Neuroticism, Causal Attribution and Reattribution of Symptoms: Is Neuroticism Associated with Internal Attributions?

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A thesis submitted to the Psychology Department

in partial fulfillment of the requirements for the Masters of Arts degree

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Ottawa, Ontario

June 2006

Your file Votre référence
ISBN: 978-0-494-18302-1
Our file Notre référence
ISBN: 978-0-494-18302-1

Abstract

The present study investigated the relationship between Neuroticism and the causes given to symptoms. It was expected that Neuroticism would be associated with more internal (i.e., psychological and somatic) attributions. This study also explored whether priming participants to attend to external causes of symptoms would decrease the hypothesized relationship between Neuroticism and internal attributions and increase the relationship between Neuroticism and external attributions. Participants (n = 215) completed a series of personality questionnaires, read a health-related article (prime) and completed two measures of symptom attributions. Results revealed that overall Neuroticism was positively associated with psychological attributions but not somatic attributions. The priming was not effective in decreasing the relationship between Neuroticism and psychological attributions and/or increasing the relationship between Neuroticism and external attributions. The findings contribute to a better theoretical understanding of individual differences in symptom attributions, interpretations of ambiguous stimuli, and causal attributions in general. Practical implications of these findings for decreasing misdiagnoses are also discussed.

Acknowledgements

I would first like to thank Dr. Steven Murphy, my external examiner, for his insightful comments about my thesis. I would also like to thank the members of my committee, Dr. Kim Matheson and Dr. Chris Davis, for their helpful suggestions and comments. I believe that these suggestions helped my thesis become a much better project. I especially want to thank Dr. Mary Gick, my thesis advisor, for all of time she spent discussing this project with me. I had a wonderful time working with her and I look forward to any collaboration on future projects. I would also like to thank Dr. John Zelenski for his knowledgeable input and advice. He has been a wonderful friend and a source of much encouragement. Finally, I want to thank my Mother and Father and my close friends Melinda Morgan and Annik O'Brien for all of their emotional support throughout this project.

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The Interpretation of Bodily Sensations

Most common physical symptoms are attributed to minor transient causes, and hence require no medical attention (Robbins & Kirmayer, 1991). However, many healthy people interpret benign physical symptoms as signs of illness that require medical attention. For instance, between 68% and 92% of people visiting primary care practices are without serious physical disease and the most common diagnosis made by physicians is non-sickness (see review by Barsky and Klerman, 1983). Why would normal, healthy people become alarmed and seek treatment for physical symptoms? The causal interpretation given to physical sensations may have major consequences for decisions to seek treatment (Macleod, Haynes & Sensky, 1998). For example, models of treatment seeking (e.g., Cameron, Leventhal, & Leventhal, 1989) assume that one factor contributing to the decision to seek care is the attribution of the symptom or sensation as a sign of illness.

The study of symptom attribution is important because individuals' hypothesized cause of reported symptoms may place them at risk for inaccurate somatic or psychological diagnosis (Robbins & Kirmayer, 1991). For instance, patients who present physical symptoms to their physician along with a psychological or somatic explanation may bias the physician in favor of a psychological diagnosis without first completing a thorough medical examination of other possible causes (Robbins & Kirmayer, 1991). Indeed, Ellington & Wiebe

(1999) found that neurotic individuals who elaborated on their symptoms, and disclosed more psychosocial information were referred to a psychiatric follow-up more often than less neurotic patients.

The present study will explore individual differences in attributions made about common physical symptoms and levels of symptom concern. In particular, this study will explore whether Neuroticism is associated with a specific type of symptom attribution. This study will also explore whether symptom attributions can be altered by increasing attention to other plausible causes of symptoms. Before discussing the relationship between Neuroticism and symptom attribution, a brief literature review of each will be presented.

Definition and Characteristics Associated with Neuroticism

Neuroticism has been defined as 'a broad dimension of individual differences in the tendency to experience negative distressing emotions and to possess associated behavioural and cognitive traits' (Costa & McCrae, 1987, p.301). Among the traits that define this dimension are fearfulness, irritability, low self-esteem, poor inhibition of impulses, and helplessness' (Costa & McCrae, 1987, p. 301). Gray (1994) proposed that the behavioural inhibition system (BIS) is the underlying neurological explanation for the behaviour and cognitions associated with Neuroticism. The behavioural inhibition system is thought to be responsible for increased sensitivity to signals of threat and punishment (Gray, 1975). Individuals high on Neuroticism have a tendency to experience anxiety and depression and are vulnerable to stress (McCrae & Costa, 1984a). They also have a tendency to be vigilant about bodily changes, interpret unusual sensations as signs of illness, and worry about diseases (Costa &

McCrae, 1987). In addition, past researchers have found that Neuroticism is associated with health habits, somatic complaints, illness behaviour and medical diagnosis, although there does not appear to be a causal link between Neuroticism and disease (Costa & McCrae, 1987).

Negative emotionality or negative affectivity (NA) closely resembles Neuroticism and the terms have been used interchangeably in past research (Watson & Clark, 1984). As outlined extensively in a review by D. Watson and Clark (1984), trait NA individuals are likely to experience generally high levels of negative affect, are introspective, dwell upon and magnify threats and frustrations, and focus on the negative side of others and the world in general. Individuals scoring high on NA have a tendency to ruminate and focus on themselves and their feelings, have preoccupying thoughts, and interpret ambiguous stimuli more negatively (see Watson & Clark 1984; Phares, 1961). Negative emotionality is also associated with health issues, such as symptom reporting and physical complaints, generally poor mental health, and a greater likelihood of reporting distress and discomfort (see Watson & Clark, 1984).

Symptom Attribution

The experience of physical symptoms (e.g., sweating, dry throat, headaches) is a daily or weekly occurrence for healthy individuals. Many physical symptoms are often experienced as a mix of confusing sensations, which are open to a variety of interpretations (Robbins & Kirmayer, 1991). According to the self-regulatory model of health and illness behaviour, changes in somatic activity initiate the self-regulatory process and the generation of illness representations (Cameron, Leventhal, &

Leventhal, 1993). Illness representations are elaborated in five areas: (a) identity of the health problem (i.e., label and symptom attributes), (b) duration, (c) consequences, (d) causes of the health problem, and (e) expectations about controllability (Cameron, Leventhal, & Leventhal, 1993). These 'illness representations guide the selection and execution of coping procedures' (Cameron, Leventhal, & Leventhal, 1993, p.171). The present study will focus on the illness representation of causes of health problems.

People offer causal explanations for bad events that they experience without solicitation (Peterson, Bettes, & Seligman, 1985). Attributing a cause to a symptom rarely happens without any information because people typically have information about possible relevant causes that were observed in the past and plausible causes that are indicated in the present instance (Kelley, 1973). Causes are frequently not mutually exclusive, such that any event (i.e., experience of a symptom) may have several possible causes (Shaklee & Fischhoff, 1982). The cause that an individual endorses will influence the way that he or she responds, both behaviourally and emotionally (Lundh & Wangby, 2002). For example, if a person attributes physical symptoms to something that is wrong with them (i.e., psychologically or illness-related) he or she may be likely to seek treatment; in contrast, individuals who attribute physical symptoms to the environment (e.g., dry throat is caused by a dry room) may be less likely to seek treatment. Past research has shown that people have attributional styles, so that some individuals routinely attribute physical symptoms to psychological, somatic or normalizing/external causes (Robbins & Kirmayer, 1991; Lundh & Wangby, 2002).

Robbins and Kirmayer (1991) categorized attributions for common sensations/symptoms into three types: normalizing/externalizing attributions, psychological attributions and somatic attributions. Their definition of normalizing/externalizing attributions is based on the discounting principle of attributions that suggests that 'whenever possible, symptoms will be normalized by attributing them to such situational factors as environmental irritants, temporary fatigue, overexertion, lack of sleep, or dietary indiscretion' (Robbins & Kirmayer, 1991, p. 1030). If a normalizing explanation cannot be found, people will likely endorse psychological or somatic explanations for their symptoms (Robbins & Kirmayer, 1991; MacLeod & Sensky, 1998). Robbins and Kirmayer (1991) defined psychological attributions as causes that are due to psychological states, such as anxiety or worry, and somatic attributions as causes that are due to physical disorder or disease.

Robbins and Kirmayer's (1991) normalizing definition suggests that 'normal' explanations for symptoms are those that are due to situational factors; yet, what are normal explanations for symptoms? Attributing symptoms such as upset stomach, loss of appetite, and constipation to stomach flu or high levels of stress might also be considered 'normalizing' reasons for these symptoms. For example, Robbins and Kirmayer (1991) defined 'ate something that did not agree with me' as an external cause of an upset stomach. However, even after finishing eating, the body is likely to remain ill, which is a somatic symptom. Thus, 'eating something that did not agree with me' could be considered a somatic cause of an upset stomach, rather than an external cause.

In addition, the normalizing definition appears inconsistent with research that has found that there are individual differences in symptom attributional styles. For instance, MacLeod, Haynes and Sensky (1998) found that individuals differ in the types of attributions even when plausible external explanations are presented as possible causes of the symptom.

Neuroticism and Symptom Attribution

There may be a link between Neuroticism and a specific type of symptom attribution. For instance, Costa and McCrae (1991) found that participants who made more psychological attributions tended to be more self-focused or introspective, more body conscious, more hypochondriacal and experience more somatic symptoms when anxious. These results may reflect an underlying factor such as anxiety or Neuroticism that increases individuals' sense of vulnerability and overall symptom reporting (Costa & McCrae, 1985).

Individuals scoring higher on Neuroticism have a tendency to experience heightened levels of anxiety (measures of trait anxiety and Neuroticism have been used interchangeably) ($r = .78$, $P<0.001$, see Byrne & Eysenck, 1993). Sensky et al. (1996) found that anxious individuals, who frequently visit general medical practices, are less able to generate normalizing/external attributions when presented with common somatic symptoms. Similarly, MacLeod, Haynes and Sensky (1998) found that relative to non-anxious individuals, anxious individuals give more reasons that are psychological and somatic, and fewer normalizing reasons for their symptoms.

The tendency for individual high on Neuroticism to experience negative affect is also likely to influence symptom attributions. Pyszczynski and Greenberg

(1986) found that individuals who are experiencing negative affect (i.e., depression) were more likely to focus internally in negative situations. The 'negative situation' used in the Pyszczynski and Greenberg study was task failure; however, individuals may also focus internally in other negative situations, such as when experiencing uncomfortable physical sensations. Self-focus influences the types of attributions that people make because when attention is focused on the self, the self becomes more salient as a locus of causality (Duval & Wicklund, 1973). Thus, when individuals experience uncomfortable symptoms they are likely to focus internally and attribute symptoms to causes within the self.

The negative mood experience by individuals higher on Neuroticism is also associated with negative perceived health status because negative mood increases the accessibility of illness-related memories (Croyle & Uretsky, 1987). For example, when instructed to imagine an illness scenario or when given no instructions concerning cognitive activity, participants in a negative mood induction judged their health to be poorer than participants in a positive mood induction (Croyle & Uretsky, 1987).

In addition, past researchers have found that individuals high on Neuroticism (or individuals high on anxiety) have a tendency to interpret ambiguous stimuli in a negative or threatening manner. For instance, thematic apperception tests (TAT) have revealed that anxious individuals frequently project threat onto the test stimuli (see Phares, 1961). Additionally, Byrne and Eysenck (1993) presented homophones auditorily with both negative and neutral interpretations (e.g., die, dye), positive and neutral interpretations (e.g., won, one), and positive and negative interpretations

(e.g., meddle, medal) to participants. The study revealed that high Neuroticism and high anxiety correlated significantly with the number of negative interpretations. Rusting (1999) also found a link between Neuroticism, negative affectivity and the tendency to make negative judgments. It is assumed that external interpretations of symptoms are less negative or threatening because external causes are more amenable to change, likely avoidable, and more temporary. Internal attributions also indicate a direct threat because the cause of the symptom is inside the person rather than outside of the person. Thus, choosing to attribute an ambiguous symptom to an internal cause (i.e., there is something wrong with me), rather than an external cause (i.e., the external environment is the cause of my symptoms) may reflect the tendency for neurotic individuals to interpret stimuli in a negative or threatening manner (Phares, 1961; Byrne & Eysenck, 1993; Rusting, 1999).

Wong and Wiener (1981) suggested that our attributional searches usually take the form of a series of implicit self-directed questions, such as "It is because of me?" and that 'that the process of causal search will first focus on the source or locus of causality (whether the cause resides within the person or in the external world)' (Wong & Wiener, 1981, p. 654) and whether the cause is subject to personal influences. However, it is unknown whether individuals high on Neuroticism make psychological, somatic or both types of internal attributions. Neuroticism may be associated with both psychological and somatic attributions about symptoms because there does not appear to be a clear dividing line between psychological and somatic causes of symptoms. For instance, Salovey and Birnbaum (1989) noted that 'psychotherapists and physicians frequently report the simultaneous occurrence of

psychological distress and physical complaints' (p. 539). Patients often present physical symptoms to their physicians that appear to have no organic basis (Salovey & Birnbaum, 1989). These physical symptoms may be a result of psychological distress. Conversely, psychotherapists are often concerned that a client's psychological distress may reflect an underlying physical disorder (Salovey & Birnbaum, 1989).

Changing Attributions and Neuroticism

Symptom reattribution is the process of 'helping' individuals view their symptoms in a different way (Goldberg, Gask, & O'Dowd, 1989). The use of reattribution techniques in clinical work may help patients view their symptoms as normal or resulting from external causes, cut down on health care seeking and may increase perceptions of psychological and physical well-being (Goldberg, Gask, & O'Dowd, 1989).

It is possible that individuals higher on Neuroticism may generate more external causes and less internal causes of symptoms when they are primed to attend to external causes of symptoms. There is some past research to suggest that increasing attention to external cues will decrease attention to internal cues (Pennebaker & Lightner, 1980). For instance, in a study conducted in an exercise setting, focusing attention away from the body decreased perceptions of fatigue and physical symptoms, reduced awareness of internal sensations, and increased perceived physical and psychological well-being (Pennebaker & Lightner, 1980). In addition, other research has revealed that the quantity of information that can be processed at any given time is limited and that encoding information from an external

source restricts one's ability to encode information from an internal source (Navon & Gopher, 1979; Pennebaker & Lightner, 1980), suggesting that external priming may limit internal attributions.

However, it may be difficult or impossible to manipulate perceptions about the causes of symptoms in individuals high on Neuroticism because they may have made psychological and somatic attributions about symptoms in the past. These prior hypotheses about the causes of somatic sensations likely lead to more psychological or somatic attributions in the future. For example, Ciofffi (1991) proposed that between becoming aware of a physical state and labeling, interpreting, and responding to it, individuals consider prior hypotheses and attributions about the causes of the physical state. These prior hypotheses and attributions affect whether subsequent attention will be deployed to the somatic sensation (Cioffi, 1991). Individuals may dismiss the sensation as something that is caused externally (cold hands are due to cold weather) or increase their attention to the sensation because they suspect that it is internally caused (cold hands are due to poor circulation) depending on their prior hypothesis about the cause of cold hands (Cioffi, 1991).

Prior beliefs about the causation of a previous event have been found to affect the intake of information when considering the cause of a new, similar or same event (Kelley, 1973). Similarly, Robbins and Kirmayer (1991) found that patients tend to attribute the cause of hypothetical symptoms to what they believed caused recent similar distress. These findings are likely due to the 'belief perseverance effect', which states that people are unlikely to go beyond their first explanation if that explanation provides a plausible fit for the sensation (Koehler, 1991; MacLoed,

Haynes, & Sensky, 1998). Past research regarding the belief perseverance effect has shown that beliefs persist even when people are asked to think more carefully or as unbiased as possible (Koehler, 1991; MacLeod, Haynes, & Sensky, 1998). Thus, the proposed tendency for individuals high on Neuroticism to attribute uncomfortable physical sensations to internal causes may not decrease, even when they are required to attend to plausible external causes of symptoms.

If neurotic individuals continue to choose internal explanations, even after being primed for external causes, this would suggest that neurotic individuals have a pervasive and powerful tendency to choose internal causes for health-related events, even when given plausible, less negative, and realistic alternative explanations.

The present study

The primary purpose of the present study was to explore the relationship between Neuroticism and symptom attribution, including whether priming plausible external causes of uncomfortable physical symptoms would decrease the hypothesized association between Neuroticism and internal attributions and increase the association between Neuroticism and external attributions. An experimental manipulation was used in which participants were assigned to one of four attribution conditions. Three conditions primed the cause of headaches to be psychological, somatic, or external; the neutral condition did not contain a prime.

An auxiliary purpose of the present study was to explore alternative measures of attributions for symptoms. One measure was the Robbins & Kirmayer (1991) forced choice SIQ that requires participants to choose between very specific reasons for symptoms. An original, second measure (the SAQ) was continuous and allows

participants to rate the likelihood of somatic, psychological, or external causes without requiring the participant to choose between very specific external, somatic or psychological causes. In addition, the SIQ and the SAQ use different definitions of external attributions, which may lead participants to endorse external causes of symptoms using one scale and not the other. Depending on the attribution scale used, the relationships between Neuroticism and attributions might differ; this highlights the importance of taking into account the type of attribution measure used when interpreting results.

Method

Participants

Subjects were 213 undergraduate students (145 females, 67 males, and 3 that did not indicate their gender) who participated in this study for an increase in their course grade. Participants were either in their first (69.3%), second (23.3%), third (6%), or fourth (1.4%) year of study. Of the participants that indicated their ethnicity (16 missing), the majority were Caucasian (55.8%), followed by Asian/Indian (21.4%), Middle Eastern (7%), African (6%) and other (2.3%). Approximately three-quarters of the participants spoke English as a first language (71.6%).

Procedure

Participants were required to sign a consent form (Appendix A) in order to participate in the study. Participants were then randomly assigned to one of four conditions. In three of the conditions, participants were required to read a health-related article in order to prime them to attend to particular causes of symptoms (Appendix B to D). In the fourth condition, participants read a health-related article

but were not primed to attend to causes of symptoms (Appendix E). As a cover story, participants were informed that the researchers wanted to find out if the article was interesting and understandable because it may be used in a future study. Participants in the psychological condition (n = 52) received an article stating that 80% of the time headaches are caused by negative moods and could be relieved by exposure to a positive mood induction. Participants in the somatic condition (n = 55) received an article stating that 80% of the time headaches are caused by sinus infections and the headaches could be relieved by taking sinus cold medication. Participants in the external condition (n = 56) received an article stating that 80% of the time headaches are caused by pressure or humidity in the environment and could be relieved by going into a climate-controlled room. Finally, participants in the control condition (n = 55) received an article stating that 80% of people suffer from headaches and described types of headaches (migraine and cluster) but did not mention a possible cause of the headaches.

After the priming, participants were told that they could begin the 'Personality and Symptom Attribution Study'. Participants were then required to complete a demographic questionnaire and two personality questionnaires concerning positive and negative emotionality (PEM & NEM; Tellegen, 1982). Participants then completed an original Symptom Attribution Questionnaire (SAQ) that required participants to individually rate how likely they think a list of thirteen symptoms might be somatically, psychologically or externally caused. Participants were then required to complete the second measure of symptom attribution, the Symptom Interpretation Questionnaire (SIQ; Robbins & Kirmayer, 1991), which

asks participants to choose between a psychological, somatic or external cause for the same 13 symptoms. Refer to Appendix F for all measures. Finally, the experimenter provided participants with a debriefing form, explained the purpose of the deception, and asked participants if they would like to withdraw their data (Appendix G).

Measures

Demographics. A questionnaire was used to gather basic demographic information, including age, gender and ethnicity.

Symptom Interpretation Questionnaire. The Symptom Interpretation Questionnaire (SIQ; Robbins & Kirmayer, 1991) contains 13 common symptoms each followed by three possible causes for the symptom: a psychological cause (*alpha* = .63), a somatic cause (*alpha* = .60), and an externalizing/normalizing cause (*alpha* = .65). The definition of normalizing/externalizing attributions states that whenever possible, symptoms will be normalized by attributing them to such situational factors as environmental irritants, temporary fatigue, overexertion, lack of sleep, or dietary indiscretion. Psychological attributions were defined as causes that are due to psychological states, such as anxiety or worry, and somatic attributions were defined as causes that are due to physical disorder or disease. Participants were required to choose the item that they think would be the most likely cause if they were to experience that symptom. For each participant, a sum of psychological, somatic and external attributions was computed (Robbins & Kirmayer, 1991). For example,

A. If I had a prolonged headache, I would probably think that it is because:

1. I am emotionally upset

2. There is something wrong with my muscles, nerves or brain.
3. A loud noise, bright light or something else has irritated me.

Symptom Attribution Questionnaire (SAQ). The possible causes of symptoms that the SIQ provides are very specific. Participants may believe that some symptoms are caused by something internal such as psychological distress; yet, participants may not choose these responses because they do not agree with the specific examples given. In addition, the SIQ requires participants to choose between causes. The alternative SAQ measure allows participants to rate how likely they think a symptom is caused by something psychological, somatic or external, without being required to endorse very specific and mutually exclusive causes. Psychological and somatic attributions are defined the same way as in the SIQ. External attributions in the SAQ are symptoms that are not caused by emotions, infection, disease, or illness, and are instead due to something related to the environment.

Participants are first given an example, as in the SIQ, and 3 choices of psychological, somatic, and external causes, and each are defined and an example also given. After the example, participants were asked if it was clear and to identify if it was not and seek clarification. Then participants were asked to rate 13 new symptoms (on a 6-point Likert-type scale where 1 is *Strongly Disagree* and 6 is *Strongly Agree*) as somatically (*alpha* = .881, n = 210), psychologically (*alpha* = .887, n = 209) or externally caused (*alpha* = .868, n = 210), without being given examples. For each symptom, participants were additionally asked to rate how concerned they would be if they experienced the symptom and how likely it would be for them to seek treatment if they experienced this symptom. If participants

indicated that they were likely to seek treatment, they were required to indicated what type of treatment they would seek (medical practitioner, psychologist, alternative medical practitioner, other), and how likely it would be for them to take over-the-counter medication. Information about treatment seeking and concern was gathered in order to obtain more information on the importance of attributions.

The Big Five Factor Inventory. The Big Five Factor Inventory (John & Srivastava, 1999) was used to assess the personality dimension of Neuroticism (*alpha* = .78). The coefficient alpha for Neuroticism in this study was .777 (n = 212). Participants were required to rate the relevance of each item for their own personality on a 7-point Likert-type scale where 1 indicates *strong disagreement* and 7 indicates *strong agreement.*

Negative Emotionality Measure. The Negative Emotionality Measure (from Tellegen's Multidimensional Personality Questionnaire; Tellegen, 1982) is a 14-item scale designed to measure trait negative affectivity (*alpha* = .82). High negative emotionality scorers are described as nervous, apprehensive, irritable, overly sensitive, and emotionally unstable. This scale focuses exclusively on negative emotionality without including items related to somatic complaints or health. The coefficient alpha for negative affectively for the present study was .82 (*n* = 212).

BIS/BAS (Carver & White, 1994). The 24-item Likert-type scale was used to measure sensitivity of the behavioral inhibition system (BIS; *alpha* = .76). The alpha for the BIS measure in the present study was .728 (*n* = 213)

Life Orientation Measure (LOT; Scheier, Carver & Bridges, 1994) is a 10-item Likert-type scale (including 4 filler items) designed to measure optimism and pessimism (*alpha* = .82). In this study the alpha for the LOT was .616 ($n = 210$).

Results

Preliminary Analyses

Frequency analyses and box plots of the standardized scores revealed that Neuroticism, NEM and BIS did not have any significant outliers. An analysis of residuals from a regression analysis revealed an outlier. This individual was also an outlier on the age variable (male, aged 60) and had a standardized residual of 9.292. Since this individual was much older than the other participants and it has been recommended that scores should lie no farther than 3.29 standard deviation from the mean, this participant was excluded from further analysis (Tabachnick & Fidell, 1989).

Separate one-way analyses of variance revealed that the mean levels of Neuroticism, $F(3,213) = .790$, $p = .790$, and NEM, $F(3, 213) = .419$, $p = .739$, did not differ across conditions; however, the mean levels of BIS did differ across conditions, $F(3, 213) = 5.482$, $p = .001$. Scheffe post-hoc analyses revealed that mean levels of BIS were higher in the psychological ($p = .045$) and control conditions ($p = .002$) than in the somatic condition; BIS will be controlled in analyses of group differences. Neuroticism was shown to be moderately correlated with BIS and NEM (see Table 1). Because pessimism had only a small relationship with Neuroticism and was only slightly related to one attribution type, it was dropped from further analysis.

Table 1

Intercorrelations Among Personality and Attributions

Scale	1	2	3	4	5	6	7	8	9	10
1. Neuro										
2. NEM	.493**									
3. BIS	.381**	.574**								
4. Pess	.187**	.379**	.253**							
5. psysaq	.223**	.374**	.341**	-.005						
6. sosaq	.136*	.113	.111	-.029	.343**					
7. extsaq	.001	-.072	-.021	-.040	.133	.095				
8. psysiq	.233**	.398**	.271**	.151*	.416**	-.026	-.073			
9. sosiq	-.080	-.085	.065	-.040	-.007	.312**	-.080	-.356**		
10. exsiq	-.154*	-.299**	-.308**	-.103	-.380**	-.232**	.129	-.639**	-.491**	
11. Treat	-.056	-.032	.048	-.042	.281**	.483**	.146**	-.005	.291**	-.236**

Note. Neuro = Neuroticism (Big Five Factor Inventory; John & Srivastava, 1999), BIS = Behavioural Inhibition System (Gray, 1981), NEM = Negative Emotionality Measure (Multidimensional Personality Questionnaire; Tellegen, 1982), Pess = Pessimism (Life Orientation Test, Scheier, Carver & Bridges, 1994), psysiq, sosiq, exsiq = # of psychological, somatic and external attributions on the Symptom Interpretation Questionnaire (SIQ; Robbins & Kirmayer,1991), psysaq, sosaq, extsaq = mean # of psychological, somatic, and external attributions on the Symptoms Attribution Questionnaire (SAQ; designed by the present investigators for the purpose of this study).

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

As expected, the two somatic attribution scales were positively and significantly correlated as were the two psychological attribution scales; external attribution scales were unrelated (see Table 1). Psychological attributions were positively associated with somatic attributions using the SAQ, although both somatic and psychological attributions were unrelated to external attributions on the SAQ. Psychological, somatic, and external attributions were negatively correlated when using the SIQ because the scales are non-orthogonal (i.e., participants can only choose one response).

Neuroticism and Symptom Attribution

It was expected that Neuroticism would be correlated with internal symptom attributions (somatic and psychological) when collapsing across priming conditions. Using the SIQ, Neuroticism, NEM and BIS were each positively related to psychological attributions, unrelated to somatic attributions, and negatively related to external attributions (see Table 1). These results are similar to those found using the SAQ; Neuroticism, NEM and BIS were positively related to psychological attributions, unrelated to somatic attributions (except a small relationship with Neuroticism), and unrelated to external attributions.

Priming

Overall priming. Preliminary analyses, using a series of analyses of variance (ANOVAs), were conducted to explore whether there were any differences across the four conditions. Participants found the articles to be approximately equally understandable across conditions (F (3, 213) = .740). Ninety-five percent of participants said they understood the headache articles, and five percent of

participants indicated they somewhat understood the articles. The five percent who indicated that they somewhat understood the articles were not excluded from the study because they answered all qualitative questions about the headache articles correctly. Participants also indicated that the headaches articles were equally interesting across conditions, F (3, 213) = .489 (M = 4.34, SD = .951, where 1 indicated 'not interesting' and 6 indicated 'very interesting'). Information about the level of concern about symptoms was also investigated as another possible difference between the priming conditions; however, symptom concern did not differ across conditions, F (3, 213) = .629 (M = 3.597, SD = .875, where 1 indicated 'not concerned' and 6 indicated 'very concerned').

Table 2

Mean number of psychological, somatic, internal and external attributions using the SAQ and SIQ in each condition

Mean number of attributions	Conditions					
	Control	Psychological	Somatic	External	*F*	*p*
Psysaq	3.598	3.589	3.091	3.358	3.029	.030*
Somsaq	3.656	3.394	3.471	3.467	.639	.591
Extsaq	3.399	3.255	3.355	3.354	.189	.838
Psysiq	4.291	4.189	3.745	4.536	1.016	.387
Somsiq	2.327	2.717	2.216	2.214	.458	.712
Extsiq	6.364	6.094	7.039	6.232	1.390	.247

It was expected that if the priming was effective, the mean number of psychological, somatic and external attributions would differ across conditions. The mean number of psychological, somatic and external attributions for each condition using the SAQ and SIQ are reported in Table 2. For the SIQ and the SAQ, the mean

number of somatic and external attributions did not differ across conditions. Psychological means did differ across conditions using the SAQ, but not the SIQ. However, a univariate ANOVA revealed that the number of psychological attributions no longer differed across condition when BIS was entered as a covariate, $F(3, 212) = 1.125$, $p = .340$ (BIS was used as a covariate because the mean levels differed across conditions and it was related to psychological attributions; it was unrelated to somatic and external attributions). Furthermore, Dunnett post-hoc t-tests also revealed that, relative to the control condition, participants did not make more somatic attributions in the somatic condition ($p = .677$), more psychological attributions in the psychological condition ($p = 1.000$), or more external attributions in the external condition ($p = .990$). Thus, it appears that the priming was ineffective overall.

Neuroticism, priming and attributions. Even though there was no overall effect of priming, the priming may have had an effect for individuals high on Neuroticism. A series of hierarchical regressions were conducted in order to find out if there was an effect of Neuroticism, condition or the interaction between Neuroticism and condition when predicting psychological (Table 3), somatic (Table 4) and external (Table 5) attributions. Each of the conditions were dummy-coded (Psychological condition = Dummy 2, Somatic condition = Dummy 3, External condition = Dummy 4) and compared to the control condition. Neuroticism and condition were entered into the regressions in Step 1 and the interactions were entered into the regressions n Step 2. It was expected that Neuroticism would be positively related to internal attributions in the psychological, somatic and control

conditions. It was unknown whether Neuroticism would be negatively or unrelated to internal attributions, and positively related to external attributions, when primed to attend to external causes of symptoms. Analogous regressions were also performed

Table 3

Regressions of Neuroticism and Condition on the Number of Psychological Attributions using the SAQ and SIQ

Variable	B	ΔR^2	ΔF (df)
Psychological SAQ			
Step 1		.088	4.998* (4, 212)
N	.215*		
Dummy 2	.017		
Dummy 3	-.195		
Dummy 4	-.093		
Step 2		.049	3.888* (3, 212)
N	.317		
Dummy 2	.013		
Dummy 3	-.181		
Dummy 4	-.086		
N X Dummy 2	-.218		
N X Dummy 3	.074		
N X Dummy 4	-.080		
Psychological SIQ			
Step 1		.067	3.735* (4, 213)
N	.229*		
Dummy 2	.013		
Dummy 3	-.081		
Dummy 4	.052		
Step 2		.009	.676 (3, 213)
N	.247		
Dummy 2	.016		
Dummy 3	-.078		
Dummy 4	.055		
N X Dummy 2	.032		
N X Dummy 3	.021		
N X Dummy 4	-.089		

Note. N = Neuroticism (Big Five Factor Inventory, John & Srivastava, 1999), Dummy 2 = Psychological condition compared to the control condition, Dummy 3 = somatic condition compared to the control condition, Dummy 4 = external condition compared to the control condition.

* $p < .01$.

using BIS and NEM in place of Neuroticism. Because the regressions were conducted for Neuroticism, NEM and BIS and for the SIQ and SAQ, the critical value will be set at 0.01 in order to reduce Type 1 error.

Neuroticism, significantly predicted the number of psychological attributions using both the SAQ and the SIQ (Table 3). NEM, $t(4, 213) = 5.740$, $\beta = .363$, $p < .001$, and BIS, $t(4, 212) = 4.601$, $\beta = .310$, $p < .001$, also significantly predicted the number of psychological attributions using the SAQ, and the SIQ, $t(4, 213) = 6.233$, $\beta = .394$, $p < .001$ (NEM); $t(4, 213) = 3.905$, $\beta = .269$, $p < .001$ (BIS). Conditions and all two-way interactions between NEM and condition and BIS and condition were unrelated to the number of psychological attributions. A significant interaction was found between Neuroticism and condition when predicting psychological attributions compared to the control group. Although the individual regressions were insignificant, it appears that Neuroticism was negatively related to psychological attributions in the psychological condition compared to the control condition. In the control condition, Neuroticism, $r = .332$, $p < 0.05$, NEM, $r = .304$, $p < 0.05$, and BIS, $r = .329$, $p < 0.05$, were positively related to psychological attributions, using the SAQ, in the control condition. Using the SIQ, Neuroticism, $r = .277$, $p < 0.05$, NEM, $r = .360$, $p < 0.01$, and BIS, $r = .376$, $p < 0.01$, were also positively related to psychological attributions in the control condition.

Unlike expected, Neuroticism was unrelated to somatic attributions using the SIQ and the SAQ (Table 4). NEM and BIS were also unrelated to the number of somatic attributions using the SAQ and the SIQ. There was no effect of condition or two-way interactions when predicting somatic attributions using the SIQ and the

SAQ, when compared to the control group. In the control group, Neuroticism, NEM and BIS were unrelated to somatic attributions using the SIQ and SAQ.

Table 4

Regressions of Neuroticism and Condition on the Number of Somatic Attributions using the SAQ and the SIQ

Variable	β	ΔR^2	ΔF (df)
Somatic SAQ			
Step 1		.026	1.403 (4, 212)
N	-.131		
Dummy 2	-.100		
Dummy 3	-.068		
Dummy 4	-.077		
Step 2		.036	2.674 (3, 212)
N	.176		
Dummy 2	-.104		
Dummy 3	-.058		
Dummy 4	-.073		
N X Dummy 2	-.113		
N X Dummy 3	.115		
N X Dummy 4	-.111		
Somatic SIQ			
Step 1		.013	.666 (4, 213)
N	-.078		
Dummy 2	.057		
Dummy 3	-.028		
Dummy 4	-.026		
Step 2		.024	1.717 (3, 213)
N	-.233		
Dummy 2	.048		
Dummy 3	-.028		
Dummy 4	-.032		
N X Dummy 2	.034		
N X Dummy 3	.207		
N X Dummy 4	.061		

Note. N = Neuroticism (Big Five Factor Inventory, John & Srivastava, 1999), Dummy 2 = Psychological condition compared to the control condition, Dummy 3 = somatic condition compared to the control condition, Dummy 4 = external condition compared to the control condition.

* $p < .01$.

Analogous regressions were conducted for Neuroticism, NEM and BIS using external attributions as the dependent variable. Neuroticism (Table 5), NEM and BIS

were unrelated to the number of external attributions using the SAQ. NEM and BIS were negatively related to external attributions using the SIQ, $t(4, 213) = -4.481$, $\beta = -.294$, $p<.001$ (NEM), $t(4, 213) = -4.425$, $\beta = -.301$, $p<.001$ (BIS); Neuroticism was unrelated to external attributions using the SIQ, although it followed the same trend.

Table 5

Regressions of Neuroticism and Condition on the Number of External Attributions using the SAQ and the SIQ

Variable	B	ΔR^2	ΔF (df)
External SAQ			
Step 1		.003	.168 (4, 212)
N	.007		
Dummy 2	-.066		
Dummy 3	-.020		
Dummy 4	-.020		
Step 2		.036	2.539 (3, 212)
N	.317		
Dummy 2	-.047		
Dummy 3	-.001		
Dummy 4	.003		
N X Dummy 2	-.180		
N X Dummy 3	-.191		
N X Dummy 4	-.249		
External SIQ			
Step 1		.042	2.317 (4, 213)
N	-.152		
Dummy 2	-.056		
Dummy 3	.102		
Dummy 4	-.028		
Step 2		.028	2.087 (3, 213)
N	-.046		
Dummy 2	-.052		
Dummy 3	.099		
Dummy 4	-.025		
N X Dummy 2	-.055		
N X Dummy 3	-.188		
N X Dummy 4	.037		

Note. N = Neuroticism (Big Five Factor Inventory, John & Srivastava, 1999), Dummy 2 = Psychological condition compared to the control condition, Dummy 3 = somatic condition compared to the control condition, Dummy 4 = external condition compared to the control condition.

* $p < .01$.

The priming conditions and all two-way interactions between Neuroticism, NEM and BIS and external attributions using the SIQ were insignificant. The priming conditions and all two-way interactions between Neuroticism, BIS and external attributions using the SIQ were also insignificant. However, an interaction was found between NEM and condition when predicting external attributions. NEM was negatively related to external attributions in the psychological condition, $t(1, 212) = -2.808$, $\beta = -.484$, $p<0.01$, external condition, $t(1, 212) = -3.654$, $\beta = -.641$, $p<0.01$, and marginally in the somatic condition, $t(1, 212) = -2.463$, $\beta = -.401$, $p=0.015$, when compared to the control group. Although insignificant, this same trend was also observed for Neuroticism and BIS. Surprisingly, Neuroticism, $r = .299$, $p<0.05$, and NEM, $r = .326$, $p<0.05$, were positively related to external attributions in the control group (BIS followed the same trend but the relationship was insignificant, $r = .198$, $p = .151$).

Treatment Seeking

Likelihood of seeking hypothetical treatment was unrelated to Neuroticism, NEM and BIS. Treatment seeking was positively related to psychological, somatic and external attributions using the SAQ. Even though there was no relationship between Neuroticism, NEM and BIS and treatment seeking when collapsed across conditions, separate regressions were conducted to determine if priming condition or the two-way interactions between Neuroticism, NEM and BIS, and condition predicted treatment seeking. The regressions revealed that priming conditions and two-way interactions were unrelated to likelihood of seeking treatment.

Discussion

To summarize the results, overall, Neuroticism, BIS and NEM were related to internal attributions, but only psychological attributions and not somatic attributions. Neuroticism, NEM and BIS were negatively related to external attributions using the SIQ, and unrelated to external attributions using the SAQ. Priming was ineffective overall; presenting a prior example with a psychological, somatic or external explanation for a cause of a symptom did not alter the production of these attributions given for subsequent symptoms, relative to a control condition that contained no such prime. Priming had no differential effect across conditions in changing the tendency of NEM and BIS to be positively associated with psychological explanations and Neuroticism, NEM and BIS to be unrelated to somatic attributions. An interaction was found between Neuroticism and condition when predicting psychological attributions; Neuroticism was negatively related to psychological attributions in the psychological condition, compared to the control conditions. However, it is likely that this finding is anomalous because it was not replicated using the NEM, BIS or the SIQ.

Priming also did not have differential effects across conditions for the relationship between Neuroticism, NEM, and BIS and external attributions using the SIQ and between Neuroticism, BIS and external attributions using the SIQ. An interaction was found between NEM and condition using the SAQ; NEM was negatively associated with external attributions in the psychological, somatic and external conditions, compared to the control group. Approximately the same trend was observed for Neuroticism and BIS, although the findings were insignificant.

Overall, Neuroticism was not associated with treatment seeking. This relationship did not change when participants were primed to attend to psychological, somatic or external attributions. When using the SAQ, treatment seeking was positively associated with psychological, somatic and external attributions (the SIQ did not inquire about treatment seeking).

Neuroticism and Symptom Attributions

Neuroticism was associated with psychological attributions and unrelated to somatic attributions. This finding was especially robust because the same result was found when Neuroticism was replaced with NEM and BIS, and when two different measures of symptom attributions were used. This result is interesting because research about attributions has suggested that when making attributions, individuals consider whether the cause is inside oneself or outside of oneself (Wong and Wiener, 1981). This implies that Neuroticism would be related to both psychological and somatic attributions. Perhaps individuals first decide if the cause is internal or external, and if they believe that it is internal, they will further assess whether the cause is psychological or somatic.

Neuroticism may be associated to psychological but not somatic attributions because past experience may have led individuals high on Neuroticism to notice that the somatic symptoms that they experience are due to higher levels of psychological distress, such as anxiety and depression. This may explain why some past researchers have found that Neuroticism is associated with somatic complaints but not actual health problems, such as cardiac pathology and cancer (see review by Watson & Pennebaker, 1989). The somatic complaints that individuals high on Neuroticism

experience may have been caused by psychological health problems such as depression and anxiety.

The lack of relationship between Neuroticism, NEM and BIS and somatic attributions may have resulted because participants were not actually experiencing symptoms at the time of the experiment. If participants were experiencing actual symptoms (rather than hypothetical symptoms), there may have been a greater relationship between Neuroticism and somatic attributions. The experience of actual, rather than hypothetical symptoms, may increase the tendency for individuals high on Neuroticism to be vigilant about bodily changes and interpret sensations as signs of illness (Costa & McCrae, 1987). It is possible that many of the individuals high on Neuroticism had recently experienced or were experiencing anxiety or depression at the time of the experiment. This may have led these individuals to make more psychological attributions about symptoms because the experience of psychological distress was salient. Future research may include a measure of mood, depression or anxiety when investigating the relationship between Neuroticism and psychological attributions to determine whether participants are experiencing psychological distress at the time of the study.

In addition, the relationships between Neuroticism and psychological attributions may differ depending on whether participants are directed to give either original or subsequent causes of symptoms. An original cause is the most direct cause of the symptom and the subsequent cause is the cause that led to a series of events that caused the symptom. For instance, an individual may attribute 'a runny nose' to stress that led the individual to become worn out and catch a cold

(subsequent cause), or to a cold (subsequent cause). Individuals high on Neuroticism may have made more somatic attributions if they were asked to attend to original causes of symptoms.

The relationship between external attributions and Neuroticism found in the present study is less clear than the relationship between internal attributions and Neuroticism. Neuroticism (and related variables) were negatively related to external attributions using the SIQ, and unrelated to external attributions using the SAQ. Thus, when individuals high on Neuroticism are forced to choose between psychological, somatic and external attributions (i.e., on the SIQ), they make psychological attributions, which implies a negative relationship to external attributions. However, when individuals high on Neuroticism are permitted to endorse more than one cause of symptoms they endorse psychological causes, but this does not lead to the dismissal of external attributions. It appears that psychological attributions are likely the 'ultimate choice' of causes of symptoms, but individuals high on Neuroticism may consider external attributions to be a possible cause of symptoms. This finding is inconsistent with the discounting principle of attributions because it suggests that whenever possible people will make external/normalizing attributions about symptoms (e.g., environmental irritants). This principle implies that there would have been a positive relationship between Neuroticism and external attributions using the SIQ.

The SIQ and the SAQ provide participants with the opportunity to choose or endorse external symptoms. It is unknown whether individuals high on Neuroticism even consider external causes of symptoms when they are not provided to them as a

possible cause in the attribution scales. The inclusion of choices in the SAQ and SIQ may have drawn attention to causes that would have otherwise not been considered. Future research may investigate whether individuals high on Neuroticism generate external attributions when they are not presented with them.

Changing Symptom Attributions

There are a number of different interpretations of the results of this study depending on how 'successful priming' is defined. If 'successful priming' is defined as making more psychological attributions in the psychological condition, more somatic attributions in the somatic condition, and more external attributions in the external condition compared to the control group, then the priming was ineffective.. In this case, it would be concluded that the different relationships between NEM and external attributions in the external, somatic and psychological conditions and NEM and external attributions in the control condition is due to some anomalous and random finding. It would also be concluded that it is unknown whether individuals high on Neuroticism would be less likely to endorse psychological attributions when an effective prime was used to increase attention to external causes of symptoms.

However, if 'successful priming' is defined as making any change in the attributions across conditions, then the priming may have been effective for individuals high on NEM (and somewhat for individuals high on Neuroticism and BIW). NEM was negatively related to external attributions in the external, somatic and psychological conditions, compared to the control group (Neuroticism and BIS followed the same trend). Perhaps individuals high on Neuroticism, NEM and BIS have a strong tendency to make psychological attributions but the tendency to make

external attributions is more malleable. For instance, individuals high on Neuroticism tend to be internally focused (because of the negative moods they experience) and interpret ambiguous stimuli in a negative manner and have likely made psychological attributions for symptoms that they have experienced in the past (Pyszczynski & Greenberg, 1986; Duval & Wicklund, 1973; Rusting, 1999; Byrne & Eysenck, 1993; Phares, 1961). The belief perseverance effect indicates that individuals high on Neuroticism are unlikely to change their attributions about psychological causes because they have already established psychological causes as plausible (Koehler, 1991; MacLeod, Haynes, & Sensky, 1998). In contrast, individuals high on Neuroticism may not usually consider or have a strong belief about external causes of symptoms. Thus, the beliefs that individuals high on Neuroticism have about external attributions may change when provided with any information about the causes of symptoms.

Unexpectedly, there were significant and positive relationships between Neuroticism and NEM and external attributions in the control condition (BIS followed the same trend) using the SAQ. NEM (and somewhat Neuroticism and BIS) may have been negatively related to external attributions in the somatic, external and psychological conditions because it was compared to the positive relationship between NEM and external attributions in the control condition. If NEM had not been positively related to external attributions in the control group, NEM would likely have been unrelated to external attributions in the somatic, external and psychological conditions. It is unknown why NEM, Neuroticism and BIS were positively associated with external attributions in the control condition. Perhaps,

when given no information about the causes of symptoms, individuals high on Neuroticism, NEM and BIS consider external attributions as plausible causes of symptoms. Yet, when given any information about the causes of symptoms, these individuals may think more about what they believe causes symptoms and recognize that it is unlikely for them to make external attributions.

Measuring Symptom Attributions

Although it was not the primary purpose of the study, this study created an opportunity to compare and contrast results obtained using two different measures of attributions. The relationship between attributions and Neuroticism differed depending on how external attributions were measured. Neuroticism was negatively associated with external attributions on the SIQ, which used examples of situational factors. In contrast, Neuroticism was unrelated to external attributions on the SAQ, which gave one example, and used a general statement of external attributions as being in the environment, and not due to the self.

Several reasons exist for these discrepant results. It is possible that, when asked to make a choice (on the SIQ), individuals high on Neuroticism have a tendency to choose psychological over external attributions, resulting in a negative relationship between Neuroticism and external attributions. In addition, the SIQ provides specific examples that Robbins and Kirmayer (1991) believe fir their definition of external attributions and individuals high on Neuroticism may have disagreed with these examples, or felt that they did not apply to them.

In contrast, to the SIQ, the SAQ asks participants to rate the likelihood of attributions that are defined more generally; participants are given only one example

of external attributions at the start, and subsequently they are defined as part of the environment and outside of the self. Moreover, participants subsequently rate the likelihood and do not make a choice, or attributions.

Because the SAQ differed from the SIQ in response format (Likert-type rating vs. forced choice) and use examples (general vs. example based), the differential results obtained with each measure with respect to Neuroticism and external attributions remains uninterpretable. Further research is needed to determine if the results would be similar if, for example, the SIQ was used with a Likert-type rather than a forced-choice format.

Limitations and Future Directions

This research project contained a few limitations. Firstly, participants were only asked about the causes of hypothetical symptoms. It is unknown whether the same results would occur if individuals were actually experiencing the symptoms at the time of the study. This suggestion is somewhat consistent with past research that found that individuals consider themselves less vulnerable to future poor health when they were healthy and in a positive mood; however, when they were healthy and sad they considered themselves more vulnerable to future poor health. Thus is appears that current health status and mood may influence the types of attributions individuals make about symptoms (Salovey & Birnbaum, 1989).

Secondly, the attribution scales asked individuals to say how likely they think that a symptom would be caused by something psychological, somatic or external; however, the attributional measures do not specify how long the participants have experienced the hypothetical symptom. The type of attribution that an individual

makes about the cause of their symptoms may differ depending on whether they have experienced that symptom for a few hours, a few days or a few weeks. This is consistent with illness models that propose that everyday thinking about illness is influenced by ideas about the duration of the illness (Cameron, Leventhal, Leventhal, 1993). Future research may explore whether individuals who score higher on measures of Neuroticism continue to make internal attributions when experiencing symptoms of different durations.

Thirdly, the priming may have been ineffective for a number of reasons. Participants may have found that the priming condition was too overtly related to the symptom attribution measures that followed it. Each participant was required to read an article that mentioned a cause of headaches (either internal or external) and participants were informed that this article was going to be used in a future study and it was unrelated to the present study (i.e. Personality and Symptom Attribution). After reading the article, individuals were asked to begin the Personality and Symptom Attribution study by completing two personality questionnaires and then questionnaires about health (SIQ and SAQ). However, the first item on the SIQ and SAQ asked individuals what they think would be the likely cause of a headache if they were to experience one. Participants may have found the link between the priming article and the attribution questionnaires too overt and decided to ignore the priming article or deliberately decided to choose answers that were inconsistent with the priming article.

The priming articles mentioned causes of only one type of symptom (i.e., headaches). Participants may have already had strong beliefs about what they think

causes headaches and dismissed the priming articles. In order to increase the effectiveness of the prime a bogus symptom could have been used in the priming articles because people would not have had any prior conceptions about the causes of this symptom. In addition, in order to produce a general schema about symptoms being due to a specific type of cause, two priming articles (e.g., one about headaches and one about stomach aches), rather than one priming article, may have been more effective. This is consistent with past research that found that participants were unsuccessful at extracting a principle from one example but were successful when provided with two examples (Gick & Holyoak, 1983).

In addition, the priming article may also have been ineffective because it may have only primed individuals to think about potential cause of headaches (given in the priming articles), rather than symptoms in general. Abramson et al. (1978) suggested that people make the same kinds of attributions for all specific instances of "being late to appointments," or "coming down with a cold", and suggested that health-related events might comprise one attributional category. Perhaps attributional style is even more specific and individuals make the same attributions for specific symptoms such as 'when I have a headache' or 'when I have a dry-throat'. A post-hoc one-way ANOVA was used to ascertain if the priming might be effective when examining only the causes of headaches. Results indicated that there were no significant differences in the number of external or somatic attributions across conditions. The number of psychological attributions did differ across conditions, $F(3, 213) = 2.912$, $p = .035$, although the differences were no longer significant once BIS was entered as a covariate.

Finally, the priming may have been effective, yet the scales that followed the priming conditions may have weakened its effect. The priming was followed by two personality measures (NEM and PEM). This may have led participants to think more about their personality attributes rather than the priming. Individuals higher on NEM may have also been primed to think about their frequent experiences of worry and negative affect, increasing the tendency to make more psychological attributions. Thus, the use of personality measures in between the priming article and the attribution scales may have weakened the effect of the priming conditions.

The Importance of Symptom Attribution Research

The investigation of the relationship between N and symptom attribution is important because it builds on research about attributions, internal focusing and interpretations of ambiguous stimuli. Past research has found that some individuals routinely attribute symptoms to a particular cause (Lundh & Wangby, 2002; Robbins & Kirmayer, 1998). This study points out that the attribution style of individuals could be somewhat due to the cognitions associated with individual differences in Neuroticism. Neuroticism has been found to be associated with negative interpretations of ambiguous stimuli, such as homophones and TAT pictures, and their own health status (Byrne & Eysenck, 1993; Phares, 1961). This finding also appears to generalize to the area of attributions about the causes of symptoms. Individuals high on Neuroticism interpreted hypothetical ambiguous symptoms as due to something that is internally wrong with them, such as psychological distress, which is likely a more negative interpretation, than attributing the cause to something that is wrong in the environment.

Findings from this study also relate to research by Pyszcynski and Greenberg (1986) who found that negative affect is associated with more internal focus and a greater tendency to think of the self as a locus of causality when individuals fail as a task. These researchers suggested that the experience of negative affect led to more internal focus in all negative situations, not just failure tasks. The present study supports this suggestion because it was found that individuals high on Neuroticism (who tend to experience higher levels of negative affect) have a tendency to think of the self as the locus of control when making attributions about the causes of symptoms. Perhaps it is negative mood, rather than the trait of Neuroticism, that is responsible for the decision to attribute symptoms to internal causes. Future research may investigate whether individuals continue to make psychological attributions when in a positive mood.

Finally, the present research builds on attribution research in general. Attribution research has found that when individuals search for the cause of events they ask themselves if the event is something that they caused or whether it was caused by something external. It appears that when individuals high on Neuroticism search for causation they make internal attributions, but they also decipher whether this internal attribution is psychological or somatic. Thus, it appears that at least when making attributions about causes of symptoms, individuals make further decisions about the causes of symptoms once they have established that the cause is internal. This finding also reveals that individuals high on Neuroticism have the ability to distinguish (either correctly or incorrectly) that their symptom caused by something somatic or psychological.

In addition to the theoretical implications of the study of symptom attributions, there also appear to be practical applications. For instance, determining an individual's attribution style may decrease misdiagnoses. When patients present a potential cause of symptoms to a medical practitioner they likely bias the physician in favor of a particular treatment without a proper examination, leading to possible misdiagnoses (Robbins & Kirmayer, 1991). Medical practitioners may benefit from investigating other possible causes of the symptoms and the patients' symptom attributional style when making a diagnosis.

It is less clear whether knowledge of a patient's level of Neuroticism can be helpful to the patient's physician. Costa and McCrae (1987) suggested that the level of Neuroticism might be taken into account when assessing symptoms. They suggested that complaints by neurotic individuals might be discounted and objective evidence could be given more weight, however, they acknowledge that this could lead to an inappropriate disregard of complaints from individuals high in Neuroticism who are actually ill. This suggestion is consistent with research by Ellington and Wiebe (1999) who found medical residents "viewed high-Neuroticism participants as less credible, less in need of medical treatment, and more in need of mental health treatment that low-Neuroticism patients" (p. 634).

In conclusion, the present study is the first to establish a link between Neuroticism (and associated variables of NEM and BIS) and internal attributions for symptoms. When forced to make a choice between Neuroticism and type of attributions, Neuroticism is associated with internal attributions in healthy participants. When a number of choices are possible, Neuroticism is still associated

with internal attributions but also external attributions, in the absence of prior possible causes. Future research will establish whether the results are similar when participants are ill, in a positive mood, when priming for plausible causes is more effective, and when measures of external attributions are refined.

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Appendix A

Participant Consent Form

Response to Symptoms Study: Consent Form

What is a consent form? The purpose of a consent form is to inform you, the participant, as to what you will be required to do in the experiment so that you have enough information to decide whether or not you would like to participate.

What is the purpose of this experiment? and ***What will I be required to do?*** The purpose of this study is to gather information about individual differences and health. This study will require you to answer questionnaires, and read and answer questions about a health-related article. Some questions are quite similar to each other.

Are there any possible risks and/or feelings of discomfort that I might experience during the experiment? There are no known risks involved in this study.

Do I have the right to withdraw from the experiment at any time and omit specific questions, without penalty? You have the right to withdraw from the study at any time, and you may omit specific questions. You will not be penalized for incompletion of the experiment and you will still receive a 1% increase on your final grade.

How long is the experiment? and ***Where will it take place?*** The entire experiment will take approximately one hour. This experiment will take place in A503 Loeb Building of Carleton University on the fifth floor.

Will my responses be anonymous or confidential? The data collected in this experiment are strictly confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project after the completion of the experiment.

Who can I get in contact with if I have questions about the experiment?
The following people are involved in this research project and may be contacted at any time: Dr. M. Gick, Faculty Sponsor, Chair, Department of Psychology, email: mgick@ccs.carleton.ca, phone: 520-2648 or Jennifer Thake, Principal Investigator, email: jenthake@yahoo.com, phone: 520-2600, ext. 3781 or Dr. Tim Pychyl, Graduate Chair, Department of Psychology, email: tim_pychyl@carleton.ca, phone: 520-2600 ext. 1403. Should you have any ethical or other concerns about this study then please contact Dr. J. Mantler, Chair, Carleton University Ethics Committee for Psychological Research, email: janet_mantler@carleton.ca, phone: 520-2600, ext. 4173.

I have read the above form and understand the conditions of my participation. My participation in this study is voluntary, and if for any reason, at any time, I wish to leave the experiment I may do so without having to give an explanation and with no penalty whatsoever. Furthermore, I am also aware that the data gathered in this study

are confidential and anonymous with respect to my personal identity. My signature indicates that I agree to participate in the study.

Participant's Name: _____ Participant's Signature: _____

Researcher Name: _____ Researcher Signature: _____

Date_____

Appendix B

Priming Articles: Control Condition

INTRUCTIONS: Below is an article that is being piloted for use in a future study. Please read the article and answer the questions about the article.

Types of Headaches

The Headache Research Center is a non-profit organization dedicated to educating headache sufferers and health care professionals about headache causes and treatment. A recent study completed by J.D. Sawyer of the Headache Research Center in Vancouver, B.C. found that about 80 percent of people suffer from headaches. This study included 3,098 participants from all over Canada. Although there are many types of headaches, two of the most common are Cluster headaches and Migraine headaches. Cluster headaches produce a dull and steady ache that often feels like pressure in one area of the head rather than a diffuse pain. Migraine headaches produce a throbbing pain that begins on one side of the head near the temple. The study by the Headache Research Centre found that roughly 72 percent of headache sufferers experience cluster headaches and 10 percent of headache sufferers experience migraine headaches.

1) Did you understand the content of the article? (circle one)

YES SOMEWHAT NO

2) How interesting did you find the above article?

1	2	3	4	5	6
Not at all Interesting					Extremely Interesting

3) Please indicate what you think is the main difference between the two types of headaches?

_____

_____

4) What were the results of this study?

_____

_____

Appendix C

Priming Articles: Somatic Condition

INTRUCTIONS: Below is an article that is being piloted for use in a future study. Please read the article and answer the questions about the article.

Headaches: A pain in the Nose?

The Headache Research Center is a non-profit organization dedicated to educating headache sufferers and health care professionals about headache causes and treatment. A recent study completed by J.D. Sawyer of the Headache Research Center in Vancouver, B.C. found that about 80 percent of headaches could be due to sinus infections. This study included 3,098 participants from all over Canada. This study found that 80 percent of the participants who were suffering from headaches also reported sinus pressure, sinus pain and a runny nose.

In the second part of the study, half of the participants were given a cold medication to relieve sinus pressure, sinus pain, and runny nose in order to treat their headaches. The other half of participants were used as a control group and were not given a cold medication. Half an hour after taking the cold medication for their headaches, 72 percent of participants reported relief from their headaches, compared to 10 percent of participants who were not given a cold medication for their headaches.

1) Did you understand the content of the article? (circle one)

YES SOMEWHAT NO

2) How interesting did you find the above article?

1	2	3	4	5	6
Not at all Interesting					Extremely Interesting

3) How are the two groups treated differently?

_____

_____

4) Why did the experimenters require half of the participants to take a cold medication?

_____

_____

Appendix D

Priming Articles: Psychological Condition

INTRUCTIONS: Below is an article that is being piloted for use in a future study. Please read the article and answer the questions about the article.

Headaches: Caused by Emotions?

The Headache Research Center is a non-profit organization dedicated to educating headache sufferers and health care professionals about headache causes and treatment. A recent study completed by J.D. Sawyer of the Headache Research Center in Vancouver, B.C. found that about 80 percent of headaches could be due to experiencing negative emotions. The study included 3,098 participants from all over Canada. This study found that 80 percent of the participants who suffer from headaches report higher rates of anxiety and depression than those who participants who do not suffer from headaches.

In the second part of the study, half of the participants were required to view a humorous television show for a half an hour in order to decrease negative emotions and increase positive emotions. The other half of the participants were used as a control group and did not view the humorous television show. After half an hour, 72 percent of participants that viewed the humorous television show reported relief from their headaches, compared to 10 percent of participants who did not view the humorous television show.

1) Did you understand the content of the article? (circle one)

YES SOMEWHAT NO

2) How interesting did you find the above article?

1	2	3	4	5	6
Not at all Interesting					Extremely Interesting

3) How are the two groups treated differently?

_____

_____

4) Why did the experimenters require half of the participants to watch a humorous television show?

_____

_____

Appendix E

Priming Articles: External Condition

INTRUCTIONS: Below is an article that is being piloted for use in a future study. Please read the article and answer the questions about the article.

Headaches: A result of bad weather?

The Headache Research Center is a non-profit organization dedicated to educating headache sufferers and health care professionals about headache causes and treatment. A recent study completed by J.D. Sawyer of the Headache Research Center in Vancouver, B.C. found that about 80 percent of headaches could be due to weather conditions. The study included 3,098 participants from all over Canada. This study found that 80 percent of the participants who suffer from headaches reported more headaches on days with high humidity and barometric pressure.

In the second part of the study, half of the participants went to a controlled, air-conditioned environment on days with high humidity and barometric pressure. The other half of the participants were used as a control group and were required to stay outside on days with high humidity and barometric pressure. Seventy-two percent of participants who went to the air-conditioned environment reported relief from their headaches, as compared to 10 percent of participants who had to remain outdoors on high humidity days.

1) Did you understand the content of the article? (circle one)

YES SOMEWHAT NO

2) How interesting did you find the above article?

1	2	3	4	5	6
Not at all Interesting					Extremely Interesting

3) How are the two groups treated differently?

_____

_____

4) Why did the experimenters require half of the participants to go into a controlled, air-conditioned environment on days with high humidity and barometric pressure?

_____

_____

Appendix F

Measures

Demographics

Gender: (please check one) Female [ ] Male [ ]

Age: _____

Are you a full-time [ ] or part-time [ ] student? (please check one)

What year of University are you in? (circle one) 1st 2nd 3rd 4th

What is your first language? _____

What is the ethnic/racial group that you most identify with? (e.g., Caucasian, French Canadian, African Canadian): _____

Are you currently employed full-time [ ] part-time [ ] not at all [ ]

Life Orientation Test Revised (LOT-R)

INSTRUCTIONS: Please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

	I agree a lot	**I agree a little**	**I neither agree nor disagree**	**I DISagree a little**	**I DISagree a lot**
1. In uncertain times, I usually expect the best.					
2. It's easy for me to relax.					
3. If something can go wrong for me, it will.					
4. I'm always optimistic about my future.					
5. I enjoy my friends a lot.					
6. It's important for me to keep busy.					
7. I hardly ever expect things to go my way.					
8. I don't get upset too easily.					
9. I rarely count on good things happening to me.					
10. Overall, I expect more good things to happen to me than bad.					

Negative Emotionality Measure (NEM)

INSTRUCTIONS: On this page you will find a series of statements a person might use to describe her/his attitudes, opinions and other characteristics. Read the statement and decide which choice best describes you **most of the time**, and is **typically true for you**. Then indicate your answer to each statement by circling the (T) if that statement is typically true for you, or the (F) if you feel that the statement is not true for you most of the time.

Read each statement carefully but do not spend too much time deciding on the answer.

1. I often find myself worrying about something.	T	F
2. My feelings are hurt rather easily.	T	F
3. Often I get irritated at little annoyances.	T	F
4. I suffer from nervousness.	T	F
5. My mood often goes up and down.	T	F
6. I sometimes feel "just miserable" for no good reason.	T	F
7. Occasionally I experience strong emotions, such as anxiety and anger, without really knowing what causes them.	T	F
8. I am easily startled by things that happen unexpectedly.	T	F
9. I sometimes get myself into a state of tension or turmoil about the day's events.	T	F
10. Minor setbacks sometimes irritate me too much.	T	F
11. I often lose sleep over my worries.	T	F
12. There are days when I am on edge all of the time.	T	F
13. I am too sensitive for my own good.	T	F
14. I sometimes change from happy to sad, or vice versa, without good reason.	T	F

Symptom Attribution Questionnaire (SAQ)

INSTRUCTIONS

Listed below are 13 conditions you may or may not have ever experienced. After each condition, there will be 3 questions to answer regarding that condition. Read each question carefully but do not spend too much time deciding on the answer.

PLEASE SEE EXAMPLE AND READ IT CAREFULLY

Condition: SORE BACK

1) How concerned would you be if you had a sore back?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of this sore back using each of the following 3 scales:

a) **This sore back is due to something related to infection, illness or disease (e.g., flu)**

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) **This sore back is due to something related to my emotions (e.g., feeling tense)**

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) **This sore back is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment (such as, someone collided with me)**

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your sore back (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your sore back, what type(s) of treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your sore back?

1	2	3	4	5	6
Not at all Likely					Extremely

Is this example clear? Please circle one.
YES NO

If the example is not clear, please ask the experimenter to clarify it.

Condition 1: HEADACHE

1) How concerned would you be if you had a headache?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of this headache using each of the following 3 scales:

a) This headache is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) This headaches is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) This headache is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your headache (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your headache, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your headache?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 2: SWEATING A LOT

1) How concerned would you be if you were sweating a lot?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of this sweating using each of the following 3 scales:

a) The sweating is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The sweating is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The sweating is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment because you are sweating a lot (e.g., visiting a general medical practitioner, a counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment because you are sweating a lot, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication because you were sweating a lot?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 3) DIZZINESS

1) How concerned would you be if you were feeling dizzy?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of this dizziness using each of the following 3 scales:

a) The dizziness is due to something related to my infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The dizziness is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The dizziness is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for feeling dizzy (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for feeling dizzy, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for feeling dizzy?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 4) DRY MOUTH

1) How concerned would you be if you had a dry mouth?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of the dry mouth using each of the following 3 scales:

a) The dry mouth is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The dry mouth is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The dry mouth is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your dry mouth (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your dry mouth, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your dry mouth?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 5) POUNDING HEART

1) How concerned would you be if you felt your heart pounding in your chest?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your heart pounding using each of the following 3 scales:

a) The feeling of my heart pounding in my chest is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The feeling of my heart pounding in my chest is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The feeling of my heart pounding in my chest is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your heart pounding in your chest (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your heart pounding in your chest, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your heart pounding in your chest?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 6: FATIGUE

1) How concerned would you be if you felt fatigued?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your fatigue using each the following 3 scales:

a) The fatigue is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The fatigue is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The fatigue is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment if you were fatigued (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your fatigue, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your fatigue?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 7: TREMBLING HAND

1) How concerned would you be if you noticed your hand was trembling?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your trembling hand using each the following 3 scales:

a) The hand trembling is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The hand trembling is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The hand trembling is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your trembling hand (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your trembling hand, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your trembling hand?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 8: TROUBLE SLEEPING

1) How concerned would you be if you had trouble sleeping?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your trouble sleeping using each the following 3 scales:

a) The trouble sleeping is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The trouble sleeping is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The trouble sleeping is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your trouble sleeping (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your trouble sleeping, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your trouble sleeping?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 9: UPSET STOMACH

1) How concerned would you be if you had an upset stomach?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your upset stomach using each the following 3 scales:

a) The upset stomach is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The upset stomach is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The upset stomach is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your upset stomach (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your upset stomach, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your upset stomach?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 10: LOST APPETITE

1) How concerned would you be if you lost your appetite?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your loss of appetite using each the following 3 scales:

a) The loss of appetite is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The loss of appetite is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The loss of appetite is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your lost appetite (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your lost appetite, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your lost appetite?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 11: DIFFICULTY CATCHING YOUR BREATH

1) How concerned would you be if you had difficulty catching your breath?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of difficulty catching your breath using each the following 3 scales:

a) The difficulty catching your breath is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The difficulty catching your breath is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The difficulty catching your breath is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for difficulty catching your breath (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for difficulty catching your breath, what type(s) treatment would you seek? (check one)
____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for difficulty catching your breath?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 12: NUMBNESS OR TINGLING IN YOUR HANDS OR FEET

1) How concerned would you be if you noticed numbness or tingling in your hands or feet?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of the numbness or tingling in your hands or feet using the following 3 scales:

a) The numbness or tingling in my hands or feet is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The numbness or tingling in my hands or feet is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The numbness or tingling in my hands or feet is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for numbness or tingling in your hands or feet (e.g., visiting a general medical practitioner, counselor, or alternative medicine practitioner)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for numbness or tingling in your hands or feet, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for numbness or tingling in your hands or feet?

1	2	3	4	5	6
Not at all Likely					Extremely

Condition 13: CONSTIPATED OR IRREGULAR BOWEL MOVEMENTS

1) How concerned would you be if you were constipated or have irregular bowel movements?

1	2	3	4	5	6
Not at all Concerned					Extremely Concerned

2) Rate the cause of your constipation or irregular bowel movements using the following 3 scales:

a) The constipation or irregular bowel movements is due to something related to infection, illness or disease

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

b) The constipation or irregular bowel movements is due to something related to my emotions

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

c) The constipation or irregular bowel movements is NOT caused by my emotions, infection, disease, or illness, and is instead due to something related to the environment

1	2	3	4	5	6
Strongly Disagree					Strongly Agree

3) How likely is it that you would seek treatment for your constipation or irregular bowel movements (e.g., visiting a general medical practitioner, counselor, or alternative medicine)?

1	2	3	4	5	6
Not at all Likely					Extremely Likely

4) If you believe that you might seek treatment for your constipation or irregular bowel movements, what type(s) treatment would you seek? (check one)

____ general medical practitioner
____ counselor, psychologist or psychiatrist
____ alternative medicine (e.g., massage, acupuncture, chiropractor)
____ other, please specify _____

5) How likely would it be for you to take over-the-counter medication for your constipation or irregular bowel movements?

1	2	3	4	5	6
Not at all Likely					Extremely

Symptom Interpretation Questionnaire (SIQ)

INSTRUCTIONS

Listed below are conditions you may or may not have ever experienced. For each condition, please put one check mark before the reason that you think would be the most likely cause of your condition.

An example is given immediately below.

EXAMPLE:

*If I have a **skin rash**, I would probably think it is because (check one):*

___ I have been under stress
___ I have a fever
___ I fell off my bicycle earlier and scraped my skin without noticing

(Putting the X besides the fever choice indicates that you think a fever is the most likely cause of your rash.)

1. *If I had a **prolonged headache**, I would probably think that it is because (check one):*

___ I am emotionally upset
___ There is something wrong with my muscles, nerves or brain
___ A loud noise, bright light or something else has irritated me

2. *If I was **sweating a lot**, I would probably think that it is because (check one):*

___ I must have a fever or infection
___ I'm anxious or nervous
___ The room is too warm, I'm overdressed or working too hard

3. If I **go dizzy all of a sudden**, I would probably think it is because (check one):

___ There is something wrong with my heart or blood pressure
___ I am not eating enough or I got up too quickly
___ I must be under a lot of stress

4. *If I **noticed my mouth was dry**, I would probably think that it is because (check one):*

___ I must be scared or anxious about something
___ I need to drink more liquids
___ There is something wrong with my salivary glands

5. *If I **felt my heart pounding in my chest**, I would probably think that it is because (check one):*

___ I've exerted myself or drunk a lot of coffee
___ I must be really excited or afraid
___ There must be something wrong with my heart

6. *If I **felt fatigued**, I would probably think that it is because (check one):*

___ I'm emotionally exhausted or discouraged
___ I've been over-exerting myself or not exercising enough
___ I'm anemic or my blood is weak

7. *If I **noticed my hand trembling**, I would probably think that it is because (check one)*

___ I might have some sort of neurological problem
___ I'm very nervous
___ I've tired the muscle in my hand

8. *If I **had trouble sleeping**, I would probably think that it is because (check one):*

___ Some kind of pain or physical discomfort is keeping me awake
___ I'm not tired or I had too much coffee
___ I'm worrying too much or I must be nervous about something

9. *If my **stomach was upset**, I would probably think that it is because (check one):*

___ I've worried myself sick
___ I have the flu or stomach irritation
___ I've had something to eat that did not agree with me

10. *If I **lost my appetite**, I would probably think that it is because (check one):*

___ I've been eating too much or my body doesn't need as much food as before
___ I'm worrying so much that food just doesn't taste good anymore
___ I have stomach or intestinal problems

11. *If I **had a hard time catching my breath**, I would probably think that it is because (check one):*

___ My lungs are congested from infection, irritation or heart trouble
___ The room is stuffy or there is too much pollution in the air
___ I'm over-exited or anxious

12. *If I **noticed numbness or tingling in my hands or feet**, I would probably think that it is because (check one):*

___ I'm under emotional stress
___ There is something wrong with my nerves or blood circulation
___ I am cold or my hand or foot went to sleep

13. If I was ***constipated or irregular****, I would probably think that it is because (check one):*

___ There is not enough fruit or fiber in my diet
___ Nervous tension is keeping me from being regular
___ There is something wrong with my bowels or intestines

BIS/BAS Scale

INSTRUCTIONS: Each item of this questionnaire is a statement that a person may either agree with or disagree with. Please indicate how much you agree or disagree with what the item says. Choose only one response to each statement. Please be as accurate and honest as you can. Respond to the items as if they were the only item. That is, don't worry about being 'consistent' in your responses. Choose from the following four response options:

1	2	3	4
very true for me	somewhat true	somewhat false	very false for me

1. ____ A person's family is the most important thing in life.
2. ____ Even if something bad is about to happen, I rarely experience fear or nervousness.
3. ____ I go out of my way to get things I want.
4. ____ When I'm doing well at something I love to keep at it.
5. ____ I'm always willing to try something new if I think it will be fun.
6. ____ How I dress is important to me.
7. ____ When I get something I want, I feel excited and energized.
8. ____ Criticism or scolding hurts me quite a bit.
9. ____ When I want something I usually go all-out to get it.
10. ____ I will often do things for no other reason than that they might be fun.
11. ____ It's hard for me to find the time to do things such as get a haircut.
12. ____ If I see a chance to get something I want I move on it right away.
13. ____ I feel pretty worried or upset when I think or know someone is angry with me.
14. ____ When I see an opportunity for something I like I get excited right away.
15. ____ I often act on the spur of the moment.
16. ____ If I think something unpleasant is going to happen I usually get pretty 'worked up'.
17. ____ I often wonder why people act the way they do.
18. ____ When good things happen to me it affects me strongly.
19. ____ I feel worried when I think I have done poorly at something important.
20. ____ I crave excitement and new sensations.
21. ____ When I go after something I use a 'no-holds-barred' approach.
22. ____ I have very few fears compared to my friends.
23. ____ It would excite me to win a contest.
24. ____ I worry about making mistakes.

Big Five Factor Inventory (BFFI)

INSTRUCTIONS: For each of the 44 characteristics listed below, rate how descriptive each characteristic is of you using the scale from 1 to 5 as shown below:

1	2	3	4	5
Disagree strongly	**Disagree a little**	**Neither agree or disagree**	**Agree a little**	**Agree strongly**

I see myself as someone who...

____ Is talkative

____ Tends to find fault with others

____ Does a thorough job

____ Is depressed, blue

____ Is original, comes up with new ideas

____ Is reserved

____ Is helpful and unselfish with others

____ Can be somewhat careless

____ Is relaxed, handles stress well

____ Is curious about many different things

____ Is full of energy

____ Starts quarrels with others

____ Is a reliable worker

____ Can be tense

____ Is ingenious, a deep thinker

____ Is emotionally stable, not easily upset

____ Is inventive

____ Has an assertive personality

____ Can be cold and aloof

____ Perseveres until the task is finished

____ Can be moody

____ Values artistic, aesthetic experiences

____ Is sometimes shy, inhibited

____ Is considerate and kind to almost everyone

____ Does things efficiently

____ Remains calm in tense situations

____ Prefers work that is routine

____ Is outgoing, sociable

____ Is sometimes rude to others

____ Makes plans and follows through with them

____ Generates a lot of enthusiasm

____ Has a forgiving nature

____ Tends to be disorganized

____ Worries a lot

____ Has an active imagination

____ Tends to be quiet

____ Is generally trusting

____ Gets nervous easily

____ Likes to reflect, play with ideas

____ Has few artistic interests

____ Likes to cooperate with others

____ Is easily distracted

____ Is sophisticated in art, music, or literature

____ Tends to be lazy

Appendix G

Participant Debriefing

Response to Symptoms Study: Debriefing Sheet

Was there deception involved in this study?
Yes. We told you at the beginning of the experiment that the purpose of the health-related article about headaches was to pilot test it for use in a future study. However, the health-related article that you read was fabricated by the experimenters (i.e., there is no Headache Research Center, and the statistics are fabricated). The article was actually used to help you think about possible causes of symptoms before completing the rest of the questionnaires. The answers that you gave about the health-related article are not for use in a future study but were to help you think about the article. This deception was necessary so that you would not be aware of the real purpose of our study. In addition, if you were aware of the real purpose it may have prevented you from giving us unbiased responses.
According to APA (American Psychological Association) guidelines it is required that when deception is used, researchers must explicitly offer participants the opportunity to withdraw their data from the study. Therefore, you have the right to withdraw your data from our study if you wish. You will not be penalized if you decide to withdraw your data at this time and you will still receive the necessary percentage increase on your final grade. However, please remember the data collected in this experiment are strictly confidential. All data are coded such that your name is not associated with the data. In addition, the coded data are made available only to the researchers associated with this project.

What are we trying to learn in this research?
The purpose of the article was to help you think about the causes of symptoms. The researchers propose that the fabricated article that you read about headaches, as well as any individual differences in personality, such as emotionality or extraversion, might influence the way that you respond to symptoms.

Why is this important for scientists or the general public?
The findings from this study are expected to contribute to health psychology's general knowledge about how people respond to the experience of uncomfortable symptoms.

What are our hypotheses and predictions?
We predict that people scoring high on measures of emotionality might have a greater tendency to think that symptoms are caused by illness or psychological distress. We also predict that reading the fabricated article may influence what you think causes symptoms.

Is there anything I can do if I found this experiment to be emotionally upsetting or if I am worried about my health?
Yes. Please feel free to contact the Carleton University Health and Counseling Services at 520-6674, or the Distress Centre of Ottawa and Region at 238-3311.

Where can I learn more?
You may want to look at the following article about causal attributions of symptoms: Robbins, J.M., & Kirmayer, L.J. (1991). Attributions of common somatic symptoms. Psychological Medicine, 21, 1029-1045.

What if I have questions later?
If you have any remaining concerns, questions, or comments about the experiment please feel free to email Jennifer Thake at jenthake@yahoo.com or talk to Dr. M. Gick, Faculty Sponsor, Chair, Department of Psychology, email: mgick@ccs.carleton.ca, phone: 520-2648 or Dr. Tim Pychyl, Graduate Chair, Department of Psychology, email: tim_pychyl@carleton.ca, phone: 520-2600 ext. 1403. If you have any ethical concerns you can also discuss them with Dr. J. Mantler, Chair, Carleton University Ethics Committee for Psychological Research, email: janet_mantler@carleton.ca, phone: 520-2600 x 4173 .