

SYMPTOM REPORTING IN RESPONSE TO SOCIAL
EXCLUSION: A SIGN OF DISTRESS
OR A DISTRESS SIGNAL

by

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ABSTRACT

Excessive illness behavior is problematic because it is costly, difficult to treat and common. In addition, previous studies show that interpersonal vulnerabilities are related to high symptom reporting. The aim of this study is to investigate the ability of two theories, the Social pain Physical Pain Overlap Theory (SPOT) and the Interpersonal Theory, to predict physical reporting. While SPOT theory defines physical distress as a byproduct of Anterior Cingulate Cortex (ACC) activation in the brain, according to the Interpersonal theory, it is a self-protective strategy against the interpersonal stressors. Even though results did not reveal a straightforward evidence for the predictions, the vulnerability factors interacted with the publicness of the symptom reporting, along the same lines as the interpersonal theory.

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INTRODUCTION

In 1993, Pilowsky stated that a patient should be diagnosed with ‘excessive illness behavior’ if he or she experiences, perceives, evaluates and responds to his or her own health status in a maladaptive way, even after an appropriate, detailed and accurate physical examination is provided and the doctor has explained the situation clearly to the patient. These maladaptive responses may include talking about one’s illness to others and going to the doctor frequently. In other words, excessive illness behavior can be defined as exaggerating the severity of physical symptoms and the degree of disability they cause. Even though excessive illness behavior represents a big problem for psychiatric and medical professions, the psychology of excessive illness behavior is not well understood. The present study is designed to test two possible psychological processes that might contribute to excessive illness behavior.

Excessive illness behavior represents a serious problem for many reasons. First of all, it is very common. Recent research shows that almost 20% of patients in primary care settings have a chronic problem that cannot be medically explained (Fink, 1992). Patients with medically unexplained symptoms (MUS) have frequent specialty care and emergency visits (Barsky et al., 2006). Secondly, excessive illness behavior is difficult to treat effectively. Different treatment techniques have been used, but a meta-analysis of all controlled studies was not able to show that one is much better than the other (Hunter & Maunder, 2004). Finally, excessive illness behavior contributes to high medical costs both in Europe and in the US. In the US, according to Barsky and his colleagues (2005), patients with excessive illness behavior use health care service

significantly more than other patients without this problem, and cause high annual medical care costs. They estimated more than \$250 billion is spent annually to assess and treat MUS. In England, Birmingham and her colleagues (2010) concluded that somatization is an economic burden among the working-adult population. For the year 2008-2009, they calculated a £3 billion incremental health care cost associated with MUS, representing 10% of the annual National Health Service budget. Additionally, productivity loss (i.e. sickness absence) costs over £14 billion for that year. Thus, excessive illness behavior is an important problem because it is common, difficult to treat, and costly.

There is a correlation between excessive illness behavior and diverse indicators of interpersonal problems. At least two theories explain this relation: social pain / physical pain overlap theory (SPOT) and interpersonal theory. According to the SPOT theory, excessive illness behavior might be a product of a specific pattern of brain activation related to both physical and social distress. Since the proceeding social pain and physical pain share the same brain regions, one might automatically activate the other. Alternatively, people may intentionally show excessive illness behaviors. They might be utilized for managing interpersonal relations, and protect people from rejection and criticism. The purpose of this study is to assess the relative importance of these two mechanisms.

Interpersonal Issues and Illness Behavior

From many perspectives, studies show that interpersonal problems are correlated with excessive symptom reporting. First of all, research shows that *social support* is negatively correlated with symptom reporting. People who have more social support during painful and/or stressful situations report fewer symptoms (Hoogendoorn et al, 2000; Zaza & Baine, 2002).

Furthermore, many studies support the idea that *poor interpersonal attachment* is correlated with high symptom reporting. Research shows that not only somatization but also MUS is correlated with insecure attachment style (Stuart & Noyes, 1999; Ciechanowski, 2002; Hunter & Maunder, 2004). Illness behavior is correlated with some *personality disorders* too. According to Lieb and his colleagues (2004) people with borderline personality have problems in affect regulation, impulse control, interpersonal relationships, and self-image. These patients experience significantly more childhood sexual and physical abuse (Ogata et al, 1990; Herman et al, 1989, Modestin et al, 2005). In the same study, Modestin indicates that self-reported childhood abuse and somatization are positively correlated among young subjects of both sexes. Additionally, Salmon and Calderbank (1996) found that people who experienced childhood sexual and physical abuse have more hospital visits and surgery in adulthood. Their results also indicated that somatization and hypochondriasis are more common among these people.

In addition to social support, insecure attachment and personality disorders, previous research shows that excessive illness behavior is correlated with *high neuroticism* (Fava, 1982), *low conscientiousness* (Feldman et al., 1999), and *the external components of contingencies of self-worth* (Sargent, Crocker & Luhtanen, 2006). Furthermore, several studies have reported that low self-esteem is related to high social distress in response to social exclusion. Specifically, people with low self-esteem reported more social pain after and reacted more extremely to social exclusion relative to their high self-esteem counterparts (Sommer, Williams, Ciarocco & Baumaister, 2001; Onoda et al., 2010).

In conclusion, it is evident that there is a connection between interpersonal sensitivity and symptom reporting, but the nature of this relationship is not clear. There are three general theories explaining the mechanisms underlying this relationship. First of all, according to the

information processing theory, it is possible that certain psychological vulnerabilities cause people to interpret their physical signs and symptoms catastrophically. On the other hand, according to the SPOT theory, interpersonal problems create social distress. Since social and physical distress share the same neural circuitry, interpersonal threat may trigger an experience of physical distress. Thus, people with social pain report more symptoms or greater functional impairment. Alternatively, according to the interpersonal theory, psychological features arising from interpersonal problems (i.e. poor attachment, low self esteem) create distress. People report more symptoms to elicit reassurance and caring from others in order to decrease interpersonal threat. I am particularly interested in two of these three theories; the SPOT theory and the interpersonal theory. In the next part, after providing a brief description for the information processing theory, the SPOT theory and the interpersonal theory will be explained in detail.

Information Processing Theory

In 1988, Taylor and Brown reviewed the existent literature and concluded that ‘normal people’ develop a positive perspective to perceive reality. They are not only optimistic about their future and their ability to control situations, but also positively biased in their self-evaluations. These positive illusions are adaptive, because they are correlated with more happiness, productivity, and care for others. In addition, the illusion of high control over environment and self-efficacy motivate sick people to fight against their health problems. Along the same lines, it is possible that people with excessive illness behavior have negative interpretation bias. Barsky, Wyshak and Klerman (1990) showed that patients with hypochondriasis have increased sensitivity towards bodily sensations, and they interpret these signs as abnormal and pathological. In conclusion, excessive illness behavior might result from a negative information processing bias. High sensitivity towards bodily sensations and negative

interpretation of them might account for the development and persistence of excessive symptom reporting.

Social Pain / Physical Pain Overlap Theory (SPOT)

According to the International Association for the Study of Pain Task Force on Taxonomy (1994), *physical pain* is defined as the annoying sensory and emotional experience as a result of actual or potential injury. In 2004, Eisenberger and Lieberman defined *social pain* as a “distressing experience arising from the perception of actual or potential psychological distance from close others or a social group” (p.294). According to social pain / physical pain overlap theory, the neural circuitry in which these two pains are processed overlaps. This system is evolutionarily adaptive because it is responsible for detecting cues of socially and physically dangerous situations and it recruits attention and energy to cope with the threat (Eisenberger & Lieberman, 2004).

Studies on human and other mammals show that the anterior cingulate cortex (ACC) is activated in response to both physical pain and social conflict. Therefore, it is called a neural alarm system. Specifically, the dorsal ACC is responsible for discrepancy detection, and its activation increases in distressing situations. In 2003, Eisenberger and his colleagues measured the activation level of the ACC and right ventral prefrontal cortex (RVPPFC) in response to social inclusion and exclusion cues. They aimed to support the ACC’s activation in response to felt unpleasantness and RVPPFC’s regulatory function on the ACC. In the study, participants were asked to play a preprogrammed ball-tossing game (cyberball) from which they were ultimately excluded. ACC was more active when participants were excluded and it was positively correlated with self-reported distress and negatively correlated with RVPPFC activation. Later, in

2006, Eisenberger and his colleagues were able to show a correlation between sensitivity to physical and social pain. After being exposed to a stressful situation (social exclusion), participants' sensitivity to physical pain increased. In other words, as participants' report of social distress increased, they reported higher pain unpleasantness.

Other studies support this overlap. In 2000, Hoogendoorn and his colleagues found that low social support creates stress both at home and at the workplace. This creates a risk factor for the occurrence of back pain. Additionally, Zaza and Baine's review of the literature in 2002 supported the negative correlation between pain reports and social support among patients with cancer. Lastly, Nelson and Panksepp (1998) stated that drugs alleviating physical pain such as oxytocin and opioids reduce social pain among animals and humans. In 2005, MacDonald and Leary supported this claim with their review. They indicated that rejection or separation reduce opioid levels in the body which has been called a regulator of the physical pain. Oxytocin that regulates and facilitates social behaviors such as maternal behavior and mate-selection also reduces sensitivity to physical pain. The reverse pattern has also been shown. Some kinds of antidepressant, reduces physical pain (Nemoto et al., 2003) and have been also used for chronic pain treatment (Eisenberger & Lieberman, 2004).

To sum up, physical symptom reporting might be a byproduct of social distress because social pain and physical pain are processed along the same neural path in the brain. Not only the studies on ACC activation and social support, but also the research on hormonal change in response to social distress support this claim.

Interpersonal Theory

According to the SPOT theory, heightened symptom reporting is caused by the activation of distress centers in the brain. It is unintentional and automatic. An alternative theory is that illness behavior serves a strategic and functional purpose. The sick role may be used to ameliorate interpersonal conflicts and to improve self-image according to the interpersonal theory. Three lines of evidence support this claim.

First of all, research on Factitious Disorder (FD) supports the intentional and strategic use of illness behavior. Factitious disorder patients feign illness and produce signs and symptoms on purpose (Bauer & Boegner, 1996; Phillips, 2001). Research also shows that patients with factitious disorder have poor self image, low self esteem, identity problems similar to borderline or narcissistic personality features and inadequate sense of self (Ehlers & Plasmann, 1994; Spivak, Rodin & Sutherland, 1994). The SPOT theory explains why these people might feel sick when they are not, but cannot explain why they intentionally feign being sick.

In addition, patients with FD and in high need of self-enhancement also have high symptom reporting most likely because the sick role provides people specific benefits. According to Hamilton and his colleagues (2003), the sick-role can be used to enhance one's self. In their article, they summarized three psychological benefits of the sick role. First of all, the sick-role may provide people with a way to accumulate and then display medical knowledge. Furthermore, having rarely-encountered sicknesses may make people feel unique, and uniqueness contributes to high self-esteem and positive self-image. Lastly, as people start visiting health centers frequently, they come to know more physicians closely and even more personally. They even may have a chance to meet prestigious doctors. These contacts may improve their self-esteem. In 1983, Smith and his colleagues supported the self-protective role of

illness behavior. In an evaluative setting, poorly performing subjects reported more physical symptoms and used poor health as an excuse. To sum up, the sick-role provides many ways to enhance self; therefore, it is reasonable to claim that it is intentional.

Lastly, specific correlation between attachment and symptom reporting also supports the strategic purpose of illness behavior. In 1999, Stuart and Noyes reported a correlation between anxious attachment and somatization. Later in 2002, Ciechanowski and his colleagues studied the relationship between attachment and MUS by comparing differently attached participants' medically unexplained symptoms over the course of their lifetimes. Participants were categorized into four attachment styles: secure, dismissing, preoccupied and fearful. They found that compared to dismissing or securely attached participants, participants with fearful attachment reported more medically unexplained symptoms. In addition, continuous ratings showed that greater degrees of preoccupied or fearful attachment are correlated with greater number of MUS reporting. Furthermore, in 2004, Hunter and Maunder pointed out the important positive correlation between insecure, specifically preoccupied attachment style, and MUS reporting. In conclusion, attachment related findings tend to lean toward anxious-ambivalent attachment that is characterized by a need to attach but afraid of being hurt. These people want others to care for them, but they are afraid of being rejected and abandoned one day. For them, symptom reporting is a good way of seeking continuous care from others. Therefore, excessive symptom reporting is both a self-protective and interpersonal strategy.

Through What Process is the Sick Role Beneficial?

In 1976, Coyne pointed out the reassurance seeking behavior of people who are depressed. According to Coyne, depressed people seek reassurance that people around them truly care for them. Even though others provide reassurance, depressed people do not feel satisfied and

ask for further reassurance. In time, extreme and frequent reassurance seeking results in rejection of depressed people by the people around them (cited in Joiner et al, 2001). Later, Swann and his colleagues (1990) explained two contrasting needs of depressed people: 1) affectively satisfying, self-enhancing positive feedback, and 2) cognitively confirming, self-consistent negative feedback. They need positive feedback to feel good and safe. On the other hand, this positive feedback conflicts with what they think about themselves, so they need affectively aversive feedback which is cognitively consistent and meaningful to them. In 2001, Joiner et al. combined these two theories. According to them, besides depression itself, ‘self-enhancing reassurance seeking’ and ‘self-verifying negative feedback seeking’ results in rejection from others, and initiates a cycle of heightened insecurity leading to further reassurance seeking.

A similar process may explain the connection between poor attachment and illness behavior. According to Stuart and Noyes (1999), because most of the people with somatization are insecurely attached, their relations with the people around them eventually produce rejection. This process may take place as follows: These people report symptoms to elicit care and support from others. People may or may not believe that they are sick. In either case, even though people reassure their care, this may not satisfy patients with MUS and they report more symptoms. In time, extreme and frequent symptom reporting results in rejection from others. In other words, because of their attachment problem, these people show reassurance seeking which ultimately and paradoxically leads to rejection from others.

In conclusion, interpersonal theory might account for the use of excessive illness behavior in socially stressful situations because it protects these people from rejection and criticism from other people, up to a point. Furthermore, symptom reporting is high for people with anxious-ambivalent attachment who want social connection, but also fear it.

Fundamental Differences Between the Two Theories

Basically, these two theories differ from each other in terms of their definition of physical distress. The SPOT theory claims that the physical distress is real and a byproduct of the ACC activity that serves no particular function. It is a natural consequence of the unintended activation of brain regions related to distress. Conversely, the interpersonal theory claims that illness behavior is strategic and self-presentational. It might serve to elicit caring from others.

PRESENT STUDY

In this study, the prediction of these two theories regarding underlying mechanisms of symptom reporting was assessed via the interaction of two key variables: 1) social exclusion and 2) publicness. Interpersonal insecurity was manipulated via social exclusion. Depending on their assigned condition, participants were either excluded or included by others during a virtual ball-tossing game. At the end of the game, they were asked to report physical symptoms, which they were told would either be kept private, shared with the experimenter, or shared with the people with whom they played the ball-tossing game. Overall, I aimed to see that participants in the excluded condition would report significantly more symptoms than participants in the included condition. If symptom reporting is strategically used to manage interpersonal interactions, a significant interaction between social exclusion and publicness condition was predicted. Among excluded participants, only participants in public conditions would show high symptom reporting. However, if symptom reporting is a byproduct of the shared neural circuitry of social pain and physical pain, social exclusion but not the publicness of symptom reporting would matter. In other words, only a main effect for social exclusion was predicted. Importantly, if both main effects and the interaction were significant, I could conclude that both processes may be operating to affect symptom reporting.

Method

Design

The experiment employed a 2 (included vs. excluded) X 3 (private vs. public-experimenter vs. public-group) between-subjects factorial design.

Participants

The participants were 62 undergraduate introductory psychology students from The University of Alabama who received course credit for their participation. Three of them who showed high suspicion about the procedure were eliminated from the analysis. The subjects were 80% white and 76% female, with a mean age of 19 yrs.

Measures

In a prescreening procedure, all participants completed The Experiences of Close Relationships Scale-Revised (ECR-R), The Contingencies of Self-Worth Scale, The Rosenberg Self-Esteem Scale (SES), The Positive Affect Negative Affect Scale (PANAS), the Screening for Somatoform Symptoms (SOMS-7) and the Big Five Inventory (BFI). A general impairment questionnaire was used to measure the key dependent variable.

The Experiences of Close Relationships Scale-Revised (ECR-R): Fraley and his colleagues revised Brennan, Clark, and Shaver's (1998) Experiences in Close Relationships (ECR) questionnaire in 2000. It is used to assess individual differences in anxious and avoidant attachment via a 7-point scale. The ECR-R is a valid and reliable measure of adult romantic attachment (Sibley, Fischer & Liu, 2005).

The Contingencies of Self-Worth Scale (CSW): CSW assesses self-esteem in seven domains: academics, appearance, approval from others, competition, family support, God's love, and virtue. It is composed of 35 items and measured with a 7-item scale. All subscales have high internal consistency and test-retest reliability (Crocker et al, 2003).

The Rosenberg Self-Esteem Scale (SES): The 10-item self-administered Rosenberg SES is designed to measure self-satisfaction, self-worth, self-respect and personal pride (Rosenberg, 1965). With a 4-point scale, it is easy to administer and high in unidimensionality and face validity (Robinson, Wrightsman & Andrews, 1991).

The Positive Affect Negative Affect Scale (PANAS): The PANAS is an internally consistent and stable measure of both positive (i.e. excited) and negative affect (i.e. irritability) (Watson, Clark and Tellegen, 1988). The 20-item PANAS uses a 5-point scale.

The Screening for Somatoform Symptoms (SOMS-7): The SOMS-7 is composed of 53 somatoform symptoms. Participants are expected to select the symptoms they had during the last seven days and rate their severity. Research shows that it is high in reliability and validity (Rief & Hiller, 2003).

The Big Five Inventory (BFI): BFI is a personality scale composed of 44 short-phrase items. Five personality dimensions are as follows: agreeableness, neuroticism, extraversion, conscientiousness and openness to experience. In 1999, John and Srivastava showed that BFI is adequately reliable and a valid measure of personality.

The General Impairment Questionnaire: Participants were asked to rate their general impairment on a 10-item scale. They rated their overall health, current health, future health, current pain and discomfort, and their health's interference to their relationships and daily work.

At the end of the questionnaire, they were asked to write a narrative about anything else they wanted to share about their health.

Procedure

Participants were able to register for this study after they completed the prescreening procedure online. They were no inclusion or exclusion criteria related to their performance at prescreening.

Subjects were tested individually in one-on-one sessions with a research assistant. Upon arrival to the lab, participants were welcomed and presented an informed consent statement outlining the basic activities in which they would engage. They were then presented with the study's cover story.

Cover story. The participants were told that the study concerned group discussion and problem solving. They were told that their group would be addressing issues of health care and health care reform. They were led to believe that they would engage in an "ice-breaker" task, complete several questionnaires, and then engage in a 20-minute group discussion with 3 other participants who they would join shortly.

After the cover story was presented the subjects were shown a brief video of a typical group discussion session. This was done to heighten the feeling that they would be engaging in a similar group discussion very shortly.

Inclusion exclusion manipulation. After the video was finished the subject was told that there would be a delay while the experimenter ran a program to calculate the "participants' group dynamics score". Ostensibly, the experimenter would use the 4 members' pretest scores to

calculate indicators of how the group would get along. During that time, the subjects were told that they would engage in an ice-breaker activity with their fellow group members. For this task the participants engaged in a game called cyberball. It is a pre-programmed ball-tossing game in which participants were assigned to either the excluded or included condition. Participants in the excluded condition were thrown the ball noticeably less than the ones in the included condition. Research shows that this pre-programmed computer game results in robust experiences of inclusion and exclusion (Williams & Sommer, 1997)

When the experimenter returned, participants in the excluded condition were given a ‘group dynamics report’ that suggested their group would be competitive, contentious and hostile. Participants in the included condition were led to believe their group would be cooperative and harmonious. Together, these manipulations were designed to cause half of the subjects to expect a hostile rejecting interaction. Other participants were led to expect a secure, inclusive and pleasant interaction.

Publicness of health appraisals.

The key dependent variable was measured via the general impairment questionnaire. This was collected under three different publicness conditions: private, public-experimenter and public-group. Those in the ‘private’ condition were told that their reports would be deleted as they completed the questionnaire; therefore, nobody would be able to see their ratings. However, they could not skip this part because they were told that this study was aimed to test if activation of previous experiences would affect their group performance. Participants in the ‘public-experimenter’ condition were told that the experimenter would read and analyze their responses but no one else would see them. In the ‘public-group’, participants were told that in order to

facilitate group interaction, all ratings would be copied and distributed to their group members before the group discussion.

Manipulation Check.

Before the general impairment questionnaire, participants were asked to complete a manipulation check questionnaire. They were asked to rate their expectations and feelings regarding the upcoming group interaction. In addition, at the end of the study, participants were asked to state the aim of the study in their own words, to test their understanding of the study.

Debriefing.

When participants completed the rating forms, debriefing started. First, participants were asked questions to measure their suspiciousness. Highly suspicious participants' scores were eliminated. Finally, they were told that the study was over and the real aim of the study was explained. After explaining why I had to use deception in this study, the subject was asked for permission to retain their scores for the study. No subject withdrew their consents.

Results

Preliminary Analyses

Quality of participation. Before testing the main hypothesis, I conducted an analysis to make sure that participants were paying attention to the procedure. Frequency analysis showed that 95% of the participants were able to state the purpose of the study correctly. Therefore, I concluded that participants were paying attention to the experiment.

Manipulation check of the social exclusion manipulation. At the end of study, participants were asked to report their feelings and expectations about what they believed to be

the upcoming group discussion. Correlation analyses showed that the ones who reported that they felt comfortable about the upcoming group discussion also expected a welcoming environment, $r=.280$, $p<.05$, and did not feel anxious about it, $r=-.578$, $p<.001$. Participants who expected an environment which was high in tension expected the group discussion to be disharmonious, $r=-.702$, $p<.001$, and unwelcoming, $r=-.678$, $p<.001$. Since these correlations were high, I used a factor analysis to determine whether I could combine them into one construct. Three of the manipulation check items (tension, welcoming and harmony) loaded on one factor and anxiety and comfort level loaded on a separate factor. One possible reason for this result might be the way I worded the questions. When I examined the manipulation check questions individually, I realized that for items assessing the anxiety and comfort levels of participants, I used the term ‘today’s discussion’ with no use of future tense or the term ‘group’. Therefore, participants might have concluded that they were expected to rate their anxiety and comfort level they experienced for the overall procedure, not specifically about the anticipated group discussion.

The three manipulation check items which were highly correlated in the predicted direction (welcome, harmony and tension) were used to create a new factor score for further analysis. Univariate analysis of variance of the effects of social exclusion, publicness and gender on this variable resulted in significant main effects and a marginally significant interaction. First of all, I found a main effect for social exclusion, $F(1,49)=38.986$, $p<.001$, which validates the manipulation. Excluded participants, ($M=.75$, $SD=.13$), expected a less welcoming and harmonious discussion than did their included counterparts, ($M=-.51$, $SD=.13$). Unexpectedly, I also found a main effect for gender, $F(2,49)=4.597$, $p<.05$; and for publicness manipulation, $F(1,49)=4.73$, $p<.05$. Female participants, ($M=-.02$, $SD=.10$), reported more positive

expectations than males, ($M=.01$, $SD=.18$). Furthermore, LSD Post Hoc analysis showed that there was a significant difference between the private condition and the two other publicness conditions, $p<.01$ for all, but not between public-group and public-experimenter conditions. Participants in the private condition, ($M=-.50$, $SD=.16$), expected more comfortable discussion environment than their counterparts, (Experimenter: $M=.20$, $SD=.17$; Group: $M=.21$, $SD=.16$). Lastly, this analysis also resulted in a marginally significant interaction between social exclusion and publicness, $F(2,49)=1.119$, $p=0.93$. In the excluded condition but not in the included condition, participants in the private condition, ($M=-1.14$, $SD=.20$), reported that the group discussion would be more comfortable than did the subjects in other publicness conditions, (Experimenter: $M=-.10$, $SD=.23$; Group: $M=-.29$, $SD=.23$). (Note that it is reverse coded, negative scores mean positive expectations about the group discussion).

I repeated the same analysis after combining the other two manipulation check items (comfort and anxiety) in another factor score. Univariate analysis resulted in a significant main effect for social exclusion, $F(1,49)= 4.162$, $p<.05$. However, the direction of the effect was contrary to the expected finding. Participants in the included condition, ($M=.13$, $SD=.20$), reported more anxiety and discomfort about upcoming group discussion than did their excluded counterparts, ($M=-.27$, $SD=.19$). The analysis also revealed a significant interaction between gender and social exclusion, $F(1,49)= 4.557$, $p<.05$. Females ($M=.05$, $SD=.21$), reported significantly more negative feelings about the upcoming group discussion than did males, ($M=-.59$, $SD=.31$), when they were excluded but not in the included condition. These results are consistent with my 'word use' explanation.

The manipulation check variables were all inter-correlated in the predicted direction. The main effect of the social exclusion manipulation consistently showed that the manipulation had

the intended effect. However, there were several unexpected and inconsistent results. First of all, simple factor analysis resulted in two factors, which might be the result of the way I worded the questions. Secondly, univariate analyses of variance yielded main effects for gender and the publicness manipulation which were not expected. Finally, gender and the publicness manipulation interacted with the social exclusion manipulation to affect the manipulation check measures. These effects were unwanted and difficult to explain.

Relations among dependent measures. Participants rated their health status on five different measures: current health, future health, overall health, pain and discomfort and interference with daily life. I also had one open-ended question asking participants to write a narrative about anything else they wanted to share about their health. Two experimenters coded this qualitative data into 4 levels: 0=no mention about health or any health problems; 1= mention about one health problem which does/did not interfere with the participant's daily life; 2= mention about one health problem which interferes/interfered with the participant's daily life; 3= mention about two or more health problems which interfere(d) with the participant's daily life. Inter-rater reliability assessing the exact agreement between two raters was adequate (72%).

I performed a correlation analysis to test whether these health measures were correlated with each other in the predicted direction. Results showed that feeling currently healthy was positively correlated with participants' overall health reports and future health estimates. Furthermore, participants' current pain and discomfort levels were positively correlated with their reports of health problems that interfered with their lives. In addition, correlation analysis revealed a negative correlation between good health measures (current health, overall health, future health) and poor health measures (pain and discomfort, interference and health narrative). Specifically, participants who felt healthy in general reported that their health problems did not

interfere with their lives, that their current pain and discomfort level was low, and their narrative reports included fewer health problems that interfered with their lives. See Table 1.

Table 1: Inter-item Correlations

	Future Health	Overall Health	P&D	Interference	H. Narrative
Current Health	.324*	.618***	-.444***	-.438***	-.346**
Future Health		.502***		-.314*	
Overall Health			-.502***	-.666***	-.402**
P&D				.669***	.585***
Interference					.269*

Note: P&D: Pain and Discomfort, H. Narrative: Health Narrative. * $p < .05$; ** $p < .01$; *** $p < .001$.

Construct validity of dependent measures. To be able to determine the construct validity of my measures, I checked whether pre-test measures of health appraisals were correlated with health appraisals measured as part of the procedure. Participants who scored high on the somatization scale completed during the pretest rated their current and overall health as poor. In addition, participants who were anxiously attached according to their pretest responses and ones who scored high on the neuroticism scale at pretest reported more symptoms than their low-scoring counterparts. In summary, consistent with previous research, and with my predictions, the dependent measures of health appraisal correlated with standardized measures of somatization, negative affect, and insecure attachment. See Table 2.

Table 2: Construct Validity

	Current health	Overall Health	P&D	Interference	H. Narrative
Somatization	-.333*	-.375**	.335*	.406**	
Neuroticism					.310*
Insecure Attachment			.326*		

Note: P&D: Pain and Discomfort, H. Narrative: Health Narrative. * $p < .05$; ** $p < .01$; *** $p < .001$.

Test of the Main Hypothesis

I used multivariate ANOVA to test whether participants' gender, the publicness of their health reports, and social exclusion condition affected their health reports. I found no main effect or interaction. Then, I added somatization level at pre-test as a covariate and repeated the test. After controlling participants' somatization level, there was a marginally significant main effect of gender, $F(1,57)=3.28$, $p=.077$, in which females ($M=8.5$) expected better health in the future than males ($M=7.75$). To sum up, being excluded or not during the experiment, or knowing that others would (not) see their health symptom reports, did not affect participants' health reports. However, gender and future health estimates were moderately correlated after controlling participants pre-test somatization level.

Since internal validity and construct validity of health measures were high, I ran a simple factor analysis to see if I could combine all health measures into one. This analysis yielded to one factor that accounted for 50% of the variance in the item set, with factor loadings in the range of .53 and .86. On the basis of these results, I replicated the test of the main hypothesis using this factor score. Univariate analysis of variance with this new factor score as a dependent

variable and three independent variables (gender, publicness manipulation and social exclusion manipulation) resulted in no significant main effects or interactions, even after using somatization level at pre-test as a covariate.

A Search for Moderators:

My analysis did not result in straightforward evidence for my predictions. Further analyses were needed to determine whether the effect could be observed among subjects with theoretically specified vulnerabilities to excessive symptom reporting. According to the previous research, *attachment* (Stuart & Noyes, 1999; Ciechanowski, 2002; Hunter & Maunder, 2004), *neuroticism* (Fava, 1982), *low conscientiousness* (Feldman et al., 1999), and *the external components of contingencies of self-worth* (Sargent, Crocker & Luhtanen, 2006) might represent vulnerabilities for excessive symptom reporting. In addition, several studies have reported the relationship between self-esteem and social exclusion (Sommer, Williams, Ciarocco & Baumeister, 2001; Onoda et al., 2010). Therefore, I also tested the moderating effects of *self-esteem* and *somatization* levels of participants. Because all of the moderators and dependent variables were continuous, I analyzed the moderation effects through regression. I used the Process module created by Hayes (2012), to test moderation effects using regression. Two dummy codes were created to represent publicness: one contrasting the private condition with the two others, the second contrasting the public-group condition with the two others. Then, each moderation analysis was run two-ways; first using the contrast variable comparing the private condition with the other two public conditions, then with the contrast comparing the public group condition with the other two conditions.

Among all of these moderators, I found three main effects; a main effect for somatization, $t(57)=2.03, p<.05$, anxious attachment, $t(57)=2.40, p<.05$, and neuroticism, $t(57)=-2.05, p<.05$. Participants who scored high on somatization, insecure attachment and neuroticism measures at pre-test reported poorer health than their low scoring counterparts. Three of the moderators, anxious attachment ($t(56)=1.76, p=.083$), PANAS-negative affect ($t(56)=2.45, p<.05$), and neuroticism ($t(56)=-2.01, p<.05$), interacted with the publicness manipulation to affect symptom reporting. In all cases, in the public conditions, higher levels of vulnerability factor led to more negative health reports (see Figure 1, 2 and 3). For negative affect and neuroticism, there was a cross over effect in which higher levels of neuroticism and negative affect led to less symptom reporting in private condition (see Figure 2 and 3).

Figure 1: Interaction between publicness manipulation and anxious attachment

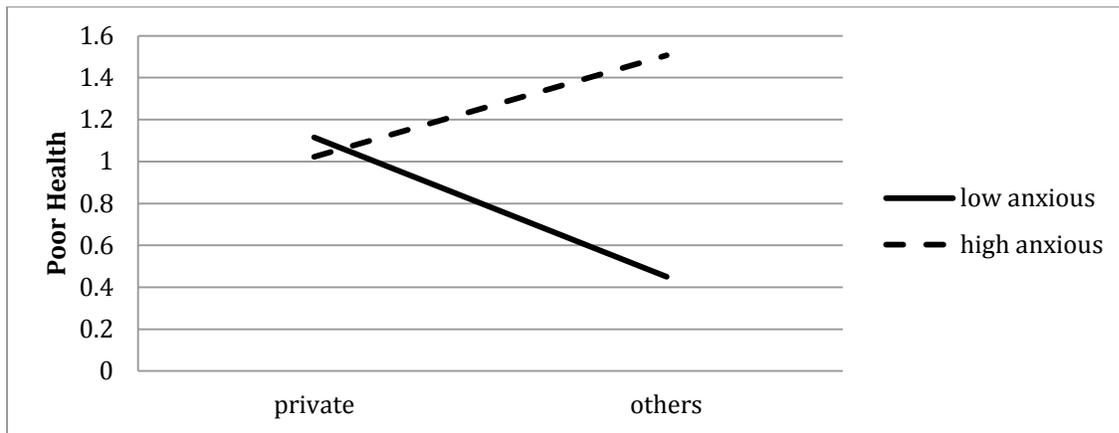


Figure 2: Interaction between publicness manipulation and negative affect. NA = Negative Affect

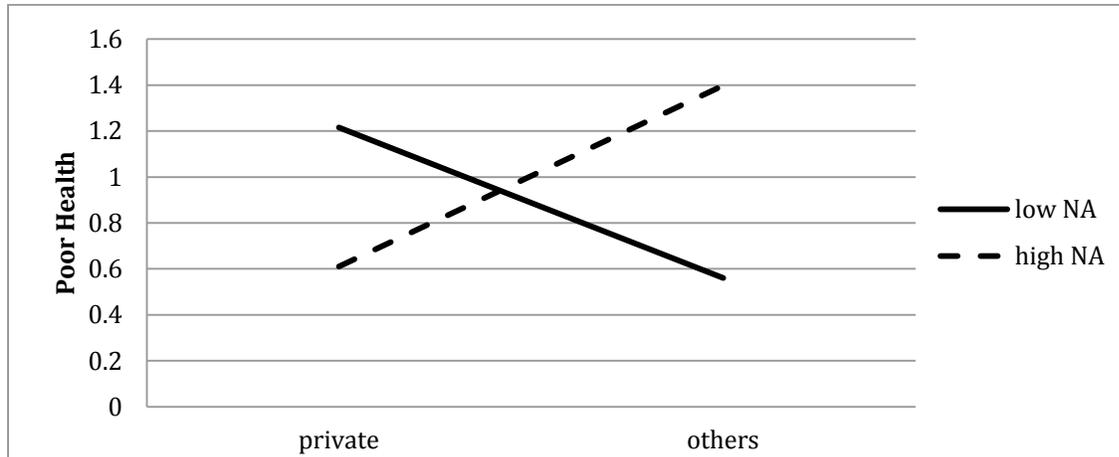
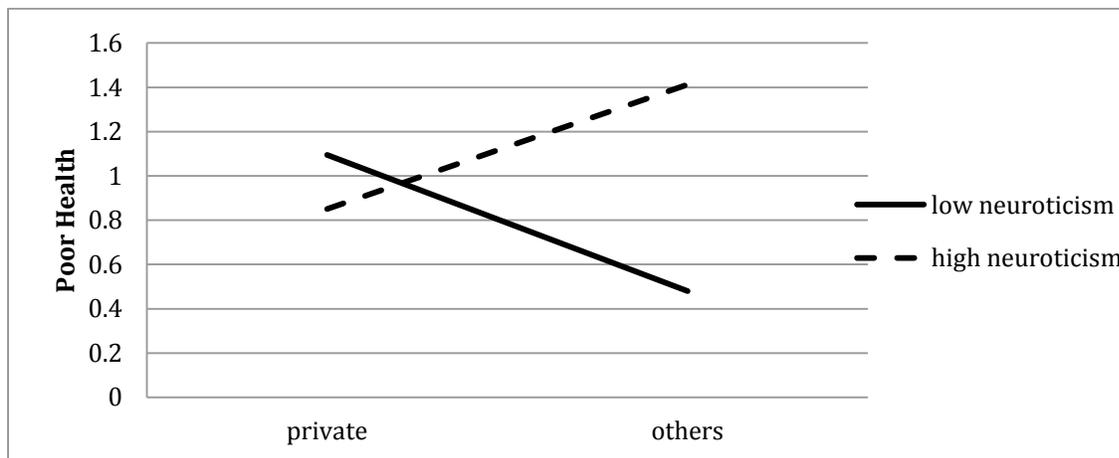


Figure 3: Interaction between publicness manipulation and neuroticism



When I used the contrast of the public-group condition with other publicness conditions, there were main effects for somatization, $t(57)=2.39, p<.05$, and anxious attachment, $t(57)=1.95, p=.056$. Specifically, high levels of somatization and insecure attachment resulted in more

symptom reporting. I also found a significant moderation effect for *avoidant attachment*, $t(56)=2.54$, $p<.05$, and a marginal moderation effect for the *neuroticism*, $t(56)=-1.75$, $p=.087$. Specifically, participants with avoidant attachment reported poor health when they were told that their reports would be shared with their assumed group members (see Figure 4). Lastly, participants who scored high on neuroticism at pre-test reported worse health when they were assigned to the group condition (see Figure 5). To sum up, participants with poor attachment and high neuroticism tended to report worse health in the public-group condition.

The analysis of moderation resulted in different results for anxious and avoidant attachment. While anxiously attached participants reported more symptoms in both publicness conditions (public-group and public-experimenter), avoidantly attached participants showed an increased symptom reporting only in the public-group condition. This difference between anxious and avoidant attachment will be further explained in the discussion section in more detail.

Figure 4: Interaction between publicness manipulation and avoidant attachment

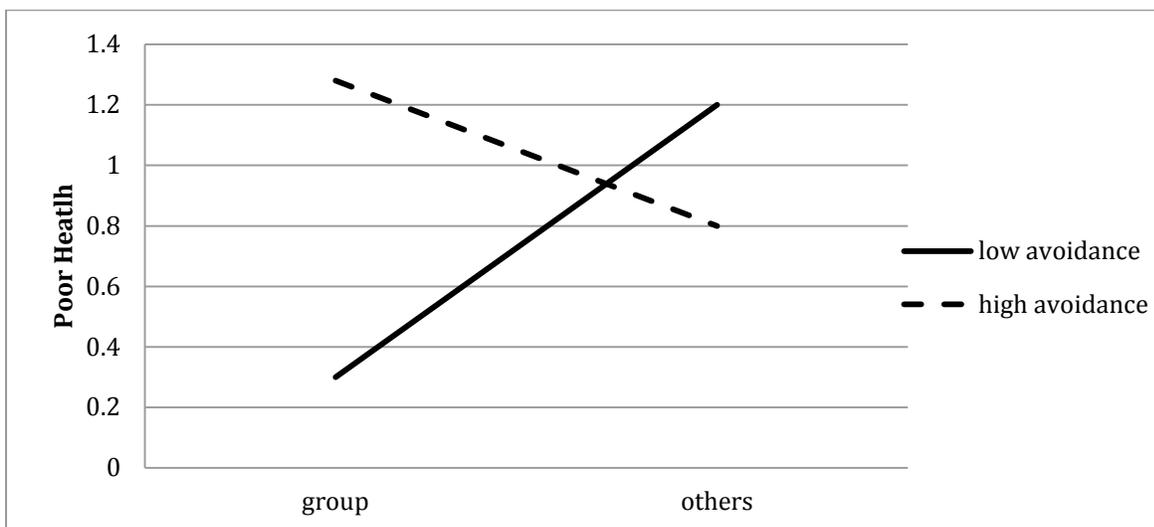
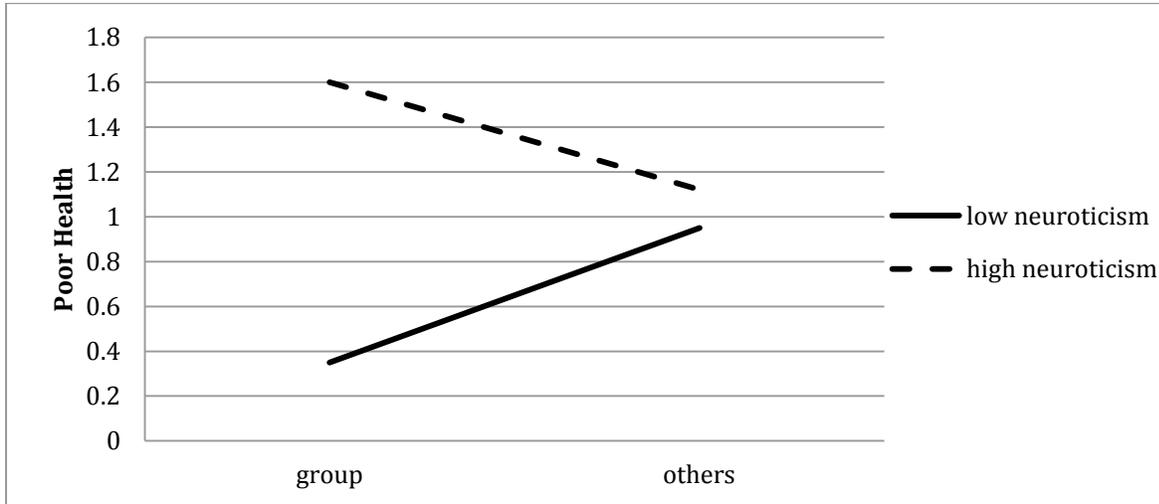


Figure 5: Interaction between publicness manipulation and neuroticism.



Previous research shows a high correlation between insecure attachment and neuroticism (Feeney & Ryan, 1994). Therefore, I re-examined their interactions with the publicness manipulation controlling the effects of each on the other. Moderation analyses revealed mixed results.

Using the ‘private versus publicness’ contrast condition, when I controlled for neuroticism, the relationship between anxious attachment and publicness condition was insignificant. In addition, when I controlled for anxious attachment, the relationship between neuroticism and publicness condition was insignificant. In conclusion, the effect was due to variance shared by attachment and neuroticism.

On the other hand, in ‘group versus others’ contrast condition, the relationship between neuroticism and publicness manipulation remained significant after I controlled for avoidant attachment. Additionally, the relationship between avoidant attachment and publicness was still

significant after I controlled for neuroticism. To sum up, each uniquely interacted with publicness to affect symptom reporting.

The pattern of results raises a possible two-way explanation. First, there is something specific about symptom reporting that was affected by the interaction of the publicness manipulation and insecure attachment. Alternatively, it might be only *self-disclosure effect*. Insecure attachment might result in high self-disclosure in the public conditions regardless of the type of information being disclosed. To test if insecurely attached participants were simply more self-disclosing, I ran a regression analysis to see if the relationship between the insecure attachment and the length of participants' health narrative (the number of words participants used in their health narrative) was moderated by publicness. The interaction effect was insignificant; insecure attachment did not interact with the publicness manipulation to affect the length of participants' narratives. Thus, the interaction effect of insecure attachment and publicness is limited specifically to disclosing physical complaints.

Discussion

In this study, even though manipulated insecurity (social exclusion) had no effect on symptom reporting, measured insecurity (poor attachment) was associated with high symptom reporting, which is consistent with previous studies (Ciechanowski et al., 2002). In addition, this study shows that this relationship was dependent on subjects' belief about whether the symptom reports would be communicated with others. In particular, the analysis of moderation revealed a significant interaction between the publicness condition and style of attachment. People with poor attachment tended to report poor health when they were told that somebody else would see their health reports. In the private condition, there was no significant difference between the

symptom reports of anxiously attached participants and participants with other attachment styles. However, anxiously attached subjects reported significantly more symptoms when they were assigned to public conditions: either the public-group or the public-experimenter conditions. In addition, in the public-group condition, avoidant attachment was correlated with poor health. There was not a significant difference between avoidantly attached participants and participants with other attachment styles in other publicness conditions (private and experimenter). Previous studies show that there is a relationship between poor attachment and high symptom reporting, however they did not control for the publicness of the symptom reports. In other words, in the literature, it is clear that insecurely attached people report more physical symptoms than securely attached people, however it is not clear if the number of people who can access their reported symptoms have an effect on that relationship.

In addition, I found a slight difference between avoidantly-attached and anxiously-attached participants. Participants with high avoidant attachment reported more physical symptoms only when their health reports would be shared with their group members. However, for anxiously attached participants, with whom they would share their information did not matter; they showed high symptom reporting in both publicness conditions (public-experimenter, public-group). The underlying mechanisms of these two attachment styles may help to explain this difference. Avoidant attachment is characterized by being more cautious about trusting others and by being more reliant on the self. On the other hand, anxiously attached people are characterized by being clingy; they are easy to be close and more dependent on others (Ciechanowski et al., 2002; Fraley, Waller & Brennan, 2000). The cautious tendency of avoidant attachment might have made my participants more picky about with whom they would like to share their information. It is also possible that avoidantly attached participants had to share more

than usual because they had no choice but to interact. Group discussion was the main part of the study, thus, participants did not have an option to decline that part if they wanted to earn their participation credit. This ‘no-escape’ feeling might have forced avoidantly attached participants to defend against the possibility of rejection because avoidance was not possible. To sum up, different underlying mechanisms or the structure of the study might have resulted in differences between avoidantly- and anxiously-attached participants.

As reported earlier, the need for self-disclosure might be another factor affecting the relationship between attachment and the publicness condition. In the literature, there are mixed results. Research shows that insecure attachment is related to low self-disclosure in general (Keelan, Patrick, Dion & Dion, 1998); other studies show a difference between ambivalently and avoidantly attached people. Specifically, people with ambivalent attachment, but not the ones with avoidant attachment, disclose more information about themselves and feel better interacting (Mikulincer & Nachshon, 1991). In this study, I found that attachment did not moderate the relationship between the publicness manipulation and the length of participants’ health narratives. In conclusion, the interaction between insecure attachment and the publicness manipulation cannot be attributed to pure self-disclosure. Insecurely attached participants were open to self-disclose only when the context was related to complaining.

The same analysis using negative affect as a moderator resulted in a significant interaction between negative affect and the publicness condition where sharing health symptoms with others caused highly neurotic participants to report more physical symptoms. This result was not surprising after I had significant interactions between attachment and the publicness manipulation because research shows that negative affect is correlated with more symptom reporting (Costa & McCrae, 1987; Watson & Pennebaker, 1989), and both fearful or preoccupied

attachment are characterized by high negative affect (Feeney & Ryan, 1994). Therefore, I reanalyzed their relationship with the publicness condition, after controlling one's effect on another. These analyses revealed mixed results depending on what publicness conditions were compared. In summary, insecure attachment and neuroticism had a shared effect on symptom reporting in interaction with the publicness manipulation. However, their unique psychological dynamics also contributed to the relationship between publicness manipulation and symptom reporting.

Limitations

Unexpectedly, my analysis did not reveal a significant main effect for the social exclusion manipulation. This is especially troubling because both theories would appear to predict at least a main effect for this manipulation. The absence of any effect of the exclusion manipulation on health reports might be due to methodological features of the study. Manipulation check analyses seemed to indicate that the manipulation worked, but it might not have been strong enough to produce the predicted effect on health reports. However, I used a standardized social exclusion manipulation, an online ball-tossing game (cyberball), used in many other ostracism studies (i.e. Eisenberger, Jarcho, Lieberman, & Naliboff, 2006; Zadgo, Williams, & Richardson, 2004). One might wonder whether the second part of the social exclusion manipulation, the group dynamics report, attenuated the effect of cyberball manipulation. However, they were presented in a sequential order, and then participants completed manipulation check items. Otherwise, there is no reason to believe that the effects of the manipulation were not present when the symptom reports were made.

Furthermore, manipulation check analyses resulted in main effects for gender and the publicness manipulation. Specifically, female participants expected a group discussion that would be more welcoming and harmonious than male participants did. This might have been resulted from two different factors. First of all, even though I used only Caucasian females for the female version of the sample video, in the male version, there were two Caucasians and two African Americans depicted in the video. As a result, male participants might have anticipated more tension based on the expectation of an unstructured mixed-race discussion. Alternatively, this result might reflect greater competitiveness among males than females. Research shows that females are more collaborative than males in a group setting. They seek help more and support their partners to a greater extent than males do (Howe, 1997). On the contrary, males are characterized by being overconfident and they like to perform in a competition (Niederle & Vesterlund, 2007). In conclusion, either different contents of the sample videos or their expectations affected by their gender might have resulted in this unexpected finding.

Another unexpected finding of this analysis was a main effect for the publicness manipulation. Participants in the public-group and public-experimenter conditions expected a more unwelcoming discussion environment than did participants in the private condition. In other words, the expectation of sharing their health reports made our participants uncomfortable about the upcoming group discussion. This effect might be related to the perception of control. Research shows that feeling lack of control over one's environment is a risk factor for anxiety (Chorpita & Barlow, 1998). Participants had to share their personal information with three strangers without having any knowledge of how they may react. Even though participants decided how much information they would share with those strangers, they did not have an option to decline sharing personal information. Alternatively, according to the

anxiety/uncertainty management theory, anxiety is related to the uncertainty people experience when they communicate with strangers. Uncertainty is affected by many factors, such as situational processes (i.e. cooperative structure of tasks, informality of interaction situation), motivation to interact with strangers and reactions to strangers (i.e. ability to tolerate ambiguity, ability to empathize with strangers) (Gudykunst & Nishida, 2001). Even though participants were provided with some information about the group discussion, none of that information would have reduced uncertainty about how the group members might respond to participants' self-disclosures. Therefore, they might have felt anxious about sharing their personal information. In conclusion, feeling out of control or feeling uncertain about the situation and their group members might have made our participants anxious about sharing their personal information in the upcoming group discussion. A significant interaction between the social exclusion and the publicness manipulations also support these explanations. Among excluded participants, the ones in the public-group and public-experimenter conditions reported more anxiety than their included counterparts. Excluded participants expected a competitive and disharmonious environment, and this bolstered their anxiety resulted from uncertainty of the situation and feeling out of control.

Other limitations of my study are as follows. First, in the sample, the number of males (n=14) was significantly lower than females (n=45). In addition, this sample was composed of healthy college students. Not only age, but also health status of this population might have affected my results.

Conclusions

The aim of this study was to investigate the ability of two theories, the SPOT theory and the Interpersonal Theory, to predict physical reporting. The key predictors were social exclusion and publicness manipulations. Specifically, SPOT theory would predict a main effect for the social exclusion manipulation, and Interpersonal Theory would predict a significant interaction between the social exclusion and the publicness manipulations. Both main effects and a significant interaction would support that both processes are operating to affect symptom reporting. Even though I could not find straightforward evidence for my predictions the interaction of vulnerability factors with the publicness manipulation is consistent with the interpersonal theory. The effect was significant only in public conditions and it was consistent across several moderator variables.

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Institutional Review Board for the
Protection of Human Subjects

THE UNIVERSITY OF
ALABAMA
R E S E A R C H

March 23, 2012

James Hamilton, PhD
Department of Psychology
College of Arts & Sciences
Box 870348

Re: IRB#: 12-OR-105 "Symptom Reporting in Response to Social Exclusion: A Sign of Distress or a Distress Signal"

Dear Dr. Hamilton:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver. Approval has been given under expedited review category 7 as outlined below:

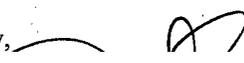
(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies

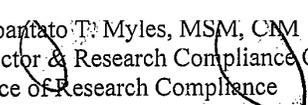
Your application will expire on March 20, 2013. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Request for Study Closure Form.

Please use reproductions of the IRB approved stamped information sheets to obtain consent from your participants.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely, 


Carpantato, T. Myles, MSM, CM
Director & Research Compliance Officer
Office of Research Compliance
The University of Alabama



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Information Statement

Please read this agreement carefully.

Purpose of the research:

The research concerns people's responses to group problem solving discussions. We are interested in the psychological processes that are involved in people's reactions to different types of problem solving discussion groups.

What you will do in this study:

You will watch a video explaining group problem solving and another showing you an example group problem solving discussion session. Then you will play an icebreaker game and get some feedback about your group before any discussion begins. Also, before your discussion begins you will provide some information about yourself. The whole procedure takes 45-60 minutes.

Risks:

There are no anticipated risks associated with participating in this study beyond those encountered in daily life.

Compensation:

The study will take under 45-60 minutes to complete. You will receive 1.5 Introductory Psychology research requirement credit(s) for participating in this study. At the end of the study, you will receive an explanation of the study and the hypotheses. We hope that you will learn a little about how psychological research is conducted.

Voluntary Withdrawal:

Your participation in this study is completely voluntary, and you may withdraw from the study at any time without penalty and receive full credit. You may skip over any question or procedures, or you may withdraw by informing the research associate that you no longer wish to participate (no questions will be asked). Your decision to participate, decline, or withdraw participation will have no effect on your status at or relationship with the University of Alabama.

Confidentiality:

Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information. All data and assent forms will be stored in a locked room. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media, but no one will be able to identify your information in the publications.

Further information:

If you have questions about this study, please contact James Hamilton, Department of Psychology, University of Alabama, Tuscaloosa, AL 35487. Email: jchamilt@bama.ua.edu; phone: 205.348.0189. Alternatively, you can contact Melike Eger or Katie Kucharski (meger@crimson.ua.edu or klkucharski@crimson.ua.edu) or at (205-348-5083).

Who to contact about your rights in this study:

If you have questions about your rights as a person taking part in a research study, make suggestions or file complaints and concerns, you may call Ms. Tanta Myles, the Research Compliance Officer of the University at (205)-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach Website at http://osp.ua.edu/site/PRCO_Welcome.html. You may email us at participantoutreach@bama.ua.edu.

UA IRB Approved Document
Approval date: 3/21/12
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