DEPRESSED OR JUST BLUE? THE PERSUASIVE EFFECTS OF A SELF-DIAGNOSIS INVENTORY

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A self-diagnosis inventory is both a response instrument, and a tool for an individual to assess their risk.

Three experiments show that the manner in which a depression self-diagnosis inventory is administered and constructed affects the manner in which a respondent interprets behavioral symptoms. This in turn affects (a) self-reports of whether the symptoms apply to them, (b) their perceived risk of depression, (c) the perceived controllability of the behavioral symptoms, and (d) the respondent's likelihood of seeking treatment. Theoretical implications of the content and format of self-diagnosis inventories are discussed, as are implications for how to persuade people to seek assistance when they are at risk.

Introduction

A self-diagnosis inventory is a tool for an individual to assess their risk of a health hazard. For example, a major drug store uses a self-diagnosis in their advertisement regarding depression (see Figure 1). At the same time, it is also a response instrument, and therefore may play a persuasive role in helping respondents assess their own risk, which, in turn, would affect intentions to seek assistance. Our main thesis is that the manner in which self-diagnosis inventories are constructed, *i.e.*, their format and content, provide contextual cues that affect the manner in which a respondent interprets ambiguous behavioral symptoms, identifies whether or not they are at risk, and whether or not they should seek treatment.

We examine the role of such inventories in the context of depression, a physiological health problem that is initially self-diagnosed

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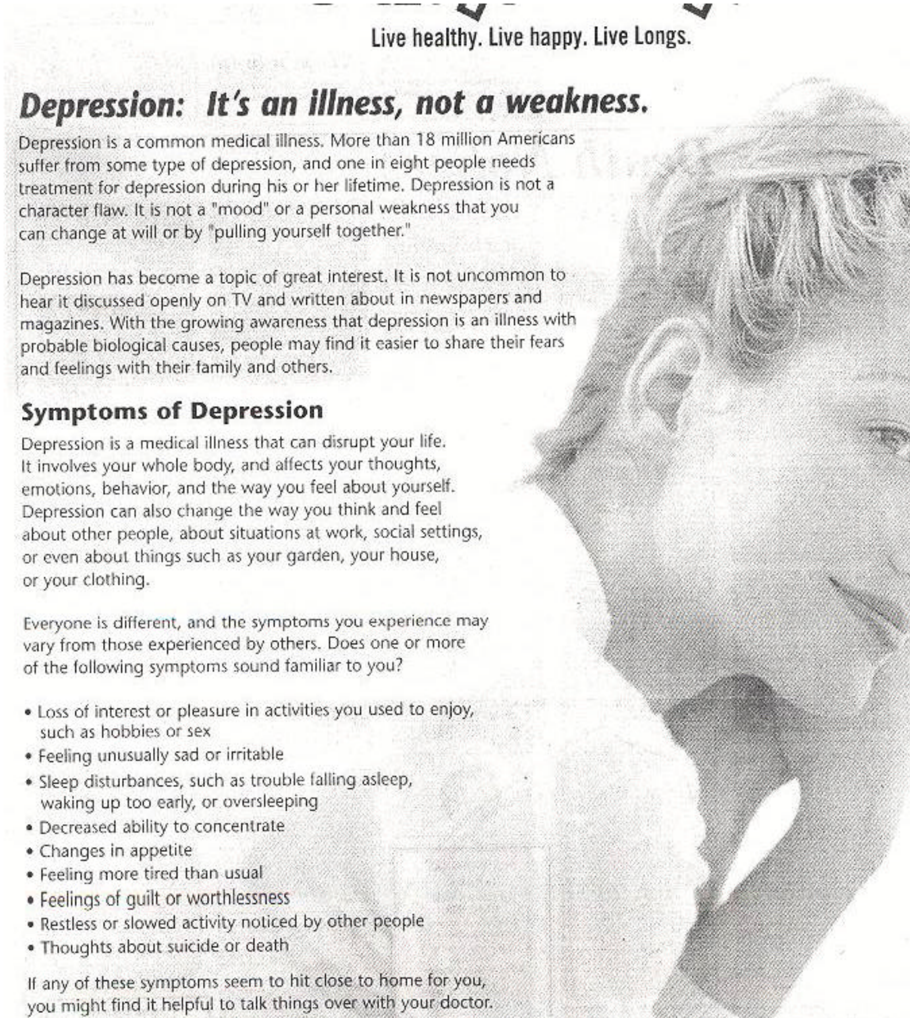
using self-reported psychological inventories. The focus of this paper is to examine the role played by self-diagnosis inventories in untreated depression. We examine whether the manner of construction of these inventories can increase the likelihood that those at risk identify their depressive symptoms, assess their risk and seek treatment. The issue of self-diagnosis brings depression into the domain of survey methodology and questionnaire construction. A rich tradition of research in the cognitive aspects of survey methods has shown that people's behavioral reports are frequently constructed as a function of the context rather than from information retrieved from memory (see the contributions in Schwarz & Sudman 1994 for a review). Since diagnosis of depression relies on self-administered inventories, it is a domain that lends itself to bridging the areas that span survey methods and persuasion. The self-inventory is at once a response instrument, and a diagnostic tool for the individual to assess whether or not they are at risk, implying that such inventories might play a persuasive role in helping respondents overcome their perceptions of invulnerability. Our focus is on getting potential depressives to seek assistance.

We now present the conceptual framework of how self-diagnosis inventories can lead to behavior interpretation and play a persuasive role. This is followed by a description of three experiments, and a discussion of the implications of our results for survey methodologists, social marketers, and social psychologists.

Conceptual Framework

The central issue for health problems is to get a person at risk to acknowledge susceptibility and seek professional diagnosis and, if required, treatment (Raghubir & Menon, 1998). Behavioral self-reports serve the primary diagnostic function for people to decide whether they are at risk and need to seek professional assistance for diagnosis and treatment. Specifically, the three steps that are required for a person to accept risk and seek treatment are: ***(a)*** to identify their behavioral symptom accurately; ***(b)*** to believe that they are diagnostic of depression; and ***(c)*** to believe that they can be controlled through intervention. We examine how the design of self-diagnosis depression inventories can affect all three stages. The *Diagnostic and Statistical Manual of Mental Disorders IV* (DSM IV, 2000, p. 356) characterizes depression as a loss of interest or pleasure in activities a person enjoyed, and/or their feeling unusually sad or irritable over a two-week period. It provides nine symptoms of depression listed in Figure 1. The symptoms differ from each other in terms of how ambiguous they are and self-diagnosis inventories differ from each other in the response scales they use to elicit self-diagnoses.

Figure 1: Advertisement Used by Drug Retailer listing depression symptoms

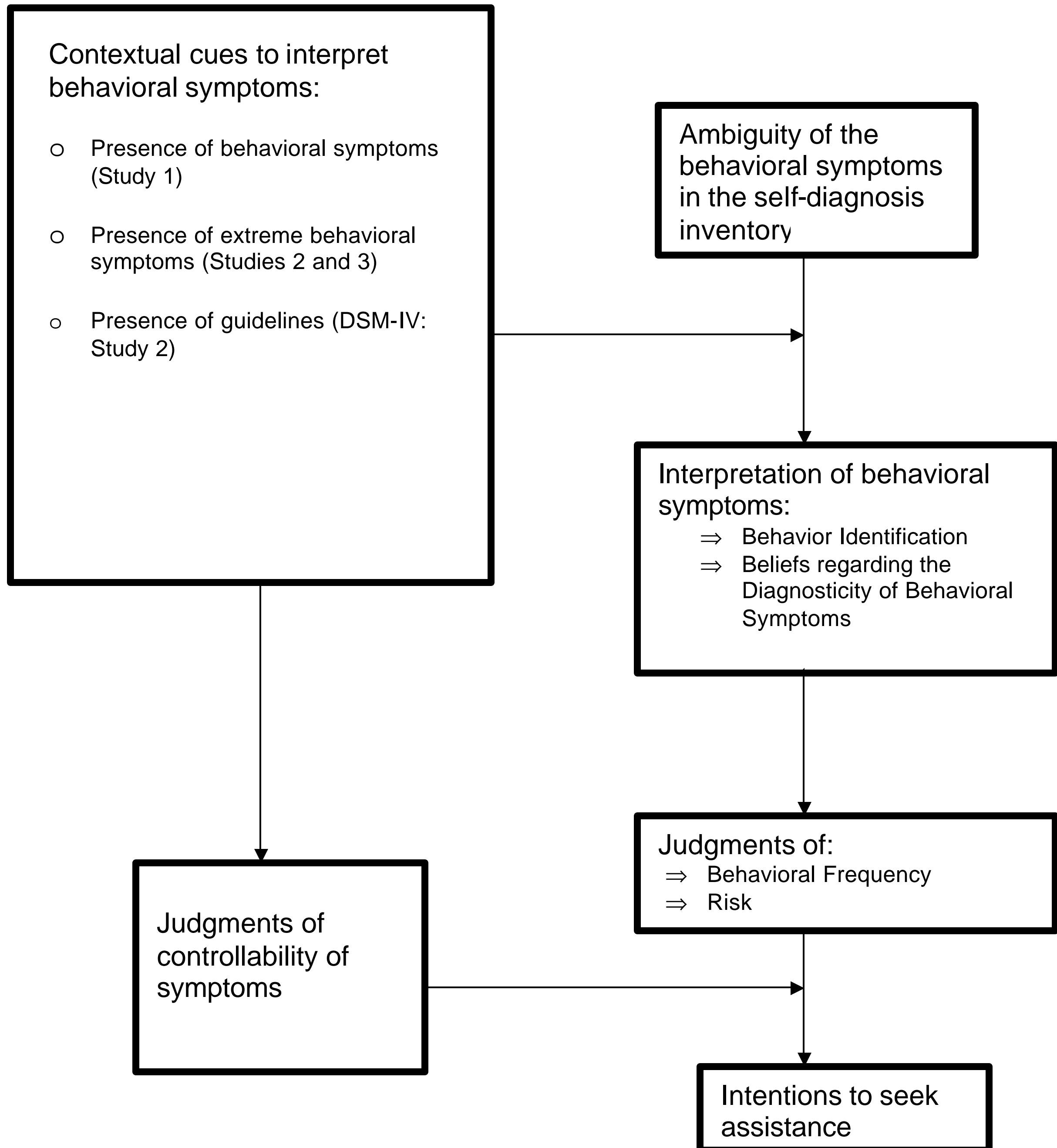


Depression Symptoms (Diagnostic and Statistical Manual of Mental Disorders-IV)

1. Loss of interest or pleasure in activities you used to enjoy, such as hobbies or sex
2. Feeling unusually sad or irritable
3. Sleep disturbances such as trouble falling asleep, waking up too early, or oversleeping
4. Decreased ability to concentrate
5. Changes in appetite
6. Feeling more tired than usual
7. Feelings of guilt or worthlessness
8. Restless or slowed activity noticed by other people
9. Thoughts about suicide or death

A person is categorized as "At risk of depression" if they have either symptom 1 or 2, and at least 5 of the other symptoms in the checklist.

Figure 2:
Conceptual Model of Behavioral Interpretation Using Contextual Cues



Given this variance, the research questions that follow are:

- Does the design of a self-diagnosis inventory affect how people interpret behaviors that are symptomatic of depression? This would affect whether they would be able to accurately identify their behavioral symptoms.
- Does the content of a self-diagnosis inventory affect beliefs that the behaviors are symptomatic (or diagnostic) of depression?
- Does the design and content of a self-diagnosis inventory affect beliefs that the behaviors are controllable through treatment?
- Do beliefs regarding the diagnosticity and controllability of the behavioral symptoms affect perceptions of risk and intentions to seek medical assistance?

Figure 2 illustrates the conceptual model we propose in this paper.

Behavior Identification

A behavioral symptom can be likened to a signal used to detect an event. Based, on the predictions of Signal Detection Theory (SDT) regarding the strength of a signal, we propose that a behavioral symptom can be ambiguous due to a number of reasons (Sperling & Dosher, 1986). These include:

a. *Degree of existence.* A symptom is more ambiguous if it can exist to some degree, rather than if it is characterized by its presence or absence. This is similar to the "threshold of detectability" from SDT;

b. *Actual-expected consistency.* A symptom is more ambiguous if it occurs only some of the time it is expected to occur rather than all of the time it is expected to occur. The expectation of whether it will occur all the time or only some of the time is a function of whether the behavior is a state of being, which should be present all of the time, or a specific event, which should only occur some of the time. This implies that specific behavioral events are less ambiguous than are states of being;

c. *Causal clarity.* A behavior is less ambiguous if every occurrence of the symptom is associated with the disease it relates to (the signal has high detection potential, with few "false alarms"), whereas it is more ambiguous when the symptom could be due to reasons other than a single disease (the signal has low detection potential, due to the large number of "false alarms");

d. *Measurement error.* A behavioral symptom is more ambiguous if it lacks physiological measurement methods. In an SDT parallel, this is because the presence of physiological tests allows

an observer to get closer to an "ideal observer";

e. *Extremity of consequence.* A behavior may be considered more ambiguous when its consequences are moderately debilitating as compared to when they are extreme, leading to severe disability or death. In an SDT parallel, the extremity of the consequence impacts the expected gain from the signal detection task: the gain is higher when the consequence of the symptom is more extreme; and,

f. *Frequency of occurrence.* A behavioral that has a higher frequency of occurrence in a population is more ambiguous than one that has a low frequency of occurrence, as it may appear to be more normal and, therefore, less diagnostic of a disease (with higher likelihood of leading to "false alarms").[i]

For example, one of the symptoms of depression is "*feeling more tired than usual*." We suggest that such a symptom is ambiguous because it may exist to some degree (the extent of tiredness felt is a range, rather than a dichotomous presence or absence of tiredness); it may be felt inconsistently (sometimes one is more tired than at other times); it lacks causal clarity (there are many different causes for being tired, including, but not limited to depression); it is difficult to measure (*e.g.*, there are no blood tests that can establish level of tiredness, as there are to establish the level of cholesterol in the blood); it has moderate consequences, and many people complain of tiredness.

On the other hand, the ninth symptom of depression in Figure 1 "*thoughts of suicide or death*" is less ambiguous as it is a dichotomous variable (*i.e.*, either you think of killing yourself or you do not); and it is not expected to occur, and therefore, a single occurrence of such a thought is unexpected and diagnostic (see Menon & Raghubir, 2003, for a discussion on the higher diagnosticity of events where actual experience deviates from expected experience). It has causal clarity in as much as having thoughts of suicide suggests one is depressed given there are very few other reasons why one might have such thoughts. It is more measurable than a state of being, with an extreme consequence, and is demonstrated by a relatively low percentage of people.

We propose that the ambiguity of a symptom may lead to people inaccurately identifying their behavioral symptoms, and discounting the diagnosticity of these symptoms. We refer to this as "*interpretation of behavioral symptoms*" (see Figure 2). By interpreting a behavior or state as "normal" rather than "symptomatic of a disease," respondents can self-select out of the "at risk" group. The first eight of the nine behaviors listed in Figure 1 that are symptomatic of depression are more ambiguous than the ninth, and may be subject to interpretation. To disambiguate these behaviors, people may search for cues to interpret the behavior to form a judgment as to whether or not the behavioral symptom applied to

them (see Menon, Raghubir & Schwarz, 1995 for the information value of response alternatives to survey respondents). Contextual cues, such as those available in the inventory, are not only easily accessible, but may seem to be particularly pertinent to the judgment of whether or not a person may be at risk. For example, if there is low awareness of the symptoms associated with depression, mere awareness of the behaviors characterizing depression should raise people's estimates of their own risk.

Study 1 examines the issue of behavior identification and interpretation. We argue that as most of the behaviors characterizing depression are "normal," people may be unaware that they are symptomatic of depression. Exposing people to the items in the self-diagnosis inventory should increase people's belief that they may be at risk. We test the following hypothesis:

H1: The administration of a self-diagnosis inventory will lead to perceptions of higher risk of depression.

Prior literature has shown that people's reports of behavioral frequencies are tensile and subject to contextual cues (Menon, 1997; Menon, Raghubir & Schwarz, 1995; Schwarz, 1990). Context, in the form of the order in which questions are asked, has been shown to affect responses (Raghubir & Johar, 1999). In the domain of perceptions of the risk of cancer, Lin, Lin & Raghubir (2003a) showed that when self-estimates are elicited before other-estimates, the self-positivity bias is attenuated, but when others' estimates are elicited prior to self-estimates, this cues comparative (vs. absolute) judgments about the self and the bias re-emerges. We propose that if people's estimates of risk are elicited prior to whether or not they have the behavioral symptoms of depression, they will wish to interpret the behaviors in a manner consistent with their belief that they are not depressed. To the extent the behaviors are ambiguous, they will be able to interpret the behaviors. Thus, we test the operational hypothesis:

H2: Behavioral self-reports for ambiguous symptoms of depression will be lower when elicited subsequent to (versus prior to) judgments of own risk.

Beliefs of Diagnosticity

While behavior identification is a necessary precondition to seeking treatment, it may not be a sufficient condition. Respondents must believe that the behaviors are diagnostic of depression. Unlike the first eight, the ninth depression symptom, "thoughts of suicide or death," is unambiguously extreme. While it is, in fact, no more diagnostic of depression than the other symptoms (and less diagnostic of symptoms 1 and 2), the fact that it is extreme may lead to it to be perceived to be more diagnostic as it may overshadow the others on the inventory (Nisbett, Fong, Lehman & Cheng, 1987). Its presence could lead people to discount the

diagnosticity of the other behavioral symptoms, as the extreme behavior provides a normatively inappropriate reference against which comparisons can be made.

The predictions of Signal Detection Theory are not contingent on contextual cues. Rather, they relate to the intrinsic aspects of a behavior: its frequency, causal clarity, extremity etc. However, the context in which a symptom is assessed could affect respondents' beliefs regarding the relative diagnosticity of the symptom (or the strength of the signal). The finding that people infer information from the context and use this to compute various kinds of judgments and probabilities has been demonstrated as a robust phenomenon in various domains (*e.g.*, question wording and sequencing: Schwarz et al., 1985; health risk estimates: Menon et al., 2002). We propose that the inclusion of an extreme behavioral symptom will decrease the diagnosticity of the less extreme behavioral symptoms as it will overshadow the others on the inventory (Nisbett et al., 1987). This implies that the strength of a signal will itself be contingent on the context in which it is assessed, or that, the perceived diagnosticity of any one given depressive symptom will be assessed contingent on the perceived diagnosticity of alternative depressive symptoms that are accessible to the respondent at the same time. In short, the perceived diagnosticity of any one symptom of depression would be contingent on the types of other symptoms included along with it on the self-diagnosis inventory.

However, according to DSM-IV guidelines, the extreme behavior is, in fact, less diagnostic than the first two symptoms ("loss of interest or pleasure in activities normally enjoyed" or "feeling unusually sad or irritable over a two-week period"), and no more diagnostic than the remaining six behaviors. Therefore, if participants are informed of the appropriate DSM-IV classification scheme, then the presence of an extreme behavior should be less likely to dilute the diagnosticity of the other behaviors on the self-report inventory. We hypothesize:

H3: Information about the relative diagnosticity of behavioral symptoms moderates the effect of the inclusion of an extreme behavior on judgments of risk, such that:

a. **inclusion of the extreme behavior decreases the diagnosticity of other behavioral symptoms in the absence of information about guidelines; but,**

b. **presence of information attenuates this effect.**

Study 2 tests whether the presence of the "suicide/death" symptom leads to respondents believing that the remaining eight symptoms are less diagnostic of depression, and whether feedback about the DSM-IV guidelines mitigates this effect.

Judgments of Controllability

A major issue in health psychology is persuading people who may be at risk, to accept their risk level (Menon, Block & Ramanathan, 2002; Raghubir &

Menon, 1998, 2001). Lin, Lin, and Raghubir (2003b) show that events that are perceived to be more in an individual's control are more strongly associated with the self-positivity bias (*i.e.*, the self is less at risk than others) than events that are perceived to be less controllable (such as cancer; see also Lin, Lin & Raghubir 2003b). They, however, focus on the control of an individual over contracting a disease. We propose that the perception of whether the disease is controllable via medical intervention is also a critical element in encouraging people to seek treatment. Getting people to accept their level of risk of depression may be a necessary, but insufficient condition to get them to seek treatment, especially as depression is believed by many to be a weakness rather than an illness (see for example Figure 1). Interventions that can simultaneously bring self-perceptions of risk in line with behavioral symptoms, and increase beliefs in the controllability of those symptoms, should have a favorable effect on help seeking.

We propose that the unambiguous symptom, "thoughts of suicide/death," is less likely to be explained away as a weakness, and more likely to be identified as a medical symptom. Its unambiguous measurement, low frequency of occurrence, causal clarity, and extremity of consequence together suggest that it is "abnormal," that is, symptomatic of a disease that medical intervention could assist with. The fact that depression includes this symptom should increase people's beliefs that it is controllable via intervention. We propose:

H4: The inclusion of the extreme behavior ("thoughts of suicide/death"):
a. increases perceived controllability of other behavioral symptoms; but,
b. reduces the estimated risk to oneself.

Study 3 shows that the presence of the "suicide/death" symptom increases perceptions of controllability of the remaining symptoms. However, its presence also leads to lower perception of own risk and intentions to seek help.

Study 1: The Persuasive Effect of Completing a Self-Diagnosis Inventory: Behavior Identification and Behavior Interpretation

Study 1 tests hypotheses 1 and 2 that argue that eight of the nine depression symptoms are poor "signals" to detect depression–they can exist to some degree (rather than be dichotomous present/ absent), are expected to occur only part of the time (rather than always), have poor causal clarity (as they may be associated with other conditions other than depression), are measured with error, do not have extreme consequences, and may occur frequently. In other words, they are "ambiguous"–making it possible for respondents to interpret them differently as a function of context. Operationally, we test that the administering an inventory will lead to perceptions of

higher risk of depression (H1: as people will *identify* depressive symptoms) but that self-reports of symptoms will be lower if they are elicited subsequent to risk estimates (H2: as respondents will *interpret* the symptom differently contingent on whether or not they believe they are depressed).

FIGURE 3
Information provided about Depression

Depression is a medical illness that can disrupt your life. It involves your whole body and affects your thoughts, emotions, behavior, and the way you feel about yourself. More than 18 million Americans suffer from some type of depression and one in eight people needs treatment for depression during his or her lifetime. Depression is not a character flaw. It is not a “mood,” or a personal weakness that you can change at will, or by “pulling yourself together.” Depression is one of the most under-diagnosed diseases in the United States. It is estimated that one out of 8 people needs assistance at some time in their lives.

There are many types of depression. One of the most serious types of depression is called “Major depression” and is associated with the second leading cause of teen deaths: suicide (accidents are the 1st). There are other, less extreme forms of depression. One such form is dysthermia (a low-grade depressive state associated with minor levels of symptoms but continuing over a long period of time, often years). Another type of depression is the seasonal affective disorder (or SAD, associated with the lack of sun in the winter months).

Depression is diagnosed by a trained medical practitioner, e.g., a psychiatrist. However, the only way people can be diagnosed is if they feel that they may be at risk, and meet their doctor. The fortunate news is that depression is treatable – using drugs, counseling, and other medical interventions. If you or anyone you know may be at risk for depression, it is recommended that you speak to your doctor. Should you feel the need to speak to a counselor on campus, please call the counseling services at the University Health Services.

Method

Participants. Study participants were 48 undergraduate students who received partial course credit for completing this study. The average age of respondents was 21.05 years. Twenty-seven were male, and 17 female (4 did not respond to the gender question). Of these, six participants reported they were currently being treated for depression. Since most of our measures have to do with behavioral symptoms and risk estimates, all analyses were conducted excluding these participants. The data was collected in the northeastern U.S. in late November and early December 2000.

Procedure. The study started with a general set of instructions about experiments, followed by some general information about depression (see Figure 3) prior to completing the questionnaire (explained in more detail under the Measures section

below). At the end of the questionnaire, respondents were asked to provide some background information about whether they were aware of any family history of depression, whether they had ever spoken to their doctor about the possibility of being depressed, whether had ever received treatment for depression, whether they were currently receiving treatment for depression, and whether they knew any one who was depressed. Subsequent to these 5 background questions, responses to which were elicited using a Yes/No scale, we asked them their gender and age. Debriefing was done collectively after the experiment was completed. We also ensured that we provided information about how and where students could seek help. Depression hotlines and access to professional counselors is free in the university where the research was conducted.

Design. We used a one-way, 2-level between-subjects design, where we manipulated the order of the self-diagnosis inventory and the elicitation of the judgments of risk. The format was a "Yes-No" checklist with all 9 behavioral symptoms. In the first condition, participants were asked to complete the self-diagnosis inventory. They were then asked to rate their own depression, their intentions to seek assistance, and their belief in the controllability of depression. In the second condition, they were asked to provide their estimates of depression, and intentions prior to completing the self-report inventory.

Table 1: Results of Study 1

Measures		Effect of Order of Elicitation (using Scale: "Yes-No" checklist)	
		Behavior-Risk	Behavior-Risk
Behavior Identification	% "At risk" as per DSM-IV classification	40.0**	9.5
	Mean number of behavioral symptoms engaged in	4.65**	3.09
Self-reported risk estimates	100-point probability scale	34.70**	19.81
	7-point likelihood scale	3.70*	2.76
Behavioral intentions	7-point intention scale to get screened for depression	2.50	2.76
	7-point intention scale to go to a doctor	1.95	2.14
Perceived controllability of depression		4.95	5.24

NOTE. The differences between the two experimental conditions are significant at: ** $p < .05$; * $p < .10$.

Measures. To assess self-estimates of risk, participants were asked: “On a scale of 0 to 100, where 0 = “Definitely not depressed” and 100 = “Definitely depressed,” how depressed would you categorize yourself?” This was supplemented with a second risk measure: “On a scale from 1 to 7, where “1 = not at all likely” and “7 = very likely,” please circle a number below to indicate how likely it is that you are depressed?” To assess behavioral intentions, study participants were asked: “If there were a free Depression Screening Day offered to students, staff and faculty on campus by the University Health Services, how likely are you to go for screening?” on a 7-point scale anchored at “not at all likely” and “very likely,” with higher numbers reflecting higher intentions to seek help. Similarly, we measured perceptions of controllability on a 7-point scale anchored at “not at all” and “very” controllable.

Results

Hypothesis 1–Estimates of risk of depression. On the 100-point probability scale, as predicted, those who had first completed a checklist reported a significantly higher level of risk of depression (M = 34.70) as compared to those who had not (M = 19.81, $F(1,40) = 4.01$, $p < .05$). The same pattern was present with the 7-point depression scale (Ms = 3.70 vs. 2.76, $F(1,40) = 2.98$, $p < .10$). Thus, responding to the self-diagnosis inventory increased perceptions of own risk.

Hypothesis 2–Behavioral reports. H2 predicted that people would be less likely to identify a behavior categorized as a symptom of depression if they had already judged themselves as being at low risk of depression. We examined this hypothesis in two different ways. First, we categorized respondents using the DSM-IV criterion: if they had checked at least 6 symptoms including symptoms 1 or 2, they were categorized as “at risk.”[ii] The proportion of respondents who were categorized “at risk” was then examined across the two conditions. Supporting a theory of behavior interpretation, we found that in the condition where self-reports were elicited after risk judgments, the proportion of respondents who checked symptoms that would place them in the “at risk” category fell from 40.0% to 9.5%, as compared to when the behavioral self-reports had been elicited first ($c^2(1) = 5.16$, $p < .05$).

Second, we examined the average number of symptoms checked off by participants as a function of whether they estimated their risk first or identified their behaviors first. The order of administration of the self-diagnosis inventory was significant ($F(1,40) =$ 4.19, $p < .05$), with more behaviors identified when the inventory preceded (M = 4.65) elicitation of risk estimates, as compared to when it followed it (M = 3.09). Therefore, H2 was supported.

There were no effects of experimental condition on intentions or judgments of the controllability of depression (all Fs < 1, see Table 1 for means). Thus, behavior identification, and risk assessment

may be insufficient at encouraging people to seek assistance.

Discussion

These results suggest that getting people to accept risk, which is effective at generating help-seeking behavior in the domains of AIDS (Raghubir & Menon, 1998, 2001), and hepatitis C (Menon et al., 2002), may be inadequate to prompt preventative action in the domain of depression. Central to this issue is the question of the ambiguity of the behaviors symptomatic of depression. Study 2 investigates a possible antecedent of this: whether the set of behavioral symptoms included can influence the diagnosticity of the symptoms themselves.

Study 2: Altering The Diagnosticity Of The Behavioral Symptoms

The objective of Study 2 is to examine the effects of the behavioral symptoms included in the self-diagnosis inventory on judgments of the diagnosticity of the behavioral symptoms for depression (H3). We proposed, that the perceived strength of depression symptoms (in diagnosing depression) would be contingent on their diagnosticity *relative* to other symptoms presented on the same self-diagnosis inventory. When a symptom with greater causal clarity relative to the others, greater extremity of consequence, a lower frequency, and lower measurement error: "suicide/ death," is present, then the remaining symptoms that are more ambiguous would be judged less diagnostic.

Method

One hundred undergraduates participated in this study for partial course credit. We used a 2 (include vs. exclude the extreme behavior, "thoughts about suicide/death") x 2 (information about guidelines developed by DSM-IV: present/absent) between-subjects design. Participants were randomly assigned to one of the four experimental cells. They were given a brief introduction to depression, as in Study 1, and then were either given the DSM-IV guidelines or not, depending on the feedback condition they were assigned to. Participants then rated each of the eight (or nine including "thoughts of suicide/death") behavioral symptoms on whether they believed that each symptom was indicative of being depressed. These ratings were elicited on seven-point scales anchored at "not at all" to "very" indicative of being depressed.

Results

Assessing the diagnosticity of the extreme behavior. We first examined whether "thoughts of suicide/death" is, in fact, perceived to be more diagnostic of depression than the other symptoms. In the condition where this symptom was included, the mean rating for the suicide symptom was 6.23 on a 7 point scale, which is significantly greater (p < .05) than the means of seven of the remaining eight symptoms, except feelings of guilt (M = 5.86; see Table 2), that was the second highest rated in terms of diagnosticity. Given this pattern, we next examine whether the presence of the suicide symptom led to

perceptions of lower diagnosticity for the remaining eight symptoms.

H3--Altering the diagnosticity of the behavioral symptoms. Hypothesis 3 argues that information about DSM-IV guidelines and the inclusion/exclusion of the extreme behavior should interact, such that when there is no information about the DSM-IV classification scheme, the absence of suicide/death should increase the perceived diagnosticity of the remaining behavioral symptoms on the depression inventory. A 2 (include vs. exclude extreme behavior) x 2 (DSM-IV guidelines: present/absent) MANOVA of the 8 behavioral symptoms revealed a significant interaction effect ($F(8,82) = 2.86$, $p < .01$). The pattern was as hypothesized and is presented separately for each symptom in Table 2.

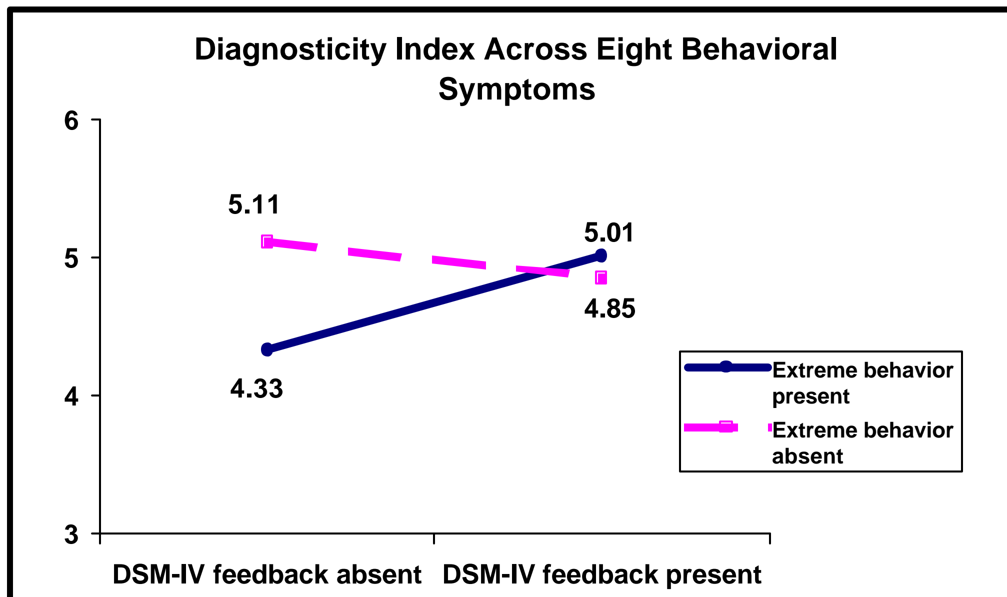
Table 2: Results of Study 2

Mean rating of how indicative each symptom is of depression (7-point scale; 1 = not at all indicative; 7 = very indicative)	No Information about DSM-IV Guidelines		Information given about DSM-IV Guidelines	
	Extreme behavior present	Extreme behavior absent	Extreme behavior present	Extreme behavior absent
Index of eight behavioral symptoms	**4.33****	**5.11**	**5.01**	**4.85**
Loss of interest or pleasure in activities you used to enjoy, such as hobbies or sex	4.35**	5.23	5.75	5.67
Feeling unusually sad or irritable	4.04**	5.36	5.83**	5.25
Sleep disturbances, such as trouble falling asleep, waking up too early, or oversleeping	4.04**	5.18	4.21*	3.63
Decreased ability to concentrate	3.83**	4.68	4.58	4.46
Changes in appetite	4.35	4.68	4.08	4.33
Feeling more tired than usual	4.00*	4.46	4.50	4.25
Feelings of guilt or worthlessness	5.44**	6.14	5.83	6.04
Restless or slowed activity noticed by other people	4.61**	5.18	4.83	5.17
Thoughts about suicide or death	6.36		6.09	

NOTE. The differences between the two experimental conditions where extreme behavior is present vs. absent within the information about DSM-IV guidelines condition are significant at: ** $p < .05$; * $p < .10$.

For ease of exposition, we describe the pattern of results for an index created by averaging the perceived diagnosticity scores of the eight symptoms ($\alpha = .86$). The means for this index are depicted pictorially in Figure 4. When people were not provided with the DSM-IV classification information, they believed that the eight behaviors were more diagnostic of depression when suicide was excluded from the inventory ($M = 5.11$) as compared to when it was included ($M = 4.33$; $p < .05$). However, when the DSM-IV information was provided to respondents, the presence of the extreme behavior did not exert an effect (Ms = 5.01 vs. 4.85 for present vs. absent respectively). The main effect of the DSM-IV classification scheme was also significant ($F(8,82) = 5.24$, $p < .01$).

Figure 4:
Study 2–Altering the Diagnosticity of the Content of a Self-Diagnosis Inventory



Discussion

The results of this study provide evidence that people deduce meaning from the behavioral symptoms that comprise the inventory. When an extreme behavior is present among more ambiguous behaviors, people deduce that the other symptoms are less diagnostic. However, providing criteria by which classification takes place is effective, not only because it increases the perceived diagnosticity of the ambiguous behavioral symptoms in the inventory, but also because it attenuates the effect of inclusion of extreme behavioral symptoms in the content of the inventory.

While providing DSM-IV guidelines is effective at increasing the perceived diagnosticity of the remaining behavioral symptoms, depressives must believe that the symptoms of depression are controllable if they are to seek assistance. The next study examines whether the presence of the extreme behavior affects perceptions of controllability of the remaining symptoms.

Study 3: The Perceived Controllability of the Symptoms of Depression

Study 3 explores the consequences of the inclusion or exclusion of the extreme behaviors on self-risk estimates and intentions to take action. The unambiguously extreme nature of the behavior may operate as a double-edged sword. On the one hand, it may overwhelm perceptions of the diagnosticity of the other symptoms (Study 2), but, on the other, its extreme nature may lead to beliefs that depression (and its symptoms) is controllable. Note that given that these two routes exert opposite effects on the intentions to seek help, the net effect on that variable will be contingent on the strength of the two effects, and cannot be hypothesized *a priori*.

Method

Thirty-four undergraduates participated in this study for partial course credit. We used a one-way between-subjects design including vs. excluding the extreme behavior: "thoughts about suicide/death." Participants were randomly assigned to one of the two experimental cells, given a brief introduction to depression, as in earlier studies, and then asked to rate each of the eight (or nine including "thoughts of suicide/death") behavioral symptoms on whether they believed that each symptom was controllable for a person suffering from depression. These ratings were elicited on 7-point scales anchored at "not at all" to "very" controllable. They then rated their likelihood of going to a doctor to talk about their own depression and rated their belief in their own likelihood of depression.

Results

H4--Perceptions of controllability, perceptions of risk and intentions to seek assistance. As argued, the presence of "thoughts of suicide or death" increased perceptions in the controllability of the remaining symptoms, and reduced risk estimates and intentions. A one-way multivariate ANOVA on beliefs regarding the controllability of the remaining eight symptoms, using the presence/absence of the extreme symptom as a between-subjects factor showed a main effect of experimental condition ($F(10,23) = 2.98$, $p < .05$).

All eight behavioral symptoms were rated as more controllable when the suicide symptom was present in versus absent from the inventory (see Table 3). The presence (versus absence) of the suicide symptom reduced beliefs that a person was at risk (Ms = 2.38 vs. 3.72, $F(1,32) = 5.63$, $p < .05$).

Table 3: Results of Study 3

Measures	Extreme Behavior ("thoughts of suicide/death")	
	Present	Absent
Intentions to see a doctor (7-point scale)	2.12*	3.00
Self-reported risk estimates (7-point scale)	2.38**	3.72
Mean perceived controllability of each behavioral symptom (7-point scale; 1=not at all controllable; 7=very controllable)		
Loss of interest or pleasure in activities you used to enjoy, such as hobbies or sex	4.38	3.72
Feeling unusually sad or irritable	4.19	3.28
Sleep disturbances, such as trouble falling asleep, waking up too early, or oversleeping	4.25*	3.17
Decreased ability to concentrate	4.19**	2.78
Changes in appetite	3.63*	2.61
Feeling more tired than usual	4.25*	3.11
Feelings of guilt or worthlessness	4.38	3.61
Restless or slowed activity noticed by other people	4.81**	3.22
Thoughts about suicide or death	3.59	

NOTE. The differences between the two experimental conditions are significant at: ** $p < .05$. and * $p < .10$.

Intentions to seek assistance were in the same direction as the estimated risk, but showed a weaker effect (***M***s = 2.12 vs. 3.00 for present vs. absent respectively, $F(1,32) = 3.59$, $p < .07$), presumably reflecting the opposing effects the presence of this symptom has on beliefs of controllability versus beliefs of diagnosticity (Study 2).

Insert Table 3 around here.

Discussion

The results of this study provide further evidence that people deduce meaning from the behavioral symptoms that comprise a depression inventory. They highlight the potential problem associated with dropping an extreme behavioral symptom from the set. At a theoretical level, the results of this study suggest that the content of the

behavioral inventory serves an informative function that can translate into a persuasive role. These results add to the literature on cognitive aspects of survey methods that shows that the manner of construction of a questionnaire affects the reports elicited, and can, in turn, affect later responses (see Sudman, Bradburn & Schwarz, 1995 for a review).

General Discussion

Implications for Survey Methodology and Questionnaire Design

Three studies systematically examined how the presence and construction of self-report inventories can assist respondents in identifying and interpreting behavioral symptoms: affecting beliefs of whether symptoms are diagnostic of depression, and whether they are controllable. Consequently, they affect their perceptions of own risk and intentions to seek assistance. Study 1 starts by showing that merely administering an inventory has a positive persuasive effect, and increases people's perception of their own risk. Studies 2 and 3 examine the effect of the inclusion/exclusion of a single extreme behavior symptomatic of depression (thoughts of suicide or death) along with the 8-item inventory. Results show that its presence allows potential for interpreting the remaining behavioral symptoms, allowing respondents to self-select out of the "at-risk" category. While Study 2 shows that the extreme behavior reduces the diagnosticity of the behavioral responses of the 8 other behavioral symptoms in the list, Study 3 shows that the behavioral symptom, "thoughts of suicide or death," is a double-edged sword, with its presence persuading people that the symptoms of depression are more controllable. This positive effect on risk estimates conflicts with the negative effect on perceived controllability. Across the studies, the evidence suggests that the manner in which one asks a question affects the manner of use of a self-diagnosis inventory, and further affects the manner in which the inventory is used to make judgments about the risk of depression.

Implications for Self-Diagnosis Inventories in General

The results of the three studies reported in this paper help delineate the process by which people answer questions in a self-diagnosis inventory. Understanding this process enables us to better design these inventories such that self-reports generated can be higher in validity. The implications of this research are that response formats: checklists versus subjective frequency scales, lead to people interpreting behavioral symptoms differently. Further, the presence of an extreme behavior in the checklist allows people to self-select themselves out of the "at risk" category.

At a general level, we show that people differ in the likelihood of reporting susceptibility to behavioral symptoms with extreme consequences. Those who are susceptible to behavioral symptoms with extreme and those with moderate consequences should be

able to spot their risk level accurately. However, those who are prone to either one of the two types of behavioral symptoms may be at risk, but may not be cognizant of their susceptibility, because they can categorize themselves as "not at risk" for a sub-set of the behavioral symptoms presented in a self-diagnosis inventory. Such a group exists for depression as demonstrated in this paper.

The issue of self-diagnosis has implications beyond depression. There is a genre of physiological health problems that are diagnosed using self-reported psychological inventories. Besides depression, these include alcoholism and the attention-deficit syndrome (ADD). Alcoholism is defined by Alcoholics Anonymous as allergic physiological reaction to the consumption of alcohol with the consequence of an inability to stop drinking once the first drink has been consumed (Alcoholics Anonymous World Services, Inc., 1998). ADD is another psychological disease with a physiological basis, relying on self- and other- inventories. These inventories invariably rely on a set of behaviors characteristic of the malady. The findings of this research apply to problem-detection in these domains too. For example, in the context of alcoholism, binge drinking would be a behavior with extreme consequences that is often used in a self-diagnostic inventory together with a behavior such as daily drinking which has less extreme consequences. Behaviors associated with alcoholism are unambiguous, but differ in terms of their extremity. On the other hand, behaviors associated with ADD differ in terms of their ambiguity, but are less extreme. Examining whether the effect of including/ excluding different behaviors from a self-diagnosis inventories replicate to these contexts would help disentangle whether it is the extremity of the consequences of a behavior, its lower likelihood of being engaged in, or its relatively lower ambiguity that leads to the effects noted.

Other diseases also rely on self-diagnosis at an initial stage. For example, the symptoms of Type I diabetes include "increased thirst and urination, constant hunger, weight loss, blurred vision, and extreme tiredness." Note that these symptoms are not unlike the ambiguous symptoms of depression. Type II diabetes is characterized by "feeling tired or ill, frequent urination (especially at night), unusual thirst, weight loss, blurred vision, frequent infections, and slow healing of sores. The symptoms of type 2 diabetes develop gradually and are not as noticeable as in type 1 diabetes." (http://my.webmd.com/content/article). Notably, the list omits "tingling hands and feet," a symptom that is less ambiguous and shares many of the characteristics of the "thoughts of suicide/ death" symptom in the depression inventory (*i.e.*, it has high causal clarity, low frequency, is a present/ absent event rather than a state etc.).

Signal Detection Theory Implications

The primary contribution of this research to Signal Detection Theory is the idea that the detection potential of a signal is contextually determined. It is a function of the

other signals that surround it as well as its own innate ability to predict. The concept that signals vary as a function of their *degree of existence* is conceptually similar to SDT's "threshold of detectability." In the current context, we argued that symptoms that are not easily categorized by their presence or absence but operate instead on a continuum, can be interpreted differently by different people in different contexts. The degree of existence of a symptom is an innate aspect of a signal, but the manner in which it is perceived to be informative is again contextually determined. We also proposed that the consistency between an event occurring and how frequently it is expected to occur affects the perceived strength of a signal. As the expectation of occurrence is itself a function of whether the event is a state of being or a specific event, specific events are perceived to be stronger signals than are states of being.

Drawing the parallels between SDT and how consumers use symptoms to self-diagnose suggests a novel new approach to study how people judge the likelihood of an event either in the future, at present (as in this paper), or retrospectively in the past.

Consumer Welfare Implications

The context in which we tested these effects was depression. Depression is estimated to affect 9.5 percent of the population in any one-year period, or about 18.8 million Americans (Robins & Regier, 1990). Major depression is the leading cause of disability worldwide (Murray & Lopez, 1996; www.nimh.nih.gov). Depression has been linked with cancer, HIV, smoking, substance abuse, osteoporosis, stroke and heart disease (Cargill et al., 2001). It is associated with heavy economic ($30-40 billion a year) and social costs (www.nimh.nih.gov), and encompasses the loss of time and productivity, personnel replacement, medical care, and loss of life (www.depression.org). The World Health Organization's *World Health Report 2000* concludes that depression claims more years than war, cancer, and HIV/AIDS together (www.who.int/whr). It is only second to heart disease as the highest cause of lost working days in the United States. Some estimate that as many as 72% of people in the work force are depressed. Many have been concerned with its near epidemic-like rise over the last few decades with younger cohorts reporting an increasingly higher incidence of depression (Murray & Lopez, 1996). Depression has also been linked with other behavioral symptoms with adverse health consequences, such as sex, alcoholism, and smoking (*San Francisco Chronicle*, November 22, 2000). While women have been found to be more prone to depression, this may simply reflect their higher likelihood of seeking assistance. In fact, the psychosocial implications of being depressed may be worse for men due to the greater stigma attached to depression for this category (Russell, 2000).

About half of those estimated to be at risk of depression do not seek assistance. In addition, untreated depression has been

documented to be the leading cause of suicide, which is the second leading cause of death for 15-24 year olds generally (www.depression.org), as well as college students (Jamison, 1999). NIMH reports that 90% of suicides are attributable to depression or another diagnosable mental or substance abuse disorder (www.nimh.nih.gov). The issue at hand is why people at risk of serious depression do not seek assistance, especially since anti-depressant drugs have been shown to be effective as much as 80 percent of the time, particularly when taken along with professional therapy (www.depression.org).

There are a number of on-line sites that are targeted towards the detection of depression (*e.g.*, www.wingofmadness.com, www.pslgroup.com, www.depression.com, www.nimh.nih.gov/publicat/depressionmenu.cfm, www.depression-screening.org/screeningtest (National Mental Heath Association), www.nmha.org/ccd/index.cfm, www.ndmda.org, and www.med.nyu.edu/Psych/screens/depres.html. These sites actively recommend that the web-site visitor seek help if their "depression score" is above a certain threshold after they self-administer the depression inventory. Each website has a battery of questions that are self-administered. Advertisements encouraging people to go for screening or talk to their doctor also use some form of a self-diagnosis inventory. A recent advertisement by Long's Drugs, a national retailer, highlighted the 9 symptoms of depression (see Figure 1), and urged the reader to seek medical advice if "they" or "someone they knew" suffered from any of them. The results of this paper show that the format and content of these inventories should be chosen with care.

Areas for Future Research

The symptom, "thoughts of suicide or death," is a double-edged sword: while on the one hand its presence decreases perceptions of the diagnosticity of the remaining behavioral symptoms, its absence reduces perceptions of the controllability of depression symptoms. As both risk perceptions and beliefs in controllability are key to persuading people to seek assistance, it may be necessary to retain the extreme behavior in the inventory while mitigating the effect it has on perceptions of the diagnosticity of the remaining eight symptoms.

If perceptions of controllability show an opposite effect to those of risk perceptions, the net effect on behavioral intentions may mirror self-risk estimates rather than the pattern for perceived controllability. This is consistent with prior literature that has shown that self-risk estimates are higher when an event (e.g., cancer) is perceived to be less controllable (Lin, Lin and Raghubir, 2003b). This leads to a reduction in the self-positivity bias. Lin et al. argue that this is because an event over which an individual does not have much control does not implicate one's self-esteem.

Therefore, accepting a higher risk level for such an event is easier in terms of the motivation for self-esteem maintenance, than is accepting higher risk levels for an event that an individual believes they can control the outcome of. It is possible that respondents will answer in terms of their perception of control of contracting the disease, rather than perception of control of curing the disease. Ways to retain the positive effects of a symptom (beliefs that the disease is curable) while mitigating its unfavorable effects (beliefs that the symptom does not cause the disease), is presented as an area for future research.

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[i] We thank an anonymous reviewer for pointing out some of these sources of behavioral ambiguity.

[ii] The pattern of results is identical if the DSM-IV cut-off used is 5 behaviors of which one must be the 1st or 2nd symptom. We use 6 symptoms for categorization in this study that used all 9 symptoms, to allow comparison with later studies where the “thoughts of suicide/death” behavioral symptom is omitted from the inventory, leading to a total of eight behaviors. For those studies, given the overall low likelihood of responding “yes” to the suicide question, we use a cut-off of 5 behaviors.