagnostic feedback. No support for the interaction was found. Regardless of the diagnostic feedback, health anxious individuals were more concerned over the implications of the test results and perceived themselves to be at greater risk than non-health anxious individuals. Health anxious individuals also generally felt that the test results were more accurate than non-health anxious individuals. These effects were not particularly pronounced when examining differences between health anxious and non-health anxious individuals to positive diagnostic feedback as predicted.

How do we Define Functional Versus Dysfunctional?

In general, determining whether a certain cognition or action is dysfunctional or functional is not an easy task. A certain amount of worry and reassurance seeking is necessary when it comes to our health. Those who do not attend to unusual symptoms and seek reassurance are as much a concern as those who worry excessively and constantly seek medical attention. Symptoms need to be noticed, and attended to in order to

determine their significance for our well-being, and therefore concluding that worry and reassurance seeking behaviour are necessarily dysfunctional is not warranted. More attention needs to be given to what or how much of a thought or behaviour is adaptive, as well as what is it about the thought or behaviour that makes it maladaptive. How do the cognitive and behavioural patterns found in the present study perpetuate or feed into excessive worry and reassurance seeking behaviour? What thoughts and actions help us to discriminate the benign from the dangerous symptom? What thoughts and actions allow us to go on with as much of a meaningful and fulfilling life as possible, despite evidence of illness, without being deleterious to our current health?

Moderators of Health Anxiety

Diagnostic feedback. Diagnostic feedback in the present study was expected to moderate the responses of health anxious and non-health anxious individuals when they were confronted with a cold pressor test ostensibly designed to explore problems individuals may have in their physiological responses to illness. It was thought that health anxious individuals receiving negative test results would be more likely to use avoidant cognitive strategies, whereas health anxious individuals receiving positive and ambiguous test results (where a perceived threat to well being was thought to be likely) would be more likely to use a negative somatic monitoring strategy when confronted with the task. The rationale behind the hypothesis was that when given positive and ambiguous diagnostic information avoidance would no longer be a viable option. In general, non-health anxious individuals were expected to engage in positive concrete somatic monitoring, especially when confronted with positive diagnostic information.

In the present study, diagnostic feedback was not found to influence the type of coping strategy employed by subjects. Further, no interactions between health anxiety and diagnostic feedback were found. Finding null results, however, does not rule out the possibility that different types of illness information may elicit different types of coping strategies. It could be that in other more naturalistic settings the proposed interactions will occur. In future studies it may be worth exploring if different coping strategies are used to deal with fleeting thoughts of the diagnosis. It is possible that even when given negative diagnostic feedback, health anxious individuals are too threatened to engage in avoidant strategies. It could be that the cold pressor experience was such that it could not possibly allow for the use of avoidance even when negative diagnostic feedback was provided.

Varying diagnostic information was also expected to influence the general response of health anxious individuals to having received diagnostic test results. This was discussed briefly above with respect to the possibility that health anxious individuals perhaps do not minimize the significance of positive test results. The CBT, for instance, led to the prediction that health anxious individuals would respond catastrophically not only to positive test results, but also to ambiguous test results. The theory also led to the expectation that, although health anxious individuals would initially be reassured by negative test results, negative feedback in the end would also increase concern and reassurance seeking. The literature on non-health anxious individuals' responses to diagnostic information (Jemmott et al., 1986; McCaul, Thiesse-Duffy, & Wilson, 1992) seemed to suggest that non-health anxious individuals would show the least concern, and the greatest questioning of the test results, and desire for additional information when they were exposed to positive test results. There was no expectation in the present study that non-health anxious individuals would be concerned or desire additional information when receiving ambiguous or negative test results. Essentially, an interaction between health anxiety and diagnostic information was predicted. No support for these hypotheses was found. As reported above, health anxious individuals regardless of diagnostic feedback were more concerned with the test results and wanted more information than non-health anxious individuals. Diagnostic information it seems influenced the subjects, but it was in the same direction consistently for both subjects.

In general, the reaction to diagnostic feedback found in the present study was similar to what has been found in other studies (Jemmott et al., 1986; McCaul, Thiesse-Duffy, & Wilson, 1992). There was a tendency among subjects to believe that the risk of experiencing medical complications was more prevalent when the test results were positive, as compared to when they were ambiguous, or when they were negative. As mentioned above, when individuals perceive a disorder to be more prevalent they also perceive it to be less severe (Ditto & Jemmott, 1989). In this way, individuals receiving positive diagnostic information were attempting to minimize the significance of the problem. Also suggesting a tendency to minimize the significance of the positive test results were findings suggesting that individuals receiving positive and ambiguous test results perceived the test results to be less reliable and they were less confident in the results compared to those receiving negative test results. Also, as in other studies, receiving positive test results, regardless of whether subjects were health anxious or not, resulted in a desire for more information about the meaning and implications of the positive

findings (McCaul et al., 1992). It also resulted in a desire to learn ways to reduce the risk more so than when individuals received ambiguous or negative information.

Some differences from previous studies (e.g., Jemmott et al., 1986) were found. That is, there were a number of findings in the present study that did not support the supposition that individuals respond to health threats by minimizing their significance. For example, among both groups of health anxious and non-health anxious individuals there was a significant tendency to be more concerned with positive test results than with the ambiguous and negative test results. Further, no subjects denied that positive test results were more serious than negative test results. A further difference from other studies (e.g., Croyle & Sande, 1988) was that receiving positive diagnostic information did not result in increased reporting of "at risk" symptoms.

Differences that were found in the studies may relate to the nature of diagnostic information that was given. Most previous studies (Cioffi, 1991; Croyle & Sande, 1988; Jemmott et al., 1986) in this area involved telling subjects that they were either positive or negative for a thioamine acetylase (TAA) deficiency that would put them at risk for a mild, but irritating pancreatic disorder. It is possible that although the manipulation in this study was effective (i.e., individuals who received positive test results perceived themselves to be at greater risk than individuals who received ambiguous test results, who perceived themselves to be at greater risk than individuals who received negative test results), it was not as potent as the TAA manipulation and therefore did not result in as much of a tendency to minimize the seriousness of the disorder or show a confirmatory bias in reporting more at risk symptoms. In many ways this is not surprising since it was the intention of the study to use feedback that would not suggest that individuals had a disorder, but might suggest they were at risk. It was felt for ethical reasons that using the TAA procedure might be too extreme when working with individuals who were health anxious.

Time. A further hypothesis in the present study was that over time health anxious individuals would alternate between different types of strategies. It was thought, for instance, that health anxious individuals may begin by attempting to avoid thinking about distressing thoughts, and that when this was unsuccessful they might move on to use the negative somatic monitoring strategy. No support for this hypothesis was found. Once again, null results do not necessarily refute the hypothesis. One problem with the assessment method used in this study is that subjects were asked to retrospectively report what they were thinking while their hand was in the cold water. It is possible that under different circumstances, with different types of illness information, time may

make a difference in the strategies health anxious individuals use. It is also possible that over longer periods (e.g., hours, days, months) time may have an impact on how individuals cope with illness information.

Sex. No firm hypotheses were made concerning the influence of sex on health anxious individuals' responses to illness information. There was some expectation, however, that sex may influence the cognitive and behavioural responses of health anxious individuals. It was thought, for instance, that the differences between health anxious and non-health anxious individuals may be greater among women than men on measures examining use of negative somatic monitoring and reassurance seeking. The results, however, generally suggested that sex did not interact with health anxiety to influence the results of the study. Several main effects for sex were found, however, that are consistent with the literature. Much like the study by Vingerhoets and Van Heck (1990), women as compared to men were more likely to catastrophize and engage in negative monitoring, as well as to pray during the cold pressor task. They also expressed less control over their ability to decrease the pain. Also consistent with a substantial literature showing females to have lower pain tolerance (Geisser, Robinson, & Pickren, 1992), women, in the present study, withdrew their hand sooner from the water and reported more pain upon withdrawing their hand than men. Women also tended to recover at a later interval than men and used more evaluative words to describe their pain. Similar to previous studies (Buck, Miller, & Caul, 1974), women were judged to be more expressive than men. In general, women were judged to be most expressive at the very beginning of the cold pressor task and at the very end. Men, on the other hand, were judged to have a steady level of facial expressiveness throughout the cold pressor task. It should be noted that with respect to these latter findings, it is possible that no actual differences in facial expressiveness between men and women exist. Rather, it could simply be that judges are influenced by stereotypes and perceive differences which are reflected in their ratings.

A final difference among men and women was found. Overall, men expressed more concern over the test results and requested more information on the test results as well. This was somewhat surprisingly, given the fact that men reported fewer dysfunctional strategies and tolerated pain longer. Finding that men were more likely to be interested in further information, was also surprising given research which suggests that men are generally less likely to utilize health care services than women (Rosenstock & Kirscht, 1979). It appears that although they may utilize health care services less and may not catastrophize as much as women, they may be more concerned and more likely to ask for information.

<u>What Remains of Health Anxiety After Negative Affect is Controlled?</u>

One question the present study aimed to address was the extent to which differences between health anxious and non-health anxious individuals could be attributed to a more general negative affective state. This was an important question to address since previous research has shown that health anxiety and measures of negative affect are quite highly correlated (Hitchcock & Mathews, 1992). Further, the literature suggests that negative affectivity tends to be associated with a tendency to complain about symptoms (Watson & Pennebaker, 1989). Ruling out the possibility that trait anxiety could account for differences among health anxious and non-health anxious individuals was particularly important in the present sample since health anxious individuals in the present study were selected on the basis of their scores on a dimensional measure, not on the basis of some discrete diagnostic criteria. This, it was thought, might make it more likely that there would be a significant overlap between health anxiety and negative affectivity.

The results of the present study strongly support the notion that health anxiety represents a unique syndrome, and that variance in measures related to health anxiety can not be fully accounted for by a more general negative affective state. After controlling for negative affect, differences among health anxious individuals and non-health anxious individuals still remained on most of the measures. The only differences between health anxious and non-health anxious individuals that were no longer significant concerned pain intensity upon completing the cold pressor task and the use of affective words to describe pain.

The results fit with a previous study by Hitchcock and Mathews (1992) who found that catastrophising predicted additional variance in health anxiety above and beyond variance explained by negative affectivity. The results contribute further to the literature in the sense that it is certain that additional variables continue to be related to health anxiety (e.g., reassurance seeking, symptom reporting, expressivity) even after controlling for negative affectivity. In general, the results are compatible with a broader literature which suggests that a strong nonspecific distress factor, namely negative affectivity, is apparent in ratings of generalized anxiety and depressive syndromes as well (Clark & Watson, 1991). This general distress factor seems to be substantial and inseparable from anxiety and depression, but also can not account for all findings concerning the syndromes (Clark & Watson, 1991).

How Do Response Styles Relate to Health Anxiety?

The results of the present study suggest that at least one response style is related to health anxiety. A negative relationship between a self-deceptive response style and health anxiety was found. The self-deceptive response style measure is thought to be a measure of honest, but positively biased reports (Paulhus, 1988).

Given the relationship between the self-deceptive response style measure and health anxiety it was important to determine whether the results of the study may simply be due to differences in response styles. Controlling for scores on the self deception measure, the relationships between health anxiety and the dependent variables remained, save for those between health anxiety and the use of positive concrete somatic monitoring, and withdrawal pain intensity ratings. It would seem that health anxiety explains variance in cognitive and behavioural responses to illness information above and beyond that which can be explained from a self-deceptive response style. At the same time, the results suggest that some findings concerning health anxiety, may be better explained by the health anxious individuals' tendency to simply respond in a negatively biased, but honest, manner.

Attitude Toward Study and Procedures

Given the fact that false feedback was given in the present study it was felt that it was necessary to assess attitudes toward the procedures used. Generally, subjects responded positively to the study. Scores on the scale measuring attitude toward the study were low indicating a positive attitude toward the study and procedures. Attitude toward the study was also assessed as a function of health anxiety, diagnostic feedback, and sex. One interaction was found. When males were given positive test results they were more negative about the study than females. Even then, however, they scored very low on the scale. Overall, these results suggest that the immediate impact of the study on individuals was positive, but that if this methodology were to be used again, more attention should perhaps be given to how males respond to positive test results.

Clinical Implications

It would appear that differentiating between individuals who score within the normal range on a measure of health anxiety and those who score in the nonclinical range, but still above average range, results in a meaningful distinction and has important implications for how an individual will respond both cognitively and behaviourally to illness information. On a daily basis, nonclinical health anxious individuals, for instance, report considerably higher trait anxiety and report experiencing more benign, but distressing somatic sensations. In

response to pain, they show lower pain tolerance, and are considerably more distressed by the experience. As time progresses, health anxious individuals also become considerably more expressive of their discomfort. The dominant response to pain appears to involve a negative somatic monitoring style. Also noticeable, is the apparent lack of the use of a positive somatic monitoring strategy which involves objectively observing sensations so that individuals are aware of what is happening to their bodies, but at the same time are not overwhelmed by the sensations. Receiving diagnostic information itself appears to lead to feelings of concern and the desire for additional information.

In general, the results taken together clearly imply that in assessing pain and other conditions, health care professionals need to consider health anxiety, even its lesser forms. Typically, attention is given to only extreme health anxiety, namely hypochondriasis. The present findings, however, suggest that even in its lesser forms, health anxiety has implications for how the individual copes and manages pain, as well as perhaps other conditions. These individuals will likely experience more extreme negative affect and catastrophise regarding the implications of illness information. It is also quite possible that they may not be able to undergo or complete necessary medical procedures, although this question requires further research. They may also be using health care resources excessively.

Helping health anxious individuals identify and challenge dysfunctional cognitions may aid these individuals in coping with perceived threats. It is also quite possible that these individuals could benefit from instruction in the use of positive concrete somatic monitoring strategies. This strategy would seem to allow individuals to attend to somatic information, but in a way that allows them to discriminate benign from potentially dangerous somatic information. Finally, health care professionals would do well to give special attention to nonverbal information in health anxious individuals. If health care professionals are unaware of subtle changes that occur among health anxious individuals, changes in facial expressions could lead health care professionals astray in their assessment and management of pain and other conditions. Alternatively, if health care professionals are attending to the cues, nonverbal information could potentially provide valuable information about increments and decrements in the patients' anxiety (Craig, 1993).

Implications for the Cognitive-Behavioural Theory of Health Anxiety

The results of the present study clearly support the hypotheses put forth by the CBT concerning cognitive and behavioural responses to illness information. Unmistakable support was found for a tendency

among non-health anxious individuals to respond to illness cues by negatively monitoring the cues and catastrophising regarding the meaning and implications of the information. There was also evidence that health anxious individuals perceived themselves to be at greater physiological risk, as well as to have less control over their ability to cope. Further, they were more concerned with the test results in general. The expectation that among health anxious individuals this pattern would be as likely in response to ambiguous and negative diagnostic feedback (over time), as it was to positive feedback was not supported, however.

Support for the hypothesized behavioural responses to illness information was also found. Health anxious individuals withdrew from cold pressor testing much sooner than non-health anxious individuals. This could reflect behavioural avoidance, but it at the same time could reflect differential pain tolerance. Reassurance seeking behaviour was also manifested in that health anxious individuals requested more additional information concerning the test results and were more interested in learning ways to reduce their risk for medical complications than non-health anxious individuals. Once again there was no support for the hypothesis that reassurance seeking behaviour would occur as frequently in response to ambiguous feedback and negative feedback (over time) as it did in response to positive test results.

Not predicted or anticipated by the CBT, an interesting behavioural reaction to pain was observed in health anxious individuals. As time went on health anxious individuals became more expressive of their pain. This could be an attempt to gain attention, or alternatively it could be a natural consequence of experiencing more distress than non-health anxious individuals. Regardless of its intentions, the implications may be important. Increases in facial expression could influence the assessment of pain and other conditions by health care professionals. Increases in facial expression could also increase the felt experience (Adelmann & Zajonc, 1989).

Also adding to the CBT, the present study found support for the notion that health anxiety may in part be a function of either a deficiency or deficit in the use of positive concrete somatic monitoring in response to distressing somatic sensations. This could have potential treatment implications. Teaching health anxious individuals positive concrete monitoring of symptoms, and using this in conjunction with existing effective treatments such as exposure and response prevention (Salkovskis & Warwick, 1986) could be beneficial.

Finally, the results of the present study strongly support the CBT in its use of a dimensional model of health anxiety. As the above results attest, statistically and clinically significant differences among a nonclinical

sample of health anxious individuals and normals were found in the present study. These differences also could not be accounted for by differences in a more general negative affective state or in a self-deceptive response style.

Future Directions

In general, future research needs to continue to explore the circumstances under which the dysfunctional cognitive and behavioural responses to illness information are likely. The search for moderators of the cognitive and behavioural reactions to illness information was not successful in the present study, but this may reflect limitations of the design more than anything else. The relative significance of avoidance compared to negative monitoring and reassurance seeking is also worthy of future attention. The present study did not find support for avoidance, but once again this may reflect the nature of the study more than the nature of health anxiety.

In general, it would seem that the time has now come to ask questions about the interrelationships among the various response systems, as well as exploring further the possibility that cognitive and behavioural responses play a role in maintaining and exacerbating health anxiety. In the present study, we learned a considerable amount about what responses are likely among nonclinically health anxious individuals. We need to now know more about the extent to which these responses are actually maladaptive. How do the responses feed back into and exacerbate health anxiety? Do the cognitive and behavioural responses put health anxious individuals at risk and threaten their well-being and ability to function?

In general, more attention needs to be given to the development of health anxiety. Learning about how a condition arises is difficult, but there appear to be a number of potential avenues for future research. The cognitive-behavioural theory posits that experience with illness in self or family can play a primary role in the development of maladaptive cognitive and behavioural patterns in health anxiety. Examining the consequences of diagnostic feedback for health anxiety within naturalistic settings may tell us more about the problem. In particular, studying those who mistakenly receive false test results (e.g., for HIV testing or pap smears) compared to those who obtain valid test results may help us learn about the development of health anxiety. Also studying responses of significant others to illness in family and friends may help us learn about the development of illness cognition and behaviour, and the consequences of the cognitive-behavioural responses for future illness and health.

Considerable attention was given in the present study to the deleterious consequences of excessive worry and reassurance seeking behaviour. Future research needs to examine those individuals who do not attend to

their health and seek medical attention when it is needed. What can account for "too little health anxiety"? What cognitive processes might underlie the lack or attention and concern that is apparent with these individuals? Will learning about a lack of health anxiety tell us anything about extreme health anxiety? With all these questions and so little past research, the study of the entire dimension of health anxiety could potentially become a very productive area of research with significant clinical implications.

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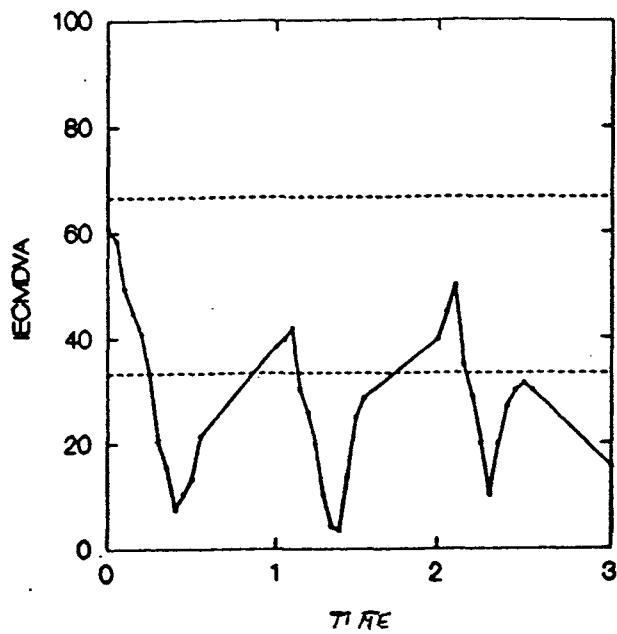
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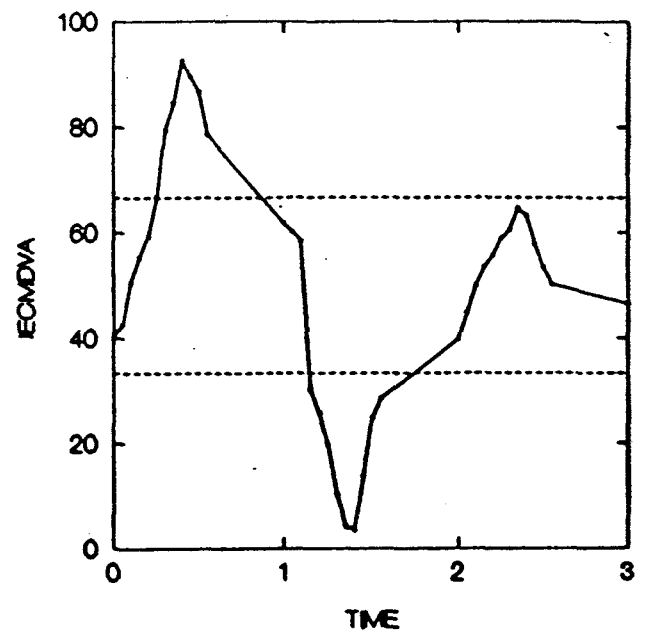
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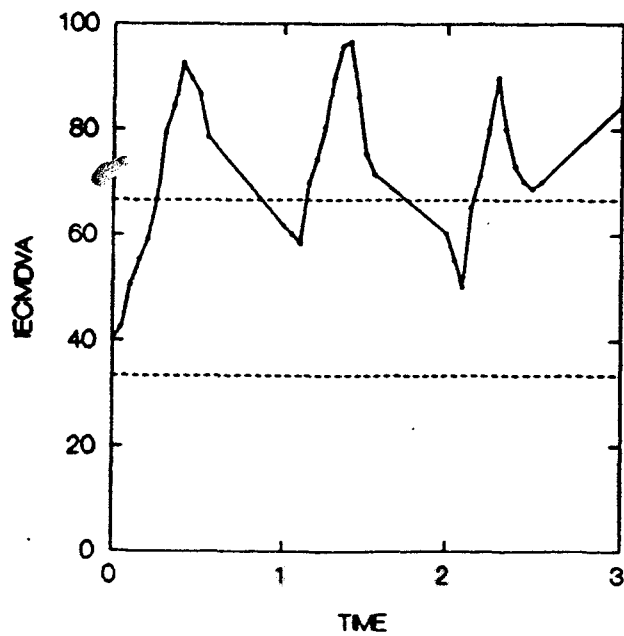
Appendix B
Illness Attitudes Scales

Please circle your answers to all questions with the exception of the few questions which require a few words or sentences. Do not think long before answering. Work quickly!

1. Do you worry about your health?

No   Rarely   Sometimes   Often   Most of the time

2. Are you worried that you may get a serious illness in the future?

No   Rarely   Sometimes   Often   Most of the time

3. Does the thought of a serious illness scare you?

No   Rarely   Sometimes   Often   Most of the time

4. If you have a pain, do you worry that it may be caused by a serious illness?

No   Rarely   Sometimes   Often   Most of the time

5. If a pain lasts for a week or more, do you see a physician?

No   Rarely   Sometimes   Often   Most of the time

6. If a pain lasts a week or more do you believe that you have a serious illness?

No   Rarely   Sometimes   Often   Most of the time

7. Do you avoid habits which may be harmful to you such as smoking?

No   Rarely   Sometimes   Often   Most of the time

8. Do you avoid foods which may not be healthy?

No   Rarely   Sometimes   Often   Most of the time

9. Do you examine your body to find whether there is something wrong?

No   Rarely   Sometimes   Often   Most of the time

10. Do you believe that you have a physical disease but the doctors have not diagnosed it?

No   Rarely   Sometimes   Often   Most of the time

11. When your doctor tells you that you have no physical disease, do you refuse to believe it?

No   Rarely   Sometimes   Often   Most of the time

12. When you have been told by a doctor what he/she found, do you soon begin to believe that you may have developed the illness?

No   Rarely   Sometimes   Often   Most of the time

13. Are you afraid of news which reminds you of death (such as funerals, obituary notices)?

No   Rarely   Sometimes   Often   Most of the time

14. Does the thought of death scare you?

No   Rarely   Sometimes   Often   Most of the time

15. Are you afraid that you may die soon?

No   Rarely   Sometimes   Often   Most of the time

16. Are you afraid that you may have cancer?

No   Rarely   Sometimes   Often   Most of the time

17. Are you afraid that you may have heart disease?

No   Rarely   Sometimes   Often   Most of the time

18. Are you afraid that you may have another serious illness? Which illness? _____

No   Rarely   Sometimes   Often   Most of the time

19. When you read or hear about an illness, do you get symptoms similar to those of the illness?

No   Rarely   Sometimes   Often   Most of the time

20. When you notice a sensation in your body, do you find it difficult to think of something else?

No   Rarely   Sometimes   Often   Most of the time

21. When you feel a sensation in your body, do you worry about it?

No   Rarely   Sometimes   Often   Most of the time

22. Has your doctor told you that you have an illness now? If yes, what illness?_____

23. How often do you see a doctor?

Almost never
Only very rarely
About 4 x a year
About once a month
About once a week

24. How many different doctors, chiropractors, or other healers have you seen in the past year?

None
1
2 or 3
4 or 5
6 or more

25. How often have you been treated in the last year (e.g., drugs, change of drugs, surgery etc.) ?

Not at all
Once
2 or 3 times
4 or 5 times
6 or more times

26. If yes, what were the treatments?

The next three questions concern your bodily symptoms (for example, pain, aches, pressure in your body, breathing difficulties, tiredness, etc.).

27. Do your bodily symptoms stop you from working?

        No   Rarely   Sometimes   Often   Most of the time

28. Do your bodily symptoms stop you from concentrating on what you are doing?

        No   Rarely   Sometimes   Often   Most of the time

29. Do your bodily symptoms stop you from enjoying yourself?

        No   Rarely   Sometimes   Often   Most of the time

Scoring of Illness Attitude Scales

No = 0
Rarely = 1
Sometimes = 2
Often = 3
Most of the time = 4

Add responses to questions 1 to 21, 27, 28 29

Appendix C
Trait Anxiety Inventory

SELF-EVALUATION QUESTIONNAIRE

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate number to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend much time on any one statement, but give the answer which seems to describe how you generally feel.

1 = Not at all
2 = Somewhat
3 = Moderately so
4 = Very much so

1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am cool calm and collected	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn't matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thoughts run through my mind and bother me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Scoring of Trait Anxiety Questionnaire

Reverse score: 1, 3, 6, 7, 10, 13, 14, 16, 19

$$1=4$$
$$2=3$$
$$3=2$$
$$4=1$$

Sum items 1 - 20

Appendix D
BIDR - Version 6 - Form 40

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

1	2	3	4	5	6	7
NOT TRUE			SOMEWHAT TRUE			VERY TRUE

_____ 1. My first impressions of people usually turn out to be right.

_____ 2. It would be hard for me to break any of my bad habits.

_____ 3. I don't care to know what other people really think of me.

_____ 4. I have not always been honest with myself.

_____ 5. I always know why I like things.

_____ 6. When my emotions are aroused, it biases my thinking.

_____ 7. Once I've made up my mind, other people can seldom change my opinion.

_____ 8. I am not a safe driver when I exceed the speed limit.

_____ 9. I am fully in control of my life.

_____ 10. It's hard for me to shut off a disturbing thought.

_____ 11. I never regret my decisions.

_____ 12. I sometimes lose out on things because I can't make up my mind soon enough.

_____ 13. The reason I vote is because my vote can make a difference.

_____ 14. My parents were not always fair when they punished me.

_____ 15. I am a completely rational person.

_____ 16. I rarely appreciate criticism.

_____ 17. I am very confident of my judgements.

_____ 18. I have sometimes doubted my ability as a lover.

_____ 19. It's all right with me if some people happen to dislike me.

_____ 20. I don't always know the reasons why I do the things I do.

_____ 21. I sometimes tell lies if I have to.

_____ 22. I never cover up my mistakes.

_____ 23. There have been occasions when I have taken advantage of someone.

_____ 24. I never swear.

_____ 25. I sometimes try to get even rather than forgive or forget.

_____ 26. I always obey laws, even if I'm unlikely to get caught.

_____ 27. I have said something bad about a friend behind his or her back.

_____ 28. When I hear people talking privately, I avoid listening.

_____ 29. I have received too much change from a salesperson without telling him or her.

_____ 30. I always declare everything at customs.

_____ 31. When I was young I sometimes stole things.

_____ 32. I have never dropped litter on the street.

_____ 33. I sometimes drive faster than the speed limit.

_____ 34. I never read sexy books or magazines.

_____ 35. I have done things that I don't tell other people about.

_____ 36. I never take things that don't belong to me.

_____ 37. I have taken sick-leave from work or school even though I wasn't really sick.

_____ 38. I have never damaged a library book or store merchandise without reporting it.

_____ 39. I have some pretty awful habits.

_____ 40. I don't gossip about other people's business.

Scoring of the BIDR

1. Reverse score: Even numbers

2. Items 1 to 20 reflect self deception. Items with a score of 6 or 7 are given one point each. Points are summed.

3. Items 21 to 40 reflect impression management. Items with a score of 6 or 7 are given one point each. Points are summed.

Appendix E
Visual Analogue Scales for Rating Pain Intensity

Please place a mark through the line to rate your pain.

Immediately upon removal:

no pain --- pain as
severe as
it could be

20 seconds:

no pain --- pain as
severe as
it could be

40 seconds:

no pain --- pain as
severe as
it could be

60 seconds:

no pain --- pain as
severe as
it could be

80 seconds:

no pain --- pain as
severe as
it could be

100 seconds:

no pain --- pain as
severe as
it could be

120 seconds:

no pain --- pain as
severe as
it could be

Appendix F
McGill Pain Questionnaire

Some of the words below describe the pain you experienced during the cold pressor task. Read each group and circle the words -- if any -- that describe your pain. Circle only one word in each group, if you find one that best describes your pain. If none of the words in a group apply to you, do not circle any -- move on to consider the next group.

1. Flickering, Quivering, Pulsing, Throbbing, Beating, Pounding

2. Jumping, Flashing, Shooting

3. Pricking, Boring, Drilling, Stabbing, Lancinating

4. Sharp, Cutting, Lacerating

5. Pinching, Pressing, Gnawing, Cramping, Crushing

6. Tugging, Pulling, Wrenching

7. Hot, Burning, Scalding, Searing

8. Tingling, Itchy, Smarting, Stinging

9. Dull, Sore, Hurting, Aching, Heavy

10. Tender, Taut, Rasping, Splitting

11. Tiring, Exhausting

12. Sickening, Suffocating

13. Fearful, Frightening, Terrifying

14, Punishing, Grueling, Cruel, Vicious, Killing

15. Wretched, Blinding

16. Annoying, Troublesome, Miserable, Intense, Unbearable

17. Spreading, Radiating, Penetrating, Piercing

18. Tight, Numb, Drawing, Squeezing, Tearing

19. Cool, Cold, Freezing

20. Nagging, Nauseating, Agonizing, Dreadful, Torturing

Scoring of McGill Pain Questionnaire
First word of grouping = 1
Second word of grouping = 2
Third word of grouping = 3
etc.

PRI (S) = Pain rated intensity (sensory) - sum of rated adjectives selected from groups 1-10

PRI (A) = Pain rated intensity (affective) - sum of rated adjectives from groups 11-15

PRI (E) = Pain rated intensity (evaluative) - sum of rated adjectives from group 16

Appendix G
Structured Interview for Coping with Pain

I AM INTERESTED IN WHAT PEOPLE ARE FEELING, THINKING, AND DOING WHILE THEIR HAND IS IMMERSED IN THE COLD WATER. I AM GOING TO ASK A FEW QUESTIONS ABOUT ANY THOUGHTS, FEELINGS OR ANYTHING THAT OCCURRED TO YOU WHILE YOUR HAND WAS IN THE COLD WATER AND I WOULD LIKE YOU TO ANSWER IN AS MUCH DETAIL AS YOU CAN. OK?

1. TRY TO IMAGINE YOURSELF BACK DURING THE FEW MOMENTS JUST BEFORE YOU PUT YOUR HAND INTO THE COLD WATER TANK. TELL ME EVERYTHING YOU CAN REMEMBER ABOUT WHAT YOU WERE THINKING, FEELING, AND DOING AT THAT TIME, EVEN IF YOUR THOUGHTS WERE BRIEF OR RANDOM, AND EVEN IF THEY SEEM TRIVIAL.

2. ONCE YOU PUT YOUR HAND IN THE WATER, WHAT WERE YOUR IMMEDIATE FEELINGS AND THOUGHTS? WERE YOU DOING ANYTHING AT THAT TIME?

3. AS YOU WERE SITTING THERE, ABOUT HALF WAY THROUGH THE EXPERIENCE WHAT ELSE DO YOU RECALL EXPERIENCING, ANY THOUGHT, FEELING, IMAGE, EVEN FLEETING OR RANDOM? WHAT WERE DOING AT THAT TIME?

4. WHAT DO YOU REMEMBER THINKING ABOUT OR FEELING JUST BEFORE YOU TOOK YOUR HAND OUT OF THE WATER? WERE YOU DOING ANYTHING AT THAT TIME?

Note 1: Reflect the subject's responses, paraphrasing them briefly when the subject pauses.

Note 2: After each question ask subjects "Is there anything else?" "After that, what can you remember?".

Note 3: If the subject (1) reports being unable to recall anything when a question is posed, or (2) responds to a question very briefly or with apparent difficulty in either formulating a response or remembering, then prompt with a question such as one of the following: "What were you thinking about?", "How were you feeling?" "Was there anything else going on?" "Can you tell me more about that?" "Were you doing anything when you had your hand in the water?"

Note 4: If it is unclear whether a statement made during the interview is meant to be a report of a cognition that occurred during the cold pressor task or is simply something that the subject is thinking of during the interview, the ambiguity should be resolved by a question such as: "Were you thinking about that during the cold pressor task?" Request additional clarification if necessary.

Scoring of the Structured Interview for Coping with Pain

A. Statements Prior to the Cold Pressor are scored on the following scale:

<div align="center">1   2   3   4   5   6   7</div>

1 = implication that the individual is extremely worried or nervous about the experience or thinking that the water will be extremely cold.

4 = it is not possible to tell if the individual is or is not worried about the cold water or his or her reaction. The individual, for instance, wonders what the water or his or her response to the water will be or has no thoughts about how it will be or how they will cope.

7 = implication is that the individual is extremely confident that he or she will be able to tolerate the water, or that the water will not be too cold.

B. Immediate, Middle and End Statements should be coded separately for the following categories using the following rating scale:

0 = No occurrence of the category
1 = Some elements of the category
2 = At least one clear occurrence of the category
3 = At least two examples of the category or the implication that this category was more than an isolated incident
4 = Implication that the category predominated

Avoidant: the individual states that he or she attempted to avoid, or ignore painful sensations.
- I just tried to think of everything I could ... I was just reading things I probably saw ...
- I was thinking of other things
- I just wasn't thinking about it
- I tried to ignore it
- I tried to push thoughts of pain out of my mind

Negative Somatic Monitoring: the individual focused on negative aspects of painful experience or his or her reaction (e.g., focusing on desire to want the experience to be over).
- withdrawal ... it is painful
- it was freezing cold ... yeah it was really really cold
- I almost flinched ... I almost wanted to take my hand out
- shocking ... I was really shocked that it was that cold
- there was a lot of pain all of a sudden
- my hand and my fingers were just like frozen
- it was starting to hurt ... I was getting pain coming from this finger and it was shooting like up
- I was thinking what if my fingers fall off
- I was wondering if my cells were dead
- it was stinging ... it was a shock

Positive Somatic Monitoring: the individual focuses on experience, but notices positive aspects of it or feels he or she can cope. The individual may also reinterpret sensations in a way that makes them less painful or suggests that he or she is coping with the sensations. The individual may notice sensations, but this is more observational than anything else, and seems to help rather than hinder performance.
- then for some reason it just started to go away ... I guess because it was getting numb
- I moved my hand in there a little bit to try and keep the blood flowing a bit better
- I was taking in warm air and kind of thinking about my arm and pushing the warm air down there ...
- it will be fine
- I was o.k. umm my hand was basically all numb by then ... there was no shooting pain
- it was just kind of a thawy feeling .... it felt alright
- I was thinking it wasn't as bad as I thought it would be
- I stopped thinking about how cold it was and just thought my hand is in the water.
- I just told myself to try to bear it
- I was just kind of encouraging myself

Appendix H
Coping Strategies Questionnaire

Individuals who experience pain have developed a number of ways to cope or deal with pain. These include saying things to themselves when they experience pain, or engaging in different activities. Below are a list of things that people have reported doing when they feel pain. For each activity, please indicate, using the scale below, how much you engaged in that activity when you felt pain, where a 0 indicates that you never did that when you were experiencing pain, a 3 indicates that you sometimes did that when you experiencing pain, and a 6 indicates you always did that when you were experiencing pain. Remember, you can use any point along the scale.

0	1	2	3	4	5	6
Never			Sometimes			Always

WHEN I FELT PAIN DURING THE COLD PRESSOR...

_____1. I tried to feel distant from the pain, almost as if the pain was in somebody else's body.

_____2. I tried to think of something pleasant.

_____3. I didn't think of it as pain, but rather as a dull or warm feeling.

_____4. It was terrible and I felt it was never going to get any better.

_____5. I told myself to be brave and carry on despite the pain.

_____6. I told myself that I could overcome the pain.

_____7. I counted numbers in my head or ran a song through my mind.

_____8. I just thought of it as some other sensation, such as numbness.

_____9. I thought it was awful and it overwhelmed me.

_____10. I played mental games with myself to keep my mind off the pain.

_____11. I felt that like this, my life wasn't worth living.

_____12. I thought someone will be here to help me and it will go away.

_____13. I prayed to God it wouldn't last long.

_____14. I tried not to think of it as my body, but rather as something separate from me.

_____15. I didn't think about the pain.

_____16. I tried to think ahead, what everything would be like after I'd gotten rid of the pain.

_____17. I told myself it doesn't hurt.

_____18. I told myself I couldn't let the pain stand in the way of what I had to do.

_____19. I didn't pay any attention to it.

_____20. I had faith the experimenter would come and help me.

_____21. I thought no matter how bad it gets, I can handle it.

_____22. I pretended it was not there.

_____23. I worried all the time about whether it would end.

_____24. I replayed in my mind pleasant experiences.

_____25. I thought of people I enjoy doing things with.

_____26. I prayed for the pain to stop.

_____27. I imagined that the pain was outside of my body.

_____28. I just got on as if nothing was happening.

_____29. I saw it as a challenge and didn't let it bother me.

_____30. Although it hurt, I just kept going.

_____31. I felt I couldn't stand it any more.

_____32. I ignored it.

_____33. I relied on my faith in God.

_____34. I thought of things I enjoy doing.

_____35. I felt like I couldn't go on.

_____36. I pretended it was not a part of me.

Based on all the things you did to cope or deal with your pain how much control did you feel you had over it? Please circle the appropriate number. Remember, you can circle any number along the scale.

0	1	2	3	4	5	6
No control			Some control			Complete Control

Based on all the things you did to cope, or deal with your pain how much were you able to decrease it? Please circle the appropriate number. Remember, you can circle any number along the scale.

0	1	2	3	4	5	6
Can't decrease it all			Can decrease it somewhat			Can decrease it completely

Scoring of Coping Strategies Questionnaire
Diverting attention: $(2 + 7 + 10 + 24 + 25 + 34)/6$
Reinterpreting the pain sensations: $(1 + 3 + 8 + 14 + 27 + 36)/6$
Catastrophising: $(4 + 9 + 11 + 23 + 31 + 35)/6$
Ignoring sensations: $(15 + 17 + 19 + 22 + 28 + 32)/6$
Praying or hoping: $(12 + 13 + 16 + 20 + 26 + 33)/6$
Coping self-statements: $(5 + 6 + 18 + 21 + 29 + 30)/6$
Control: (mean of last two questions)

Appendix I
Responses to Diagnostic Information

How intensely over the past month have you experienced the following symptoms?

1	2	3	4	5
not at all intensely		moderately intensely		extremely intensely

_____ aching of joints

_____ headaches

_____ swollen ankles

_____ repeated stomach aches

_____ coughing or chest colds

_____ pains in heart or chest

_____ paralysis or numbness

_____ nervousness or shakiness inside

_____ loss of sexual interest or pleasure

_____ pains in lower part of your back

_____ trouble remembering things

_____ itching

_____ trouble getting your breath

_____ sweating

_____ trembling

_____ weakness in parts of your body

_____ poor appetite

_____ crying easily

_____ numbness or tingling in parts of your body

_____ constipation

_____ feeling fearful

_____ heart pounding or racing

_____ nausea or upset stomach

_____ loose bowel movements

_____ difficulty in falling or staying asleep

_____ trouble concentrating

_____ feeling tense or keyed up

The following sensations have been found to be associated with the physiological recordings that were taken today and are also indicative of individuals who are at risk of complications during medical procedures and illness. Please indicate how frequently over the past month you have experienced the symptoms listed below.

1	2	3	4	5
not at all		moderately		almost always

------ headaches

------ faintness or dizziness

------ pains in heart or chest

------ feeling low in energy of slowed down

------ pains in the lower part of your back

------ soreness of your muscles

------ trouble getting your breath

------ hot or cold spells

------ numbness or tingling in parts of your body

------ a lump in your throat

------ weakness in parts of your body

------ heavy feelings in your arms or legs

1. According to the test results, how likely is it that you will experience medical complications should you become ill or have to undergo painful medical procedures?

1	2	3	4	5	6	7	8	9
not at all				moderately likely				extremely likely

2. What percentage of students do you think at UBC will be at risk for complications during medical procedures? Place a mark through the line.

0   10   20   30   40   50   60   70   80   90   100

3. In your opinion how serious is it to obtain results on the physiological measure which suggest that one is at risk for complications during medical procedures or future illness episodes?

1	2	3	4	5	6	7	8	9
not at all serious				moderately serious				extremely serious

4. How concerned are you with your test results?

1	2	3	4	5	6	7	8	9
not at all concerned				moderately concerned				extremely concerned

5. How accurate do you think the test results are?

1	2	3	4	5	6	7	8	9
not at all accurate				moderately accurate				extremely accurate

6. How competent do you think the lab technician was?

1	2	3	4	5	6	7	8	9
not at all competent				moderately competent				extremely competent

7. What do you think the chances are that the recordings were wrong or unreliable?

1	2	3	4	5	6	7	8	9
not at all likely				moderately likely				extremely likely

8. How confident are you in your test results?

1	2	3	4	5	6	7	8	9
not at all confident				moderately confident				extremely confident

9. Are you interested in obtaining more information about complications associated with a poor response on the physiological measure?

```
      1      2      3      4      5      6      7      8      9
  not at all                 moderately              very much so
```

10. More elaborate physiological testing can be done to examine one's risk for medical complications. Would you like a follow-up test?

```
      1      2      3      4      5      6      7      8      9
  not at all                 moderately              very much so
```

11. Are you interested in learning about ways to decrease your chances of complications during medical procedures?

```
      1      2      3      4      5      6      7      8      9
  not at all                 moderately              very much so
```

12. Do you have any questions about your test results that you would like answered? Please list. Please note that the investigators will put together a hand-out based on questions that you and other students have.

13. Do you have any specific questions or concerns regarding the physiological instrument? Please list. Please note that the investigators will put together a hand-out based on questions that you and other students have.

Appendix J
Post Experimental Inquiry

What was the nature of your physiological test results (e.g., how at risk are you for complications?)?

What in your opinion was the purpose of this study?

Did anything about the procedure seem puzzling or unusual to you?

Appendix K
Questions on Attitude Toward Study

The study you just participated in is called a deception experiment. I have attempted to explain the benefits of this type of research to you. Researchers are very interested in your opinions on the use of this type of research. I am asking participants to answer the following questions. This will give me as well as other researchers a better idea about how participants find studies such as this one, and may lead us to alter our practices.

In completing these questions do not put your name on this sheet and please give me your honest objective opinion. I will not be examining the questions until after the entire study has been completed so you do not have to worry that I will be able to identify your responses. Thank you for your help.

ANSWER THE QUESTIONS BY USING THE FOLLOWING THE SCALE:

```
   1      2      3      4      5      6      7
NOT AT ALL        SOMEWHAT        VERY MUCH SO
```

------   1. Are you bothered by the fact that I deceived you?

------   2. Do you feel lesser of me or Psychology because of the study?

------   3. Were you satisfied with the explanation that I gave you for doing the study?

------   4. Do you feel that being in this study was a valuable experience?

------   5. Would you still be willing to participate in other studies in psychology?

------   6. Do you feel that you benefited from the experience?

------   7. Do you feel that you were harmed beyond feeling momentary discomfort?

Scoring:
1. Reverse Score Items 3, 4, 5, 6

2. Take the mean of all items

Appendix L
Expressiveness Coding Sheet

not at all expressive   extremely expressive

A.	1	2	3	4	5	6	7	8	9
B.	1	2	3	4	5	6	7	8	9
C.	1	2	3	4	5	6	7	8	9
D.	1	2	3	4	5	6	7	8	9

Segments A, B, C, D refer to one of the following segments depending on the random order assigned to each subject:

1) Baseline: 10 seconds immediately prior to exposure

2) First Exposure: 10 seconds immediately after exposure

3) Midpoint: 10 seconds in the middle of exposure

4) Endpoint: 10 seconds immediately prior to withdrawal of the hand

Appendix M
Advertisement for Study

HEALTH STUDY

We are conducting a study concerned with how people feel about and cope with health problems and pain. The first part of the study involves filling out a questionnaire about your health. It takes approximately 10 minutes. Later, we may ask you to come to the lab for another hour in return for one course credit so we can learn more about your health.

If you are interested in the study you can:

1) complete the questionnaire in the envelope below and return it to Room 3328.

2) contact Heather at 822-5280 for more information.

Study conducted by: Heather Hadjistavropoulos and Dr. Ken Craig
Approval number: B93-0676
Subject pool number: 93-28

Appendix N
Consent to Complete Questionnaire

Investigators: Heather D. Hadjistavropoulos, M. A. (822-5280)
                        Kenneth D. Craig, Ph.D. (822-3948)
                        Department of Psychology
                        The University of British Columbia

Project Title: Attitudes about Health

We are interested in learning more about how individuals feel about their health and cope with health problems. In the first part of the study, we are asking that you complete the attached questionnaire and return it to us in Room 3328. Alternatively, you can leave the questionnaire in the blue envelope attached to the Psychology Experiment's Bulletin Board in the Kenny Building. The questionnaires will be picked up daily from there except on weekends. Completing the questionnaire will take approximately 5 to 10 minutes. After filling out the questionnaire, you may be contacted by phone to come to the lab to participate in another part of the study. This part of the study will take approximately one hour for which you will receive one course credit. In this part of the study we will examine the relation between your health and your physiological responses to different conditions.

By filling in the questionnaire and spaces below, you are not obliged to participate in further studies. You are consenting only to complete the questionnaire and to be contacted by us at a later time to receive further information about the lab aspect of the study. If at that time you decide you do not want to participate in the lab part of the study you are free to say so. You are free to withdraw from the study at any time without it adversely affecting you in any way and without it affecting your class standing, if you are a student. Your responses will be kept strictly confidential by storing them in a locked cabinet in our offices in the Department of Psychology.

If after reading the above information you are interested in participating take this form for yourself, sign the duplicate form on the next page, complete the questionnaire and return it to me in Room 3328. If you have any questions about this please feel free to contact Heather Hadjistavropoulos at 822-5280. Thank you for your participation.

I have read and understand the contents of this consent form and I agree to participate. I also acknowledge that I have received a copy of this consent form.
Name (Print):
Name (Signature):
Phone Number:
Date:

The University of British Columbia
Office of Research Services
**Behavioural Sciences Screening Committee for
Research Involving Human Subjects**

Certificate of Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	NUMBER
Craig, K.D.	Psychology	B93-0676

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT

UBC Campus

CO-INVESTIGATORS:

Hadjistavropoulos, H.D., Psychology

SPONSORING AGENCIES

Social Sciences & Humanities Research Council

TITLE:

Cognitive and behavioral responses to diagnostic feedback in low and high health anxious individuals

APPROVAL DATE	TERM (YEARS)	AMENDED:
OCT 26 1993	3	

CERTIFICATION:

The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.

Dr. R. Corteen *or*
Dr. I. Franks, Associate Chairs

Dr. R. D. Spratley
Director, Research Services

This Certificate of Approval is valid for the above term provided there is no change in the experimental procedures

Appendix P
Consent to Participate in Study

Investigators: Heather D. Hadjistavropoulos, M. A. (822-5280)
                           Kenneth D. Craig, Ph.D. (822-3948)
                           Department of Psychology
                           The University of British Columbia

Project Title: Physiology and Health

We are interested in learning more about physiological and psychological responses to pain. Recently, a new computer program was developed that combines various types of physiological information (e.g., heart rate, blood pressure, muscle activity, and skin conductance). This measure has proven to be very useful. It is presently being used in hospital settings to examine individual's physiological reactivity, and predict complications that individuals may have when undergoing medical procedures or faced with illness. The goal of our study is to examine this measure more thoroughly by exploring your responses to a standardized experimental procedure that is designed to simulate the sensations brought on by a painful medical procedure.

To begin, you will be asked to complete a number of questionnaires concerning your attitudes toward health and medical history. Following this, your responses to the new instrument will be recorded, and you will receive feedback regarding your performance. The recordings are in no way painful or harmful. You may, however, receive feedback that will make you feel uncomfortable. Next, you will be asked to undergo a standardized experimental procedure, called the cold pressor task, which involves emerging your hand in a cold container of water until you feel you can no longer tolerate the temperature. This procedure, although discomforting, is used commonly in research and has not been found to cause physical harm in any way. Following the cold pressor experience, you will be interviewed and asked to complete a number of questionnaires concerning your experience.

The entire procedure requires about one hour of your time for which you will receive one course credit. You are free to withdraw from the study at any time without it adversely affecting you in any way and without it affecting your class standing, if you are a student. Your responses will be kept strictly confidential by storing them in a locked cabinet in our offices at the Department of Psychology.

If you have any questions now or later please feel free to ask your experimenter or contact the student investigator, Heather Hadjistavropoulos, at 822-5280. Thank you for your participation.

I have read and understand the contents of this consent form and I agree to participate. I also acknowledge that I have received a copy of this consent form.
Signature: _____
Date: _____

Appendix Q
Background Information

Please fill in the blanks or circle the correct response.

AGE: _____

SEX: male or female

MARITAL STATUS:
        never married
        married
        separated/ divorced
        widowed

YEAR IN UNIVERSITY: _____

AREA OF STUDY: _____

IF YOU ARE NOT A STUDENT PLEASE INDICATE WHAT YOUR OCCUPATION IS:

HAS YOUR PHYSICIAN TOLD YOU THAT YOU HAVE A MEDICAL CONDITION. IF SO, WHAT?

DO YOU BELIEVE THAT YOUR MEDICAL CONDITION WOULD BE ADVERSELY AFFECTED BY EXPERIENCING DISCOMFORT?

Appendix R
Debriefing Form

Investigators:	Heather D. Hadjistavropoulos, M. A.(822-5280)
	Kenneth D. Craig, Ph.D. (822-3948)
	Department of Psychology
	The University of British Columbia
Project Title:	Cognitive and Behavioural Responses to Diagnostic Information

Thank you very much for participating in this study. Frequently within the health care setting individuals are required to process, respond and interpret diagnostic information or test results which range anywhere from positive, negative to ambiguous. The information that you were given in this study was designed to simulate this feedback. That is, some participants in this study received information that they were at risk for complications, whereas others received information that they were not at risk, and still others received feedback that it was impossible to obtain an accurate reading from the results. In reality, no physiological recordings were actually taken. The results you were given have no relevance for your ability to undergo medical procedures or cope with future illnesses.

Our rationale for giving you this feedback was to learn more about how people, especially individuals who are worried about their health to begin with, cope with diagnostic information. We strongly believe that we could not have learned about how people cope without providing them with feedback in an experimental setting. We believe that it is very important to learn about how diagnostic information affects people in order that health care professionals can learn more about how to give the most effective feedback and help patients cope with this information. In particular, we are interested in learning whether diagnostic information influences the effectiveness of an individual's coping strategies as well as the choice of strategies. The choice of coping strategies can have important implications for a person's well-being. It has been suggested for instance that people frequently try and cope with discomfort by suppressing emotional reactions, both verbally and nonverbally. This strategy although frequent, is often not adaptive and can actually increase thoughts of discomfort, as well as physiological reactions to it.

As mentioned above, there is some evidence to suggest that individuals cope with discomfort by suppressing their nonverbal emotional reactions. For this reason we videotaped your facial expressions while you were undergoing the cold pressor task. We felt this was necessary since informing you of the videotape may have resulted in subtle changes in your facial expression. With your permission, your videotape will be viewed and coded by independent observers and used for research purposes to learn more about the relation between coping and the expression of pain. If you like, you may request that the videotape be erased since we did not ask your prior permission to videotape you.

Since we will be asking some of your classmates or acquaintances to participate in this study, it is important that you avoid discussing the study's purpose with potential subjects. Thank you very much for your cooperation. If you wish to know the outcome of the study or any further details, please contact the student investigator, Heather Hadjistavropoulos (822-5280, Room 3328). If you would like to read more about this area of study, the following articles may be of interest to you:

McCaul, K. D. Thiesse-Duffy, E. & Wilson, P. (1992). Coping with medical diagnosis: The effects of at-risk versus disease labels over time. Journal of Applied Social Psychology, 22, 1340-1355.

Berry, D. S. & Pennebaker, J. W. (1993). Nonverbal and verbal emotional expression and health. Psychotherapy and Psychosomatics, 59, 11-19.

Now that the real conditions of the study have been revealed, please sign below to indicate your consent to permit use of your videotape and other data.
Signature:
Date:

Appendix S
Means and Standard Deviations

Means and Standard Deviations on all of the Variables for Females Grouped by Health Anxiety and Diagnostic

Feedback

Variable		Non-Health Anxious			Health Anxious		
		Positive (*n*=21)	Negative (*n*=21)	Ambiguous (*n*=21)	Positive (*n*=21)	Negative (*n*=21)	Ambiguous (*n*=21)
Illness Attitude Scale	*M*	28.76	22.33	28.19	48.05	48.52	47.76
(0-96)	*SD*	7.48	8.66	8.27	6.48	5.68	4.25
Perceived Risk	*M*	6.05	2.67	3.57	6.24	3.57	4.62
(1-9)	*SD*	1.96	1.02	1.69	1.70	1.75	1.07
Trait Anxiety	*M*	39.00	39.24	43.95	47.67	46.86	48.24
(20-80)	*SD*	10.00	6.71	6.49	10.21	7.59	7.25
Self Deception	*M*	6.48	6.05	4.76	4.81	3.71	3.62
(0-20)	*SD*	3.83	4.53	2.57	3.56	2.45	2.06
Impression	*M*	5.57	5.57	5.57	5.29	5.00	5.19
Management (0-20)	*SD*	3.92	3.53	3.75	2.55	3.51	3.17
Expectancy	*M*	4.00	3.86	3.95	4.19	3.95	4.29
(1-7)	*SD*	1.58	1.68	1.77	1.72	2.01	1.82
Avoidance	*M*	.48	.71	.57	.24	.24	.24
Immediate (0-2)	*SD*	.75	1.31	1.08	.70	.70	.70
Avoidance	M	.43	.62	.57	.10	.38	.43
Middle (0-2)	*SD*	.93	1.07	1.08	.30	.92	.93
Avoidance	*M*	.62	.24	.52	.48	.29	.14
End (0-2)	*SD*	.92	.70	.93	1.08	.46	.66
Positive Monitoring	*M*	.86	1.57	.52	.57	.62	.95
Immediate (0-2)	*SD*	1.15	1.33	.75	.75	.92	1.12
Positive Monitoring	*M*	.91	1.14	1.14	1.33	1.14	1.10
Middle (0-2)	*SD*	1.26	1.28	1.28	1.39	1.15	1.30
Positive Monitoring	*M*	.76	1.14	1.38	.67	.62	.57
End (0-2)	*SD*	1.18	1.28	1.24	1.07	1.07	.93
Negative Monitoring	*M*	1.57	1.05	1.57	1.67	1.76	1.62
Immediate (0-2)	*SD*	.51	.74	.60	.58	.54	.59
Negative Monitoring	*M*	.91	.95	1.00	1.10	.91	1.00
Middle (0-2)	*SD*	.70	.74	.71	.77	.87	.71
Negative Monitoring	*M*	1.00	1.10	1.19	1.29	1.24	1.24
End (0-2)	*SD*	.95	.89	.93	.85	.89	.94

Distraction	M	1.50	2.10	2.40	1.87	1.90	1.97
(0-6)	SD	1.22	1.69	1.43	1.44	1.36	1.62
Ignoring	M	2.64	2.79	2.71	2.17	2.34	2.65
(0-6)	SD	1.30	1.39	1.37	1.32	1.39	1.14
Reinterpretation	M	2.44	2.60	2.51	1.79	2.14	2.33
(0-6)	SD	1.27	1.18	1.78	1.13	1.26	1.17
Cognitive coping	M	4.97	4.24	4.26	4.33	4.51	4.15
(0-6)	SD	.70	1.44	1.18	.83	.78	.93
Control	M	3.50	3.50	3.14	3.07	3.05	3.33
(0-6)	SD	.96	1.21	1.28	1.08	1.00	.80
Catastrophising	M	2.32	1.76	2.43	3.11	2.78	2.88
(0-6)	SD	1.29	1.14	1.37	1.38	1.29	1.03
Praying	M	2.42	2.06	2.79	2.23	2.38	2.33
(0-6)	SD	1.33	1.36	1.07	1.15	1.03	.91
Tolerance	M	.81	.62	.71	.38	.62	.33
(0-1)	SD	.40	.50	.46	.50	.50	.48
Recovery	M	5.62	5.38	6.10	5.57	5.48	6.14
Interval (1-9)	SD	3.07	3.20	2.63	2.11	2.44	2.37
Withdrawal Pain	M	93.62	87.43	109.95	116.05	112.90	108.10
Rating (0-150)	SD	47.94	37.63	36.02	30.70	30.31	34.69
Sensory	M	17.10	14.24	17.52	18.67	17.18	17.24
(0-42)	SD	6.76	5.11	7.59	5.28	8.55	7.56
Evaluative	M	3.19	2.43	2.81	3.71	3.24	3.29
(0-5)	SD	1.29	1.99	1.89	1.31	1.67	1.71
Affective	M	2.29	2.57	2.81	3.81	2.71	3.10
(0-14)	SD	1.65	3.40	3.14	3.20	2.78	2.96
Before Cold Press	M	2.70	2.41	2.96	2.58	2.32	3.74
Expressiveness (1-9)	SD	1.24	.98	1.44	1.41	1.00	1.90
Immediate Cold Press	M	2.64	3.18	3.24	3.31	3.23	3.96
Expressiveness (1-9)	SD	1.15	1.83	1.55	1.81	1.19	1.88
Middle Cold Press	M	2.45	2.64	3.13	3.59	2.93	2.83
Expressiveness (1-9)	SD	1.23	1.88	1.97	1.95	1.24	1.54
End Cold Press	M	2.68	2.65	3.13	3.61	4.22	3.75
Expressiveness (1-9)	SD	1.57	1.17	2.18	2.15	2.14	2.26
Concern	M	5.24	3.24	3.91	6.86	3.71	5.67
Before Cold Press (1-9)	SD	1.58	2.39	1.81	1.42	2.10	1.71
Concern	M	5.43	4.29	4.00	7.14	4.62	6.05
After Cold Press (1-9)	SD	1.83	2.43	1.98	1.20	2.04	1.32

Request More Info.	M	6.62	5.14	5.57	7.52	5.81	6.76
Before Cold Press (1-9)	SD	1.60	3.07	1.86	1.44	2.23	1.61
Request More Info.	M	6.48	5.86	6.05	7.29	5.62	6.14
After Cold Press (1-9)	SD	1.12	2.99	2.04	1.62	2.25	1.56
Percent (0-100)	M	41.29	38.48	31.43	52.14	35.95	44.91
	SD	18.55	13.65	20.20	17.65	19.91	17.17
Serious (1-9)	M	5.81	6.38	5.81	6.52	5.95	6.10
	SD	1.81	1.77	2.11	1.40	1.53	1.81
Desire to Learn	M	6.81	6.10	5.86	7.86	6.00	6.67
More (1-9)	SD	1.78	2.14	1.93	1.35	1.58	1.43
Questions	M	.43	.33	.43	.48	.38	.71
(0-1)	SD	.51	.48	.51	.51	.50	.46
More Testing	M	4.57	4.57	5.10	5.71	4.24	5.29
Desired (1-9)	SD	2.32	2.34	1.90	2.33	1.92	1.79
Accuracy	M	5.57	5.71	4.62	6.24	6.14	5.47
(1-9)	SD	1.40	1.90	1.50	1.51	.96	1.17
Competency	M	7.67	7.52	7.29	7.43	7.57	6.90
of Experimenter (1-9)	SD	1.06	1.12	1.71	.87	1.03	1.30
Reliability	M	4.10	3.81	4.81	4.62	3.33	4.52
(1-9)	SD	1.58	1.47	1.66	1.66	.86	1.36
Confidence in Results	M	5.67	5.81	4.52	5.62	5.91	4.86
(1-9)	SD	1.65	1.29	1.50	1.75	1.18	1.32
General Symptoms	M	1.64	1.61	1.81	2.18	2.06	2.26
(1-5)	SD	1.46	.51	.45	.51	.48	.60
At Risk Symptoms	M	1.62	1.54	1.77	2.40	1.93	2.11
(1-5)	SD	.39	.43	.51	.59	.57	.56
Negative Attitude	M	1.94	2.04	1.90	2.02	2.33	2.25
(1-7)	SD	.65	.98	.57	.79	.62	.61

Note. Minimum and maximum scores for the variables are given in brackets beside the variable name.

Means and Standard Deviations on all of the Variables for Males Grouped by Health Anxiety and Diagnostic

Feedback

Variable		Non-Health Anxious			Health Anxious		
		Positive (n=11)	Negative (n=11)	Ambiguous (n=11)	Positive (n=11)	Negative (n=11)	Ambiguous (n=11)
Illness Attitude Scale	M	29.09	26.09	22.18	48.82	47.00	49.82
(0-96)	SD	6.07	7.92	2.93	6.82	5.08	8.22
Perceived Risk	M	5.46	2.55	3.91	6.09	3.55	4.18
(1-9)	SD	2.02	1.37	1.38	2.02	1.75	2.52
Trait Anxiety	M	39.55	40.18	41.64	50.64	46.36	50.27
(20-80)	SD	5.54	10.85	9.94	6.59	8.77	9.32
Self Deception	M	6.18	6.18	5.73	2.27	4.18	4.00
(0-20)	SD	2.48	4.24	3.77	2.10	1.94	1.48
Impression	M	5.09	4.46	5.27	3.27	5.55	2.55
Management (0-20)	SD	2.39	2.73	3.27	2.33	4.11	1.37
Expectancy	M	4.37	3.64	3.91	3.18	3.64	3.91
(1-7)	SD	1.86	1.43	1.04	1.17	1.86	1.04
Avoidance	M	.09	.82	.18	.27	1.00	.18
Immediate (0-2)	SD	.30	1.17	.41	.47	1.34	.41
Avoidance	M	.64	.82	1.55	.55	.64	.64
Middle (0-2)	SD	1.21	1.17	1.44	.93	1.21	1.21
Avoidance	M	.09	.55	.73	.64	.73	.27
End (0-2)	SD	.30	1.21	1.19	.92	.91	.47
Positive Monitoring	M	.82	.82	1.91	.64	.73	.55
Immediate (0-2)	SD	1.17	1.17	1.30	1.21	.91	.93
Positive Monitoring	M	1.55	1.27	.46	1.27	1.00	1.00
Middle (0-2)	SD	1.44	1.42	.93	1.42	.78	.78
Positive Monitoring	M	1.64	.73	.91	.73	.46	.55
End (0-2)	SD	1.36	.91	1.38	1.19	.93	.93
Negative Monitoring	M	1.36	1.00	.46	1.27	1.36	1.55
Immediate (0-2)	SD	.81	.78	.52	.79	.81	.82
Negative Monitoring	M	.46	.55	.73	.82	.91	1.27
Middle (0-2)	SD	.69	.82	.65	.75	.70	.79
Negative Monitoring	M	.36	.73	.46	.64	.82	1.46
End (0-2)	SD	.67	.79	.52	.81	.75	.69

Distraction	M	1.80	2.71	2.47	2.38	2.26	1.98
(0-6)	SD	1.44	1.39	.89	1.48	1.75	1.39
Ignoring	M	2.40	2.86	3.36	3.30	2.42	2.49
(0-6)	SD	1.58	1.24	1.16	1.02	1.49	1.36
Reinterpretation	M	2.27	2.46	2.67	3.15	2.26	2.49
(0-6)	SD	1.32	.98	1.41	1.31	1.26	1.43
Cognitive coping	M	4.23	4.52	4.38	4.08	4.79	4.70
(0-6)	SD	1.45	.85	1.09	.78	1.36	.93
Control	M	3.64	3.91	4.36	3.50	3.41	3.09
(0-6)	SD	1.47	.94	.81	.81	1.18	1.63
Catastrophising	M	2.27	1.89	1.20	2.30	2.44	2.94
(0-6)	SD	1.30	1.46	1.13	1.38	1.06	1.28
Praying	M	1.77	2.12	1.41	2.15	1.61	2.12
(0-6)	SD	1.21	1.02	.73	.78	1.19	1.04
Tolerance	M	.64	.91	1.00	.91	.82	.55
(0-1)	SD	.51	.30	.00	.30	.41	.52
Recovery	M	2.91	4.36	4.36	5.73	4.27	4.18
Interval (1-9)	SD	1.81	2.69	2.58	3.04	2.57	2.60
Withdrawal Pain	M	74.45	102.55	84.36	91.45	88.18	101.36
Rating (0-15)	SD	44.81	34.89	33.80	43.23	46.06	31.53
Sensory	M	15.09	13.00	13.27	17.36	15.91	15.73
(0-42)	SD	7.48	7.62	5.26	5.32	7.45	4.96
Evaluative	M	2.27	2.18	1.45	2.09	3.09	3.64
(0-5)	SD	1.95	1.99	1.21	1.38	1.70	1.63
Affective	M	1.64	1.64	1.36	2.55	3.73	2.82
(0-14)	SD	1.86	2.54	2.25	2.16	2.76	1.89
Before Cold Press	M	3.07	2.70	2.94	2.51	2.94	2.76
Expressiveness (1-9)	SD	1.02	1.18	1.56	.97	1.33	1.57
Immediate Cold Press	M	3.07	2.53	3.00	3.13	2.90	3.49
Expressiveness (1-9)	SD	1.09	.81	1.20	1.85	1.04	2.60
Middle Cold Press	M	3.14	2.41	2.56	2.65	3.42	3.46
Expressiveness (1-9)	SD	1.54	.81	1.26	1.52	1.77	2.69
End Cold Press	M	2.28	2.27	2.47	2.43	3.13	3.04
Expressiveness (1-9)	SD	.71	.77	1.22	1.17	1.59	1.92
Concern	M	6.09	3.64	4.55	6.91	5.82	5.82
Before Cold Press (1-9)	SD	1.70	2.25	2.46	1.22	1.94	1.83
Concern	M	6.09	4.18	4.82	7.09	5.55	6.64
After Cold Press (1-9)	SD	1.70	1.94	1.89	1.22	2.07	1.91

Request More Info.	*M*	7.45	6.18	7.00	7.54	6.64	7.09
Before Cold Press (1-9)	*SD*	1.44	1.17	2.10	2.11	2.80	1.64
Request More Info.	*M*	7.18	5.63	6.73	7.91	7.18	7.00
After Cold Press (1-9)	*SD*	1.33	2.01	1.56	1.30	2.40	1.95
Percent (0-100)	*M*	35.00	26.36	36.36	47.27	41.36	48.18
	SD	18.30	16.29	21.34	15.23	20.01	21.25
Serious (1-9)	*M*	5.82	5.73	6.00	6.18	5.55	7.09
	SD	1.54	1.35	1.18	.98	1.97	1.38
Desire to Learn	*M*	7.55	6.91	6.27	7.73	6.82	7.00
More (1-9)	*SD*	1.21	1.22	1.56	.90	2.64	2.14
Questions	*M*	.55	.64	.64	.64	.73	.46
(0-1)	*SD*	.52	.51	.51	.51	.47	.52
More Testing	*M*	5.18	5.27	5.09	6.09	4.46	6.18
Desired (1-9)	*SD*	2.40	1.85	2.07	1.87	2.73	1.99
Accuracy	*M*	5.36	6.09	5.09	5.82	5.82	6.00
(1-9)	*SD*	1.69	1.30	.94	1.47	1.66	1.18
Competency	*M*	6.55	7.64	7.18	7.55	7.27	7.64
of Experimenter (1-9)	*SD*	1.75	.81	.87	.93	1.19	.81
Reliability	*M*	4.55	3.45	3.91	4.82	3.36	4.55
(1-9)	*SD*	1.57	1.75	1.22	1.66	1.80	1.75
Confidence in Results	*M*	5.46	6.73	5.27	5.09	5.73	6.00
(1-9)	*SD*	1.57	1.35	1.10	1.51	1.68	1.73
General Symptoms	*M*	1.71	1.58	1.61	2.05	2.15	2.11
(1-5)	*SD*	.37	.35	.29	.28	.50	.35
At Risk Symptoms	*M*	1.61	1.42	1.67	1.86	2.08	1.87
(1-5)	*SD*	.42	.33	.36	.44	.66	.37
Negative Attitude	*M*	2.23	2.05	1.99	2.58	1.81	2.05
(1-7)	*SD*	.69	.48	.62	.40	.53	.57

Note. Minimum and maximum scores for the variables are given in brackets beside the variable name.

Appendix T
Correlation Matrix

<u>**Key**</u>

ha	- health anxiety (0 = non-health anxious, 1 = health anxious)
race	- race (1 = caucasian, 2 =asian)
disease	- presence or absence of minor medical problems
age	- age of subject
sex	- sex of subject (male = 1, female = 2)
ta	- trait anxiety score
sde	- self deceptive response style score
rsde	- square root transformation of "sde"
im	- impression management score
rim	- square root transformation of "im"
affect	- use of affective words to describe pain
raffect	- square root transformation of "affect"
prieval	- use of evaluatuve words to describe pain
sprieval	- sqaured transformation of "prieval"
sensory	- sensory words to describe pain
dxtime	- completed or did not complete cold pressor task
pnrec0	- pain rating immediately upon completing cold pressor
spnrec0	- sqaured transformation of "pnrec0"
recover	- interval recovered from cold pressor
csqcd	- ability to control or decrease pain
scsqcd	- sqaured transformation of "csqcd"
cope	- use of coping statements to deal with cold pressor
scope	- squared transformation of "cope"
csqdis	- use of distraction
rcsqdis	- square root transformation of "csqdis"
pray	- use of hoping or praying to deal with pain
reinter	- tendency to reinterpret pain sensations
catast	- tendency to catastrophize
csqign	- attempt to ignore pain
txiavd	- use of avoidance in beginning of cold pressor
txmavd	- use of avoidance in middle of cold pressor
txeavd	- use of avoidance at end of cold pressor
txicope	- use of positive monitoring in beginning of cold pressor
txmcope	- use of positive monitoring in middle of cold pressor
txecope	- use of positive monitoring at end of cold pressor

txicat	- use of negative monitoring in beginning of cold pressor
txmcat	- use of negative monitoring in middle of cold pressor
txecat	- use of negative monitoring at end of cold pressor
regsxs	- intensity of a number of benign somatic symptoms
lregsxs	- log transformation of "regsxs"
probsxs	- frequency of "at risk symptoms
lprobsxs	- log transformation of "probsxs"
jbcp	- judged expressiveness before cold pressor
ljbcp	- log transformation of "jbcp"
jimmed	- judged expressiveness in beginning of cold pressor
ljimmed	- log transformation of "jimmed"
jmid	- judged expressiveness during middle of cold pressor
ljmid	- log transformation of "jmid"
jend	- judged expressiveness at end of cold pressor
ljend	- log transformation of "jend"
moreinf1	- desire for more information before cold pressor
sminf1	- squared transformation of "moreinf1"
moreinf2	- desire for more information after cold pressor
sminf2	- squared transformation of "moreinf2"
learn	- desire to learn how to reduce risk
slearn	- squared transformation of "learn"
openq	- number of questions about test results and procedure
moretest	- desire for more testing
comp	- perceived competency of the experimenter
scomp	- sqaured transformtaion of "comp"
reliable	- how unreliable the test is
rrel	- square root transformation of "rel"
conf	- confidence in test results
percent	- prevalence of risk
concern1	- degree of concern for test results before cold pressor
concern2	- degree of concern for test results after cold pressor
serious	- perceived seriousness of test results
medcomp	- likelihood of experiencing medical complications
negatt	- negative attitude toward the procedures
lnegatt	- log transformation of "negatt"

	HA	RACE	DISEASE	AGE	SEX	TA
HA	1.00	.13	-.07	-.07	.00	.41**
RACE	.13	1.00	-.24**	-.08	-.08	.22**
DISEASE	-.07	-.24**	1.00	-.04	-.03	-.15*
AGE	-.07	-.08	-.04	1.00	-.05	-.05
SEX	.00	-.08	-.03	-.05	1.00	-.03
TA	.41**	.22**	-.15*	-.05	-.03	1.00
SDE	-.31**	-.16*	.20**	.16*	.02	-.56**
RSDE	-.29**	-.17*	.17*	.14	.01	-.54**
IM	-.10	-.05	.05	-.06	.15*	-.22**
RIM	-.11	-.03	.05	-.06	.14*	-.22**
AFFECT	.17*	.13	-.03	-.01	.10	.26**
RAFFECT	.18*	.13	-.03	-.02	.10	.25**
PRIEVAL	.21**	.12	-.11	.01	.18*	.18*
SPRIEVAL	.20**	.16*	-.13	.01	.18*	.19**
SENSORY	.13	.01	.07	.00	.14	.05
DXTIME	-.22**	-.17*	.01	.04	-.22**	-.14*
PNRECO	.18*	.23**	-.06	-.00	.19**	.18*
SPNRECO	.16*	.21**	-.04	.02	.19**	.16*
RECOVER	.06	.06	-.09	-.02	.25**	.07
CSQCD	-.16*	-.00	.02	.00	-.16*	-.15*
SCSQCD	-.20**	.00	.04	.01	-.20**	-.17*
COPE	-.03	-.08	.05	-.09	-.02	-.05
SCOPE	-.06	-.07	.05	-.10	-.03	-.06
CSQDIS	-.03	-.13	.03	-.03	-.10	-.07
RCSQDIS	-.04	-.12	-.00	-.03	-.11	-.06
PRAY	-.00	-.05	-.06	-.12	.21**	.06
REINTER	-.09	.06	-.02	.08	-.09	.07
CATAST	.29**	.23**	-.18*	-.09	.13	.31**
CSQIGN	-.10	-.06	-.02	.01	-.09	-.01
TXIAVD	-.11	-.21**	.17*	-.04	-.02	-.10
TXMAVD	-.15*	-.13	.14	.03	-.18*	-.06
TXEAVD	-.03	-.20**	.05	-.01	-.08	-.17*
TXICOPE	-.15*	-.11	.13	-.06	-.01	-.03
TXMCOPE	.06	-.02	.13	-.00	-.00	-.07
TXECOPE	-.22**	-.12	.07	.04	.01	-.21**
TXICAT	.24**	.04	.01	-.05	.25**	.03
TXMCAT	.13	-.05	-.18*	-.10	.13	.05
TXECAT	.15*	-.01	-.11	-.13	.23**	.16*
REGSXS	.47**	.08	-.02	-.06	.06	.52**
LREGSXS	.48**	.07	-.04	-.07	.03	.55**
PROBSXS	.37**	.06	-.04	-.02	.09	.41**
LPROBSXS	.38**	.05	-.04	-.04	.08	.43**
JBCP	.02	-.09	-.01	.17*	-.01	-.01
LJBCP	.01	-.11	.02	.18*	-.03	-.05
JIMMED	.11	-.03	-.05	.10	.08	.14
LJIMMED	.11	-.04	-.06	.13	.08	.11
JMID	.12	-.09	-.02	.02	.00	.11
LJMID	.12	-.11	.00	.04	.00	.10
JEND	.23**	-.07	-.09	-.04	.20**	.12
LJEND	.22**	-.07	-.06	-.03	.18*	.12
MOREINF1	.16*	.17*	.03	.11	-.17*	.07
SMINF1	.16*	.17*	.05	.09	-.17*	.05
MOREINF2	.11	.10	.04	.08	-.17*	-.02
SMINF2	.11	.08	.07	.07	-.17*	-.03
LEARN	.13	.03	.05	.01	-.13	-.02
SLEARN	.14	.02	.05	.00	-.13	-.05
OPENQ	.08	-.11	.03	-.09	-.14	.03
MORETEST	.08	.15*	.03	-.01	-.10	-.04
COMP	.00	-.37**	.17*	-.13	.04	-.20**
SCOMP	-.02	-.38**	.18*	-.14*	.05	-.23**
RELIABLE	.01	.04	-.05	.09	.03	.08
RREL	.01	.06	-.06	.09	.04	.09
CONF	.00	-.15*	.21**	-.05	-.10	-.14*
PERCENT	.24**	.14	-.03	-.08	.04	.21**
CONCERN1	.30**	.16*	.02	.06	-.15*	.28**
CONCERN2	.33**	.18*	.00	.00	-.11	.31**
SERIOUS	.08	-.04	.02	.01	.01	.04
MEDCOMP	.17*	.04	.11	-.14	.03	.12
NEGATT	.14	.15*	-.05	-.02	-.02	.36**
LNEGATT	.14*	.15*	-.05	-.00	-.04	.36**

	SDE	RSDE	IM	RIM	AFFECT	RAFFECT
HA	-.31**	-.29**	-.10	-.11	.17*	.1841*
RACE	-.16*	-.17*	-.05	-.03	.13	.13
DISEASE	.20**	.17*	.05	.05	-.03	-.03
AGE	.16*	.14	-.06	-.06	-.01	-.02
SEX	.02	.01	.15*	.14*	.10	.10

TA	-.56**	-.54**	-.22**	-.22**	.26**	.25**
SDE	1.00	.99**	.34**	.32**	-.11	-.11
RSDE	.99**	1.00	.33**	.32**	-.10	-.10
IM	.34**	.33**	1.00	.98**	-.00	.02
RIM	.32**	.32**	.98**	1.00	.00	.02
AFFECT	-.11	-.10	-.00	.00	1.00	.98**
RAFFECT	-.11	-.10	.02	.02	.98**	1.00
PRIEVAL	-.07	-.07	-.01	-.00	.42**	.43**
SPRIEVAL	-.08	-.08	-.01	-.00	.43**	.44**
SENSORY	.02	.03	-.05	-.05	.44**	.45**
DXTIME	.14	.12	-.07	-.07	-.15*	-.1416
PNREC0	-.23**	-.23**	.00	.01	.19**	.20**
SPNREC0	-.19**	-.20**	-.01	-.01	.24**	.25**
RECOVER	-.16*	-.16*	.05	.05	.18*	.19**
CSQCD	.19**	.17*	.01	.02	-.28**	-.27**
SCSQCD	.22**	.20**	.02	.02	-.27**	-.26**
COPE	.18*	.18*	.02	.03	.00	.04
SCOPE	.20**	.21**	.04	.05	-.02	.01
CSQDIS	.01	.03	-.04	-.04	.03	.04
RCSQDIS	.00	.01	-.06	-.06	.03	.03
PRAY	-.10	-.08	.01	.02	.29**	.30**
REINTER	.05	.06	-.13	-.11	-.02	-.01
CATAST	-.33**	-.31**	-.11	-.10	.47**	.48**
CSQIGN	.07	.08	-.07	-.06	-.26**	-.26**
TXIAVD	.05	.05	.07	.05	.03	.03
TXMAVD	.00	-.00	.15*	.14	-.12	-.12
TXEAVD	.15*	.16*	.00	.00	.02	.02
TXICOPE	.12	.10	.10	.10	-.10	-.11
TXMCOPE	.17*	.16*	.04	.02	-.12	-.12
TXECOPE	.27**	.26**	.10	.11	-.09	-.09
TXICAT	-.07	-.07	.09	.09	.21**	.25**
TXMCAT	-.00	.01	-.07	-.06	.23**	.23**
TXECAT	-.17*	-.16*	-.00	-.01	.16*	.16*
REGSXS	-.43**	-.41**	-.29**	-.27**	.24**	.24**
LREGSXS	-.45**	-.43**	-.30**	-.29**	.24**	.24**
PROBSXS	-.28**	-.26**	-.19**	-.17	.27**	.27**
LPROBSXS	-.29**	-.27**	-.20**	-.18*	.28**	.28**
JBCP	-.11	-.11	-.14*	-.15*	.11	.10
LJBCP	-.10	-.10	-.12	-.13	.09	.08
JIMMED	-.13	-.12	-.17*	-.17*	.25**	.23**
LJIMMED	-.14	-.13	-.17*	-.17*	.24**	.22**
JMID	-.10	-.09	-.08	-.08	.39**	.39**
LJMID	-.10	-.08	-.07	-.07	.39**	.38**
JEND	-.14	-.13	-.11	-.10	.22**	.22**
LJEND	-.14	-.13	-.12	-.11	.23**	.21**
MOREINF1	.02	.00	.04	.04	.03	.04
SMINF1	.02	.01	.03	.04	.05	.06
MOREINF2	.06	.05	.08	.09	.08	.10
SMINF2	.08	.07	.09	.09	.07	.08
LEARN	.08	.07	.08	.08	.09	.10
SLEARN	.09	.08	.08	.08	.09	.09
OPENQ	-.00	.01	.06	.06	-.02	-.02
MORETEST	.04	.03	-.02	-.01	.04	.04
COMP	.21**	.20**	.03	.02	-.06	-.05
SCOMP	.23**	.21**	.03	.02	-.08	-.07
RELIABLE	-.06	-.07	-.15*	-.13	-.00	.02
RREL	-.06	-.07	-.15*	-.12	.01	.03
CONF	.05	.03	.01	.02	.00	.01
PERCENT	-.22**	-.20**	-.13	-.10	.04	.04
CONCERN1	-.17*	-.15*	-.04	-.03	.19**	.20**
CONCERN2	-.23**	-.21**	-.08	-.07	.24**	.25**
SERIOUS	.04	.02	-.02	-.02	-.01	.01
MEDCOMP	-.14	-.12	-.06	-.04	.07	.08
NEGATT	-.25**	-.26**	-.06	-.05	.12	.13
LNEGATT	-.24**	-.26**	-.07	-.06	.11	.11

	PRIEVAL	SPRIEVAL	SENSORY	DXTIME	PNREC0	SPNREC0
HA	.21**	.20**	.13	-.22**	.18*	.16*
RACE	.12	.16*	.01	-.17*	.23**	.21**
DISEASE	-.11	-.13	.07	.01	-.06	-.04
AGE	.01	.01	.00	.03	-.00	.02
SEX	.18*	.18*	.14	-.22**	.19**	.19**
TA	.18*	.19**	.05	-.14*	.18*	.16*
SDE	-.07	-.08	.02	.14	-.23**	-.19**
RSDE	-.07	-.08	.03	.12	-.23**	-.20**
IM	-.01	-.01	-.05	-.07	.00	-.01
RIM	-.00	-.00	-.05	-.07	.01	-.01

AFFECT	.42**	.43**	.44**	-.15*	.19**	.24**
RAFFECT	.43**	.44**	.45**	-.14	.20**	.25**
PRIEVAL	1.00	.99**	.30**	-.23**	.26**	.32**
SPRIEVAL	.99**	1.00	.25**	-.26**	.27**	.34**
SENSORY	.30**	.25**	1.00	-.08	.16*	.20**
DXTIME	-.23**	-.26**	-.08	1.00	-.28**	-.27**
PNREC0	.26**	.27**	.16*	-.28**	1.00	.89**
SPNREC0	.32**	.34**	.20**	-.27**	.89**	1.00
RECOVER	.15*	.15*	.16*	.04	.53**	.46**
CSQCD	-.30**	-.31**	-.24**	.25**	-.18*	-.20**
SCSQCD	-.30**	-.30**	-.24**	.26**	-.20**	-.21**
COPE	.11	.07	.19*	.31**	-.04	-.03
SCOPE	.09	.05	.18*	.33**	-.07	-.07
CSQDIS	-.12	-.13	-.07	.33**	-.07	-.06
RCSQDIS	-.13	-.14	-.07	.35**	-.08	-.07
PRAY	.30**	.31**	.30**	-.04	.19**	.22**
REINTER	-.13	-.14	.05	.19**	-.13	-.09
CATAST	.51**	.54**	.35**	-.38**	.41**	.45**
CSQIGN	-.30**	-.32**	-.19**	.26**	-.26**	-.28**
TXIAVD	-.09	-.10	.05	.20**	-.08	-.05
TXMAVD	-.26**	-.26**	-.18*	.34**	-.17*	-.17*
TXEAVD	-.03	-.04	.02	.28**	-.08	-.06
TXICOPE	-.19**	-.18*	-.12	.16*	-.11	-.14
TXMCOPE	-.12	-.12	-.05	.08	-.13	-.16*
TXECOPE	-.16*	-.17*	.02	.33**	-.23**	-.24**
TXICAT	.23**	.22**	.17*	-.09	.17*	.18*
TXMCAT	.30**	.29**	.24**	-.15*	.20**	.20**
TXECAT	.24**	.24**	.19**	-.34**	.16*	.17*
REGSXS	.17*	.18*	.21**	-.15*	.15*	.17*
LREGSXS	.17*	.17*	.23**	-.14	.15*	.17*
PROBSXS	.17*	.12*	.27**	-.12	.19**	.18*
LPROBSXS	.16*	.15*	.26**	-.12	.19**	.17*
JBCP	.06	.05	.15*	-.08	.18*	.18*
LJBCP	.05	.04	.14	-.06	.18*	.17*
JIMMED	.15*	.16*	.22**	-.26**	.18*	.19**
LJIMMED	.11	.13	.21**	-.23**	.17*	.17*
JMID	.26**	.27**	.17*	-.24**	.14	.18*
LJMID	.25**	.25**	.18*	-.23**	.14	.17*
JEND	.28**	.28**	.20**	-.20**	.23**	.26**
LJEND	.28**	.28**	.19**	-.18*	.22**	.26**
MOREINF1	.21**	.20**	-.03	-.10	.01	-.04
SMINF1	.22**	.21**	-.01	-.11	.00	-.04
MOREINF2	.13	.12	.02	-.10	-.11	-.13
SMINF2	.13	.12	.02	-.10	-.13	-.15*
LEARN	.07	.06	.01	-.11	-.17*	-.14
SLEARN	.07	.06	.02	-.09	-.15*	-.13
OPENQ	.01	.01	.04	-.03	.02	.00
MORETEST	.05	.07	-.03	-.10	-.10	-.11
COMP	.06	.03	.13	.24**	-.06	-.04
SCOMP	.05	.02	.13	.24**	-.06	-.04
RELIABLE	-.04	-.04	.09	-.01	-.04	-.03
RREL	-.03	-.03	.09	-.02	-.03	-.03
CONF	-.03	-.04	-.03	-.03	-.05	-.11
PERCENT	-.02	-.02	-.05	-.22**	.03	-.01
CONCERN1	.19**	.19**	-.00	-.17*	.08	.08
CONCERN2	.24**	.23**	.05	-.24**	.15*	.13
SERIOUS	.10	.09	.04	.06	.02	-.05
MEDCOMP	.08	.06	.13	-.17*	.11	.09
NEGATT	.09	.10	.05	-.06	.18*	.13
LNEGATT	.08	.09	.05	-.06	.18*	.15*

	RECOVER	CSQCD	SCSQCD	COPE	SCOPE	CSQDIS
HA	.06	-.16*	-.20**	-.03	-.06	-.03
RACE	.06	-.00	.00	-.08	-.07	-.13
DISEASE	-.09	.02	.04	.05	.05	.03
AGE	-.02	.00	.01	-.09	-.10	-.03
SEX	.25**	-.16*	-.20**	-.02	-.03	-.10
TA	.07	-.15*	-.17*	-.05	-.06	-.07
SDE	-.16*	.19**	.22**	.18*	.20**	.01
RSDE	-.16*	.17*	.20**	.18*	.21**	.03
IM	.05	.01	.02	.02	.04	-.04
RIM	.05	.02	.02	.03	.05	-.04
AFFECT	.18*	-.28**	-.27**	.00	-.02	.03
RAFFECT	.19**	-.27**	-.26**	.04	.01	.04
PRIEVAL	.15*	-.30**	-.30**	.11	.09	-.12
SPRIEVAL	.15*	-.31**	-.30**	.07	.05	-.13
SENSORY	.16*	-.24**	-.24**	.19*	.18*	-.07
DXTIME	.04	.25**	.26**	.31**	.33**	.3274**

PNREC0	.53**	-.18*	-.20**	-.04	-.07	-.07
SPNREC0	.46**	-.20**	-.21**	-.03	-.07	-.06
RECOVER	1.00	-.13	-.16*	.06	.04	.03
CSQCD	-.13	1.00	.98**	.22**	.25**	.26**
SCSQCD	-.15*	.98**	1.00	.21**	.24**	.23**
COPE	.06	.22**	.21**	1.0000	.98**	.25**
SCOPE	.04	.25**	.24**	.9841**	1.00	.24**
CSQDIS	.03	.26**	.23**	.25**	.24**	1.00
RCSQDIS	.03	.26**	.24**	.25**	.23**	.99**
PRAY	.24**	-.17*	-.18*	.22**	.20**	.27**
REINTER	-.05	.24**	.21**	.25**	.25**	.26**
CATAST	.19**	-.42**	-.42**	.00	-.03	-.11
CSQIGN	-.16*	.45**	.43**	.36**	.36**	.43**
TXIAVD	-.04	.06	.03	.09	.10	.28**
TXMAVD	-.12	.23**	.22**	.03	.04	.34**
TXEAVD	.08	.07	.05	.13	.11	.34**
TXICOPE	.05	.31**	.33**	.15*	.16*	.12
TXMCOPE	-.01	.03	.03	.14	.12	.07
TXECOPE	-.17*	.18*	.20**	.03	.06	.10
TXICAT	.04	-.16*	-.17*	-.01	-.03	-.11
TXMCAT	.18*	-.15*	-.13	.01	.03	-.13
TXECAT	.10	-.26**	-.26**	.01	-.02	-.25**
REGSXS	.13	-.05	-.08	.04	.02	.05
LREGSXS	.13	-.06	-.09	.06	.03	.04
PROBSXS	.17*	.02	-.01	.10	.08	.07
LPROBSXS	.16*	.02	-.01	.11	.09	.06
JBCP	.01	-.07	-.07	-.03	-.05	-.05
LJBCP	.01	-.07	-.06	-.02	-.03	-.02
JIMMED	.06	-.12	-.11	-.13	-.13	-.07
LJIMMED	.07	-.12	-.12	-.13	-.13	-.02
JMID	.09	-.22**	-.23**	-.13	-.12	-.07
LJMID	.13	-.22**	-.24**	-.09	-.08	-.04
JEND	.15*	-.17*	-.19**	-.16*	-.16*	-.09
LJEND	.16*	-.18*	-.21**	-.13	-.14	-.07
MOREINF1	-.03	.12	.13	.09	.08	.05
SMINF1	-.01	.12	.14	.09	.09	.04
MOREINF2	-.08	.07	.09	.07	.06	-.02
SMINF2	-.09	.07	.08	.06	.07	-.02
LEARN	-.12	.09	.11	.09	.08	-.12
SLEARN	-.13	.10	.14	.11	.11	-.11
OPENQ	.06	.04	.04	-.03	-.03	.01
MORETEST	-.09	.13	.15*	.07	.06	.02
COMP	.08	.09	.10	.25**	.25**	.04
SCOMP	.08	.09	.10	.22**	.23**	.02
RELIABLE	-.02	.11	.09	.08	.10	.09
RREL	-.01	.11	.09	.10	.11	.09
CONF	-.07	.12	.14*	.07	.06	.02
PERCENT	.02	-.04	-.07	-.02	-.04	-.16*
CONCERN1	-.01	-.08	-.07	.01	-.03	.01
CONCERN2	.01	-.11	-.10	-.01	-.04	-.07
SERIOUS	.03	.02	.02	-.00	.00	-.05
MEDCOMP	.11	-.09	-.12	-.05	-.08	-.22**
NEGATT	.11	-.04	-.06	-.05	-.07	.05
LNEGATT	.11	-.03	-.06	-.05	-.07	.06

	RCSQDIS	PRAY	REINTER	CATAST	CSQIGN	TXIAVD
HA	-.04	-.00	-.09	.29**	-.10	-.11
RACE	-.12	-.05	.06	.23**	-.06	-.21**
DISEASE	-.00	-.06	-.02	-.18*	-.02	.17*
AGE	-.03	-.12	.08	-.09	.01	-.04
SEX	-.11	.21**	-.09	.13	-.09	-.02
TA	-.06	.06	.07	.31**	-.01	-.10
SDE	.00	-.10	.05	-.33**	.07	.05
RSDE	.01	-.08	.06	-.31**	.08	.05
IM	-.06	.01	-.13	-.11	-.07	.07
RIM	-.06	.02	-.11	-.10	-.06	.05
AFFECT	.03	.29**	-.02	.47**	-.26**	.03
RAFFECT	.03	.30**	-.01	.48**	-.26**	.03
PRIEVAL	-.13	.30**	-.13	.51**	-.30**	-.09
SPRIEVAL	-.14	.31**	-.14	.54**	-.32**	-.10
SENSORY	-.07	.30**	.05	.35**	-.19**	.05
DXTIME	.35**	-.04	.19**	-.38**	.26**	.20**
PNREC0	-.08	.19**	-.13	.41**	-.26**	-.08
SPNREC0	-.07	.22**	-.09	.45**	-.28**	-.05
RECOVER	.03	.24**	-.05	.19**	-.16*	-.04
CSQCD	.26**	-.17*	.24**	-.42**	.45**	.06
SCSQCD	.24**	-.18*	.21**	-.42**	.43**	.03
COPE	.25**	.22**	.25**	.00	.36**	.09

SCOPE	.23**	.20**	.25**	-.03	.36**	.10
CSQDIS	.99**	.27**	.26**	-.11	.43**	.28**
RCSQDIS	1.00	.28**	.28**	-.11	.44**	.28**
PRAY	.28**	1.00	.24**	.44**	-.01	.02
REINTER	.28**	.24**	1.00	-.16*	.57**	.24**
CATAST	-.11	.44**	-.16*	1.00	-.40**	-.16*
CSQIGN	.44**	-.01	.57**	-.40**	1.00	.22**
TXIAVD	.28**	.02	.24**	-.16*	.22**	1.00
TXMAVD	.34**	-.14	.06	-.31**	.17*	.20**
TXEAVD	.34**	.02	.04	-.15*	.16*	.23**
TXICOPE	.11	-.13	.08	-.27**	.22**	.04
TXMCOPE	.06	.03	-.02	-.10	.15*	-.03
TXECOPE	.10	-.11	.02	-.32**	.08	-.04
TXICAT	-.11	.14	-.13	.26**	-.26**	.04
TXMCAT	-.12	.21*	-.04	.25**	-.22**	-.03
TXECAT	-.25**	.23**	-.13	.38**	-.21**	-.09
REGSXS	.05	.13	.10	.29**	-.03	-.06
LREGSXS	.05	.14*	.10	.30**	-.03	-.08
LPROBSXS	.07	.10	.10	.25**	.01	-.03
LPROBSXS	.06	.11	.10	.26**	.02	-.05
JBCP	-.04	.10	-.05	.19**	-.12	-.08
LJBCP	-.02	.11	-.03	.16*	-.11	-.06
JIMMED	-.08	.16*	-.08	.27**	-.13	-.09
LJIMMED	-.03	.16*	-.07	.25**	-.14	-.09
JMID	-.08	.06	-.21**	.28**	-.25**	-.10
LJMID	-.06	.08	-.17*	.28**	-.26**	-.09
JEND	-.10	.10	-.21**	.30**	-.29**	-.06
LJEND	-.08	.10	-.18*	.30**	-.29**	-.06
MOREINF1	.04	.02	-.06	.06	.03	-.10
SMINF1	.03	.02	-.05	.04	.03	-.10
MOREINF2	-.02	-.01	-.03	.01	.01	-.01
SMINF2	-.03	-.02	-.03	-.02	-.01	-.01
LEARN	-.13	.01	.04	.02	-.03	.04
SLEARN	-.13	-.01	.04	.01	-.03	.05
OPENQ	-.00	-.05	-.13	-.02	-.06	.08
MORETEST	.02	.06	-.03	.03	.02	-.07
COMP	.03	.13	.08	-.23**	.07	.14
SCOMP	.02	.12	.07	-.24**	.05	.15*
RELIABLE	.10	.07	.12	.10	.15*	-.05
RREL	.09	.07	.12	.12	.15*	-.07
CONF	.01	.03	-.01	-.05	.05	.04
PERCENT	-.16*	-.10	-.18*	.16*	-.09	-.17*
CONCERN1	.02	.03	-.03	.23**	-.02	-.07
CONCERN2	-.07	.03	-.07	.28**	-.10	-.12
SERIOUS	-.05	.04	.04	-.06	-.09	.07
MEDCOMP	-.22**	-.00	-.08	.180*	-.14*	-.11
NEGATT	.06	.04	.05	.16*	.02	-.07
LNEGATT	.06	.03	.04	.16*	.01	-.07

	TXMAVD	TXEAVD	TXICOPE	TXMCOPE	TXECOPE	TXICAT
HA	-.15*	-.03	-.15*	.06	-.22**	.24**
RACE	-.13	-.20**	-.11	-.02	-.12	.04
DISEASE	.14	.05	.13	.13	.07	.01
AGE	.03	-.01	-.06	-.00	.04	-.05
SEX	-.18*	-.08	-.01	-.00	.01	.25**
TA	-.06	-.17*	-.03	-.07	-.21**	.03
SDE	.00	.15*	.12	.17*	.27**	-.07
RSDE	-.00	.16*	.10	.16*	.26**	-.07
IM	.15*	.00	.11	.04	.10	.09
RIM	.14	.00	.10	.02	.11	.09
AFFECT	-.12	.02	-.10	-.12	-.09	.21**
RAFFECT	-.12	.02	-.11	-.12	-.09	.25**
PRIEVAL	-.26**	-.03	-.19**	-.12	-.16*	.23**
SPRIEVAL	-.26**	-.04	-.18*	-.12	-.17*	.22**
SENSORY	-.18*	.02	-.12	-.05	.02	.17*
DXTIME	.34**	.28**	.16*	.08	.33**	-.09
PNREC0	-.17*	-.08	-.11	-.13	-.23**	.17*
SPNREC0	-.17*	-.06	-.14	-.16*	-.24**	.18*
RECOVER	-.12	.08	.05	-.01	-.17*	.04
CSQCD	.23**	.07	.31**	.03	.18*	-.16*
SCSQCD	.22**	.05	.33**	.03	.20**	-.17*
COPE	.03	.13	.15*	.14	.03	-.01
SCOPE	.04	.11	.16*	.12	.06	-.03
CSQDIS	.34**	.34**	.12	.07	.10	-.11
RCSQDIS	.34**	.34**	.11	.06	.10	-.11
PRAY	-.14	.02	-.13	.03	-.11	.14
REINTER	.06	.04	.08	-.02	.02	-.13
CATAST	-.31**	-.15*	-.27**	-.10	-.32**	.26**

CSQIGN	.17*	.16*	.22**	.15*	.08	-.26**
TXIAVD	.20**	.23**	.04	-.03	-.04	.04
TXMAVD	1.00	.18*	.14*	-.19**	.13	-.06
TXEAVD	.18*	1.00	.10	-.03	-.02	-.00
TXICOPE	.14*	.10	1.00	.01	.12	-.47**
TXMCOPE	-.19**	-.03	.01	1.00	.07	.21**
TXECOPE	.13	-.02	.12	.07	1.00	-.05
TXICAT	-.06	-.00	-.47**	.22**	-.05	1.00
TXMCAT	-.21**	.02	-.06	-.36**	-.02	.04
TXECAT	-.13	-.14*	-.10	.01	-.46**	.23**
REGSXS	-.04	.06	.03	-.03	-.19**	.10
LREGSXS	-.05	.05	.02	-.02	-.19**	.10
PROBSXS	-.03	.07	.04	-.03	-.13	.10
LPROBSXS	-.02	.06	.05	-.03	-.12	.11
JBCP	.01	-.03	-.06	-.13	-.07	.08
LJBCP	.02	-.01	-.04	-.15*	-.05	.05
JIMMED	-.00	-.00	-.07	-.09	-.10	.12
LJIMMED	-.02	.04	-.06	-.08	-.11	.11
JMID	-.10	.05	-.11	-.06	-.04	.13
LJMID	-.10	.04	-.10	-.08	-.05	.13
JEND	-.12	.06	-.10	-.07	-.06	.15*
LJEND	-.14	.05	-.06	-.10	-.06	.10
MOREINF1	.03	-.01	.06	.03	-.06	-.01
SMINF1	.02	-.01	.07	.02	-.05	-.03
MOREINF2	.03	.06	.00	.01	-.01	.07
SMINF2	.03	.07	.01	.01	.00	.04
LEARN	-.01	-.01	.01	.12	.03	.08
SLEARN	-.00	-.00	.01	.10	.05	.07
OPENQ	-.03	.16*	.09	.05	.03	-.01
MORETEST	.03	-.03	-.01	.06	.05	.06
COMP	-.01	.21**	.13	.09	.14*	.03
SCOMP	-.03	.21**	.12	.08	.15*	.02
RELIABLE	-.07	-.16*	-.02	-.02	.05	-.03
RREL	-.07	-.17*	-.02	-.02	.05	-.04
CONF	-.02	.10	.17*	.20**	.05	-.04
PERCENT	-.16*	-.10	-.08	.03	-.15*	.03
CONCERN1	-.12	-.01	-.09	.02	-.18*	.02
CONCERN2	-.13	-.05	-.07	-.00	-.17*	.07
SERIOUS	.06	-.04	-.01	.04	.03	.09
MEDCOMP	-.12	.04	-.15*	-.04	-.10	.13
NEGATT	.00	-.04	-.04	-.15*	-.16*	.03
LNEGATT	.00	-.05	-.05	-.14	-.17*	.04

	TXMCAT	TXECAT	REGSXS	LREGSXS	PROBSXS	LPROBSXS
HA	.13	.15*	.47**	.48**	.37**	.38**
RACE	-.05	-.01	.08	.07	.06	.05
DISEASE	-.18*	-.11	-.02	-.04	-.04	-.04
AGE	-.10	-.13	-.06	-.07	-.02	-.04
SEX	.13	.23**	.06	.03	.09	.08
TA	.05	.16*	.52**	.56**	.41**	.43**
SDE	-.00	-.17*	-.43**	-.45**	-.28**	-.29**
RSDE	.01	-.16*	-.41**	-.43**	-.26**	-.27**
IM	-.07	-.00	-.29**	-.30**	-.19**	-.20**
RIM	-.06	-.01	-.27**	-.29**	-.17*	-.18*
AFFECT	.23**	.16*	.24**	.24**	.27**	.28**
RAFFECT	.23**	.16*	.24**	.24**	.27**	.28**
PRIEVAL	.30**	.24**	.17*	.17*	.17*	.16*
SPRIEVAL	.29**	.24**	.18*	.17*	.16*	.15*
SENSORY	.24**	.19**	.21**	.23**	.27**	.26**
DXTIME	-.15*	-.34**	-.15*	-.14	-.12	-.12
PNREC0	.20**	.16*	.15*	.15*	.19**	.19**
SPNREC0	.20**	.17*	.17*	.17*	.18*	.1737*
RECOVER	.18*	.10	.13	.13	.17*	.16*
CSQCD	-.15*	-.26**	-.05	-.06	.02	.02
SCSQCD	-.13	-.26**	-.08	-.09	-.01	-.01
COPE	.01	.01	.04	.06	.10	.11
SCOPE	.03	-.02	.02	.03	.08	.09
CSQDIS	-.13	-.25**	.05	.04	.07	.06
RCSQDIS	-.12	-.25**	.05	.05	.07	.06
PRAY	.21**	.23**	.13	.14*	.10	.11
REINTER	-.04	-.13	.10	.10	.10	.10
CATAST	.25**	.38**	.29**	.30**	.25**	.26**
CSQIGN	-.22**	-.21**	-.03	-.03	.01	.02
TXIAVD	-.03	-.09	-.06	-.08	-.03	-.05
TXMAVD	-.21**	-.13	-.04	-.05	-.03	-.02
TXEAVD	.02	-.14*	.06	.05	.07	.06
TXICOPE	-.06	-.10	.03	.02	.04	.05
TXMCOPE	-.36**	.01	-.03	-.02	-.03	-.03

TXECOPE	-.02	-.46**	-.19**	-.19**	-.13	-.12
TXICAT	.04	.23**	.10	.10	.10	.11
TXMCAT	1.00	.22**	.09	.10	.11	.11
TXECAT	.22**	1.00	.15*	.16*	.17*	.19**
REGSXS	.09	.15*	1.00	.99**	.84**	.83**
LREGSXS	.10	.16*	.99**	1.00	.82**	.83**
PROBSXS	.11	.17*	.84**	.82**	1.00	.99**
LPROBSXS	.11	.19**	.83**	.83**	.99**	1.00
JBCP	.15*	.10	.04	.06	.07	.07
LJBCP	.15*	.05	.04	.05	.04	.04
JIMMED	.17*	.21**	.21**	.21**	.18*	.18*
LJIMMED	.15*	.18*	.20**	.20**	.16*	.15*
JMID	.25**	.15*	.17*	.17*	.12	.11
LJMID	.23**	.15*	.17*	.17*	.11	.10
JEND	.25**	.14	.21**	.21**	.19**	.17*
LJEND	.24**	.10	.18*	.17*	.15*	.13
MOREINF1	-.14	-.03	.10	.09	.08	.08
SMINF1	-.11	-.03	.12	.11	.11	.11
MOREINF2	-.01	.04	.02	.02	.04	.04
SMINF2	-.01	.04	.04	.03	.05	.05
LEARN	-.04	.10	.08	.09	.08	.10
SLEARN	-.02	.10	.08	.09	.09	.11
OPENQ	.07	.04	.10	.09	.13	.12
MORETEST	.01	.03	.08	.07	.08	.08
COMP	.04	-.00	-.00	-.00	.01	.01
SCOMP	.04	-.02	-.02	-.03	-.01	-.02
RELIABLE	-.09	.05	.20**	.20**	.22**	.22**
RREL	-.09	.05	.20**	.20**	.21**	.21**
CONF	-.01	-.05	.00	-.00	.01	.00
PERCENT	-.01	.08	.18*	.18*	.12	.13
CONCERN1	-.10	.05	.20**	.22**	.14*	.16*
CONCERN2	.05	.06	.31**	.33**	.24**	.26**
SERIOUS	-.01	.03	.06	.06	.03	.04
MEDCOMP	-.02	.00	.15*	.16*	.12	.13
NEGATT	-.00	.04	.17*	.19**	.04	.07
LNEGATT	-.01	.04	.17*	.19**	.04	.07

	JBCP	LJBCP	JIMMED	LJIMMED	JMID	LJMID
HA	.02	.01	.11	.11	.12	.12
RACE	-.09	-.11	-.03	-.04	-.09	-.11
DISEASE	-.01	.02	-.05	-.06	-.02	.00
AGE	.17*	.18*	.10	.13	.02	.04
SEX	-.01	-.03	.08	.08	.01	.01
TA	-.01	-.05	.14	.11	.11	.10
SDE	-.11	-.10	-.13	-.14	-.10	-.10
RSDE	-.11	-.09	-.12	-.13	-.09	-.08
IM	-.14*	-.12	-.17*	-.17*	-.08	-.07
RIM	-.15*	-.13	-.17*	-.17*	-.08	-.07
AFFECT	.11	.09	.25**	.24**	.39**	.39**
RAFFECT	.10	.08	.23**	.22**	.39**	.38**
PRIEVAL	.06	.05	.15*	.11	.26**	.25**
SPRIEVAL	.05	.04	.16*	.13	.26**	.25**
SENSORY	.15*	.14	.22**	.21**	.17*	.18*
DXTIME	-.08	-.06	-.26**	-.23**	-.24**	-.23**
PNREC0	.18*	.18*	.18*	.17*	.14	.14
SPNREC0	.18*	.17*	.19**	.17*	.18*	.17*
RECOVER	.01	.01	.06	.07	.09	.13
CSQCD	-.07	-.07	-.12	-.12	-.22**	-.22**
SCSQCD	-.07	-.06	-.11	-.12	-.23**	-.24**
COPE	-.03	-.02	-.13	-.13	-.13	-.09
SCOPE	-.05	-.03	-.13	-.13	-.12	-.08
CSQDIS	-.05	-.02	-.07	-.02	-.07	-.04
RCSQDIS	-.04	-.02	-.08	-.03	-.08	-.06
PRAY	.10	.11	.16*	.16*	.06	.08
REINTER	-.05	-.03	-.08	-.07	-.21**	-.17*
CATAST	.19**	.16*	.27**	.25**	.28**	.28**
CSQIGN	-.12	-.11	-.13	-.14	-.25**	-.26**
TXIAVD	-.08	-.06	-.09	-.09	-.10	-.09
TXMAVD	.01	.02	-.00	-.02	-.10	-.10
TXEAVD	-.03	-.01	-.00	.04	.05	.04
TXICOPE	-.06	-.04	-.07	-.06	-.11	-.10
TXMCOPE	-.13	-.15*	-.09	-.08	-.06	-.08
TXECOPE	-.07	-.05	-.10	-.11	-.04	-.05
TXICAT	.08	.05	.12	.11	.13	.13
TXMCAT	.15*	.15*	.17*	.15*	.25**	.23**
TXECAT	.10	.05	.21**	.18*	.15*	.15*
REGSXS	.04	.04	.21**	.20**	.17*	.17*
LREGSXS	.06	.05	.21**	.20**	.17*	.17*

PROBSXS	.07	.04	.18*	.16*	.12	.11
LPROBSXS	.07	.04	.18*	.15*	.12	.10
JBCP	1.00	.96**	.57**	.58**	.26**	.28**
LJBCP	.96**	1.00	.55**	.58**	.28**	.31**
JIMMED	.57**	.55**	1.00	.97**	.55**	.52**
LJIMMED	.58**	.58**	.97**	1.00	.53**	.54**
JMID	.26**	.28**	.55**	.53**	1.00	.96**
LJMID	.28**	.31**	.52**	.54**	.96**	1.00
JEND	.26**	.24**	.50**	.49**	.50**	.49**
LJEND	.28**	.27**	.48**	.50**	.52**	.53**
MOREINF1	.03	.06	.01	.03	.03	.06
SMINF1	.01	.04	.03	.04	.08	.10
MOREINF2	.04	.07	-.03	-.05	.08	.06
SMINF2	.01	.05	-.03	-.05	.10	.08
LEARN	.01	.02	.07	.07	.05	.08
SLEARN	.01	.03	.07	.07	.06	.09
OPENQ	.06	.05	-.03	-.02	.01	.01
MORETEST	.06	.05	.12	.10	.13	.12
COMP	-.08	-.05	-.07	-.10	.02	.01
SCOMP	-.08	-.04	-.08	-.11	.03	.02
RELIABLE	.11	.10	.09	.07	.07	.05
RREL	.10	.10	.10	.08	.08	.06
CONF	-.05	-.04	-.05	-.07	.05	.07
PERCENT	-.07	-.06	.05	.05	.11	.09
CONCERN1	.00	.02	.00	.00	.04	.06
CONCERN2	.05	.08	.06	.04	.09	.08
SERIOUS	-.02	-.02	-.01	-.03	.01	.01
MEDCOMP	.01	-.01	.01	.00	.07	.07
NEGATT	.03	.05	.05	.06	-.02	-.01
LNEGATT	.02	.05	.05	.07	-.01	-.00

	JEND	LJEND	MOREINF1	SMINF1	MOREINF2	SMINF2
HA	.23**	.22**	.16*	.16*	.11	.11
RACE	-.07	-.07	.17*	.17*	.10	.08
DISEASE	-.09	-.06	.03	.05	.04	.07
AGE	-.04	-.03	.11	.09	.08	.07
SEX	.20**	.18*	-.17*	-.17*	-.17*	-.17*
TA	.12	.12	.07	.05	-.02	-.03
SDE	-.14	-.14	.02	.02	.06	.08
RSDE	-.13	-.13	.00	.01	.05	.07
IM	-.11	-.12	.04	.03	.08	.09
RIM	-.09	-.11	.04	.04	.09	.09
AFFECT	.22**	.23**	.03	.05	.08	.07
RAFFECT	.22**	.21**	.04	.06	.10	.08
PRIEVAL	.28**	.28**	.21**	.22**	.13	.13
SPRIEVAL	.28**	.28**	.20**	.21**	.12	.12
SENSORY	.20**	.19**	-.03	-.01	.02	.02
DXTIME	-.20**	-.18*	-.10	-.11	-.10	-.10
PNREC0	.23**	.22**	.01	.00	-.11	-.13
SPNREC0	.26**	.26**	-.04	-.04	-.13	-.15*
RECOVER	.15*	.16*	-.03	-.01	-.08	-.09
CSQCD	-.17*	-.18*	.12	.12	.07	.07
SCSQCD	-.19**	-.21**	.13	.14	.09	.08
COPE	-.16*	-.13	.09	.09	.07	.06
SCOPE	-.16*	-.14	.08	.09	.06	.07
CSQDIS	-.09	-.07	.05	.04	-.02	-.02
RCSQDIS	-.10	-.08	.04	.03	-.02	-.03
PRAY	.10	.10	.02	.02	-.01	-.02
REINTER	-.21**	-.18*	-.06	-.05	-.03	-.03
CATAST	.30**	.30**	.06	.04	.00	-.02
CSQIGN	-.29**	-.29**	.03	.03	.01	-.00
TXIAVD	-.06	-.06	-.10	-.10	-.01	-.01
TXMAVD	-.12	-.14	.03	.02	.03	.03
TXEAVD	.06	.05	-.01	-.01	.06	.07
TXICOPE	-.10	-.06	.06	.07	.00	.01
TXMCOPE	-.07	-.10	.03	.02	.01	.01
TXECOPE	-.06	-.06	-.06	-.05	-.01	.00
TXICAT	.15*	.10	-.01	-.03	.07	.04
TXMCAT	.25**	.24**	-.14	-.11	-.01	-.01
TXECAT	.14	.10	-.03	-.03	.04	.04
REGSXS	.21**	.18*	.10	.12	.02	.04
LREGSXS	.21**	.17*	.09	.11	.02	.03
PROBSXS	.19**	.15*	.08	.11	.04	.05
LPROBSXS	.17*	.13	.08	.11	.04	.05
JBCP	.26**	.28**	.03	.01	.04	.01
LJBCP	.24**	.27**	.06	.04	.07	.05
JIMMED	.50**	.48**	.01	.03	-.03	-.03
LJIMMED	.49**	.50**	.03	.04	-.05	-.05

JMID	.50**	.52**	.03	.08	.08	.10
LJMID	.49**	.53**	.06	.10	.06	.08
JEND	1.00	.97**	-.02	-.01	-.07	-.06
LJEND	.97**	1.00	.00	.02	-.07	-.06
MOREINF1	-.02	.00	1.00	.98**	.74**	.70**
SMINF1	-.01	.02	.98**	1.00	.74**	.74**
MOREINF2	-.07	-.07	.74**	.75**	1.00	.98**
SMINF2	-.06	-.06	.70**	.74**	.98**	1.00
LEARN	-.07	-.06	.47**	.47**	.57**	.58**
SLEARN	-.07	-.05	.45**	.47**	.56**	.58**
OPENQ	.03	.01	.07	.06	.12	.11
MORETEST	.05	.04	.48**	.49**	.54**	.54**
COMP	.05	.03	-.01	.04	.09	.13
SCOMP	.05	.03	-.02	.03	.10	.14
RELIABLE	.05	.02	.14	.13	.15*	.13
RREL	.05	.03	.15*	.13	.14	.12
CONF	-.01	.00	.04	.08	.01	.04
PERCENT	.14	.14	.11	.12	.00	.01
CONCERN1	.00	-.01	.49**	.46**	.39**	.35**
CONCERN2	.03	.02	.48**	.47**	.45**	.42**
SERIOUS	.03	.00	.13	.15*	.15*	.18*
MEDCOMP	.07	.07	.26**	.24**	.18*	.15*
NEGATT	.00	.01	.06	.03	-.04	-.05
LNEGATT	.01	.01	.08	.04	-.03	-.05

	LEARN	SLEARN	OPENQ	MORETEST	COMP	SCOMP
HA	.13	.14	.08	.08	.00	-.02
RACE	.03	.02	-.11	.15*	-.37**	-.38**
DISEASE	.05	.05	.03	.03	.17*	.18*
AGE	.01	.00	-.09	-.01	-.13	-.14*
SEX	-.13	-.13	-.14	-.10	.04	.0463
TA	-.02	-.05	.03	-.04	-.20**	-.23**
SDE	.08	.09	-.00	.04	.21**	.23**
RSDE	.07	.08	.01	.03	.20**	.21**
IM	.08	.08	.06	-.02	.03	.03
RIM	.08	.08	.06	-.01	.02	.01
AFFECT	.09	.09	-.02	.04	-.06	-.08
RAFFECT	.10	.09	-.02	.04	-.05	-.07
PRIEVAL	.07	.07	.01	.05	.06	.05
SPRIEVAL	.06	.06	.01	.07	.03	.02
SENSORY	.01	.02	.04	-.03	.13	.13
DXTIME	-.11	-.09	-.03	-.10	.24**	.24**
PNREC0	-.17*	-.15*	.02	-.10	-.06	-.06
SPNREC0	-.14	-.13	.00	-.11	-.04	-.04
RECOVER	-.12	-.13	.06	-.09	.08	.08
CSQCD	.09	.10	.04	.13	.09	.09
SCSQCD	.11	.13	.04	.15*	.10	.10
COPE	.09	.11	-.03	.07	.25**	.22**
SCOPE	.08	.11	-.03	.06	.25**	.23**
CSQDIS	-.12	-.11	.01	.02	.04	.02
RCSQDIS	-.13	-.13	-.00	.02	.03	.02
PRAY	.01	-.01	-.05	.06	.13	.12
REINTER	.04	.04	-.13	-.03	.08	.07
CATAST	.02	.01	-.02	.03	-.23**	-.24**
CSQIGN	-.03	-.03	-.06	.02	.07	.05
TXIAVD	.04	.05	.08	-.07	.14	.15*
TXMAVD	-.01	-.00	-.03	.03	-.01	-.03
TXEAVD	-.01	-.00	.16*	-.03	.21**	.21**
TXICOPE	.01	.01	.09	-.01	.13	.12
TXMCOPE	.12	.10	.05	.06	.09	.08
TXECOPE	.03	.05	.03	.05	.14*	.15*
TXICAT	.08	.07	-.00	.06	.03	.02
TXMCAT	-.04	-.02	.07	.01	.04	.04
TXECAT	.10	.10	.04	.03	-.00	-.02
REGSXS	.08	.08	.10	.08	-.00	-.02
LREGSXS	.09	.09	.09	.07	-.00	-.03
PROBSXS	.08	.09	.13	.08	.01	-.01
LPROBSXS	.10	.11	.12	.08	.01	-.02
JBCP	.01	.01	.06	.06	-.08	-.08
LJBCP	.02	.03	.05	.05	-.05	-.04
JIMMED	.07	.07	-.03	.12	-.07	-.08
LJIMMED	.07	.07	-.02	.10	-.10	-.11
JMID	.05	.06	.01	.13	.02	.03
LJMID	.08	.09	.01	.12	.01	.02
JEND	-.07	-.07	.03	.05	.05	.05
LJEND	-.06	-.05	.01	.04	.03	.03
MOREINF1	.47**	.45**	.07	.48**	-.01	-.02
SMINF1	.47**	.47**	.06	.49**	.04	.03

MOREINF2	.57**	.56**	.12	.53**	.09	.10
SMINF2	.57**	.58**	.11	.54**	.13	.14
LEARN	1.00	.99**	.23**	.52**	.04	.04
SLEARN	.99**	1.00	.23**	.50**	.07	.07
OPENQ	.23**	.23**	1.00	-.00	.02	.03
MORETEST	.52**	.50**	-.00	1.00	.06	.05
COMP	.04	.07	.02	.06	1.00	.99**
SCOMP	.04	.07	.03	.05	.99**	1.00
RELIABLE	.14	.13	.02	.21**	-.11	-.11
RREL	.12	.11	-.00	.23**	-.12	-.12
CONF	.08	.08	.01	.14	.34**	.32**
PERCENT	.01	.01	-.01	.15*	-.03	-.06
CONCERN1	.30**	.28**	.04	.29**	-.05	-.06
CONCERN2	.40**	.38**	.03	.34**	-.00	-.02
SERIOUS	.13	.15*	-.02	.16*	.36**	.35**
MEDCOMP	.18*	.18*	.12	.17*	.01	.01
NEGATT	-.11	-.14*	-.04	-.06	-.25**	-.27**
LNEGATT	-.12	-.15*	-.06	-.03	-.24**	-.26**

	RELIABLE	RREL	CONF	PERCENT	CONCERN1	CONCERN2
HA	.01	.01	.00	.24**	.30**	.33**
RACE	.04	.06	-.15*	.14	.16*	.18*
DISEASE	-.05	-.06	.21**	-.03	.02	.00
AGE	.09	.09	-.05	-.08	.06	.00
SEX	.03	.04	-.10	.04	-.15*	-.11
TA	.08	.09	-.14*	.21**	.28**	.31**
SDE	-.06	-.06	.05	-.22**	-.17*	-.23**
RSDE	-.07	-.07	.03	-.20**	-.15*	-.21**
IM	-.15*	-.15*	.01	-.13	-.04	-.08
RIM	-.13	-.12	.02	-.10	-.03	-.07
AFFECT	-.00	.01	.00	.04	.19**	.24**
RAFFECT	.02	.03	.01	.04	.20**	.25**
PRIEVAL	-.04	-.03	-.03	-.02	.19**	.24**
SPRIEVAL	-.04	-.03	-.04	-.02	.19**	.23**
SENSORY	.09	.09	-.03	-.05	-.00	.05
DXTIME	-.01	-.02	-.03	-.22**	-.17*	-.24**
PNREC0	-.04	-.03	-.05	.03	.08	.15*
SPNREC0	-.03	-.03	-.11	-.01	.08	.13
RECOVER	-.02	-.01	-.07	.02	-.01	.01
CSQCD	.11	.11	.12	-.04	-.08	-.11
SCSQCD	.09	.09	.14*	-.07	-.07	-.10
COPE	.08	.10	.07	-.02	.01	-.01
SCOPE	.10	.11	.06	-.04	-.03	-.04
CSQDIS	.09	.09	.02	-.16*	.01	-.07
RCSQDIS	.10	.09	.01	-.16*	.02	-.07
PRAY	.07	.07	.03	-.10	.03	.03
REINTER	.12	.12	-.01	-.18*	-.03	-.07
CATAST	.11	.12	-.05	.16*	.23**	.28**
CSQIGN	.15*	.15*	.05	-.09	-.02	-.10
TXIAVD	-.05	-.07	.04	-.17*	-.08	-.12
TXMAVD	-.07	-.07	-.02	-.16*	-.12	-.13
TXEAVD	-.16*	-.17*	.10	-.10	-.01	-.05
TXICOPE	-.02	-.02	.17*	-.08	-.09	-.07
TXMCOPE	-.02	-.02	.20**	.03	.02	-.00
TXECOPE	.05	.05	.05	-.15*	-.18*	-.17*
TXICAT	-.03	-.04	-.04	.03	.02	.07
TXMCAT	-.09	-.09	-.01	-.01	-.10	.05
TXECAT	.05	.05	-.05	.08	.05	.06
REGSXS	.20**	.20**	.00	.18*	.20**	.31**
LREGSXS	.20**	.20**	-.00	.18*	.22**	.33**
PROBSXS	.22**	.21**	.01	.12	.14*	.24**
LPROBSXS	.22**	.21**	.00	.13	.16*	.26**
JBCP	.11	.10	-.05	-.07	.00	.05
LJBCP	.10	.10	-.04	-.06	.02	.08
JIMMED	.09	.10	-.05	.05	.00	.06
LJIMMED	.07	.08	-.07	.05	.01	.04
JMID	.07	.08	.05	.11	.04	.09
LJMID	.05	.06	.07	.09	.06	.08
JEND	.05	.05	-.01	.14	.00	.03
LJEND	.02	.03	.00	.14	-.01	.02
MOREINF1	.14	.15*	.04	.11	.49**	.48**
SMINF1	.13	.13	.08	.12	.46**	.47**
MOREINF2	.15*	.14	.01	.01	.39**	.45**
SMINF2	.13	.12	.04	.01	.35**	.42**
LEARN	.14	.12	.08	.01	.30**	.39**
SLEARN	.13	.11	.08	.01	.28**	.38**
OPENQ	.02	-.00	.01	-.01	.04	.03
MORETEST	.21**	.22**	.14	.15*	.29**	.34**
COMP	-.11	-.12	.34**	-.03	-.05	-.00

SCOMP	-.11	-.13	.32**	-.06	-.06	-.02
RELIABLE	1.00	.99**	-.23**	.01	.10	.07
RREL	.99**	1.00	-.23**	.02	.11	.07
CONF	-.23**	-.23**	1.00	.10	.01	.07
PERCENT	.01	.02	.10	1.00	.27**	.31**
CONCERN1	.10	.11	.01	.27**	1.00	.82**
CONCERN2	.07	.07	.07	.31**	.82**	1.00
SERIOUS	.09	.08	.22**	.12	.11	.27**
MEDCOMP	.02	.03	.01	.38**	.39**	.39**
NEGATT	.09	.10	-.12	.02	.21**	.18*
LNEGATT	.09	.10	-.13	.03	.23**	.20**

	SERIOUS	MEDCOMP	NEGATT	LNEGATT
HA	.08	.17*	.14	.14*
RACE	-.04	.04	.15*	.15*
DISEASE	.02	.11	-.05	-.05
AGE	.01	-.14	-.02	-.00
SEX	.01	.04	-.03	-.04
TA	.04	.12	.36**	.36**
SDE	.04	-.14	-.25**	-.24**
RSDE	.02	-.12	-.26**	-.26**
IM	-.02	-.06	-.06	-.07
RIM	-.02	-.04	-.05	-.06
AFFECT	-.01	.07	.12	.11
RAFFECT	.01	.08	.13	.11
PRIEVAL	.10	.08	.09	.08
SPRIEVAL	.09	.06	.10	.09
SENSORY	.04	.13	.05	.05
DXTIME	.06	-.17*	-.06	-.06
PNRECO	.02	.11	.18*	.18*
SPNRECO	-.05	.09	.13	.15*
RECOVER	.03	.11	.11	.11
CSQCD	.02	-.09	-.04	-.03
SCSQCD	.02	-.12	-.06	-.06
COPE	-.00	-.05	-.05	-.05
SCOPE	.00	-.08	-.07	-.07
CSQDIS	-.05	-.22**	.05	.06
RCSQDIS	-.05	-.22**	.06	.06
PRAY	.04	-.00	.04	.03
REINTER	.04	-.08	.05	.04
CATAST	-.06	.18*	.16*	.16*
CSQIGN	-.09	-.14*	.02	.01
TXIAVD	.07	-.11	-.07	-.07
TXMAVD	.06	-.12	.00	.00
TXEAVD	-.04	.04	-.04	-.05
TXICOPE	-.01	-.15*	-.04	-.05
TXMCOPE	.04	-.04	-.15*	-.14
TXECOPE	.03	-.10	-.16*	-.17*
TXICAT	.09	.13	.03	.04
TXMCAT	-.01	-.02	-.00	-.01
TXECAT	.03	.00	.04	.04
REGSXS	.06	.15*	.17*	.17*
LREGSXS	.06	.16*	.19**	.19**
PROBSXS	.03	.12	.04	.04
LPROBSXS	.04	.13	.07	.07
JBCP	-.02	.01	.02	.02
LJBCP	-.02	-.01	.05	.05
JIMMED	-.01	.01	.05	.05
LJIMMED	-.03	.00	.06	.07
JMID	.01	.07	-.02	-.01
LJMID	.01	.07	-.01	-.00
JEND	.03	.07	.00	.01
LJEND	.00	.07	.01	.01
MOREINF1	.13	.26**	.06	.08
SMINF1	.15*	.24**	.03	.04
MOREINF2	.15*	.18*	-.04	-.03
SMINF2	.18*	.15*	-.05	-.05
LEARN	.13	.18*	-.11	-.12
SLEARN	.15*	.18*	-.14*	-.15*
OPENQ	-.02	.12	-.04	-.06
MORETEST	.16*	.17*	-.06	-.03
COMP	.36**	.01	-.25**	-.24**
SCOMP	.35**	.01	-.27**	-.26**
RELIABLE	.09	.02	.09	.09
RREL	.08	.03	.10	.10
CONF	.22**	.01	-.12	-.13
PERCENT	.12	.38**	.02	.03
CONCERN1	.11	.39**	.21**	.23**
CONCERN2	.27**	.39**	.18*	.20**

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SERIOUS     1.00      .11      -.05      -.04
MEDCOMP      .11     1.00       .05       .04
NEGATT      -.05      .05      1.00      .98**
LNEGATT     -.04      .04       .98**    1.00

* - Signif. LE .05      ** - Signif. LE .01      (2-tailed)
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Appendix U
Summary of Hypotheses and Findings

Statements preceded by a - sign were not supported by the analyses, whereas statements preceded by a * sign were supported by the analyses. Statements preceded by a # sign were not hypothesized results, but were nevertheless supported by the analyses.

HA = health anxious

NHA = non-health anxious

DIAG = diagnostic feedback

COGNITIVE AND BEHAVIOURAL RESPONSES TO THE COLD PRESSOR
1. Positive Appraisal
- main effect for HA (NHA > HA).
- interaction of HA and DIAG (HA given positive and ambiguous feedback will have greater doubt about ability to cope compared to HA given negative feedback; NHA not influenced by feedback).

2. Spontaneous Coping Strategies
a) avoidance
- main effect for HA (HA > NHA).
- interaction of HA and DIAG (HA > use of strategy when given negative feedback compared to positive and ambiguous; NHA rarely use strategy regardless of diagnostic feedback).
- interaction of HA and TIME (HA > use of strategy in beginning of cold pressor compared to middle and end; NHA rarely use strategy regardless of time).
main effect for time (this strategy was used more frequently during the middle of the cold pressor compared to the beginning or end).

b) negative somatic monitoring
* main effect for HA (HA > NHA).
- interaction of HA and DIAG (HA > use of strategy when given positive and ambiguous results; NHA rarely use strategy regardless of diagnostic feedback).
- interaction of HA and TIME (HA greater use of strategy during middle and end segments compared to beginning; NHA rarely use strategy regardless of time).
main effect for sex (females used this strategy more than males).
main effect for time (negative somatic monitoring tended to occur most frequently during the beginning of the cold pressor task compared to the middle or end).

c) positive somatic monitoring
* main effect of HA (NHA > HA).
- interaction of HA and DIAG (NHA > use when given positive test results compared to negative and ambiguous where strategy is also used frequently; HA rarely use strategy).
main effect for time (positive somatic monitoring tended to occur most frequently during the middle of the cold pressor task compared to the beginning or the end).

3. Cued Coping Strategies
a) catastrophising
* main effect for HA (HA > NHA).
- interaction of HA and DIAG (HA > catastrophising with positive and ambiguous diagnosis compared to negative; NHA very little catastrophising expected).
main effect for sex (females greater report of catastrophising compared to males).

b) distraction/ignoring
- main effect for HA (HA > NHA).
- interaction of HA and DIAG (HA > avoidance with negative test results compared to others; NHA very little use of strategies).

c) reinterpretation/cognitive coping
- main effect for HA (NHA > HA).
- interaction of HA and DIAG (NHA greatest use of this strategy with positive diagnosis; HA very little use).

d) control
* main effect for HA (NHA > HA).
# main effect for sex (males more control than females).

4. Pain Reaction
a) tolerance
* main effect for HA (NHA > HA).
# main effect for sex (males > females).

b) recovery
- main effect for HA (HA longer recovery than NHA)
main effect for sex (males faster recovery than females).

c) intensity
* main effect for HA (HA describe pain with greater intensity than NHA).
# main effect for sex (males lower pain intensity ratings than females).

d) pain Words
* main effect for HA (HA use more affective, evaluative and sensory words than NHA; the use of sensory words was only marginally significant).
# main effect for sex (females used more evaluative words than males)

5. Nonverbal Reaction
- no firm hypotheses were made.
- main effect for HA (HA > NHA).
- interaction of HA and DIAG (HA greater experssivity when given positive and ambiguous test results as compared to negative).
* interaction of HA and TIME (health anxious individuals were significantly more expressive during the end segment compared to non-health anxious individuals).
# main effect for time (subjects were most expressive when they first put their hand in the water compared to all other points).
# interaction of sex and time (females were significantly more expressive than males at the end of the cold pressor experience).

COGNITIVE AND BEHAVIOURAL RESPONSES TO DIAGNOSTIC FEEDBACK
1. Concern
a) concern (before and after cold pressor)
* main effect for HA (HA > NHA)
- interaction of HA and DIAG and TIME (HA greater concern when receiving positive and ambiguous test results compared to negative test results at time 1; at time 2 all HA regardless of diagnostic test results show equal amount of concern, reflecting the notion that HA individuals receiving negative test results will no longer be reassured that do not have a problem after having undergone the cold pressor; NHA show least concern when receiving positive diagnostic test results compared to negative and ambiguous test results at both time 1 and 2)
main effect for DIAG (those receiving positive diagnostic feedback were more concerned than those receiving either ambiguous or negative diagnostic feedback).
main effect for sex (males were more concerned than females)
main effect for time (after the cold pressor subjects were more concerned about their test results).

b) seriousness
- main effect for HA (HA > NHA)

- interaction of HA and DIAG (NHA lower scores on seriousness when receiving positive test results compared to negative and ambiguous test results)

c) percentage risk
* main effect for HA (HA were predicted to perceive the risk to be less common than NHA since less common disorders are perceived to be more serious; instead HA were found to perceive the risk to be more common than NHA)
- interaction of HA and DIAG (NHA believe risk is more common when receive positive diagnostic test results compared to ambiguous and negative test results).
main effect for DIAG (those receiving positive diagnostic information perceived the risk for experiencing medical complications to be much higher than those receiving negative and ambiguous diagnostic information).

2. Reassurance Seeking
a) more information (before and after cold pressor)
* main effect for HA (HA > NHA)
- interaction of HA and DIAG and Time (HA greatest reassurance seeking when receiving positive and ambiguous test results compared to negative test results at time 1; at time 2 all HA subjects regardless of diagnostic test results show equal amount of reassurance seeking behaviour reflecing the fact that HA receiving negative test results are no longer reassured that do not have a problem once they have undergone the cold pressor experience; NHA greatest reassurance seeking when receiving positive diagnostic test results compared to negative and ambiguous test results at both time 1 and 2)
main effect for DIAG (those receiving positive diagnostic feedback wanted more additional information than those receiving either ambiguous or negative diagnostic feedback).
main effect for sex (males wanted more additional information than females).

b) number of questions
- main effect for HA (HA more questions than NHA)
- interaction of HA and DIAG (NHA more questions when they receive positive diagnostic test results compared to ambiguous and negative test results)

c) more testing
- main effect for HA (HA > NHA)
- interaction of HA and DIAG (NHA want more testing if receive positive diagnostic test results compared to negative or ambiguous test results)

d) desire to learn how to reduce risk
* main effect of HA (HA > NHA)
- interaction of HA and DIAG (NHA want to learn how to reduce risk if receive positive diagnostic test results compared to negative or ambiguous test results)
main effect for DIAG (those receiving positive diagnostic information would like to learn how to reduce their risk more than those receiving ambiguous or negative test results).

3. Validity
a) competence
- main effect for HA (HA > NHA)
- interaction of HA and DIAG (HA perceive greater competence when given ambiguous and positive diagnostic test results compared to negative test results; NHA perceive greater competence when given negative test results compared to positive and ambiguous test results)

b) accuracy
* main effect for HA (HA > NHA)
- interaction of HA and DIAG (HA perceive greater accuracy when given ambiguous and positive diagnostic test results compared to negative test results; NHA perceive greater competence when given negative test results compared to positive and ambiguous test results)
main effect for DIAG (individuals receiving ambiguous test results perceived the test results to be less accurate than those receiving positive and negative test results).

c) reliability
- main effect for HA (HA > NHA)
- interaction of HA and DIAG (HA perceive greater reliability when given ambiguous and positive diagnostic test results compared to negative test results; NHA perceive greater reliability when given negative test results compared to positive and ambiguous test results).
main effect for DIAG (individuals receiving ambiguous and positive test results perceived the test results to be less reliable compared to individuals receiving negative test results)

d) confidence
- main effect for HA (HA > NHA)
- interaction of HA and DIAG (HA have greater confidence when given ambiguous and positive diagnostic test results compared to negative test results; NHA have greater confidence when given negative test results compared to positive and ambiguous test results)
main effect for DIAG (individuals receiving ambiguous and positive test results were less confident in the test results compared to individuals receiving negative test results)

4. Symptom Reporting
a) general symptoms
* main effect for HA (HA > NHA)

b) at risk symptoms
* main effect for HA (HA > NHA)
- interaction of HA and DIAG (NHA greater symptom reporting when receiving positive test results compared to negative and ambiguous test results).

TRAIT ANXIETY AND RESPONSE STYLES
1. Trait Anxiety
* trait anxiety would relate to health anxiety but would not be able to account for the relations between health anxiety and the dependent variables.

2. Self Deception / Impression Management
* the self deceptive response style measure would relate to health anxiety, but would not be able to account for the relations between health anxiety and the dependent variables
- the impression management response style measure would relate to health anxiety, but would not be able to account for the relations between health anxiety and the dependent variables