

INTRODUCTION

Overview

People function so as to confirm existing beliefs that are consistent with one's self-concept. Mediated through a number of specific motives (Kowalski & Westen, 2005), the self-concept is a schema that includes cognitive generalizations which guide the way in which information pertinent to one's self is processed and perceived (Markus, 1977). The desire to confirm one's self-conceptions is referred to by Swann (1983) as the theory of "self-verification" and states that in order to support one's perceptions of a situation, including its predictability and controllability, a person will strive to confirm their own self-conceptions even in the event in which they are false (Heider, 1958; Kelly, 1955; Lecky, 1945, Rodin & Voshart, 1986). Swann and Read (1981) found that social interactions act as opportunities for people to verify their self conceptions and that more social feedback is desired when individuals suppose it will serve the purpose of confirming their self-conceptions. People self-verify their beliefs in accordance with their positive or negative self-views (Pinel & Swann, 2000) resulting in a preference for negative feedback among those with negative self-views (Swann *et al.* 1992). Thus, the desire for self-verification in individuals with negative self-views is stronger than the desire for positive evaluations (Swann, 1997).

However, continually seeking out negative evaluations can have harmful consequences to the individual. Self-verification is considered particularly problematic in the onset and maintenance of psychiatric disorders such as depression (Giesler & Swann, 1999). In a study by Swan, Wenzlaff and Tafarodi (1992) involving depression and self-verification, it was found that individuals sought to confirm their self-beliefs,

even if those beliefs were negative. Individuals with negative self-views had a preference for being evaluated less favorably than those with positive self-views, despite the fact that they were equally disturbed by negative feedback as those with positive self-views (Swan, *et al.*, 1992). Joiner (1995) confirmed that an increasing vulnerability and a heightened risk of depressive symptoms are associated with those seeking and receiving negative feedback. In addition to being related to peer rejection, negative feedback is strongly associated with cognitive aspects of depression (Joiner, Katz & Lew, 1997). Continually looking for and verifying negative feedback has been proposed to sustain one's self-concept, resulting in a feedback loop of self-confirming, yet damaging beliefs that may perpetuate the length of depression (Andrews, 1989). Similarly, self-verification (Swann, 1983) represents one mechanism for those with varying health beliefs to selectively attend to certain illness-related information.

Festinger (1957) offered one possibility that would speak to the reason for which individuals seek to self-verify. His concept of cognitive dissonance proposes that people seek to match their beliefs with their actions (Festinger, 1962). Subsequent beliefs and behaviors (or new pieces of information) may be perceived as disagreeing with one another, leading to psychological tension that may motivate the person to either change their beliefs or their behaviors (Kowalski & Westen, 2005). The presence of dissonance, described as non-fitting cognitive relationships, results in efforts to reduce it as well as the avoidance of both interactions and information that could produce increased dissonance (Festinger, 1962). The theory of cognitive dissonance (Festinger, 1957) holds that the amount of psychological tension or dissonance that is present after an action has been completed is directly proportional to how many elements are believed to be

inconsistent with the chosen behavior. According to Festinger (1962), the more conflict that results when an individual makes their decision, the more he or she will attempt to justify their decision after the fact. In reference to how much dissonance is actually elicited and the extent to which the person feels the need to overcome it is dependent on both the perception of choice and the size of the rewards and punishments (Kowalski & Westen, 2005). Cognitive dissonance can thus be viewed as a motivating, preceding condition which facilitates desires to reduce psychological anxiety that is caused by discrepant beliefs and actions (Festinger, 1962).

Hypochondriasis

The willingness to accept the presence of a health problem falls along a broad continuum. Health beliefs range from the repeated dismissal of obvious signs of illness to preoccupation with an illness that does not exist; both of which can reach pathological proportions. The various ways in which one might respond to a health threat are dependent on the person's readiness to accept the presence of an illness as well as the extent to which a person perceives the health threat is probable or salient. Those with somatoform disorders such as clinical and sub-clinical manifestations of hypochondriasis are prone to adopt relatively irrational health-related concerns. Speckens (2001) describes hypochondriasis as a "false belief in illness". Defined as a preoccupation with illness due to the misinterpretation of bodily symptoms (Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, 1994), hypochondriasis is a psychiatric disorder characterized in large part by a readiness to accept the presence of a health problem. Diagnostic criteria for clinical hypochondriasis require that one experiences at least six months of fears of having or the idea that one has a serious

disease based on the person's misinterpretation of bodily symptoms. Hypochondriasis causes clinically significant distress, persists despite medical reassurance and is not due to a general medical condition or other mental disorder (Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, 1994).

Health preoccupation may involve perceived symptoms in a number of areas including bodily functions, minor physical abnormalities or physical sensations that are not easily identified (Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, 1994). However, when examined by a medical health professional, these individuals are found to be without any general health condition that would justify their somatosensory experiences. Coined by Barsky and Klerman (1983), somatic amplification is a term referring to the experience of intense, noxious, and disturbing bodily sensations resulting from sensory, perceptual or cognitive distortions. According to Barsky (2001), the hypochondriacal patient's amplification of bodily symptoms is most closely associated with their tendency to perceive an exaggerated risk of disease and illness. Among the illnesses and diseases that they feel most susceptible include arthritis, ulcers, insomnia and diabetes (Barsky, 2001). Hypochondriasis is also associated with the occurrence of other psychiatric disorders, mainly Axis I disorders affecting mood and anxiety (Barsky, Wyshak, & Klerman, 1992) as well as psychological distress, help seeking and impaired functioning (Barsky et al., 1990; Guereje et al., 1997; Looper & Kirmayer, 2001). Although 50 percent of people experiencing high hypochondriacal fears can be initially alleviated by primary care reassurance, hypochondriasis is generally considered a chronic condition (Barsky, Wyshak & Klerman, 1990). Thus, those who persist with their health concerns despite medical

reassurance represent a distinct population when compared to those whose health concerns are present, but more easily resolved.

Hypochondriacal Costs and Maintenance

Hypochondriasis can be costly, both to the health care system and the individual. Within the medical outpatient population, it is estimated that the prevalence of hypochondriasis falls between 4 and 6 percent (Barksy, Wyshak, Klerman, & Latham, 1990). Repeated attempts to confirm suspicions of illness via health care professionals causes considerable strain on health care resources, and the global effects on the health care system in general are highly problematic and a cause for concern. Indeed, upwards of 50% of adult ambulatory costs are attributable to cases of hypochondriasis (Collyer, 1979), and hypochondriacal individuals are responsible for a large portion of medical health care costs (Monson & Smith, 1983; Wagner & Curran, 1984). In addition, individuals with hypochondriasis suffer from a variety of consequences resulting from their condition including psychological distress, help seeking and impaired functioning (Barsky et al. 1990). Their medical complaints often result in hospitalization, elaborate diagnostic workups, appendectomies and cholecystectomies for suspected adhesions or pinched nerves, and develop into long histories of numerous unnecessary surgeries (Ford, Kayton & Lipkin, 1993). Symptomatic or inappropriate treatments can cause serious complications and side effects, as well as the possibility of death (Howes, 1998).

According to Escobar, Gara, Waitzkin, Silver, Holman and Compton (1998), hypochondriacal patients are also more impaired in their physical functioning than patients without the disorder. For example, their risk of having moderate to severe occupational disability is at least twice as likely as the risk for non-hypochondriacal

individuals (Gureje, Ustun, & Simon, 1997). Their impairment on standard physical functioning scales is equal or greater to those with chronic debilitating conditions and when compared to most patients with major medical health problems, hypochondriacal people spend two to three times more time resorting to bed rest (Barsky, Fama, Bailey, & Ahern, 1998; Smith, Rost, & Kashner, 1995).

Both cognitive and perceptual distortions are also indicated in the development and maintenance of clinical hypochondriasis. Health preoccupation may involve perceived symptoms in a number of areas including bodily functions, minor physical abnormalities or physical sensations that are not easily identified (Diagnostic and Statistical Manual of Mental Disorders, American Psychiatric Association, 1994). However, when examined by a medical health professional, these individuals are found to be without any general health condition that would justify their somatosensory experiences.

Hypochondriacal and Normative Responses to Health Threats

The variability in health concern is reflected in the dramatic differences between clinical and non clinical populations with regard to their readiness to accept a diagnosis. Those with clinical hypochondriasis experience the most extensive worry, concern and fear of having an illness (Hersen & Turner, 2003). Sub-clinical hypochondriacs are already inclined to believe that they have a health problem, they report symptoms associated with their health concerns, and actively engage in “doctor shopping” (Lecci & Cohen, 2002). Thus, those with hypochondriasis seek out illness (presumably confirming) information, especially if illness concerns have been activated (Barsky, et al., 2001). In contrast, Weinstein (1980) found that those without hypochondriasis consider

themselves to be healthy; they initially deny the presence of a health problem and are reluctant to seek medical attention that may confirm the presence of a physical health problem. People who are low in hypochondriasis prefer to disconfirm the possibility of illness, and pay less attention to illness confirming information. However, both non clinical and sub clinical populations subscribe to the general belief that one is at less risk than someone else to experience a negative event, a concept referred to as unrealistic optimism (Weinstein, 1980).

Importantly, unrealistic optimism and self-confirming biases are the same for non hypochondriacal people in that they believe that they are less likely than others to have illness and therefore look to disconfirm evidence of illness to confirm the belief that they are healthy. However, the two biases are not the same in the case of hypochondriacal individuals because although they believe they are less likely than others to have an illness, they nonetheless look for evidence of illness to confirm the belief that they are unwell (Warwick & Salkovskis, 1989). In accordance with the literature on unrealistic optimism, Barsky, Ahern, Bailey, Saintfort, Liu and Peekna (2001) have found that most people - including those with hypochondriacal tendencies - underestimate their risk of illness as compared to others of the same sex and age. Those with hypochondriasis tend not to differ from the normal population with regard to their worry of other threats such as accidents or criminal victimization, but feel more susceptible to illness because of the amplification of benign bodily sensations (Barsky, et al. 2001). They overestimate their own susceptibility to illness as well as that of others (Barsky, et al. 2001).

Although unrealistic optimism with regard to health threats occurs in clinical and non clinical populations, it can yield very different results. When presented with the

same information about an event, people's cognitive and perceptual interpretations of that information often vary. In fact, it was found that exposure to evidence that differs from one's own beliefs is generally avoided (McGuire, 1961). For example, as opposed to those with normative health beliefs, hypochondriacal individuals repeatedly seek out multiple doctors to confirm what they perceive is a serious health problem. Through "selective attention" (Broadbent, 1958; Triesman, 1960), defined by Lecci and Cohen (2002) as a pattern of processing perceptual stimuli that may distort reality, they will seek out information that confirms their illness beliefs, especially in the case where their concerns have been activated (Barsky, et al., 2001).

Situational Interpretations

The readiness with which one accepts the possibility of having health threatening conditions is affected by the situation (Lecci & Cohen, 2002; Broadbent, 1958; Triesman, 1960). According to Weinstein (1980), unrealistic optimism influences the way one perceives an event and each event has certain characteristics upon which realistic optimism is dependent. Research suggests that individuals believe themselves to be less likely than others to experience negative as opposed to positive events, and are particularly skeptical about events occurring that are of low probability (Weinstein, 1980). Likewise, people inaccurately perceive themselves as invulnerable to event information perceived as being controllable (such as health hazards). They fail to acknowledge that their actions are responsible for determining negative outcomes and view their psychological attributes as reducing their illness vulnerability (Weinstein, 1984).

Differential interpretations of event characteristics between hypochondriacal and non-hypochondriacal individuals are best explained by differing motivations for an individual's reasoning that affect any or all stages of "hypothesis testing" (Kunda 1990). Like people with normative health beliefs, hypochondriacal individuals are motivated to arrive at directional conclusions in order to confirm their pre-existing beliefs (Kunda, 1990; Pyszczynski, Holt, & Greenberg, 1987). Directional conclusions affect reasoning (memory listing, reaction time and rule use) by affecting what information will be considered (Kunda, 1990). For example, one way in which directional conclusions affect reasoning is by influencing an individuals' tendency to over rationalize and construct their own beliefs. The construction of beliefs is a process which is largely outside of the individual's awareness (Pyszczynski, Holt, & Greenberg, 1987). For example, Weinstein (1980) found that those with normative health beliefs view negative events as less likely to happen to them when they are undesirable. In contrast, a person with hypochondriasis may view a negative, undesirable event as more likely to occur as a result of their motivated reasoning to maintain their self-beliefs. Whereas a high probability event may be seen as more likely to happen by a non-hypochondriacal person, the hypochondriacal individual sees it as more likely to happen to them (Weinstein, 1980). Clearly, such beliefs go against logical reasoning and suggest that the cognitive mechanisms being utilized are not intended to reach accurate conclusions, but directional ones that concur with an alternate set of underlying perceptions and beliefs.

Warwick and Salkovskis (1989) maintain that in the case of a hypochondriacal individual, disconfirmation of evidence suggesting that one is ill is actually perceived as a negative event. Dissonance theory (Kunda, 1990) predicts that in the event that health

concerns are not validated, a patient continues to struggle with the tensions between two inconsistent beliefs (i.e., they are both sick and well). When left unresolved, such a situation usually results in increased anxiety and rumination and thus repeated reassurance of satisfactory health may contribute to the maintenance of the disorder as well as resulting in increased self checking behaviors to reconfirm their initial health convictions (Warwick & Salkovskis, 1989).

Awareness of Health-Based Biases

Despite the fact that a limited amount of research addresses the issue of how aware one is of his or her self-confirming biases in regard to perceptions of health-related information, past literature would suggest that people are not aware of their own general biases and that behavior aimed at achieving directional goals is due to largely unconscious processes. A person pursuing a directional goal modifies and interprets information to arrive at a desired outcome which appears rationally thought out. Because this process is intended to protect a person's self concept by confirming their self-beliefs, it would not be effective if people were aware that they were engaging in such behavior. Thus, it is likely that this process is an unconscious one. Hypochondriacal individuals who are motivated to self-confirm the presence of a suspected illness are most likely not consciously aware of their own bias to choose information that supports their directional goals; in this case, to self confirm their beliefs of illness. It might be reasonable to suggest that one with hypochondriacal tendencies should apply the same unconscious processes by disregarding information that disagrees with their directional goals because it fails to confirm what the individual believes is true. Individuals not evidencing hypochondriacal tendencies should act similarly because they are motivated to self-

confirm the belief that they are healthy. As a result, they too would remain unaware of their directional goals and would be biased to ignore information that suggests the presence of an illness.

In general, the unconscious (implicit) processing of perceivable yet nonessential information functions as an adaptive mechanism in that it conserves the amount of space allotted for information that must be processed simultaneously (Bargh & Chartrand, 1999). Instead, situational factors outside of conscious awareness account for much of an individual's experiences. Each individual possesses goals that can be activated unconsciously without a person being aware of their motives for behaving in a certain way to meet those goals (Bargh & Chartrand, 1999). Experiments by Bargh and Chartrand (2001) demonstrate that primed information-processing goals as well as goals that have been activated by a conscious act of will result in the same outcomes. Regardless as to the level of awareness associated with a goal, once activated, that person's behavior will function so as to carry out his or her goals effectively (Bargh & Chartrand, 2001). Thus, behaviors, decisions, and judgments rely on how available information relates to that individual's goals (Bargh & Chartrand, 2001).

Goal-directed, unconscious behavior can become either automatic, implicit, or both. Behavior becomes automatic as it develops over time from consistent and repeated exposure to phenomena due to either a person's intentions to attain a goal, or past tendencies to respond similarly when in certain situations (Bargh & Chartrand, 1999). For a process to be considered automatic it must not occur with intention, conscious awareness, and it should not interfere with other mental activities (Posner, 1978; Spielman, Pratto & Bargh, 1988). Implicit behaviors and goals are those which are

implied or understood though not directly expressed. Aside from occurring automatically, after time individuals may remain unaware of the fact that their behavior is directed at achieving a certain goal and thus, unintentional behavior is said to be implicit (Neisser, 1967; Posner & Snyder, 1975; Triesman, 1960 cited in Bargh & Chartrand, 1999). However, goal-directed behavior can occur unconsciously in that it is both automatic and implicit. The more automatic a behavior becomes, the more implicit it may seem and vice-versa. Yet, it is not necessary for automatic goal-directed behavior to be implicit, nor is it necessary for implicit behavior to occur automatically. Whether automatic, implicit, or both, Bargh and Chartrand (1999) point out that experiences that occur unconsciously are not remembered as being non-consciously processed.

The automaticity of hypochondriacal goal-directed behavior may gradually increase over time and therefore may not be as pronounced in younger (e.g., college-aged) samples. In a study by Karoly and Lecci (1993), college-aged females with hypochondriasis were found to have a relatively larger amount of illness-related goals when compared to their non-hypochondriacal peers, and viewed those illness-related goals as being more important. An overemphasis on attaining illness-related goals might be expected to limit how much time could be spent on other non-health related goals. However, despite the amount of time spent in pursuit of health-related goals, this did not prevent the hypochondriacal students from pursuing non-health related goals (Karoly & Lecci, 1993). One explanation for this might be that the relatively young hypochondriacs' behavior had not yet "developed" enough so as to disrupt the functioning of non-health pursuits. The conclusion was that given more time and indulgence in health-focused goals, unconscious behaviors might become increasingly

automatic for hypochondriacs and result in more potentially harmful deficits in psychosocial functioning (Karoly & Lecci, 1993). In a subsequent study, Lecci, Karoly, Ruehlman and Lanyon (1996) did in fact find evidence for a developmental trend, suggesting that older (inveterate) hypochondriacs have an even greater number of health-related goals, and these goals are perceived as more central to their cognitive functioning.

The Present Study

Although much is known about the ways in which individuals evidencing hypochondriacal tendencies ultimately react to information suggesting their illness fears are unsubstantiated, research has not yet addressed the question of what kind of health feedback those with varying degrees of hypochondriasis prefer to receive. The theory of self-verification presents a strong motive for hypochondriacal and non-hypochondriacal individuals to selectively attend to illness confirming and illness disconfirming information, respectively. Likewise, dissonance theory might predict that individuals in this situation would experience stress when their health beliefs are not confirmed. Moreover, individuals experiencing a health threat would be most likely to arrive at directional conclusions about their health by attending to proportionately more information that confirms their initial health-related beliefs (i.e., an impending health threat should initially strengthen existing beliefs). The present study will investigate the role of illness fear activation in affecting the attentional biases of individuals evidencing varying degrees of hypochondriacal tendencies by examining a controlled situation in which mock patients interact with a mock doctor and have the opportunity to select either illness confirming or illness disconfirming information.

Hypotheses

First, it was hypothesized that the greater the hypochondriacal tendencies the more the individual would select illness confirming information relative to illness disconfirming information. The second hypothesis was that there would be an interaction between hypochondriacal tendencies and the experimental induction of illness fears such that if illness fears are activated, those with higher hypochondriacal tendencies would show a greater effect for selecting illness confirming information relative to those with lower hypochondriacal tendencies and would be more concerned about illness confirming information relative to illness disconfirming information as compared to those with lower hypochondriacal tendencies. This hypothesis was based on past research suggesting that activating illness concerns (i.e., an illness induction) heightens hypochondriacal fears (see Lecci & Cohen, 2002). Importantly, hypochondriacal tendencies will here be theoretically considered and assessed as a continuous variable, with the assumption that higher scores more accurately reflect the functioning of sub-clinical hypochondriacs and lower scores more accurately reflect the functioning of normative health beliefs (see Lecci, 2004).

METHOD

Participants

The participants in this study consisted of 199 participants from Introduction to Psychology classes, including 147 females and 52 males aged 18 to 37 years of age. A total of 29 participants' data was removed from the study. One subject opted not to complete the study, while another was found to have a suspicious pattern of responding

on the hypochondriasis measures indicating invalid data. Seven participants were eliminated because they lacked any variability in their believability ratings and an additional 20 participants were taken out because of malfunctions in the computer program that may have affected the believability of the procedure. Three participants also had missing data on at least one of the variables of interest. The resulting number of participants was 167, including 103 females and 44 males. Of the original sample, all subjects were assigned to either the control (N = 101) or experimental (N = 98) condition and received 1 hour of course credit for their participation in the experiment.

Measures

Whitely Index

The Whitely Index (WI) was used to assess hypochondriasis, and includes the constructs of disease fear, disease conviction, and bodily preoccupation (see Appendix G). This scale consists of two subscales, including the Illness Conviction and the Illness Worrying scale (Fink, Edwald, Jensen *et. al.*, 1997). The full test has a test-retest figure of .81 over a 28-week period (Pilowsky, 1967) and the intrascale consistency of the 13-item WI varies between .84 and .95 (Barsky, Wyshak, 1989; *et al.*, 1990c, 1992b, 1998).

SAMPI

Participants were also given the SAMPI, a self-report index of measuring sensitivity perception to physical sensations. This 5- item likert scale measures individual differences in hypochondriacal tendencies has been shown to have a reliability of .85 over 28-day interval (Barsky *et al.*, 1990), e.g. “I am often aware of various things happening within my body.” The SAMPI and Whitely have a typical correlation of 0.56 (Barsky and Wyshak, 1990). This scale will be the preferred assessment of

hypochondriacal tendencies for two reasons. First, it more accurately detects subtle manifestations of hypochondriasis due to the fact that the items have lower face validity. A second reason is that past research (Lecci & Cohen, 2002, in press) has shown the SAMPI to be more sensitive than the Whitely in detecting variability in hypochondriacal tendencies most associated with subtle affects that are attributed to attention.

Speilburger's State Anxiety Scale

In order to control for individual differences in state anxiety, participants were administered Speilburger's State Anxiety Scale (STAI), a 20-item self report questionnaire measuring state as opposed to trait anxiety and rating current anxiety on a likert scale ranging from 1 to 4 (Spielberger, Gorsuch, & Lushene, 1970).

Procedure

Participants were assigned to either an illness protective condition or an illness fear induction condition. All individuals participated in a computer-based program after being randomly assigned to one of two conditions involving testing for an enzyme called PKR. Participants were told that the first part of the study involved a brief health exam including blood pressure and heart rate measurements as well as an enzyme testing that was being done in order to assess the overall risk of contracting meningitis on the UNCW campus. The enzyme testing procedure closely mimicked the procedure employed in a study by Croyle and Ditto (1990) in which glucose-sensitive paper was used in place of enzyme test paper. Similar to the Croyle and Ditto (1990) study, participants were informed in a brief article that the enzyme PKR was related to meningitis susceptibility and could be detected in a person's saliva by chemically coated testing paper. Written instructions were given to participants by experimenters wearing white lab coats and

stethoscopes concerning how to self-administer the enzyme test. First, participants were instructed to rinse with a cup of mouthwash and spit it back into the cup. Second, they were asked to spit into another small cup before placing the chemically coated enzyme test into the saliva. Because participants were instructed to first rinse with mouth wash in which glucose had been added before self-administering the enzyme test, the results of the test were the same for each individual – the glucose sensitive paper turned blue-green. Regardless of the participant's condition, the blue-green color indicated the presence of the enzyme. Interpretation of these results varied as a function of the participant's assigned condition.

All documents given to participants explaining the procedure contained the same introductory information with the exception of the interpretation of the results.

Participants in the illness fear induction condition were told that the enzyme PKR destroys large white blood cells that protect the body against pathogens responsible for meningitis, and in turn, increases their susceptibility to this illness. Therefore, the presence of the enzyme indicated by the blue-green test paper results indicated that they are more susceptible to meningitis than others who do not have the enzyme present in their body. This was expected to result in illness fear activation for this condition. The same section of information regarding the interpretation of the enzyme paper results differed slightly for those who were assigned to the illness protective condition. In the illness protective condition, the presence of the enzyme was a positive outcome of the test because the information they were given described the enzyme's presence as a preventative factor for meningitis, thus decreasing their susceptibility compared to others. These individuals were told that the enzyme PKR facilitates the production of large white

blood cells that protect the body against pathogens that cause meningitis, and therefore they were less susceptible to the illness than others. Presumably, in this condition illness fears should have been deactivated.

After participating in the PKR enzyme test, the participant was told that the second part of the study involved assessing the effectiveness of communication between medical staff at the health center and students on campus. It was explained that doctors have different "styles" of interacting with patients and that matching doctor-patient communication styles is essential to quick and effective treatment, especially if a serious threat to one's health should arise. According to the information given to participants, the computer task that follows the meningitis enzyme screening would assess which doctors would be the best communication "match" for them in the event that they should develop a serious illness. Next, all participants took part in a computer task in which they had the opportunity to choose from a series of confirming and disconfirming statements that may or may not suggest that they have a serious illness. The statements were determined to be credible by the results of a pilot study. Participants in the pilot study (N = 60) rated statements with regard to their credibility as being related to a diagnosis of meningitis using a 5-point likert scale with 4 denoting a "very credible" statement and 0 denoting a "not at all credible" statement. Only those statements with the highest credibility scores (approximately the top 40% of the items) were selected for the computer task.

The procedure for the present study was based on a computer software program that allowed the participant to choose illness confirming or disconfirming information by clicking the appropriate box on the screen with a mouse. The choices were organized

into categories on opposite sides of the display. Each set of information served as a makeshift doctor's feedback that he or she would give to a patient and was labeled as either 'Doctor A.' or 'Doctor B.' according to whether it was illness confirming or disconfirming information. However, the participants were not told that there was a difference between the information provided by Dr. A and Dr. B. Participants began the task by being asked to view four pieces of information from doctor A and doctor B. The order in which the individual was presented information from a particular doctor was counterbalanced. Because participants were less likely to already be aware of their own biases and motivations, avoiding labeling of each category of information should have yielded a greater effect, as well as increased generalizability. Whereas, if the information were to be labeled, participants might have been more inclined to modify their behaviors and attempt to choose equally among illness confirming and disconfirming information from each doctor. The primary purpose for this initial trial was to familiarize participants with the contents of both sets of information (labeled Dr. A and Dr. B) while enabling participants to establish any preferences for selecting one type of illness related information over another.

The participants were given 8 trials and 24 choices for a total of 32 selections. The number of selections desired was based on a pilot study by Morris and Lecci (in press) which determined that participants are less accurate at estimating the number of facts they have selected after being exposed to thirty or more facts. The first 8 pieces of information viewed were not chosen voluntarily, but acted as a trial in which participants were familiarized with the type of choices offered by each doctor in the computer simulation. For example, the participant viewed the first four pieces of information from

Dr. A (illness confirming information) and the next four pieces of information from Dr. B (illness disconfirming information). The order in which the doctor's information was viewed was counterbalanced. The participants were then free to choose which doctor's information was viewed for the remaining 24 selections. For all selections, the participants were asked to rate the quality of the presented information (for each fact) by assessing its believability and the degree to which the information resulted in some degree of concern using ratings scaled from 1 to 5. When rating the extent to which the information was believable, a rating of 1 indicated that it was very believable whereas a rating of 5 indicated that the information was very unbelievable. For the rating of concern second, a score of 1 indicated that one was very concerned and a rating of 5 indicated they were very unconcerned. Participants were told that that the experimenter would instruct them to stop once they had made the requisite number of choices (24) from the available information. Therefore, it was not necessary for them to keep track. Believability ratings were used as a manipulation check. Following the completion of the computer task, the participants were asked to complete the Speilberger's State Anxiety Inventory (STAI), the Whitely Index, and SAMPI (see Appendixes F, G, H) and debriefed about the procedure.

RESULTS

Overview of the Analysis

Analyses were conducted using hierarchal regressions. Hypochondriasis scores were standardized and effect coding was used for the categorical variable (in this case, condition) using a single vector. The illness fear induction condition was coded as (+1)

whereas the illness protective condition was coded as (-1). The variables were entered into the regression equation in the following order: covariate (standardized state anxiety ratings); standardized SAMPI scores (Hs tendencies); main effect for experimental condition (coded as -1 or +1); and the interaction (computed by multiplying standardized SAMPI scores by the condition).

The following variables were adjusted and/or transformed within the data set. The first four trial statements from the illness confirming and disconfirming categories were removed from the final counts of statements chosen, because selection of these statements was required for the procedure and were not voluntarily selected. Because the selection of confirming and disconfirming statements is necessarily reciprocal, we examined only the subject's number of illness confirming statements chosen. This allowed for a single score of selected statements that was reflective of each participant's overall selection preference (representing both the tendency to select illness confirming or avoid illness disconfirming information).

Values relating to concern ratings were coded so that higher values represent more concern and lower values represent less concern. In an effort to standardize concern ratings within each individual and reduce the variability associated with idiosyncratic methods of rating concern, ratings from the illness disconfirming statements were subtracted from the corresponding concern ratings from illness confirming statements. As a result, the larger these values, the more the participant considered the illness confirming information concerning relative to the illness disconfirming information. All scores for all variables were then standardized.

Manipulation Check

Believability ratings represent one aspect of the manipulation check. Subjects were eliminated based on one of two criteria. First, a total of seven subjects whose believability ratings for all of the statements showed little to no variability were taken out of the study. It was suspected that these subjects had suspicious response patterns which prevented an accurate way of determining whether or not they had found the procedure to be believable. Second, those subjects who were completely inattentive as noted by the experimenter or those who experienced computer malfunctions within the course of the experiment were also eliminated. Computer malfunctions include observations documented by research assistants in which subjects had seen nearly identical information from opposing doctors in succession as well as instances in which the computer program shut down in the middle of the procedure and had to be rebooted. Such incidents undermined the believability of the experiment as a whole and it was determined that data from these subjects would be affected by the potential decrease in authenticity of the procedure. Finally, 3 participants had data missing on at least one of the variables of interest. As a result, a total of 167 participants were left for the analyses that follow, with 80 in the induction condition and 87 in the control condition.

Correlations between the Individual Difference Measures

A positive correlation ($r = .56, p < .0001, N = 167$) was found between the Whitely and the SAMPI; the two measures of hypochondriasis. There was no correlation observed between the measure of state anxiety (STAI) and the Whitely ($r = .00, ns$). The STAI and the SAMPI were not significantly correlated ($r = .13, ns$), however this

correlation approached significance in the positive direction. That is, as SAMPI scores increased, individuals tended to report more state anxiety.

Although the Whitely and SAMPI are both measures of hypochondriacal tendencies, the SAMPI has been shown to be the more effective measure of the two when working with automated processes (Lecci and Cohen, 2002). For this reason, the remaining analyses used the SAMPI as the measure of choice.

Self-Verification Tendencies

It was predicted that there would be a main effect of selection bias with regard to hypochondriacal tendencies. That is, individuals were expected to choose relatively more items from the illness confirming category as hypochondriasis scores increased. Using the above-described hierarchical regression, it was shown that those with higher hypochondriacal tendencies did select more illness confirming statements relative to those lower in hypochondriacal tendencies as measured by standardized SAMPI scores ($B = .13, t = 1.66, p < .05$). There was no effect for condition with regard to selection bias ($B = -.14, t = -.35, ns$). Selection bias was not related to the covariate, standardized state anxiety scores ($B = .07, t = -.87, ns$).

It was also predicted that there would exist an interaction between hypochondriasis and the induction for selection bias, yet, this interaction did not emerge ($B = .10, t = .25, ns$). In other words, individuals higher in hypochondriacal tendencies in the illness fear induction condition did not necessarily select more illness confirming information relative to those lower in hypochondriacal tendencies who were in the same condition.

Evaluating Ratings of Concern

A main effect emerged for SAMPI scores in regard to the amount of concern elicited by illness confirming relative to illness disconfirming statements ($B = .18, t = 2.30, p < .01$). That is, as SAMPI scores increased, individuals exhibit more concern for illness disconfirming statements relative to illness confirming statements. Condition was not significantly related to these standardized ratings of concern ($B = .59, t = 1.53, ns$) nor was state anxiety ($B = .04, t = .47, ns$). We expected an interaction between hypochondriacal tendencies (as measured by the SAMPI) and condition with regard to these standardized concern ratings. That interaction emerged, was significant ($B = .70, t = 1.84, p < .04$), and is depicted in Figure 1. Specifically, an increase in standardized SAMPI scores was associated with decreased ratings of concern (less concern) over illness confirming information relative to concern ratings over illness disconfirming information when examining the illness protective condition ($B = .32, t = 3.13, p = .002$). This effect occurred even after controlling for state anxiety ratings. However, in the illness induction condition standardized SAMPI scores were unrelated to the standardized ratings of concern ($B = .04, t = .31, ns$).

In order to determine if the above-described effects are occurring equally for both illness confirming and illness disconfirming statements, a follow-up analysis was conducted in which standardized scores for the confirming and disconfirming statements were examined separately within the illness protective condition. As depicted in Figure 2, it is apparent that as SAMPI scores increase there is an increase in the concern associated with receiving physician feedback that disconfirms the presence of an illness ($B = .38, t = 3.94, p < .001$). However, the effect is not significant for the illness confirming statements

($B = -.13$, $t = -1.18$, *ns*), though a trend towards significance did emerge. This means that the more hypochondriacal the individual, the more one experiences concern when receiving physician feedback suggesting that there is no illness, and this effect only emerges in the illness protective condition. The effect is also absent (or at least less pronounced) when examining illness confirming statements.

Interaction between standardized hypochondriasis scores and condition with regard to standardized concern ratings

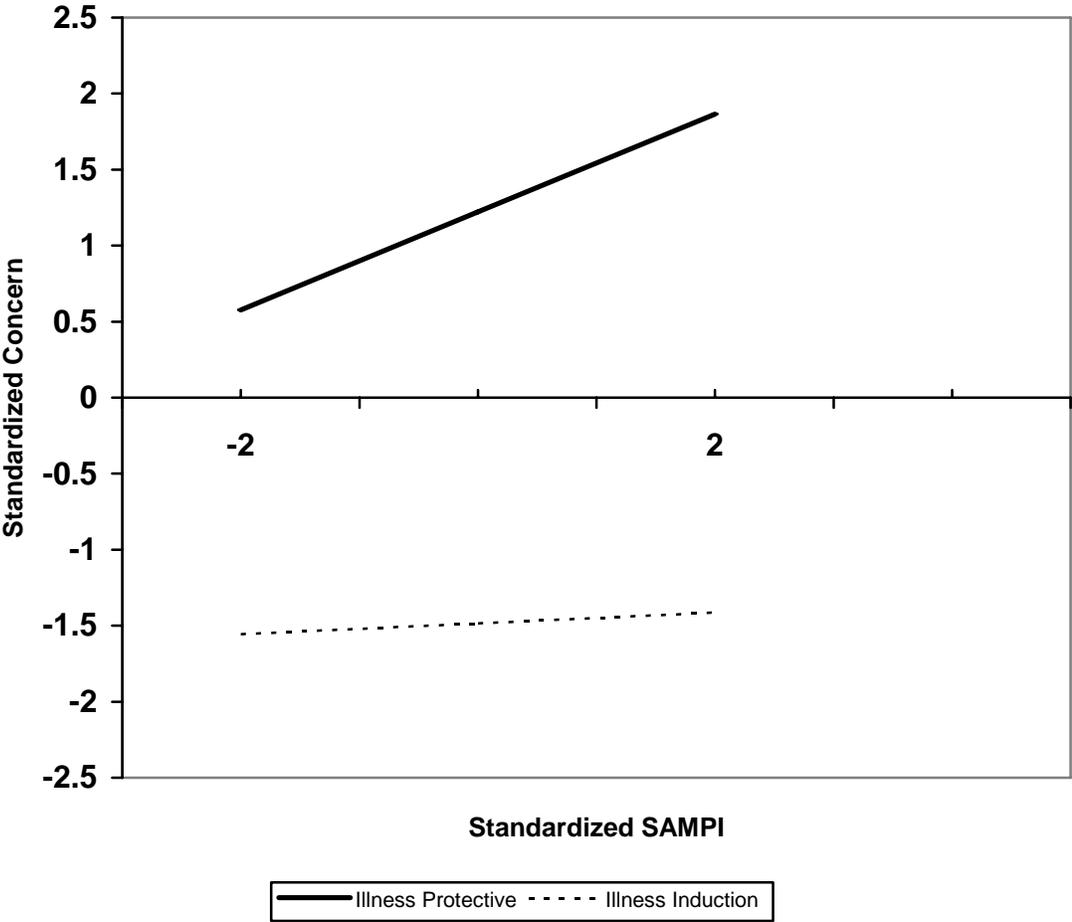


Figure 1. Interaction between standardized hypochondriasis scores and condition with regard to standardized concern ratings.

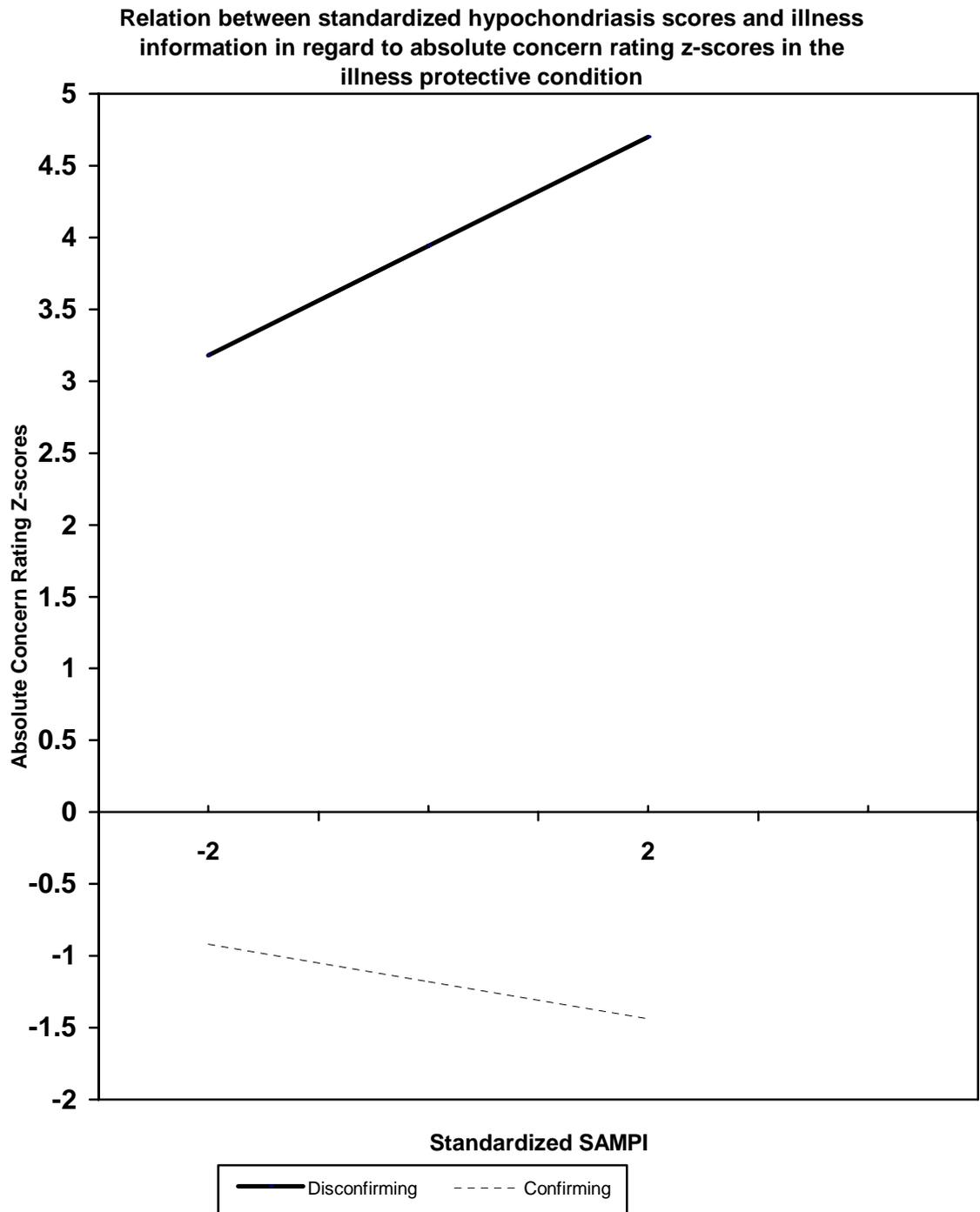


Figure 2. Relation between standardized hypochondriasis scores and illness information with regard to absolute concern rating z-scores in the illness protective condition.

DISCUSSION

Motivations to Self-Verify

This study provides evidence that as hypochondriasis scores increase, individuals tend to be more concerned about illness disconfirming information relative to illness confirming statements. Specifically, the interaction observed between hypochondriacal tendencies and condition with regard to concern suggests that when compared to those with more normative health beliefs in a non-health threatening situation, those with elevated hypochondriacal tendencies show increased concern when presented with illness disconfirming feedback as opposed to illness confirming feedback. Similar to those experiencing depression (Swan, Wenzlaff & Tafarodi, 1992), this study found evidence supporting the presence of a self-confirming bias among those with hypochondriacal tendencies. The lack of a significant effect for the concern ratings over illness disconfirming feedback among those with more normative health beliefs was most likely due to the fact that the information they were viewing confirmed pre-existing beliefs that they were well. However, the sub-clinical hypochondriac's increased concern after being provided the same feedback as those with normative health belief most likely resulted from the discrepancy between their own beliefs of being afflicted with illness and the information provided by a medical professional that suggested they were well. Because the information given did not agree with the hypochondriacal individuals' health perceptions, the sub-clinical sample was therefore unable to confirm their illness beliefs, presenting a significant threat to their self-concept and general perception of themselves.

Thus, in the context of a doctor's office, it would be expected that the more hypochondriacal a person is, the higher concern would be when they are told they are not

ill, and such a response differs from those with lower hypochondriacal tendencies. That is, those with more normative health beliefs exhibit concern when told they may have an illness (see Weinstein, 1980). However, this study suggests that in the absence of a health threat, those with increased hypochondriacal tendencies would be less concerned with information confirming their illness fears and more concerned with illness disconfirming information. When making visits to the doctors when health fears had not been activated, it is likely that those with clinical or subclinical manifestations of hypochondriasis would be more concerned about information that disconfirms one's health fears as opposed to information that confirms their fears.

According to the results of this study, those with normative responses to health fears should be less likely to show concern when presented with information that is suggestive of a serious illness, especially when there is no health threat present. The way in which patients respond to health information, particularly those who tend not to reject information suggesting that they are ill (as is the case for the hypochondriac), might be a helpful tool for medical professionals to consider when questioning the motives behind those patients' numerous doctor visits. Warwick and Salkovski (2001) state that although "difficult" patients (or those who most likely do not have a physical cause for their reported symptoms) can provoke a variety of negative emotions in the physician because they feel as though they are unable to actually treat them. In order to maintain the hypochondriacal person's self-concept, medical professionals can best serve those with hypochondriacal tendencies by partially confirming some of what the worrisome patient believes is true. This includes respecting the patient's symptoms and acknowledging the validity of the patient's concerns (Warwick & Salkovski, 2001).

Awareness of Biases

A person with hypochondriasis may view a negative, undesirable event as more likely to occur as a result of their motivated reasoning to maintain their self-beliefs (Weinstein, 1980). The cognitive mechanisms being utilized are not intended to reach accurate conclusions, but directional ones that concur with an alternate set of underlying perceptions and beliefs. Past literature would suggest that people are not aware of their own general biases and that behavior aimed at achieving directional goals is due to largely unconscious processes (Bargh & Chartrand 1999). In order to be useful to the person, the process leading to their biases regarding illness information are most likely automatic. If this is true, a small effect size would be expected relative to processes that are characterized by both automaticity and high awareness. Data from this study indicated a small effect size which was only significant in the case of the SAMPI and number of illness confirming statements. This supports the idea that biases are either automatic or high in awareness, and that the underlying perceptions and beliefs affect the way that those higher in hypochondriacal tendencies arrive at conclusions regarding their health. Those evidencing hypochondriacal tendencies are most likely unaware that the reason they are biased towards illness confirming information and that this bias function serves to protect their irrational health beliefs.

Problems with Measuring Self-Verification

One issue with the measurement of self-verification in general is that one can not always be sure of what is actually being verified. Not all people higher in hypochondriasis are convinced they have the same illnesses. One problem in this study concerned the possibility that the participants who were higher in hypochondriasis were

not necessarily worried about contracting meningitis even though they may have felt more vulnerable to other diseases. Barsky et al. (2001) note that the illnesses and diseases that those with hypochondriasis feel most susceptible to include arthritis, ulcers, insomnia and diabetes (Barsky et al., 2001). If higher hypochondriacal participants did not feel particularly vulnerable to meningitis despite their college environment, the self-verification process would not occur. Also, according to Barsky, Wyshak and Klerman (1990), 50 percent of people experiencing high hypochondriacal fears can be initially alleviated by primary care reassurance. Those that may have been concerned about meningitis in this study but who were not experiencing chronic hypochondriasis may have been reassured in the past or possibly even by the illness disconfirming information in this study and therefore were lacking any self-relevant beliefs concerning meningitis to verify. These would also be reasonable explanations for the latter ineffectiveness of the induction as well as the small effect size for selection bias and hypochondriasis scores. Future considerations might include the modification of the illness used in the study from meningitis to an illness or disease such as diabetes or ulcers. Also, it might be helpful to assess participants' fear of the illness being used in the study ahead of time to ensure they feel susceptible and are in fact self-verifying valid fears of contracting that specific illness.

Examining the Effectiveness of the Induction

The presence of an interaction between hypochondriasis and induction for concern provides evidence that the induction was most likely effective in elevating illness fears. However, when the interaction between hypochondriasis and the induction for selection bias was examined, there was no effect present, and no main effects of the

induction emerged. This raises the possibility that the induction was not optimally effective and some situational interpretations may have rendered it less effective. Although the believability ratings served as the manipulation check for the confirming and disconfirming statements, there was no manipulation check for the induction. This makes it difficult to assume that the induction had a particularly strong effect for both conditions. There are a variety of reasons that the induction may not have created a stronger effect for the two variables than it did. First, Lecci and Cohen (2002) have established that the perceived nature of a specific health threat, including its salience and probability affects the readiness with which one accepts the possibility of having health threatening conditions (Lecci & Cohen, 2002). Despite the fact that meningitis is a salient illness on college campuses, some participants were not aware of what it was until after reading the provided information (see Appendix C). Also, the probability of contracting meningitis is low and most participants had never come in contact with anyone including friends or family who had experienced the illness (and the very few that had were released from the participating in the study for ethical reasons). Another reason for the weaker than expected induction effect may have been questionable credibility of the induction. Participants simply may have not believed that it was possible to test for an enzyme related to their meningitis susceptibility or had prior knowledge about meningitis that raised questions about the validity of the induction procedure and thus, their illness fears were not activated to the extent that they would have been had they believed that part of the procedure.

Also, although the testing area was set up to resemble a doctor's office as much as possible and the illness threat was chosen because it was both familiar and prevalent

around college campuses, it is possible that these two conditions were not sufficiently met. Participants were may not have been influenced enough to think of the testing area as a doctor's office, nor may they have fully associate the research assistants administering the blood pressure and meningitis enzyme test with real doctors, despite the fact that they were each wearing a white lab coat and stethoscope. As a result, illness fears in the participants may not have been activated to the degree which was necessary in order for them to react accordingly by choosing disproportionately more illness disconfirming statements in the case of those who were lower in hypochondriasis and disproportionately more illness confirming statements in the case of individuals who were higher hypochondriasis.

An alternative explanation for the minimal effectiveness of the induction may lie with the sample of the population being tested. Participants in this study were college students and may not have adequately sampled the higher scorers on hypochondriacal tendencies. Indeed, given the youthfulness of the sample, feelings of invulnerability are more commonly observed (see Weinstein, 1980). Thus, the results of the induction may not have been of particular importance or interest to them and consequently had less influence on how much information they chose from one category as opposed to the other. One problem arising from the fact that the induction resulted in an effect for only concern and not for the interaction for selection bias is the possibility that the induction itself may have made the following computer task slightly less credible. A likely possibility is that participants were conscious of the differences between the two categories of information and attempted to regulate the number they chose from each one, disregarding the induction process altogether. In the future, it would be suggested that

the induction be modified to address the above concerns in order to maximize its potential for creating an illness activating effect. Suggestions include using a sample of older adults as well as an induction that took place in a real health setting with real health professionals.

Assessing Hypochondriasis

The moderate correlations between the two measures used to assess hypochondriasis in this study can most likely be explained as a difference in the aspects of hypochondriasis that each measure intends to assess. Despite similarities, some of the aspects of hypochondriasis that are measured by the SAMPI and Whitely are unique. Whereas the Whitely is a more face-valid measure (Lecci, 2004) and is designed to assess an individual's fear of symptoms that are indicative of a possible illness, the SAMPI is a more direct measure of intense somatic experiences. The variance shared between the SAMPI and the Whitely in this study was modest and consistent with that observed in the literature (Speckens, 2001), suggesting that there is some overlap between the two measures. The reason for this overlap was not directly addressed within this study. It is possible that the shared variance may reflect the fact that these two measures tap into some of the same underlying constructs of hypochondriasis. The overlap could also be due to a causal relation in which over a period of time, heightened fears result in automated (i.e., well rehearsed) illness-related cognitive processes (Lecci & Cohen, 2002, in press). Thus, it is possible that the two measures might be differentially related depending upon the stage of hypochondriacal development in the individual. In the context of this study, the use of both the SAMPI and Whitely offered an opportunity in which slightly different interpretations for the results could be made according to each

measure. The absence of uniformity among the two measures was actually beneficial because it allowed for different variables related to hypochondriasis including selection bias and concern to be addressed separately with each measure.

Measurement of Self-Verification

If self-verification is one of the aspects of hypochondriasis that is assessed differently by the SAMPI and the Whitely, it would be expected that the two measures would have related differently to selection bias in this study. Although hypotheses were not made for the individual measures prior to the results, there did exist a difference between the SAMPI and Whitely when the association between hypochondriasis and self-verification was assessed. Given the automated nature of cognitive processes associated with the SAMPI, it's relation to attentional biases as documented in previous research (Lecci & Cohen, 2002, in press), as well as what it intends to assess, one might foresee it as being more closely related to the selection of illness related information than the Whitely. Also, those with more inveterate hypochondriacal tendencies could be expected to engage in higher rates of self-verification. Indeed, a positive relation was found between the SAMPI and the number of illness confirming statements chosen. Conversely, the number of illness confirming statements was not related to the Whitely. This appears to suggest that individuals who are higher in the experience of intense somatic experiences as measured by the SAMPI tend to selectively attend to information that confirms their illness beliefs, a finding that is consistent with the avoidance of cognitive dissonance through means of self-verification. From this information one can assume that an elevated SAMPI score is more likely to indicate a high level of resistance to illness-related information that fails to agree with one's perception of their health, more

so than would be indicated by an elevated score on the Whitely. Our results also agree with literature suggesting that components of hypochondriasis are not present in the same degree among every hypochondriacal person and that although each person will generally resist reassuring information, they may not necessarily reject it (Salkovskis, 2001).

Although the constructs assessed by the Whitely and SAMPI are related to an individual's level of hypochondriasis, the measure in this study that was most applicable to self-verification was the SAMPI.

The Whitely may not be as strongly related to self-verification as is the SAMPI, in which case the relation between selection of illness confirming or disconfirming information and Whitely scores may be weaker. If increased fear of illness-suggesting symptoms does not equate to the experience of those symptoms or that particular illness, higher Whitely scores would not result in any self-verification. In this case, the symptoms that we focused on were specific to meningitis. It may be that those with higher hypochondriacal tendencies were more concerned about other symptoms that were not related to meningitis. If this is true, it would explain why the Whitely did not show as much of an effect. Participants were not particularly concerned about the symptoms presented that related to meningitis, however, they were concerned with other symptoms of a different illness as indicated by the Whitely. The finding implies that the nature of hypochondriasis is more symptom-specific rather than generalized. Highly hypochondriacal individuals must be presented with the particular symptoms related to the illness that they are concerned about in order to engage in the self-verification process.

This study's results indicated that illness-related attitudes as measured by the Whitely were not necessarily related to selection of illness confirming information. There are a number of reasons why this may have occurred. Increased fear of illness-suggesting symptoms as measured by the Whitely does not equate to the experience of those symptoms or that particular illness and therefore, may not result in any self-verification that would lead to the selection of choosing more or less illness confirming information. Secondly, it may be that high Whitely scores (but low scores on the SAMPI) indicate that illness-confirming behavior has not become practiced enough to become fully automated. That is, participants in this study with higher scores on the Whitely but not on the SAMPI may have consisted of less "experienced" hypochondriacs, an idea mentioned in (Lecci, Karoly, Ruehlman, & Lanyon, 1996). Although elevated scores on the Whitely indicated higher hypochondriacal tendencies and more specifically, increased fearfulness of illness-suggesting information, it did not result in the disproportionate selection of illness confirming information. This may have been because hypochondriacal tendencies had not developed to that severity. In fact, fear of symptoms suggesting an illness may have made participants more defensive and actually less likely to select illness confirming information than those who had elevated SAMPI scores. For the same reasons, those with lower Whitely scores and higher SAMPI scores may have been less afraid of viewing illness confirming information while at the same time more likely to want to seek out information confirming their that suspected symptoms were related to meningitis.

Implications for Use of the SAMPI and Whitely

These findings present useful information for doctors treating those higher in hypochondriacal tendencies as measured by the SAMPI or Whitely. Individuals with hypochondriacal tendencies scoring high on the SAMPI versus those scoring high on the Whitely may react to their health professional's feedback in two very different ways depending on which construct associated with hypochondriasis that best characterizes their concerns. Those with higher SAMPI scores may be more likely to attend only to illness confirming information, possibly resulting in the perpetuation of illness beliefs and continued doctor's visits (Lecci & Cohen, 2002). Those with higher Whitely scores wouldn't be expected to attend only to information around them suggesting illness, however information that did suggest illness would be viewed as more concerning. The Whitely may also coincide more with the individuals concern of illness related information presented by a health professional rather than the preference to selectively attend to on type of illness related information. Findings in this study emphasizes the individualization of the condition of hypochondriasis, suggesting the use of both measures to best predict the manner in which a person with higher hypochondriacal tendencies will react to illness confirming or disconfirming information.

Alternative Explanations for the Data

Swann, Stein-Seroussi and Giesler (1992) contend that people seek interaction partners (e.g., doctors) who satisfy "positivity strivings" such as allowing them to achieve self-improvement, win converts, interact with someone who has similar attitudes or someone who is very perceptive. This finding applies to both those seeking positive and negative evaluators (Swann et al., 1992). Similar to other studies examining preference

for negative or positive evaluations (Swann, 1992), the evaluations in the current study did not come from medical professionals, but rather, from a computerized evaluator instead. Thus, the effect might have been different had the feedback resulted from human interactions. It is also possible that the underlying motive to meet positivity strivings may not be equally applied when considering the differences between which aspects of hypochondriasis that the SAMPI and Whitely Index measure. Those seeking positivity strivings who were higher in hypochondriasis would be expected to seek out relatively more illness-confirming information and score higher on the SAMPI, but not necessarily score higher on the Whitely. Although a valid theory, the results of this study are unable to confirm that the motivation to self-verify was due solely to positivity strivings.

However, results do seem to support some aspects of the cognitive dissonance theory. The self-verification that did occur with elevated SAMPI scores may have been motivated by cognitive dissonance. That is, participants were acting to avoid cognitive dissonance in order to reduce psychological anxiety caused by discrepant beliefs and actions (Festinger, 1962). This could have been further tested by looking at the happiness of people based on their test scores after completing the computer task. Individuals with elevated hypochondriasis scores selected relatively more information from the illness confirming category, which also means that they avoided information from the illness disconfirming category. According to cognitive dissonance theory (Festinger, 1967) choosing information from the illness disconfirming statements would be an action that was discrepant with beliefs of possibly having an illness, and so that information was avoided by those higher in hypochondriasis as measured by the SAMPI. By selecting

relatively more statements that were illness confirming, participants essentially avoided any information that was inconsistent with their beliefs.

Limitations and Future Directions

The use of a computer to provide illness confirming and disconfirming information to the participant was a limitation to the generalizability of this study.

Although the computerized manner of relating information was advantageous in that it served to eliminate variability that would have occurred when using research assistants as doctors, it also failed to mimic reality in a number of ways. First, there were a number of computer malfunctions during the procedure. Also, using a computerized task minimized elements of personalization of information that would be present within the doctor-patient interaction. For example, participants in this study may not have seen information as personally relevant to them and therefore, may not have responded to the computerized feedback in the same way as they would have in a situation in which illness confirming and disconfirming feedback was provided by individuals considered to be health professionals.

Participants in this study were also given the option to choose from illness confirming and illness disconfirming information. Although this allowed us to assess their preference for feedback, individuals in a real doctor's office are not given this option. Typically, they present the doctor with their symptoms, followed by a physical checkup that the doctor uses to confirm or disconfirm whether they are ill. The use of the computerized task did not provide this level of attention and thus, may not have been viewed as being fully credible by the participants as would a real-life situation.

Feedback given by a doctor in a medical setting would most likely evoke much more concern as compared to feedback given by a computer during a psychology experiment. Thus, ratings may not have been truly reflective of the level of concern caused by feedback from doctors in most real-life situations. Although this research was limited in the resources it was allowed to use, future studies might avoid these issues by utilizing a different setting for which the procedure is to take place, such as a real doctor's office where the subject's established health professional is the provider of feedback. This would make the study more believable overall as well as add the element of reality needed for the feedback to be taken seriously.

This study provides evidence of bias for illness confirming information among those higher in hypochondriacal tendencies, but the fact that the induction produced an effect with only one of the variables examined may somewhat limit the ability to examine this phenomenon in the case where illness fears were fully activated. Even though the illness fear induction was similar to that of Croyle and Ditto (1990), it had to be modified given the university setting and available supplies and this may have contributed to its reduced effectiveness. It is suggested that the procedure in this study either be modified either to match Croyle and Ditto's (1990) procedure exactly, or that another form of illness fear induction within ethical standards be used in the future. Most likely, the lack of interaction for selection bias in this study can be attributed to the some of the properties of the induction and it is believed that future studies might observe this effect under the proper illness fear activating circumstances.

Other future considerations might include the modification of the illness used in the study from meningitis to an illness that would correspond to the possible symptom-

specific nature of a given hypochondriac. It might be helpful to assess participants' fear of the illness being used in the study ahead of time to ensure they feel susceptible and are in fact self-verifying valid fears of contracting that specific illness. Also, future studies should include additional measures following the feedback procedure that would allow for the assessment of awareness of biases including asking participants what their goals were when choosing information as well as administering a state anxiety measure before and after the feedback procedure. A manipulation check that is additional to the believability ratings should be utilized to ensure the effectiveness of the induction as well. Directions for future research might explore to a further extent the awareness of illness information biases, whether awareness differs in those scoring high on the Whitely from those with high scores on the SAMPI, as well as investigating methods of modifying feedback given to highly hypochondriacal individuals in a way that is more assuring and less threatening to their self-concept.