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PSYCHOLOGICAL FACTORS RELATED TO DELAY IN CONSULTATION FOR CANCER SYMPTOMS

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SUMMARY

This research investigated psychological characteristics associated with delay in seeking help for symptoms of rectal cancer. Sixty nine subjects reconstructed pivotal events beginning with symptom onset and ending with medical consultation, and completed the Temperament and Character Inventory (TCI) and the State-Trait Anxiety Inventory (STAI). The mean delay time was around 6 months, with about 1 out of 6 subjects waiting one year or more. Subjects estimated the lengths of two sequential segments of total time to consultation: (1) Symptom Appraisal time (from symptom onset to recognition of possible seriousness), and (2) Action Appraisal time (from recognition of seriousness to medical consultation). Symptom Appraisal time accounted for over two-thirds of total time and was associated with low scores on the TCI Harm Avoidance scale (TCI-HA), indicating dispositional insensitivity to threat, and marginally associated with less education and younger age. Action Appraisal time was not associated with any demographic or psychological variables. Low TCI-HA scores were also associated with lower likelihood of previous cancer screening, and with better judgments of premorbid health. Low STAI Trait scores were associated with better judgments of premorbid health and fewer doctor visits. Results are discussed regarding the importance of understanding dispositional characteristics related to health behavior.

INTRODUCTION

Delay in seeking medical attention for symptoms signaling cancer has long been recognized as a conspicuous and serious problem. Broad causal attributions for delay can be made, with some of the cause attributable to the patient, some to administrative difficulties such as insurance or scheduling problems, and some to the physician(s) (Robinson *et al.*, 1984, 1986). Patient delay has often been related to 'contextual variables' (Facione, 1993), such as gender, marital status, and SES. The strongest evidence exists for longer patient delays to be associated with lower SES (Antonovsky and Hartman, 1974; Coates *et al.*, 1992; Hackett *et al.*, 1973; Ramirez *et al.*, 1999) and fewer years of education (Andersen *et al.*, 1995; Antonovsky and Hartman, 1974; Facione, 1993; Facione *et al.*, 2002; Ramirez *et al.*, 1999; Samet *et al.*, 1988). There is less consistent evidence for relationships between patient delay and gender (Antonovsky and Hartman, 1974; Langenbach *et al.*, 2003; Robinson *et al.*, 1986; Samet *et al.*, 1988), age (Andersen *et al.*, 1995; Antonovsky and Hartman, 1974; Arndt *et al.*, 2002; Cameron and Hinton, 1968; Facione, 1993; Langenbach *et al.*, 2003;

Meechan *et al.*, 2003; Nosarti *et al.*, 2000; Phelan *et al.*, 1992; Ramirez *et al.*, 1999; Samet *et al.*, 1988), and ethnic background (Coates *et al.*, 1992; Ramirez *et al.*, 1999).

In addition, it appears that many individuals delay for reasons that are more psychological in nature. There is recurring evidence for the existence of two principal, albeit contrary, reasons given by patients who were asked why they delayed in seeking help. The first is given by the person who believed that their symptoms *were not serious* and would clear up on their own, suggesting a rather complacent attitude toward their symptoms. The second is given by the person who was concerned that their symptoms *were serious*, but who was then immobilized by fear, embarrassment, or denial, suggesting that avoidance was the prime psychological deterrent (Andersen *et al.*, 1995; Byles *et al.*, 1992; de Nooijer *et al.*, 2001a, b; Hansen *et al.*, 1997; Moyer and Levine, 1998).

Refined studies of delay suggest that the former problem (i.e. thinking that the symptoms are *not serious*) is the greater impediment to help seeking. Such studies have demonstrated that segmenting the total time period into sequential ‘periods of delay’ can facilitate the search for specific causes (i.e. when the delay occurs and why) as well as differences between individuals regarding the principal cause of their delay (Andersen *et al.*, 1995; Antonovsky and Hartman, 1974; Safer *et al.*, 1979). These periods of delay are punctuated by critical psychological and behavioral junctures such as the recognition of seriousness of symptoms, the decision to seek medical attention, calling for an appointment, etc. This approach makes it possible to have patients estimate the time elapsed between these junctures so that, for example, it can be determined how long it took someone to call for an appointment once they had recognized the seriousness of their symptoms. In essence, this approach allows the differentiation of disparate causal factors that come into play as the person’s reactions, decisions, and behaviors unfold. Such research has shown that the segment of time that has been found to account for the longest portion of patient delay, 60–70% across all subjects, begins with the onset of symptoms and ends when the individual has determined that their symptom(s) may represent some significant medical condition (Andersen *et al.*, 1995; Cacioppo *et al.*, 1986; Jones, 1990). This period of time is that during which the individual is trying to determine the cause and significance of their symptom(s), and has thus been called ‘appraisal delay’. Because the symptom appraisal process accounts for the majority of total delay time, the psychological processes that occur during this time are of special interest (Andersen *et al.*, 1995). An individual might delay seeking treatment when their appraisal of their symptoms is influenced in part by an ‘optimistic bias,’ (Andersen *et al.*, 1995; Jones, 1990) ‘denial,’ (Moyer and Levine, 1998), or a health related ‘defensive bias’ leading to a psychological minimization of threat (Croyle *et al.*, 1997) and a more benign explanation of their symptoms.

The literature regarding individual differences in the perceptions of bodily changes has a long and robust history. In an early summary of their work on the incongruous relationship between objective and subjective health, Costa and McCrae (Costa and McCrae, 1985) concluded that the best explanatory model:

‘holds that the relation between complaints and medical conditions varies with the individual; that there are consistent and enduring individual differences in the perception, interpretation, and reporting of bodily symptoms; and that there is a continuum from persistent underreporting to frank hypochondriasis.’ (p. 20).

In addition, these authors and others have provided a substantial body of evidence to show that this ‘dimension of somatic concern’ (Costa and McCrae, 1985) correlates very strongly with a fundamental dimension of personality. The various researchers in this area, however, have provided slightly different perspectives on the psychological dimension of interest, variously referring to it as ‘Neuroticism’ (Costa and McCrae, 1992), ‘Negative Affectivity’

(Watson and Clark, 1984), or 'Trait Anxiety' (Cameron *et al.*, 1998). Granted these variations, however, there is general consensus on four interrelated themes: (1) there is a fundamental dispositional characteristic, or 'Negative Affective Trait' that is manifested in the degree of tendency toward anxiety, worry, and negative emotions in general (Cloninger, 1987; Costa and McCrae, 1992; Gray, 1994; Watson and Clark, 1984), (2) this trait correlates significantly with the frequency of somatic complaints, and the relationship between the two dimensions is fairly rectilinear from one extreme end to the other (Costa and McCrae, 1985), (3) somatic complaints are a function of both psychological disposition and medical conditions (Costa and McCrae, 1987; Leventhal *et al.*, 1996; Mechanic, 1979; Mechanic, 1980; Watson and Pennebaker, 1989, 1991), and (4) somatic complaints often correlate more strongly with dispositional factors than with objective medical assessments (Koller *et al.*, 1996; Watson and Pennebaker, 1989).

Most of the work on symptom appraisal has focused on the end of the continua where elevated levels of somatic complaints coincide with elevated levels of this negative affective trait, which is manifested in the problem of excessive and undue medical utilization (Kirmayer *et al.*, 1994). Conversely, however, a *dampened* response to bodily changes represents a very different sort of problem and illustrates the need to understand the other end of this dimension, where a person's somatic concern is insufficient at those times when it is medically warranted. One manifestation of a dampened response to bodily changes could be a delay in the recognition that one's symptoms could be serious, resulting in an overall delay in seeking medical consultation.

The present research

The present research was designed to investigate the role of negative affective traits in delayed help seeking for symptoms of rectal cancer. For the remainder of this paper we will adopt the term Trait Anxiety to describe the dispositional dimension of interest. While non-specific negative affectivity may be associated with frequency of somatic complaints, more specific attention to Trait Anxiety seems warranted (Watson and Clark, 1992). Antonovsky and Hartman, in their extensive review of delay in cancer, determined that both low and high levels of anxiety were associated with longer delay times (Antonovsky and Hartman, 1974). In addition, anxiety is the emotion that corresponds most directly to responsiveness to potentially threatening situations (Barlow, 1988; Beck *et al.*, 1985; Gray, 1994). A simplified model of delay time segmentation was distilled from the models described earlier in order to place emphasis specifically on the psychological aspects of patient delay. The point at which the individual recognizes that their symptoms could be serious is a critical psychological turning point in the time prior to seeking help. In the present model, then, there are three events of interest: (1) the point at which signs or symptoms were first noticed, (2) the point at which the patient decided that their bodily changes might be signaling some serious health problem, and (3) the point when the patient took concrete action by seeing their doctor or calling for an appointment. The first time period, called *Symptom Appraisal*, corresponds to Andersen *et al.*'s (Andersen *et al.*, 1995) 'appraisal delay.' The second time period, called *Action Appraisal*, corresponds to their 'illness delay' and 'behavioral delay' combined (see Figure 1).

A pilot study explored delay in the case of carcinoma of the rectum, which is a particularly troubling problem for two reasons. First, there are often salient and regularly occurring symptoms in rectal cancer, including a very high incidence of rectal bleeding as a first sign, which should provide a clear sign of trouble. And yet, many people who experience symptoms of rectal cancer wait inordinate periods of time before seeking help (Hansen *et al.*, 1997; Holliday and Hardcastle, 1979; Irvin and Greaney, 1977; MacArthur and Smith, 1984; Rubin *et al.*, 1980). Second, while the success rate for treatment of early-stage rectal cancer is very high, delay in seeking help for symptoms severely compromises that success

(Byers *et al.*, 1997; Winawer *et al.*, 1997). The pilot data ($n = 40$) indicated that the mean total time from symptom onset to medical consultation was 20.2 weeks (S.D. = 24.6; median = 9.0) and the mean Symptom Appraisal time was 14.9 weeks (S.D. = 21.3; median = 8.0), showing that Symptom Appraisal time accounted for 75.5% of the total time on average. Pilot analyses also revealed that those patients who took the longest time in Symptom Appraisal had very low scores on two measures related to Trait Anxiety. The patients who took one year or more in Symptom Appraisal all had scores below the 15th percentile on the Harm Avoidance scale of the Temperament and Character Inventory (TCI-HA) (Cloninger *et al.*, 1994) and scores below the 40th percentile on the Trait scale of the State-Trait Anxiety Inventory (STAI-T) (Spielberger *et al.*, 1970). The individual who took the longest to recognize the seriousness of their symptoms (2 years) had the lowest possible score on the STAI-T and was below the 10th percentile on the TCI-HA (see Materials section below for a description of these scales).

The following study was then undertaken with three purposes in mind. The primary purpose was to explicitly test the hypothesis that a low level of Trait Anxiety is associated with longer Symptom Appraisal times. The second purpose was to determine whether Trait Anxiety is associated with the length of time taken to actively get help once that realization had occurred (Action Appraisal). The third purpose was to explore associations between Trait Anxiety and indicators of broader patterns of health behavior.

METHOD

Participants and procedure

Participants were patients who had been diagnosed with primary rectal tumors and who had been treated in the Section of Colon and Rectal Surgery at the Washington University School of Medicine. Patients were recruited during a follow-up office visit soon after initial treatment, but were excluded if there was evidence of cognitive deficits that would have precluded reliable recall of the events of interest or that would have interfered with completion of the psychological instruments. Informed consent was obtained at that time.

Materials

A structured interview had been developed in the pilot work, but was subsequently converted to a self-report paper-and-pencil format that could be completed at home and returned by mail, which resulted in a marked increase in participation. The paper-and-pencil questionnaire was designed to collect information about history of symptoms, perceptions of those symptoms, pertinent decision-making and behaviors during the time period prior to medical consultation, as well as more general health behavior history. The questionnaire was made up of several sections of multiple-choice or checklist questions. The first section included questions about the nature of the initial symptoms and the patients' reactions to them. The next three sections included questions about the recognition of seriousness of symptoms, the decision to seek medical help, and the actual pursuit of medical help. These sections also included the questions that were used to estimate the lengths of the two time segments. Subjects were asked to think back on the time when they first thought or realized that their symptoms might be serious, and Symptom Appraisal time was estimated by asking, '*How long after your very first symptom did this occur?*' Action Appraisal time was estimated by asking, '*How long was it after your first symptom that you first saw or called a doctor about it?*' and then subtracting Symptom Appraisal time from this estimate. Both Symptom Appraisal and Action Appraisal times were measured as continuous variables (in weeks) so as to capture the most information (Facione, 1993).

Prior health care beliefs and practices were assessed in the next section with the following questions: ‘*Before these problems started, did you have a regular doctor?*’ ‘*How often did you go to your doctor before these problems began?*’ ‘*For what reasons did you see your doctor?*’ and ‘*How would you describe your overall health before you were diagnosed with cancer?*’ To assess prior cancer screening behavior, subjects were asked: ‘*Have you ever had screening for any kind of cancer?*’ and ‘*(If yes) What kind of screening have you had?*’ Finally, demographic information (age, education, ethnic background, gender) was documented, in order to test relationships between these variables and delay.

Trait Anxiety was assessed with two standardized psychological measures. The first was the short form (144 items) of the TCI (Cloninger *et al.*, 1994), which was developed out of Cloninger’s unified biosocial theory of personality (Cloninger, 1987). Based on theory as well as the pilot data discussed earlier, the Harm Avoidance scale (TCI-HA) was of particular interest. The TCI-HA scale measures individual differences in sensitivity to signals of possible threat, danger or punishment. Individuals who score high on the TCI-HA ‘are characterized as cautious, tense, apprehensive, fearful, inhibited, shy, easily fatigable, and apprehensive worriers,’ while individuals who score low on the TCI-HA ‘are confident, relaxed, optimistic, carefree, uninhibited, outgoing, and energetic’ (Cloninger, 1987, p. 576). In a study involving 5,903 Australian twins, the short TCI-HA scale demonstrated a Cronbach’s alpha ranging from 0.78 to 0.85 over four birth cohorts (Heath *et al.*, 1994). In the same study, test–retest correlations ranged from 0.73 to 0.84 over an average of 2.1 years. Cloninger’s model endeavors to tie measurable personality dimensions to heritable brain structures (Cloninger, 1987, 1998). In that regard, approximately 54% to 56% of the stable variation in TCI-HA scores has been shown to be determined by additive and nonadditive genetic influences in the same study of 2680 adult Australian twin pairs (Heath *et al.*, 1994). In addition, TCI-HA scores have been found to correlate in normal subjects with the surface area of the anterior cingulate gyrus (Pujol *et al.*, 2002) and with levels of serotonergic activity (Hansenne and Ansseau, 1999), both of which play a significant role in the processing of affective information (Rauch, 2003). The TCI-HA scale has been found to correlate very highly with measures designed by other authors to reflect the same broad theoretical construct (Cloninger *et al.*, 1994; Zelenski and Larsen, 1999), including the Neuroticism scales of the EPQ (Eysenck and Eysenck, 1976) and the NEO-PI (Costa and McCrae, 1992), the Punishment Expectancy scale of the GRAPES (Ball and Zuckerman, 1990), the BIS scale of the BIS/BAS (Carver and White, 1994), and the total score on the SCL-90 (Derogatis *et al.*, 1973).

The second instrument was the *State-Trait Anxiety Inventory* (Spielberger *et al.*, 1970), which is a well-known and widely used measure of symptoms of anxiety, both transitory and trait. Because we were interested in the role of stable dispositional characteristics, the Trait Anxiety scale (STAI-T) was of special interest. The STAI-T requires subjects to estimate how much of the time they typically experience various symptoms of anxiety. The STAI-T has also been found to correlate significantly with the TCI-HA scale (Cloninger *et al.*, 1994).

Statistical analyses

All analyses were done using SAS version 8.1. Means and frequency counts were used to describe initial responses to symptoms. Mean lengths of delay times were calculated, as were mean proportions of Symptom Appraisal times. Because of the pilot findings, the calculation of Action Appraisal time was based only on those subjects who suspected their symptoms were serious prior to seeking help.

Cox proportional hazards analysis was used to test whether Symptom Appraisal time was associated with the psychological scores, with the event of interest being the point at which

the subjects recognized the seriousness of their symptoms. Time-to-event analysis was used for two reasons (Kleinbaum, 1996). First, it is the method of choice with time-based measures, which tend to be non-normally distributed. Second, because it was expected that some subjects would not have suspected seriousness before getting help, as was found in pilot work, time-to-event analysis would allow inclusion of data points from subjects who did not reach the event of interest prior to medical consultation. These models also allow estimation of covariate effects. As mentioned previously, those pilot subjects who had scores in the lowest range on both the TCI-HA and STAI-T took the longest time in Symptom Appraisal. For that reason, scores on both measures were divided into tertiles—low, medium, and high.

Cox proportional hazards analyses were also applied to Action Appraisal time, but excluded any subjects who did not recognize the seriousness of their symptoms prior to seeking help. The purpose in isolating the Action Appraisal time was to uncover and study any evidence that *high* anxiety was associated with longer Action Appraisal times, which would suggest hesitation or avoidance in seeking help following suspicion of seriousness. Therefore, analyses regarding the Action Appraisal time period were done only on the subjects who recognized seriousness prior to medical consultation. Lastly, non-parametric Kruskal–Wallis analyses were used to look at the association between the two measures of Trait Anxiety and previous health related behaviors.

Results

Of the 100 subjects who were approached to participate in this study, 91 initially agreed to participate and 80 returned the questionnaire materials. Eleven of the 80 participants were asymptomatic prior to the discovery of the rectal tumor; the problem was first discovered during a routine medical examination or cancer-screening test. The remaining 69 subjects were symptomatic prior to seeking help, so data on these subjects are reported here.

Twenty-seven of the subjects were female and 42 were male. Sixty-five of the subjects were Caucasian and four were African-American. The age at diagnosis ranged from 33 to 85 years, with a mean of 61.3 (S.D. = 12.7) and a median age of 62. Level of education ranged from 1 to 20 years: 12 subjects did not complete high school, 26 completed high school, 18 completed at least some college or technical school, and 13 completed at least some graduate work.

Two-thirds of the subjects reported that their initial symptoms were either ‘barely’ (24/69; 34.8%) or ‘a little’ (22/69; 31.9%) noticeable, while the remaining subjects reported that they were ‘somewhat’ (13/69; 18.8%) or ‘very’ (10/69; 14.5%) noticeable. On the other hand, around 80% of the subjects initially believed that their symptoms were either ‘not’ (38/69; 55.1%) or ‘a little’ (17/69; 24.6%) serious, while the remaining subjects believed that they were ‘somewhat’ (10/69; 14.5%), ‘very’ (2/69; 2.9%), or ‘extremely’ (2/69; 2.9%) serious. Judgments of salience and seriousness were statistically related (Spearman’s $\rho = 0.24$, $p = 0.0497$, two-tailed), but note that the judgments of seriousness were quite positively skewed, more than were the judgments of salience.

Regarding subjects’ initial attributions about the cause of their symptoms, the majority (49/69; 71.0%) did not believe that their symptoms were due to cancer, while only three subjects (3/69; 4.3%) believed that they were. The remaining subjects were either uncertain (16/69; 23.2%) or did not answer this question (1/69; 1.4%). Of those who thought their symptoms could be due to something other than cancer, most thought they had hemorrhoids (37/53; 69.8%). Others attributed their symptoms to diet (3/53; 5.7%), physical injury or

stress (5/53; 9.4%), or miscellaneous causes such as ulcers, diverticulitis, or other less-threatening medical conditions (8/53; 15.1%).

Six subjects indicated that they were unable to estimate the total time before consultation or the two time segments, leaving 63 subjects for these analyses. The total time from symptom onset to medical consultation ranged from less than a week to around 5 years. The mean total length of time was 25.0 weeks (± 40.4) and the median was 10.0 weeks. Eighteen of these subjects (28.6%) waited 6 months or more, while 11 of them (17.5%) waited one year or more from symptom onset to medical consultation.

The original intention was to calculate Symptom Appraisal time from the onset of symptoms until the point when subjects recognized the seriousness of their symptoms. However, 13 of the subjects sought medical attention for their symptoms while still believing that they were probably experiencing some benign condition. That is, these patients only realized that their symptoms were serious after their physician told them so. Symptom Appraisal time was thus calculated from symptom onset until either the recognition of seriousness or the visit to a doctor, whichever came first. Symptom Appraisal time ranged from less than a week to around 2 years, with a mean of 17.3 weeks (± 24.0) and a median of 7.0 weeks. On average, then, the time spent in Symptom Appraisal accounted for approximately 69.8% of the total time prior to medical consultation. Sixteen of the 63 subjects (25.4%) took 6 months or more to arrive at the conclusion that their symptoms might be serious, while 8 (12.7%) took 1 year or more.

Because thirteen of the subjects sought medical attention for their symptoms while still believing that they represented some benign condition, calculations of Action Appraisal time was based on the remaining 50 subjects. Action Appraisal time ranged from less than a week to around 5 years, with a mean of 9.7 (± 35.4) weeks and a median of 1.0 week. The correlation between the two time segments was marginally significant (Spearman's $\rho = 0.263$, $p = 0.065$), indicating that those subjects who spent more time in Symptom Appraisal also tended to spend more time in Action Appraisal.

Time-to-event analyses were conducted to determine the association between the two psychological measures (TCI-HA and STAI-T) and the length of Symptom Appraisal time, with the event of interest being the point at which the subjects recognized the seriousness of their symptoms. In addition, the relevant demographic variables were included in these analyses, given previous findings and interest in these patient characteristics. The 13 subjects who sought medical attention for their symptoms while still believing that they probably represented some benign condition were censored. As in the pilot work, scores on the two psychological measures were highly correlated (Spearman's $\rho = 0.58$; $p < 0.0001$; two-tailed), so separate analyses were completed for each of them. The first time-to-event analyses predicting Symptom Appraisal time included the following variables: TCI-HA, age at diagnosis, sex, and education. Unfortunately, ethnicity could not be included due to the very low number of minority subjects. The global null hypothesis was rejected (chi-square = 15.50; $p = 0.0084$; $df = 5$), indicating that Symptom Appraisal time was significantly related to some combination of these four variables. As seen in Table 1, those subjects who scored in the lowest tertile on the TCI-HA took significantly longer to realize that their symptoms were serious as compared with subjects in the middle and high tertiles. In addition, longer Symptom Appraisal times were also significantly related to fewer years of education (high school or less). There was also a nonsignificant tendency ($p = 0.059$) for younger subjects to take longer in Symptom Appraisal. The second time-to-event analysis simply substituted STAI-T for TCI-HA, and the global null hypothesis was very nearly rejected (chi-square = 10.80; $p = 0.0556$; $df = 5$). As seen in Table 2, younger subjects again took longer in Symptom Appraisal time, but no other variables were predictive. Two remaining time-to-

event analyses were performed, using the same variables as those above but predicting Action Appraisal time instead of Symptom Appraisal time. In neither case did the analysis result in rejection of the global null hypothesis.

Single variable Kaplan–Meier analyses were then conducted in order to provide estimates of median Symptom Appraisal times for subgroups of patients according to their psychological scores, age, sex, and education. As seen in Table 3, low scorers on the TCI-HA took much longer (30 weeks) in Symptom Appraisal than the middle (9 weeks) and high (12 weeks) scorers. On the other hand, there was very little difference by STAI-T score or sex. The trend by age is also shown, with the oldest group taking less time (7 weeks) in Symptom Appraisal than the others. Lastly, patients with fewer years of education took longer than those with more years of education (15 vs 8 weeks).

The final analyses explored relationships between the two psychological measures of Trait Anxiety and subjects' answers to questions about previous health-related judgments and behaviors. As seen in Table 4, lower scores on the TCI-HA were related to more favorable judgments of prior overall health. A test of the relationship between these two variables using the Kruskal-Wallis statistic was significant ($p = 0.039$). Lower TCI-HA scores also were related to less frequent doctor visits prior to cancer diagnosis, although this relationship did not reach statistical significance ($p = 0.07$). Low scores were also related to lower likelihood of cancer screening of any kind prior to their cancer diagnosis, and this relationship did reach statistical significance ($p = 0.040$). There was no apparent relationship between TCI-HA score and history of colorectal cancer screening, specifically. Similar analyses were done using the same health behavior questions and STAI-T tertile. In this case, lower scores were associated with more favorable judgments of overall prior health ($p = 0.025$) and with fewer doctor visits ($p = 0.041$), but were not associated with cancer screening or colorectal cancer screening.

DISCUSSION

The purpose of this work was to investigate dispositional characteristics associated with delays in seeking help for symptoms of rectal cancer. In several respects, findings from this study were in accordance with previous reports of delayed help seeking for symptoms of cancer. For example, delay in seeking help was a problem for a number of these patients, with over 17% waiting one year or more, suggesting that there has been little progress in reducing the problem of delay when compared with earlier findings (Hansen *et al.*, 1997; Holliday and Hardcastle, 1979; Irvin and Greaney, 1977; MacArthur and Smith, 1984; Robinson *et al.*, 1986; Rubin *et al.*, 1980). However, inspection of these data also revealed that delay times were skewed, as has been found in most studies of delay (Andersen *et al.*, 1995; Hackett *et al.*, 1973; Safer *et al.*, 1979; Worden and Weisman, 1975), showing that most people do act fairly quickly in response to symptoms. Also, this study provided more evidence that the minimization of symptoms during the Symptom Appraisal process is the major psychological culprit in delayed help seeking. Most patients tended to initially attribute their symptoms to some benign process such as hemorrhoids, and the method of delay time segmentation revealed that the Symptom Appraisal process accounted for the majority of total delay time, on average (Andersen *et al.*, 1995; Cacioppo *et al.*, 1986; Safer *et al.*, 1979). Together, these findings suggest a normative tendency to downplay the seriousness of ambiguous symptoms (Andersen *et al.*, 1995), which then resulted in delayed help seeking.

But the central aim of this work was to explore the role of broad and stable individual differences related to delay in seeking help for symptoms of rectal cancer. In that regard, these data provide evidence that some individuals tended to minimize their symptoms for a

longer period of time than others and that this tendency was related to a more global personality disposition, characteristic of people who are generally less responsive to threatening stimuli in their environments (Cloninger, 1987). The TCI-HA measure tends to focus on the cognitive aspect of anxiety (i.e. worry), with questions that tap the person's typical response to threatening or ambiguous situations (e.g. 'I often feel tense and worried in unfamiliar situations, even when others feel there is no danger at all.'). On the other hand, the STAI-T, which is designed to capture both the cognitive and somatic aspects of anxiety, was not related to Symptom Appraisal time. Recent research has shown that the cognitive and somatic aspects of anxiety are dissociable (Heller *et al.*, 1997; Nitschke *et al.*, 1999), and the present study suggests that the cognitive aspect (i.e. a decreased tendency toward worry) may be more strongly associated with longer Symptom Appraisal times.

There was some evidence, albeit not particularly strong, that younger age and less education were also related to longer Symptom Appraisal times. This evidence regarding less education is consistent with the prevailing literature (Andersen *et al.*, 1995; Antonovsky and Hartman, 1974; Facione, 1993; Facione *et al.*, 2002; Ramirez *et al.*, 1999; Samet *et al.*, 1988). As mentioned in the introduction, the evidence for association between age and delay has been inconsistent in the literature, with some studies showing that older patients delayed longer (Arndt *et al.*, 2002; Coates *et al.*, 1992; Ramirez *et al.*, 1999), others showing the reverse (Andersen *et al.*, 1995). Inconsistencies may have to do with the site of the cancer, the segment of delay being measured, and prevailing beliefs about the nature of certain diseases and their symptoms. Younger delayers may have lower perceived risk of colorectal cancers.

Also, lower levels of Trait Anxiety were variously related to other indicators of a history of lax health behaviors. These findings, though preliminary, might provide an intriguing link to previous clinical observations and research. That is, some have suggested that proximal causes of delay are related to more generalized and long-standing habits of health behavior. For example, it has long been observed clinically that people seem to respond to their cancer symptoms in much the same way that they had responded to previous medical or help-seeking situations (Coates *et al.*, 1992; Goldsen, 1963; Green and Roberts, 1974; Hackett *et al.*, 1973; King and Leach, 1950). In a large study of delay in patients with cancer symptoms, Hackett and colleagues asked subjects two related questions: (1) 'Do you tend to put off seeing your doctor?' and (2) 'Did you put it off this time?' The association between affirmative answers to these questions was highly significant (Hackett *et al.*, 1973). In another study, women who had utilized health services (e.g. routine dental exams, breast health exams) to a lesser extent over the previous 6 years waited longer to seek help for symptoms of breast cancer (Coates *et al.*, 1992). So, the fact that someone delays seeking help for their cancer symptoms may simply be one manifestation of some larger pattern of health-related behavior, which was probably established long before the onset of their present symptoms. The present study provides some evidence that the constellation of lax health behaviors that is seen in some people might also include a dispositional tendency to not worry, even in the face of health-threatening situations.

There are two principal limitations to the present study. First, it is retrospective, which presents challenges to the collection of maximally reliable data and the drawing of valid causal inferences. The reliability of these data depends on patients' recall of events that may have occurred up to several years in the past. But since patient delay is, by definition, a time period during which important physical symptoms are occurring without the benefit of appropriate clinical attention, it is a phenomenon for which retrospective investigation is the only reasonable alternative. The long-term goal of this research is to develop more effective methods of reaching those individuals who, left to their own devices, are most likely to delay seeking medical consultation when symptoms arise. Hence, the purpose of this study

was to begin to develop psychological characterizations of individuals who *did* delay seeking treatment, having been left to their own devices. An indirect causal argument could be made by noting that TCI-HA scores have been shown to be extremely stable over time (Cloninger *et al.*, 1994). In addition, recent studies have shown that TCI-HA scores are highly heritable (Heath *et al.*, 1994) and are also related to the size of specific brain structures (Pujol *et al.*, 2002) as well as measures of brain functioning (Hansenne, 1999; Hansenne and Ansseau, 1999) that seem to be involved in responsiveness to threat. These findings would suggest that whatever levels of Harm Avoidance were measured at the time of the present study were probably close to what might have been measured prior to symptom onset.

The second limitation to this study is that all data are provided by patients' self-reports. The biggest threat to validity posed by the self-report format is that those patients who took the longest to seek help may have tended to underreport their delay times out of shame or embarrassment (Coates *et al.*, 1992). But the present findings regarding lengths of delay times are consistent with many other studies (Holliday and Hardcastle, 1979; Irvin and Greaney, 1977; MacArthur and Smith, 1984; Rubin *et al.*, 1980), and the fact that a fair number of these patients reported very long delay times suggests that they were probably not intentionally minimizing the facts.

Some variables that have been found to be associated with delay might be subject to direct intervention and change, such as economic or logistic barriers. The evidence presented here suggests that one aspect of personality disposition is related to slower response to symptoms as well as a decreased likelihood of engaging in other preventive behaviors. While the psychological characteristics investigated in this report are not easily alterable, they could provide direction for future public health initiatives. A clearer understanding of the psychological characteristics of this at-risk audience could inform us as to how we can tailor and present educational materials most effectively.

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Figure 1.
Model of patient delay.

Table 1

Time-to-event analyses for TCI-HA tertile, age, sex, and education predicting symptom appraisal time

Variable	Hazard ratio	95% Confidence limits	<i>p</i>
TCI-HA			
Low	0.23	0.091–0.60	0.0024
Middle	0.63	0.31–1.30	0.21
High	1.00		
Age at diagnosis (Per year increase)	1.02	0.999–1.05	0.059
Sex			
Male	1.42	0.72–2.78	0.31
Female	1.00		
Education			
H.S. or less	0.49	0.26–0.94	0.030
> H.S.	1.00		

Table 2

Time-to-event analyses for STAI-T tertile, age, sex, and education predicting symptom appraisal time

Variable	Hazard ratio	95% Confidence limits	<i>p</i>
STAI-T			
Low	0.59	0.29–1.20	0.14
Middle	1.33	0.62–2.85	0.46
High	1.00		
Age at diagnosis (Per year increase)	1.03	1.004–1.06	0.025
Sex			
Male	1.08	0.56–2.09	0.82
Female	1.00		
Education			
H.S. or less	0.59	0.33–1.07	0.084
> H.S.	1.00		

Table 3

Single-variable Kaplan–Meier estimates of median symptom appraisal times

Variable	Median time (weeks)	95% Confidence limits	<i>n</i>
TCI-HA			
Low	30.0	(12.0, 78.0)	19
Middle	9.0	(4.0, 17.0)	24
High	12.0	(4.0, 26.0)	19
STAI-T			
Low	15.0	(4.0, 30.0)	20
Middle	9.0	(2.0, 26.0)	18
High	12.0	(4.0, 26.0)	23
Age at diagnosis			
33–51	13.0	(4.0, 65.0)	15
52–61	15.0	(3.0, 26.0)	16
62–70	14.0	(4.0, 26.0)	16
71–85	7.0	(2.0, 9.0)	16
Sex			
Male	12.0	(4.0, 26.0)	38
Female	13.0	(5.0, 20.0)	25
Education			
H.S. or less	15.0	(9.0, 26.0)	36
> H.S.	8.0	(4.0, 15.0)	27

Table 4

Relationships between psychological measures and responses to health behavior questions

Health behavior question	TCI-HA	STAI-T
'How would you describe your overall health before you were diagnosed with cancer?'	8.35 (<i>p</i> = 0.039)	9.33 (<i>p</i> = 0.025)
'How often did you go to your doctor before these problems began?'	6.99 (<i>p</i> = 0.07)	8.25 (<i>p</i> = 0.041)
'Have you ever had screening for any kind of cancer?'	4.20 (<i>p</i> = 0.040)	1.99 (<i>p</i> = 0.16)
'Have you ever been screened for colon or rectal cancer?'	0.01 (<i>p</i> = 0.91)	0.10 (<i>p</i> = 0.75)

Note: Numbers indicate Kruskal–Wallis test of association.