DOES CHRONIC VICTIMIZATION LEAD TO A REJECTION ATTRIBUTION BIAS?

by

HAYLIE L. GOMEZ

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ABSTRACT

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Haylie L. Gomez, M.S.

The University of Texas at Arlington, 2009

Supervising Professor: Lauri A. Jensen-Campbell, Ph.D.

This study examined the influence of chronic victimization on social pain reactions. This influence is referred to as the rejection attribution bias, measured via self-reports of feeling excluded, threatened needs, and neurological activity in the right prefrontal cortex (RPFC) after ostracism. Participants (N = 189) completed an online survey containing personality and victimization measures. They were then offered the opportunity to complete a second phase in the lab, which involved collection of EEG data before and during an online ball-tossing manipulation (Cyberball), and measures to assess affective responses to exclusion. Results support the RAB model, with victimized participants reporting greater threatened needs and distress, particularly in an ambiguous situation. Furthermore, activity in the RPFC was decreased in response to social pain as

expected. Moderating effects of the need to belong and mediating effects of rejection sensitivity were also examined, with results partially supporting the theoretical model.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Figure Page

LIST OF TABLES

CHAPTER 1

INTRODUCTION

If a person is asked to recall a time when someone has excluded him or her, he or she will likely be able to recount a personal experience of being left out or ostracized. This memory may be quite vivid, and the person might even be able to recall exactly how he or she felt at the time, physically and emotionally. This is an experience of social pain–the set of affective and physiological reactions to the real or perceived disruption of one's relationships (e.g., rejection, victimization, or hurt feelings).

Now imagine that this individual has experienced repeated instances of ostracism, victimization, or exclusion. How might that affect his or her future interactions with people? Recent research has investigated what physiological and psychological factors account for individual differences in social pain thresholds; this study sought to replicate and extend that body of work, with specific focus on a chronically peer-victimized population and individuals with a high need to belong.

Using neuroimaging, the mechanisms underlying social pain have been localized to a set of specific brain regions including but not limited to the right ventral prefrontal cortex (RVPFC) and the dorsal anterior cingulate cortex (dACC). A great deal of overlap has been observed between the processes underlying the affective experience of social and physical pain, both in mind and body, and will be discussed at a later point. Having obtained a detailed functional understanding of social pain through neuroimaging studies,

I was interested in examining how people vary in their reactions, both psychologically and physiologically, to ostracism.

When dealing with personality factors influencing thresholds for social pain, both chronic peer victimization and the need to belong (nBelong) may be key components. I expected that individuals who have been chronically victimized would exhibit a *rejection attribution bias* (RAB). This bias refers to the perception of an ambiguous situation as deliberate rejection, when in fact no intentional rejection occurred. The work of Dodge and his colleagues (1983) revealed a hostile attribution bias, after which the RAB is modeled, in which aggressive boys are more likely to perceive an ambiguous situation (i.e.; bumping into someone in the hall at school) as intentional aggression, while maintaining a typical perception of aggressive or prosocial behaviors. In short, when both aggressive and non-aggressive children are recipients of aggressive behavior, both interpret it as aggression. When aggressive and non-aggressive children are recipients of prosocial (or clearly non-aggressive) behavior, both groups interpret it as non-aggressive. However, when these two groups are placed in an ambiguous situation, the aggressive children perceive aggressive intent and the non-aggressive children interpret the event as an accident.

I expected the same construct to hold for rejection and chronically victimized individuals. That is to say, when participants are in an ambiguous situation, those who have been chronically victimized will attribute the behavior to rejection, especially in cases where the individual has a high nBelong. To test the RAB, I created nonexclusion (i.e., the ambiguous situation), nonambiguous exclusion, and nonambiguous inclusion (or

superinclusion) conditions in a ball-tossing game. For chronically victimized participants, especially those with a high nBelong, I expected that the nonexclusion condition would be perceived as exclusion. I anticipated lower activity in the RPFC brain regions as well as differences in self-reports of threatened needs and feeling excluded for chronically victimized participants in this condition when compared with those participants low on chronic victimization and nBelong. This expected finding was in contrast to the work presented in Forgas, Williams, and Wheeler (2005), which posits that everyone behaves the same in response to real or perceived ostracism.

In this section of the paper, I will first outline in detail the physiological mechanisms underlying the process of social pain, addressing the overlap between the experience of social and physical pain. I will focus the discussion on the two brain regions examined in this study–the ACC and the RPFC. Next, I will describe the experience of social pain first in terms of being ostracized, and then as pertaining to victimization and nBelong and how they may influence the individual's threshold for that pain. Finally, I will address the major shortcomings of existing research in the areas of social pain and victimization, and describe the goals of the present study.

1.1 Overlap in the Experience of Social and Physical Pain

Despite the vast body of research dealing with physical pain and how humans experience it physiologically, psychologically, and behaviorally, only recently have scientists begun to investigate social pain. Social pain is described as "the distressing experience arising from the perception of actual or potential psychological distance from close others or a social group." (Eisenberger & Lieberman, 2005, p. 112). Recent

evidence suggests that there is a great deal of overlap in how humans experience social pain and physical pain, both physiologically and psychologically. However, before validating such conclusions, it is important to define pain in general terms so that an accurate comparison of physical and social pain mechanisms can be made.

Craig (1999) describes pain using a two-factor model as first proposed by Melzack and Casey (1968). The first aspect of pain involves sensory-discriminative information and the second involves affective-motivational information. The sensory-discriminative aspect maintains what might be considered the technical details of pain– the location of the pain, its intensity relative to past experiences, and its duration. The affective-motivational component is responsible for the psychological response, specifically, the emotions elicited by the painful experience. While physical pain incorporates both of these components as outlined by Craig, social pain seems to involve primarily the affective-motivational system.

It is important, therefore, to focus on comparing the mechanisms underlying the affective-motivational component of pain when attempting to demonstrate an overlap between social pain and physical pain. Recent publications provide strong evidence of the overlapping processes behind social and physical pain. Eisenberger & Lieberman (2005) suggest that the dorsal region of the anterior cingulate cortex (dACC) functions as a neural alarm system capable of both detecting a problem and alerting the appropriate mechanisms. They propose that the dorsal anterior cingulate cortex (dACC) is specifically linked to the affectively distressing component of pain in both animals and humans.

The ACC is not, however, the only physiological component of pain experience. In addition to the ACC, the periaquiductal gray area (PAG), right ventral prefrontal cortex (RVPFC), insula, and neuroendocrine systems involving oxytocin and opioid regulation and secretion are involved in social pain (Eisenberger & Lieberman, 2004; MacDonald & Leary, 2005). The dACC is thought to alert the RVPFC to the problem, and the executive control of the RVPFC provides a hinderance to any automatic processes that do not aid in dealing with the threatening situation (Miller & Cohen, 2001). Eisenberger and Lieberman (2004) discuss the self-regulatory function of the RVPFC and its negative relationship to dACC activation suggesting such a function. They propose that the act of thinking about pain, either physical or social, is enough to trigger activity in the RVPFC. At this point in their model, the RVPFC projects efferent connections to the dACC as a feedback mechanism for the previously discussed "alarm system" to limit its effects if they become maladaptive. This distress-regulating function of the RVPFC is also described in a later study conducted by Eisenberger, Jarcho, Lieberman, and Naliboff (2006). While examining the neural systems underlying social and physical pain, they again demonstrated that the RVPFC is involved in the regulation of distress, this time with respect to both thermal pain and rejection via Cyberball.

DeWall and Baumeister (2006) provided further evidence for the overlap between social and physical pain experience. If in fact there is such an overlap, any induction of physical pain should decrease ability to cope with social pain, and vice versa, as a result of shared mechanisms like the dACC. DeWall and Baumeister tested the effects of social exclusion on physical pain tolerance, and found that social pain significantly produced

decreased tolerance to, and lowered the threshold for, physical pain. DeWall, MacDonald, Webster, Tice, and Baumeister (under review) also examined the effects of a physical pain suppressant on psychological experiences of pain. Participants were given two daily doses of acetaminophen or placebo and instructed to complete hurt feelings assessments daily for 21 days. Given the assumption that social pain activates neural substrates of physical pain, a pain suppressant should lessen hurt feelings, and in fact, a moderate effect of the pain suppressant–but not placebo–on reducing hurt feelings was found. With such strong empirical data supporting an overlap of neural mechanisms involved in social and physical pain, the next logical step is to investigate individual differences in the threshold for socially painful experiences.

1.2 Chronic Victimization and the Need to Belong (nBelong)

Many individual differences exist in the experience of both physical and social pain, and those differences influence how humans cope with ostracism and exclusion. In particular, two personality factors are of interest in this study, chronic peer victimization and nBelong. A number of studies have utilized both physiological and psychological measures to assess the possible contributions of chronic pain to instances of acute physical or social pain. At present, a diathesis-stress model seems the most likely means of explaining the influence of chronic pain on future pain sensitivity (Dersh, Polatin, & Gatchel, 2002; Cicchetti & Walker, 2003). Cicchetti and Walker propose that emotional sensitivity to future acute pain episodes is increased through altered brain activity resulting from trauma such as chronic social pain. This increased sensitivity may be a result of activation in the hypothalamic-pituitary-adrenal (HPA) axis in response to

chronic social stress. This HPA activation leads to changes in cortisol reactivity, which can bathe the brain and cause neural changes, for instance, interfering with the RPFC's ability to dampen ACC activation in response to acute social pain (Vaillancourt, Duku, Decatanzaro, Macmillan, Muir, & Schmidt, 2008; Vaillancourt, Becker, Nicol, & Duku, 2009). In an effort to identify the diathesis in this model of pain, Phillips and Gatchel (2000) examined extraversion and introversion and their contribution to chronic pain experience. The results of their study suggest that personality factors may be inherent characteristics predisposing an individual to high pain sensitivity. In my study, high pain sensitivity will be examined via the RAB. For example, I examined nBelong as the diathesis and peer victimization as the stressor. I expected that the interaction between victimization and nBelong would trigger a RAB, influencing the acute pain experience created by ostracism during Cyberball.

Other physical pain research also supports the notion that chronic pain increases sensitivity to future acute pain experiences. For example, research by Alveres et al. (2000) indicates that infants exposed to prolonged physical pain experience hyperalgesia and undergo significant neurological changes in central nervous system pathways as a result of high neural plasticity, making them more sensitive to subsequent pain experiences. Similarly, McKeever and Huff (2003) observed that residual stress from traumatic experiences resulting in post-traumatic stress disorder (PTSD) resulted in increased sensitivity to and anxious expectancy of future pain. This again supports the diathesis-stress model, especially when coupled with the research of Sharp and Harvey (2001) on PTSD, which investigated the relationship of PTSD to chronic back pain and

demonstrated that similar exacerbating effects of previous pain on subsequent painful experiences occurred.

All of the above studies support the conclusion that chronic pain causes a lowered threshold to subsequent acute pain, results in anxious expectation of future pain, and exacerbates the psychological and physiological effects of that pain. I expected that chronic social pain, in the form of peer victimization, would similarly influence acute social pain experiences such as ostracism from Cyberball by way of the proposed RAB. I expected that rather than becoming desensitized to the pain, chronically victimized participants would react to ostracism similarly to those in a study by Usher, Waldrip, and Jensen-Campbell (2007). Usher and her colleagues found that victimized participants reported significantly increased negative mood, threat perception, and fear of future interactions following exposure to an ambiguous situation. The results of the study indicated that chronically victimized participants have an increased sensitivity to perceived ostracism, especially in ambiguous situations. Furthermore, the increased fear of future interactions leads to the conclusion that chronic victimization does not lead to numbing of future social pain, but rather a heightened response to subsequent instances of ostracism.

Another key personality factor influencing the experience of social pain is nBelong, which contributes to individual differences in both physiological and behavioral responses to ostracism. Baumeister and Leary (1995) define nBelong as the innate motivation to avoid exclusion and maximize chances of inclusion into social groups by forming relational bonds. They assert that it is a fundamental human motivation because

it produces effects under most conditions, has affective consequences, guides cognitive processing, leads to negative consequences when hindered, elicits goal-oriented behavior, is universal, affects many types of behaviors, and has greater implications beyond psychological function. Baumeister and Leary propose that nBelong has two primary components–the need for frequent personal interactions, and the need for perceived relationship stability and longevity. If these needs are threatened, negative affect occurs. Exclusion, according to Baumeister, Heatherton, and Tice (1990), is presented as the primary source of anxiety because of the feelings of isolation and helplessness it induces.

Much research in the area of social psychology includes, at least to some degree, consideration of belongingness in analysis of individual differences. In this study, I hoped to focus on this particular characteristic and its tendency to predispose individuals to stronger aversive reactions to social pain and ostracism. Based on evidence from previous research, I anticipated that those participants with a higher nBelong would show more neural activity and self-report higher levels of distress during and after ostracism in the Cyberball game (Waldrip, 2006; Knack et al., 2007). In addition, I anticipated that nBelong would exacerbate the association between chronic victimization and reactions to ostracism. That is, persons who were higher on nBelong and were chronically victimized should react most strongly to ostracism, especially in the nonexclusion condition.

1.3 Rejection Sensitivity Influencing Coping

Rejection sensitivity was taken into consideration during the course of the study when examining possible mediating influences. Downey and Feldman (1996) describe rejection sensitivity as the tendency for individuals to anxiously anticipate being rejected

by others, regardless of whether the threat of rejection is real or perceived. This sensitivity is thought to stem from previous experiences of rejection, for example chronic victimization, and indicates yet another lasting negative consequence of ostracism (Levy, Ayduk, & Downey, 2001). I expected that chronic peer victimization would lead to greater rejection sensitivity, in turn leading to greater distress, especially in the ambiguous situation. It is important to note that the RAB differs from the construct of rejection sensitivity. While everyone has some degree of sensitivity to rejection, this sensitivity typically only leads to distress in response to overt ostracism, not ambiguous or neutral situations. Conversely, the RAB should only emerge in individuals who have been targets of chronic peer victimization, causing distress regardless of how overt or intentional the instance of ostracism.

1.4 Cyberball: An Online Ball-Tossing Game

In 2000, Kip Williams and colleagues expanded existing definitions of ostracism to incorporate exclusion from a group online (Williams, Cheung, & Choi, 2000). They referred to this type of exclusion as *cyberostracism*, and demonstrated its effects using a computer-based ball-tossing game, Cyberball, which was used to replicate the effects of face-to-face ostracism manipulations (Williams & Sommer, 1997). Cyberball, which is presented on the computer screen in an Internet Explorer webpage format, leads participants to believe they are playing against other people in another location over the internet. This deception is crucial to successfully creating feelings of ostracism. Participant self-reports indicate that they perceive key needs as being threatened by the exclusion, and neurological data reveal that the physiological response is strong as well

(Eisenberger, Lieberman, & Williams, 2003; van Beest & Williams, 2004). Because Cyberball has been consistently demonstrated to replicate the effects of face-to-face ostracism, eliminating the need for trained confederates, it is an ideal choice for this experiment. In this experiment, Cyberball was programmed to run three conditions – inclusion (I), nonexclusion (NE), and exclusion (E).

1.5 Physiological and Self-Report Data

Existing research, while providing an excellent guide to the neural mechanisms and cognitive processes underlying social pain on a basic level, fails to accurately understand individual differences in reactions to social exclusion. Additionally, many studies have focused primarily on self-report data with the exception of Eisenberger et al. (2003) and Campbell et al. (2006). Moreover, the fMRI designs using ostracism were less than optimal, because they used a blocked design. For example, the Eisenberger et al. (2003) study used long blocks, with one block per condition. The ideal approach in fMRI would be using multiple shorter blocks per condition and averaging those counterbalanced blocks to minimize noise/confounds. However, the caveat to this multiple-blocks design lies in the difficulty to psychologically re-include an already excluded participant. Given that only one long block for each condition was used, scanner drift may be a plausible alternative explanation for the resulting differences between I and E conditions, though Eisenberger suggests that the self-reports of distress correlate with the fMRI results, verifying the presence of an actual change not attributed to artifact.

While the low spatial resolution of EEG is typically a major disadvantage, EEG carries a number of advantages for studying ostracism, namely that it is ideally suited to examining neural activity during behaviors that change drastically over brief intervals of time (Davidson, Jackson, & Larson, 2000). In addition, EEG can be collected over a long period of time without the limitations associated with fMRI. This advantage stems from the fact that postsynaptic potentials measured by EEG are much more instantaneous changes than a hemodynamic response as measured by fMRI. Therefore, they are more accurately linked to behavioral or affective changes in the participant. Furthermore, the practical caveats to fMRI, the first being the large amount of funding necessary, prevented it from being a reasonable choice for this study. Participants would have been required to travel to another facility, and issues such as claustrophobia would prevent some from involvement. Using a low-cost and local technology also allowed for a larger sample size, which is critical to successfully assessing individual differences. For these reasons, I chose EEG as the physiological measure of neural activity for this project.

1.6 Goals of the Present Study

I planned to address several goals in the course of this study. First, I hoped to replicate and extend previous research in the area of social pain, linking EEG data to the MEG and fMRI evidence reported in the research previously discussed. I hypothesized that excluded individuals would report higher distress during exclusion and increased RPFC activation compared to individuals in the NE and I conditions (Hypothesis 1). This activity was assessed via 24-channel EEG (measuring sites F_{P1}, F_{P2}, F_3, F_4, F_7, F_8, and accounting for artifact by examining horizontal and vertical EOG), with special interest

in right frontal areas. I anticipated higher RPFC (F_{P2}, F_4, and F_8) in the exclusion condition given that participants would need to regulate the increased activation of the ACC.

Second, I examined individual differences in chronic victimization. I expected that both chronically victimized and non-victimized participants should have similar neurological and affective responses to the I and E conditions (Hypothesis 2a). However, I anticipated that chronically victimized participants, especially those with a high nBelong, would demonstrate a RAB in the NE condition. I expected that for the chronically victimized participants, a RAB would result in greater self-reports of feeling ostracized, greater threatened needs, and physiological patterns for the neutral NE condition similar to those observed in the overt E condition (Hypothesis 2b). This effect was expected to be in contrast to a lack of distress or feeling of exclusion in those participants not chronically victimized for the same condition. In addition, nBelong was expected to moderate the link between chronic victimization and outcomes in the ambiguous situation (Hypothesis 3).

Finally, I considered the possible mediating influence of rejection sensitivity (Hypothesis 4). I expected that chronically victimized persons would evidence higher levels of rejection sensitivity, which was thought to influence reactions to social exclusion, especially in ambiguous rejection situations. (See Figure 1.1 for the theoretical model.)

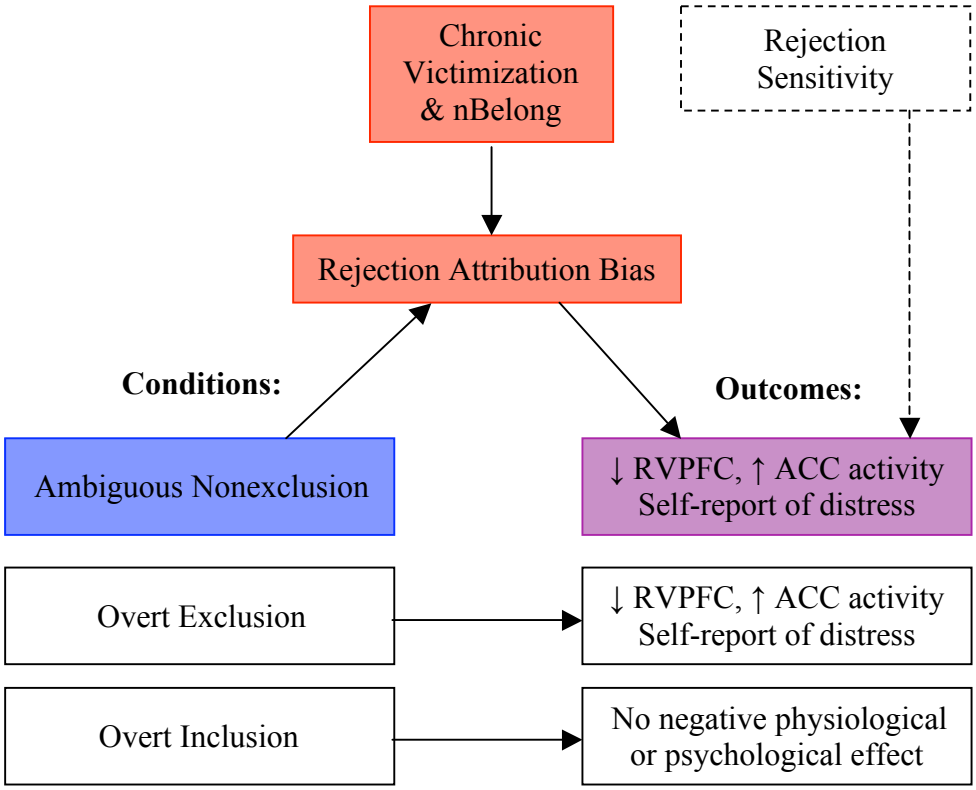

Figure 1.1 Theoretical model

CHAPTER 2

METHOD

2.1 Participants

In this study, 189 male (N = 55) and female (N = 134) undergraduate students from the University of Texas at Arlington (UT Arlington) volunteered as participants, either for research credit in an introductory psychology course or extra credit for advanced coursework in the same area. The number of participants was chosen based on power calculations according to Cohen's (1988) guidelines for a power of 0.70 and correlations of 0.35 or higher. Participants were randomly assigned to one of three conditions, I (N = 61), NE (N = 63), or E (N = 65). All participants completed pre-screening questionnaires that included demographic information such as age (M = 22.90, SD = 7.03, range = 17-54), ethnicity (White/Anglo-American = 46.00%, Asian = 21.20%, Black/African-American = 13.80%, Pacific Islander = 1.10 %, and Other/Multiracial = 16.9%), and major (Psychology = 13.20%). The distribution of male and female participants approximated the distribution of the subject pool (M = 20.10%, F = 70.90%).

2.2 Materials

The following measures were administered to participants online for Phase I and in paper-and-pencil format for Phase II. Descriptive statistics and reliability coefficients for all measures are presented in Table 2.1 (Phase I) and Table 2.2 (Phase II).

Table 2.1 Descriptive Statistics for Personality and Victimization Measures

Variable/Scale Name	Mean	*SD*	Skewness	Possible Range	Actual Range	Alpha
Personality Measures						
Need to Belong Scale (nBelong)	33.48	6.71	-0.13	10-50	16-50	0.82
Positive and Negative Affect Scale (PANAS)						
Positive	35.88	6.89	-0.34	10-50	18-50	0.87
Negative	20.08	6.35	1.09	10-50	10-49	0.86
Rejection Sensitivity Questionnaire (RSQ)	141.32	17.47	-0.98	36-180	36-178	0.86
Victimization Measures						
Total Victimization (DIAS + CSEQ)	62.28	17.67	1.34	38-190	39-133	0.95
Children's Social Experiences Questionnaire (CSEQ-SR)	23.93	7.10	1.39	15-75	15-51	0.75
Overt Victimization	8.59	2.79	1.70	6-30	6-21	0.76
Relational Victimization	15.34	4.82	1.23	9-45	9-35	0.85
Prosocial Help	22.78	3.45	0.06	6-30	14-30	0.76
Direct and Indirect Aggression Scale (DIAS)	38.35	11.74	1.30	24-120	24-85	
Physical Aggression	8.86	3.01	2.32	7-35	7-24	0.85
Verbal Aggression	8.95	3.21	1.10	5-25	5-21	0.80
Indirect Aggression	20.54	6.83	1.16	12-60	12-50	0.90

Table 2.2 Descriptive Statistics for Experimental Measures

Variable/Scale Name	Mean	SD	Skewness	Possible Range	Actual Range	Alpha
Cyberball (TNS)	53.35	18.75	0.23	20-100	20-100	0.96
Belongingness	12.38	5.91	0.37	5-25	5-25	0.93
Self-Esteem	12.73	4.50	0.10	5-25	5-25	0.88
Control	12.65	4.39	-0.03	4-20	4-20	0.90
Meaningful Existence	15.58	5.93	0.46	6-30	6-30	0.81
Cyberball (Other Items)						
"I felt rejected"	2.07	1.31	0.79	1-5	1-5	
"I felt ignored"	2.33	1.45	0.61	1-5	1-5	
"I felt excluded"	2.37	1.50	0.53	1-5	1-5	
"% Throws Received"	27.00	21.56	1.16	0-100	1-90	
Positive and Negative Affect Scale (PANAS)						
Positive Affect (Pretest)	30.48	7.54	-0.09	10-50	10-48	0.90
Negative Affect (Pretest)	15.59	4.56	1.41	10-50	11-33	0.76
Positive Affect (Posttest)	25.58	8.87	0.15	10-50	11-50	0.92
Negative Affect (Posttest)	14.05	4.65	2.19	10-50	11-35	0.84
Δ Positive Affect*	0	1.00	-0.38		-3.35-6.50	
Δ Negative Affect*	0	1.00	1.25		-2.61-5.01	

* Change scores are std. resid. from regression of PANAS-Moment posttest on pretest

In addition to general demographic information, I assessed correlation between measures. These results are first presented separately for victimization and threatened needs in Tables 2.3 and 2.4, then in combination with RS and nBelong in Table 2.5.

Table 2.3 Correlations Between Measures of Victimization

	I	II	III	IV	V	VI
Prosocial Help - CSEQ-SR (I)	–	-.29*	-.33*	-.27*	-.31*	-.25*
Overt Victimization - CSEQ-SR (II)		–	.72*	.68*	.59*	.45*
Relational Victim. - CSEQ-SR (III)			–	.64*	.62*	.71*
Physical Victim. - DIAS-VV (IV)				–	.70*	.63*
Verbal Victim. - DIAS-VV (V)					–	.74*
Indirect Victim. - DIAS-VV (VI)						–
$N = 189$						

* $p < 0.001$

Table 2.4 Correlations Between Measures of Threatened Needs

	I	II	III	IV	V
tBelong (I)	–	.71*	.77*	.81*	.92*
tEsteem (II)		–	.63*	.80*	.87*
tControl (III)			–	.76*	.87*
tMeaning (IV)				–	.94*
Total Threat (V)					–
$N = 189$					

* $p < 0.001$

Table 2.5 Correlations Between Victimization, nBelong, RS, and Threatened Needs

	I	II	III	IV	V	VI	VII	VIII	IX
Relational Victimization (I)	–	.88	.25**	.30**	.08	.02	.09	.16*	.05
Overall Victimization (II)		–	.27**	.33**	.03	-.06	.05	.10	.04
nBelong (III)			–	.22**	.01	.03	.13	.16*	.07
RS (IV)				–	.15*	.06	.16*	.21*	.12
Total Threat (V)					–	.92**	.94**	.87**	.87**
tBelong (VI)						–	.81**	.71**	.77**
tMeaning (VII)							–	.80**	.76**
tEsteem (VIII)								–	.63**
tControl (IX)									–
$N = 189$									

*$p < 0.05$, ** $p < 0.001$

2.2.1 Demographic measures

2.2.1.1 Psychology Department General Pre-Test

The Psychology department prescreening contains a demographic questionnaire consisting of 28 multiple-choice and free-response items. Included in this questionnaire are questions pertaining to characteristics such as participant sex, ethnicity, age, and socio-economic status. To be included in the present study, all participants must have completed the questions about sex and ethnicity. Other demographic information was collected, but participants who declined to answer additional questions were still eligible.

2.2.2 Victimization Measures

2.2.2.1 Modified Children's Social Experiences Questionnaire - Self Report (CSEQ-SR)

The CSEQ-SR focuses on the measurement of victimization and social support in peer relationships. The questionnaire consists of 21 items (i.e., "How often does another person do something that makes you feel happy?") on a Likert-type scale (1 = never, 5 = always), and is divided into three subscales measuring overt victimization, relational victimization, and receipt of prosocial behaviors (Crick & Grotpeter, 1996). The current version was modified to assess current levels of peer victimization and social support in college. (For range and alpha, see Table 2.1).

2.2.2.2 Direct and Indirect Aggression Scales – Victim Version (DIAS)

The DIAS measures aggressive acts committed against a victim on three dimensions–physical, verbal, and indirect. These three subscales are intended to more accurately quantify victimization for both males and females in light of previous research indicating a direct aggression/victimization (physical, verbal) bias for males and an indirect aggression/victimization (backbiting, social manipulation) bias for females (Lagerspetz, Björkqvist, & Feltonen, 1988). The version used in this study consisted of a total of 24 questions (i.e., "How often are you insulted by other people?") modified from the original to create a victim version. (For range and alpha, see Table 2.1).

2.2.3 Personality Measures

2.2.3.1 Need to Belong Scale (nBelong)

The nBelong is a brief Likert-type scale (1 = strongly disagree, 5 = strongly agree) consisting of ten items. The nBelong is a means of assessing the desire for group

interaction and acceptance (i.e., “I try hard not to do things that will make other people avoid or reject me.”). Scores can range from 10-50, with higher scores associated with a greater nBelong (Baumeister & Leary, 1995). (For range and alpha, see Table 2.1).

2.2.3.2 Rejection Sensitivity Questionnaire (RSQ)

The RSQ measures rejection sensitivity on an individual basis. It consists of two questions for each of 18 scenarios (i.e., “You ask your friend to go on vacation with you over spring break.”), the first question assessing the level of rejection concern (i.e., “How concerned would you be over whether or not your friend would want to go with you?”), and the second measuring the level of acceptance expectancy (i.e., “I would expect that he/she would want to go with me.”). Scoring involves multiplying the participant’s response to the first question by the reverse of the response to the second question, then averaging the 18 resulting scores to gain a total measure of rejection sensitivity for the participant (Downey & Feldman, 1996). (For range and alpha, see Table 2.1).

2.2.4 Experimental Measures

2.2.4.1 Cyberball Questionnaire – Version 2

Cyberball Questionnaire version 2 contains 31 items (i.e., “I felt I had control over the course of the game.”) on a five-point (1 = not at all, 5 = extremely) Likert-type scale. The intent of this questionnaire is to assess the participant’s feelings while playing Cyberball (Williams, Cheung, & Choi, 2000). Within the Cyberball Questionnaire are manipulation checks, current mood assessments, and a *Threatened Needs Scale (TNS)*. Using a five-point Likert-type scale (1 = not at all, 5 = extremely), the TNS measures four needs that participants experience while playing Cyberball. These include belonging

(i.e., “I felt poorly accepted by the other participants”), control (i.e., “I felt that I was able to throw the ball as often as I wanted during the game”), self-esteem (i.e., “During the Cyberball game, I felt good about myself”), and meaningful existence (i.e., “I felt that my performance had some effect on the direction of the game”) (Zadro, Williams, & Richardson, 2004). (For range and alpha, see Table 2.2).

2.2.4.2 Cyberball Social Exclusion Task (Cyberball)

Cyberball (v. 2) is a virtual ball-tossing game wherein researchers may create predetermined “scripts” for when and how a participant receives the ball and is able to toss it to another player (Williams et al., 2000). The program seeks to simulate real-life exclusion, inclusion, and neutral social situations and exercises through computer-guided virtual play. Participants can be shown 2 or 3 other participants. For the current study, participants were shown three pictures and names of what were actually computerized confederates, but whom they believed to be fellow participants. Three confederates were chosen to help create the ambiguous NE situation (i.e., receiving the ball an equal number of times as the other supposed participants but only 25% of the entire throws possible). Ball toss direction and frequency was controlled through prewritten script and settings files. For this experiment, those files corresponded to the conditions of E, NE, and I (Williams & Jarvis, 2007).

2.2.4.3 Positive and Negative Affect Schedule-Moment (PANAS-Moment)

The PANAS-Moment is an assessment of positive and negative affect measured on a five-point Likert-type scale (1 = very slightly or not at all, 5 = extremely). The PANAS-Moment is intended to gain information on a participant’s emotional state at the

moment that the questionnaire is given (Watson, Clark, & Tellegen, 1988). For the present study, ten positive items (i.e. "At this moment, I am feeling excited.") were combined to create a Positive Affect measure, and eleven negative items (i.e. "At this moment, I am feeling anxious.") were combined to create a Negative Affect measure. (For range and alpha, see Table 2.2).

2.3 Apparatus

Hardware and software from the James Long Company (Caroga Lake, NY) was used to collect and analyze EEG data. A cap from Electro-Cap International, Inc. (Eaton, OH) equipped with 24 channels was fitted to participants upon beginning Phase II of the study. The caps hold 6-mm recessed, pure tin electrodes positioned according to the International 10-20 System (Jasper, 1958). Following recommendations found in Davidson et al. (1990b), I chose to use a linked-ears reference in data collection, linking off-line with one ear active during data collection, then carefully removing excess artifact during the data analysis phase and averaging data across points of interest to reduce shunting.

2.4 Procedure

Phase I of this experiment involved of a series of questionnaires administered through the UTA subject pool online. Potential participants had the opportunity to participate in an on-line study entitled "Who Am I?", and saw the following set of instructions prior to completing the questionnaires:

> The purpose of this study is to examine individual differences in college students and how they describe themselves. Participants who complete this study will also have the opportunity to sign-up for additional studies.

> This study consists of an online survey, which you may now participate in. You will receive credit immediately upon completion of the survey. The survey consists of a number of multiple-choice questions, which are divided into a number of sections. You must complete all sections in one sitting, as you are not allowed to resume at another time from where you left off. While you are participating, your responses will be stored in a temporary holding area as you move through the sections, but they will not be permanently saved until you complete all sections and you are given a chance to review your responses.
>
> The purpose of this study is to examine individual differences in how people view themselves. In addition, participants may be eligible for additional studies that examine individual differences in social behavior. Students will describe themselves on a number of facets (e.g., how talkative you are). Answering the questions should take approximately 1 hour to complete. Risks in participating are no more than one would experience in daily activities. There are no direct benefits to students. Students will contribute to our understanding of how individual differences are related to social behavior. All of your answers will remain confidential.
>
> For problems or questions regarding your rights as a subject, the Office of Research of the University of Texas at Arlington can be contacted at (817) 272-2105. For other questions about the study, you should call the principal investigator, Dr. Lauri A. Jensen-Campbell at (817) 272-5191. By answering this survey, you are freely consenting to participate.

Included measures were the Need to Belong Scale (nBelong), CSEQ-SR, Rejection Sensitivity Questionnaire (RSQ), Direct and Indirect Aggression Scales (DIAS), (see Appendix A). These measures were included as part of a larger study to eliminate the possibility of demand characteristics by concealing which studies students' responses made them eligible for, and by distancing the personality measures temporally from this experiment.

After completion of Phase I online, eligible participants were able to see three new study options (including Phase II of the present study) in the online participant pool,

and could volunteer to sign up for only one of the three. If they chose to sign up for this experiment, they were brought into the lab for Phase II, but remained unaware that the "Who Am I?" was linked to the in-lab study. During Phase II of this experiment, participants were again asked to carefully read and sign appropriate informed consent documents. The experimenter briefly explained through a scripted set of instructions that Phase II involved self-report measures, an online game, and EEG data collection. Additionally, the experimenter told participants that the purpose of collecting EEG data was to gain information about brain wave patterns associated with mental visualization. Participants then completed the PANAS-Moment and were fitted with an EEG cap with electrodes attached to the face, ears, and scalp according to the guidelines set forth in Pivik et al. (1993), and given instructions to limit movement as much as possible during the experiment in an attempt to lessen artifact. Once the cap was properly aligned on the participant's head, the experimenter instructed him or her to relax as much as possible and look at a fixed point straight ahead so that baseline measures could be obtained. Following the procedure used by Jensen-Campbell and her colleagues in 2006, four 1-minute measures of baseline were collected with the participant's eyes alternating between open and closed.

After collecting baseline EEG data, the participant began the Cyberball task. The game was explained using the following set of instructions read aloud from the computer screen by the experimenter:

> In the upcoming experiment, we test the effects of practicing mental visualization on task performance. Thus, we need you to practice your mental visualization skills. We have found that the best way to do this is to have you play an on-line ball tossing game with other participants who are logged on at the same time.

> In a few moments, you will be playing a ball tossing game with other students over our network. The game is very simple. When the ball is tossed to you, simply click on the name of the player you want to throw it to. When the game is over, the experimenter will give you additional instructions.
>
> What is important is not your ball tossing performance, but that you ***MENTALLY VISUALIZE*** the entire experience. Imagine what the others look like. What sort of people are they? Where are you playing? Is it warm and sunny or cold and rainy? Create in your mind a complete mental picture of what might be going on if you were playing this game in real life (Zadro, Williams, & Richardson, 2004).

Once all preliminary steps were taken according to the protocol, participants began to play Cyberball while EEG data was collected. They experienced one of three conditions: exclusion (E), nonexclusion (NE), or inclusion (I). These conditions were based on previously written settings and schedule files created by the principal investigator. The E condition began with a short period of inclusion followed by total exclusion of the participant by the three computerized confederates. The NE condition was randomized across all players including the participant, reflecting typical inclusion in a game. In other words, the participant received the ball 25% of the time in this condition. Thus, he or she was not excluded, but not necessarily included, leaving a degree of ambiguity in how accepted the participant felt. The I condition created an environment in which the participant received, and consequently was allowed to throw, the ball a disproportionately large number of times relative to the computer confederates (e.g., at least 50% of the ball tosses). This condition was unambiguous, that is, the participant was clearly accepted. After the participant played Cyberball, the PANAS-Moment and Cyberball Questionnaire version 2 were administered.

Experimenters collected freestanding EEG data as the Cyberball task began, measuring activity for the duration of the ball-tossing game. After completing the entire Cyberball task and questionnaires, which took approximately 25 minutes, participants were thoroughly debriefed as to the true intent of the experiment, thanked for their participation, given the opportunity to ask questions, and allowed to leave.

CHAPTER 3

RESULTS

3.1 Overview and Data Management

This study sought to understand the effect of chronic victimization on physiological and psychological reactions to ostracism better. Self-reports of feeling rejected, ignored, and excluded, in addition to participant perceptions of percent throws received and measures of threatened needs, were used to assess the psychological aspect of this reaction. EEG data measured RPFC activation to measure the physiological aspect of the social pain experience. Data screening was conducted and missing value analysis (MVA) was performed according to the recommendations of Little (1988) for the limited number of cases that fit "missing completely at random" (MCAR) criteria, $X^2(6777) = 0.00$, *ns.* Though initially planned, analysis of EEG data using LORETA was not conducted due to unforeseen compatibility issues between the James Long Company data collection software and the LORETA analysis package.

In addition to a variable-centered approach, I also took a person-centered approach to this data as suggested by Mervielde & Asendorpf (2000). As such, I used a hierarchical cluster analysis in SPSS to identify homogenous groups that differed significantly from one another on victimization measures. I used overall victimization (composite of the physical, verbal, and relational DIAS subscales with the overt and relational CSEQ subscales) and relational victimization (composite of the

relational subscales of the DIAS and CSEQ) in analyses. Examining relational victims separately from overall victims is particularly appropriate for a college sample because relational victimization is the most common form of victimization experienced in the college demographic. This form of victimization is also particularly salient for females, who make up the majority of the current sample (Crick, Casas, & Nelson, 2002). Finally, relational victimization involves ostracism (i.e., the experimental manipulation) (Crick, Casas, & Nelson, 2002; Crick & Nelson, 2002; Cullerton-Sen & Crick, 2005).

Two clear clusters emerged for both relational victimization and total victimization–victims and nonvictims, and this grouping was confirmed with K-cluster analysis, which produced similar results. For relational victimization there were 43 victims and 146 nonvictims, and for total victimization there were 41 victims and 148 nonvictims[1]. These clusters are used in the following analyses. Nonparametric testing (Mann-Whitney Test) indicated that the current sample clusters did not significantly differ from the larger "Who Am I?" sample, $z = 0.00$, $p = 1.00$, with both studies consisting of approximately 25% victims and 75% nonvictims.

One-way ANOVA was used to determine significant differences between the I, E, and NE groups. Moderated multiple regression (MMR) and MANOVAs, taking a person-centered approach using victim and nonvictim clusters for overall and relational victimization as described above, were used to analyze Hypotheses 2 and 3 (Cohen, Cohen, West, & Aiken, 2003). Finally, mediation analyses (e.g., Sobel tests and

[1] Analyses conducted to identify any differences in victim and nonvictim clusters for males vs. females and for participants without vs. participants with EEG data produced virtually identical results to the cluster analysis performed on the full sample.

bootstrapping mediation) were used to assess my mediation model for Hypothesis 4 (Preacher & Hayes, 2008). In MMR, personality measures were treated as continuous variables, and the three conditions were coded using unweighted effects codes following procedures outlined by Aiken and West (1991) and Cohen et al., 2003. Additionally, I created several composite variables for later use in examining interaction effects between victimization (relational and total), experimental condition (I, NE, E), nBelong, and RS. I conducted post-hoc analyses for any significant interactions after initial hypothesis testing, again following the guidelines outlined in Cohen et al. (2003).

Furthermore, taking a person-centered approach to my data, I used MANOVA and Roy-Bargmann's step-down method to further probe significant effects, which enabled me to control for contributions of multiple dependent variables to the same model in order of theoretical importance. The person-centered approach allows for emphasis on the person rather than variables, and was appropriate to the current study's theoretical model because my interest was in victim vs. nonvictim differences rather than just raw scores on victimization measures. This approach is ideal for the constructs of interest in the RAB model because it considers how individuals resemble one another on a given dimension of interest rather than considering individual scores on variables (Mervielde & Asendorpf, 2000). Additionally, I used planned contrasts (described in greater detail in section 3.4.1) to assess differences between conditions according to my theoretical predictions.

3.2 EEG Data Reduction and Analysis

EEG was used to assess right prefrontal activity. Due to issues with data collection, while all participants' baseline data was useable, Cyberball EEG data only exists for the last 60 participants who completed the study. All EEG data was first visually inspected to identify epochs containing ocular and other artifacts. Using the most commonly used method to remove EEG artifact (Hagemann, 2004), I excluded artifact-contaminated epochs from analysis. Data was then digitally transformed from an A1-reference to an average-ears reference, and I applied the Fast Fourier Transformation (FFT) to each 1-minute recording period. Hanning windows identified 1.00 s epochs of artifact-free data in each recording period, and epochs overlapped by 50%.

Spectral power from 1 Hz bins was clustered into broad bands. The band of primary interest was alpha (pWΩ; 7.50 Hz to 13.50 Hz), which I averaged across baseline and during Cyberball. I selected the alpha band because it reflects a state of relaxed wakefulness and reflection. Given that alpha power varies inversely with cortical activation, alpha suppression reflects increased brain activity. In future analyses, the beta frequency range (12 Hz to 20 Hz) will also be examined, as it is associated with anxiousness and active cognition when observed in low amplitudes and varying frequencies. Skewness in the EEG data necessitated logarithmic (ln) transformation of each site. PFC activity assessed at sites FP_2, F_4, and F_8 was compared to activation at corresponding left-hemisphere sites (FP_1, F_3, and F_7), as I only anticipated differential activation on the RPFC in the predicted direction compared to the LPFC. This right-relative-to-left activation was examined using a composite variable created by subtracting

left-hemisphere activity from right hemisphere activity for each set of corresponding sites (e.g., FP_1 minus FP_2) (Harmon-Jones, 2004). As such, this new variable represents activation in the RPFC, rather than suppression (as represented by FP_2, F_4, and F_8).

3.3 Manipulation Check (Hypothesis 1)

Using a series of one-way ANOVAs, I examined the effectiveness of the Cyberball manipulation for ostracism. I anticipated that participants in the I condition would experience a significantly greater feeling of inclusion than those in the E condition, and vice versa for feeling ostracized, replicating the results of Eisenberger, Lieberman, and Williams (2003) (Hypothesis 1). I also anticipated that the NE condition would fall between the I and E conditions on feelings of inclusion and rejection. In agreement with my predictions, significant differences existed between participants in the I, NE, and E conditions on reported feelings of being rejected, $F(2, 186) = 53.63$, $p < 0.001$, partial $\eta^2 = 0.37$; ignored, $F(2, 186) = 59.13$, $p < 0.001$, partial $\eta^2 = 0.39$; excluded, $F(2, 186) = 43.18$, $p < 0.001$, partial $\eta^2 = 0.32$. As anticipated, scores on each item differed significantly at the $p < 0.05$ level for participants in the E > NE > I groups.

Furthermore, a one-way ANOVA revealed expected group differences on perceived percent throws received, $F(2, 186) = 82.18$, $p < 0.001$, partial $\eta^2 = 0.47$. Again, post-hoc analysis revealed that participants significantly differed in their perceptions of percent throws received at the $p < 0.05$ level for the E > NE > I groups (see Figure 1.1). Finally, I used a one-way ANOVA to examine mean differences between conditions on total threatened needs, collapsing across the four threatened needs subscales. Again, this analysis revealed significant differences as predicted, $F(2, 186) = 45.19$, $p < 0.001$,

partial $\eta^2 = 0.33$, with post-hoc testing confirming expected significant differences at the $p < 0.05$ level for participants in the E > NE > I groups (see Figure 3.2).

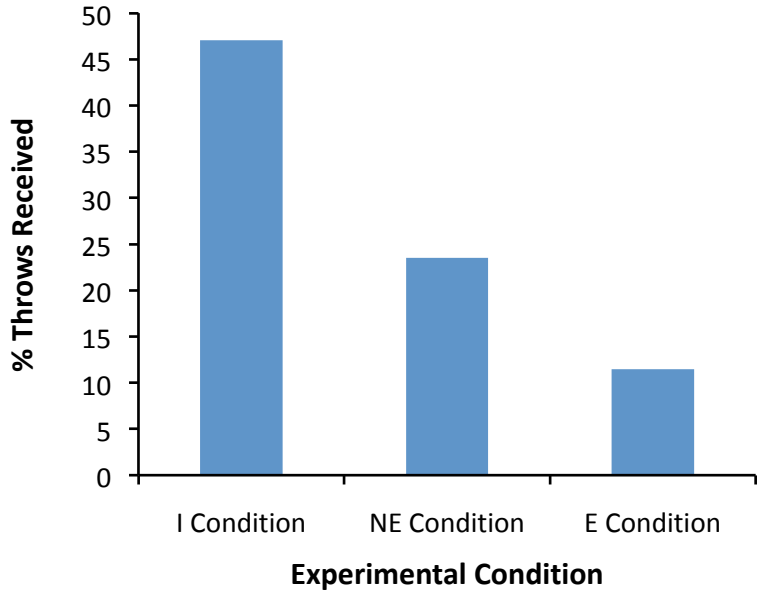

Figure 3.1 Mean differences in perceptions of percent throws received

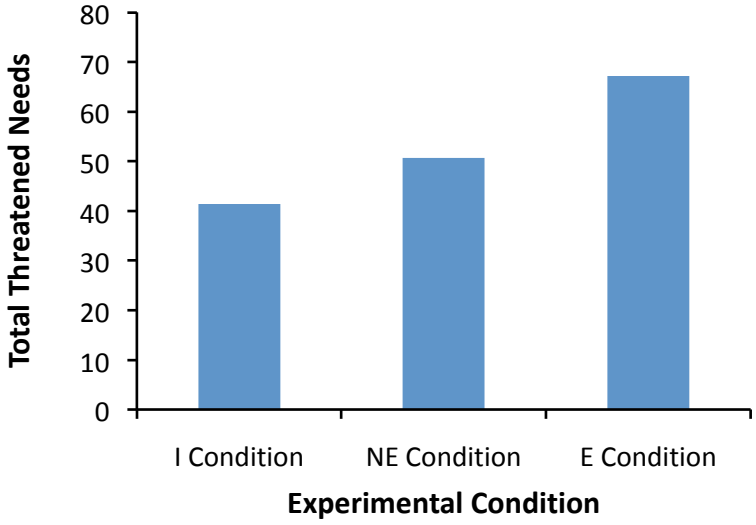

Figure 3.2 Mean differences in total threatened needs

Because group differences existed between each condition on each variable examined in the manipulation check, the goal of replicating results of Kip Williams and colleagues (2000; 2007) was fully met. Additionally, these results justify the decision to extend previous findings by including a NE condition, demonstrating that participants clearly perceived differences between overt inclusion and ambiguous nonexclusion. Additional condition effects will be examined as part of Hypothesis 2 (e.g.; for individual threatened needs).

3.4 Hypothesis Testing

3.4.1 Hypotheses 2a and 2b

I examined individual differences in chronic victimization, expecting that both chronically victimized and non-victimized participants would have similar neurological and affective responses to the I and E conditions (Hypothesis 2a). However, I anticipated that chronically victimized participants would demonstrate a RAB in the NE condition (Hypothesis 2b). For the chronically victimized participants, a RAB should result in greater self-reports of feeling ostracized or threatened and physiological patterns for the neutral NE condition that are similar to those observed in the overt E condition. This effect was expected to be in contrast to a lack of feeling excluded in those participants not chronically victimized for the same condition.

The influence of chronic victimization on reactions to exclusion was examined through MMR. Due to the RAB, those participants who had been chronically victimized were expected to report greater distress, threatened needs, and negative mood in the NE (ambiguous) condition than those not chronically victimized, and were expected to show

decreased RPFC activity. I did not anticipate differences in the E and I conditions. The first step in conducting a MMR analysis was to treat victimization as continuous and center it. Unweighted effects codes were then created for the experimental conditions, U1 (E = -1, NE = 0, I = 1) and U2 (E = -1, NE = 1, I = 0), and after creating the appropriate cross-products, they were entered into the model to assess interactions between condition and victimization. If there was a significant effect for condition, I re-ran the MMR using contrast effects to determine which groups were different from one another. The first contrast effect examined whether participants in the exclusion and nonexclusion conditions were significantly different from participants in the inclusion condition (i.e., conditions were coded, -1, -1, and 2). In the second contrast, I examined whether the participants in the exclusion and nonexclusion conditions were different from one another (i.e., conditions were coded -1, 1, and 0). Dependent measures included self-reported feelings of rejection, being ignored, and exclusion in addition to changes in mood, threatened needs, and RPFC (relative to LPFC) activation[2].

3.4.1.1 Does Victimization Predict Feelings of Exclusion?

First, I used regression analyses to examine effects of relational victimization and condition on three Cyberball variables measuring feelings of exclusion. There was an overall main effect for condition for rejection, being ignored, and being excluded, Fs(2, 183) = 53.72, 59.56, 43.50, ΔR^2s = 0.37, 0.39, 0.32, ps < 0.001. Using contrast effects, I found that participants in the exclusion and nonexclusion conditions reported greater feelings of being rejected, ignored, and excluded than participants in the inclusion

[2] Supplementary analysis of controlling for gender produced nearly identical results.

condition, *b*s = -0.36, -0.48, -0.44, *t*s(183) = -6.53, -8.08, -6.69, sr^2s = 0.14, 0.21, 0.16, *p*s < 0.01. In addition, participants in the exclusion condition reported greater feelings of being ignored than participants in the nonexclusion condition, *b*s = -0.74, -0.73, -0.71, *t*s(183) = -7.93, -7.19, -6.38, sr^2s = 0.21, 0.17, 0.15, *p*s < 0.001.

Although there was not a main effect for relational victimization, there was a marginal relational victimization X condition interaction for being ignored, $F(2, 183) = 2.34$, $\Delta R^2 = 0.02$, $p = 0.099$. For the nonexclusion condition, relational victimization was positively related to feeling ignored ($r = 0.20$, $p = 0.12$) although this slope was not significantly different than zero. For exclusion, the relationship between relational victimization and being ignored was negative and nonsignificant ($r = -0.11$). For inclusion, there was no relationship between relational victimization and being ignored ($r = 0.07$). There were no relational victimization main effects or interactions for feeling rejected and excluded.

Using a person-centered approach, I conducted a MANOVA using relational victimization, with feelings of being ignored, rejected, and excluded as the outcome variables. However, I found no significant interaction of relational victimization and condition in this model.

Next, I used regression analyses to examine effects of overall victimization and condition on three Cyberball variables measuring feelings of exclusion. There was an overall main effect for condition for rejection, being ignored, and being excluded, *F*s(2, 183) = 52.54, 58.09, 42.00, ΔR^2 = 0.36, 0.38, 0.31, *p*s < .001. Using contrast effects, I found that participants in the exclusion and nonexclusion conditions reported greater

feelings of being rejected, ignored, and excluded than participants in the inclusion condition, *b*s = -0.36, -0.47, -0.42, sr^2s = 0.14, 0.21, 0.15, *t*s(183) = -6.40, -7.92, -6.48, *p*s < 0.001. In addition, participants in the exclusion condition reported greater feelings of being rejected, ignored, and excluded than participants in the nonexclusion condition, *b*s = -0.74, -0.73, -0.71, sr^2s = 0.22, 0.17, 0.15, *t*s(183) = -7.93, -7.21, -6.39, *p*s < 0.001.

There were no overall victimization main effects or interactions for feeling rejected, ignored, or excluded. Using the person-centered approach, I conducted another MANOVA with identical dependent measures, this time for total victimization. There was a marginal multivariate total victimization X condition interaction, Pillai's trace = 0.06, $F(6, 364) = 1.92$, $p = 0.08$, $\eta^2 = 0.03$. Using Roy-Bargmann's step-down procedure, I entered outcome variables into the model in order of theoretical importance (based partially on effect sizes from the main effect of condition), such that the first univariate test was of feeling ignored, the next was for rejected, then excluded, with each subsequent test controlling for the previously tested dependent variables. The interaction of condition and victimization significantly contributed to predicting feeling ignored, $F(2, 183) = 3.89$, $p = 0.02$, $\eta^2 = 0.04$, but not to feeling rejected or excluded in the step-down model.

Pairwise comparisons using a Bonferroni correction revealed that nonvictims in the exclusion condition ($M = 3.62$, $SD = 1.20$) felt significantly more ignored than nonvictims in the nonexclusion ($M = 1.87$, $SD = 1.15$) or inclusion ($M = 1.33$, $SD = 0.84$) conditions ($p < 0.05$), but that nonvictims in the nonexclusion condition did not feel significantly more ignored than those in the inclusion condition. Overall victims did not

differ on feelings of being ignored for the exclusion (M = 3.04, SD = 1.42) and nonexclusion (M =2.73, SD = 1.56) conditions, but victims in the exclusion condition felt significantly more ignored than those in the inclusion (M = 1.50, SD = 0.86) condition (p < 0.05). As predicted in the theoretical model, overall victims and nonvictims differed significantly on feeling ignored in the nonexclusion condition, $t(61) = -2.11$, $p = .04$, but not the inclusion or exclusion conditions (Figure 3.3).

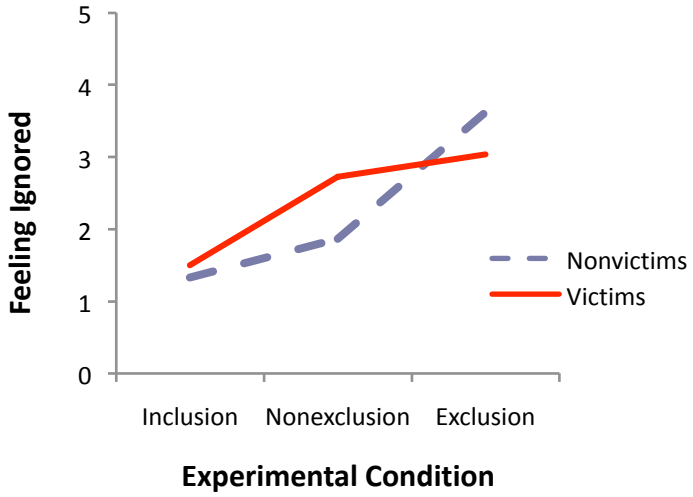

Figure 3.3 Interaction of total victimization and condition on feeling ignored

3.4.1.2 Does Victimization Influence Changes in Mood?

I then used multiple regression to assess changes in mood as assessed by the pre-Cyberball and post-Cyberball PANAS-Moment administrations[3]. Contrary to predictions, neither changes in positive mood nor changes in negative mood were significantly predicted by victimization (relational or overall), condition, or their interaction.

[3] Prior to regression analysis, repeated-measures ANOVA confirmed that a change in mood did occur from the pre-Cyberball to post-Cyberball administrations of the PANAS.

3.4.1.3 Does Victimization Influence Threatened Needs?

I conducted a series of regression analyses to examine effects of relational victimization and condition on total threatened needs and its four subscales. The subscales were for threatened belongingness (tBelong), threatened meaningful existence (tMeaning), threatened self-esteem (tEsteem) and threatened control (tControl). There was an overall main effect for condition for total threatened needs, $F(2, 183) = 48.25$, $\Delta R^2 = 0.33$, $p < 0.001$. Using contrast effects, I observed greater total threatened needs from participants in the exclusion and nonexclusion conditions than in the inclusion condition, $b = -6.18$, $t(185) = -7.80$, $sr^2 = 0.21$, $p < 0.001$. Additionally, participants in the exclusion condition reported greater threatened needs than those in the nonexclusion condition, $b = -7.86$, $t(185) = -5.83$, $sr^2 = 0.12$, $p < 0.001$.

Moreover, there was an overall main effect of condition for tBelong, tMeaning, tEsteem, and tControl, Fs(2, 183) = 69.97, 25.41, 18.21, 45.54, ΔR^2s = 0.43, 0.21, 0.16, 0.32, ps < 0.001. Using contrast effects, I found that participants in the exclusion and nonexclusion conditions reported greater tBelong, tMeaning, tEsteem, and tControl than participants in the inclusion condition, bs = -2.05, -1.57, -1.12, -1.45, ts(183) = -8.75, -5.72, -5.24, -7.69, sr^2s = 0.23, 0.14, 0.12, 0.21, ps < 0.001. In addition, participants in the exclusion condition reported greater tBelong, tMeaning, tEsteem, and tControl than participants in the nonexclusion condition, bs = -3.11, -1.94, -1.05, -1.77, ts(183) = -7.79, 4.15, -2.90, -5.51, sr^2s = 0.18, 0.07, 0.04, 0.11, ps < 0.001.

The main effect of relational victimization on total threatened needs, tMeaning, tEsteem, and tControl (but not tBelong) was significant, Fs(1, 183) = 6.73, 5.28, 11.66,

3.74, ΔR^2s = 0.02, 0.02, 0.05, 0.01, *p*s = 0.01, 0.023, 0.001, 0.055, with greater victimization associated with greater threat, *b*s = 0.65, 0.20, 0.23, 0.11, *t*s(183) = 2.59, 2.30, 3.42, 1.93, sr^2s = 0.02, 0.02, 0.05, 0.01, *p*s = 0.01, 0.02, 0.01, 0.06.

For total threat, tBelong, tMeaning, tEsteem, and tControl, the overall victimization X condition interaction was significant, *F*s(1, 183) = 3.91, 3.15, 2.74, 2.87, 3.56, ΔR^2s = 0.03, 0.02, 0.02, 0.03, 0.03, *p*s = 0.02, 0.05, 0.07, 0.06, 0.03 (Figures 3.4, 3.5, 3.6, 3.7, and 3.8). The relationship between relational victimization and each type of threatened need was largely in the expected direction, positive (see Table 3.1).

Table 3.1 Associations Between Relational Victimization and Threatened Needs

	N	*r*	*p*
Total Threat			
Exclusion	65	-.08	*ns*
Nonexclusion	63	.32	.011
Inclusion	61	.28	.029
tBelong			
Exclusion	65	-.15	*ns*
Nonexclusion	63	.19	*ns*
Inclusion	61	.23	.070
tMeaning			
Exclusion	65	-.06	*ns*
Nonexclusion	63	.29	.022
Inclusion	61	.25	.050
tEsteem			
Exclusion	65	.04	*ns*
Nonexclusion	63	.36	.004
Inclusion	61	.28	.030
tControl			
Exclusion	65	-.13	*ns*
Nonexclusion	63	.25	.050
Inclusion	61	.25	.052

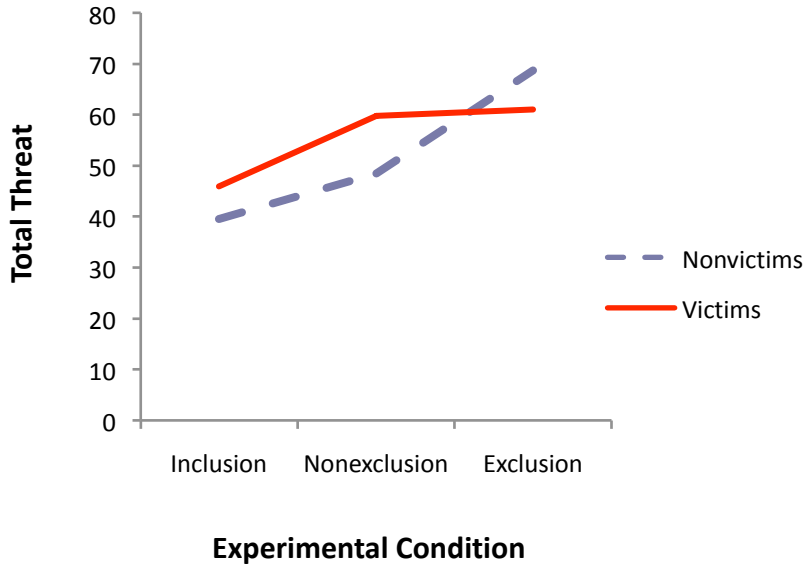

Figure 3.4 Interaction of relational victimization and condition on total threat

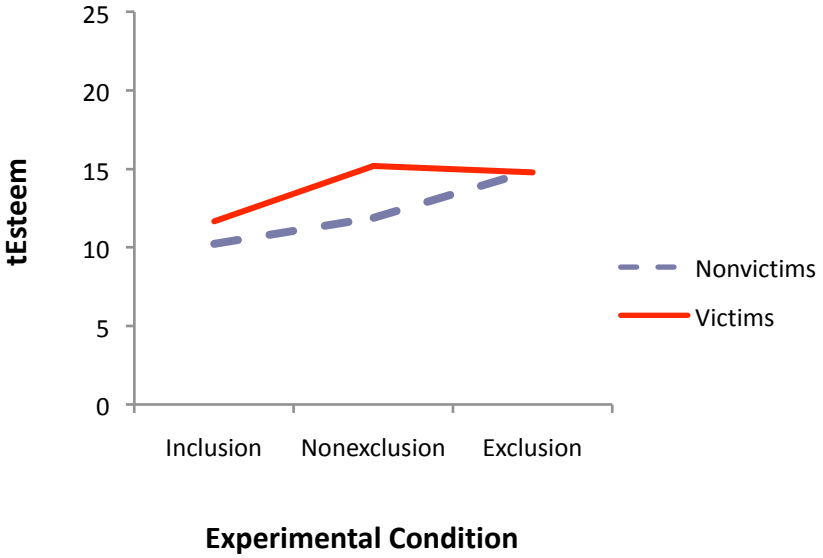

Figure 3.5 Interaction of relational victimization and condition on tEsteem

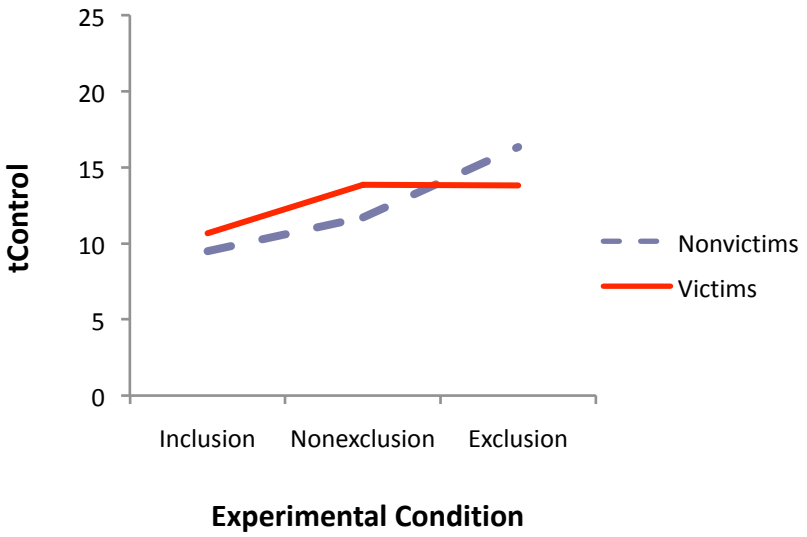

Figure 3.6 Interaction of relational victimization and condition on tControl

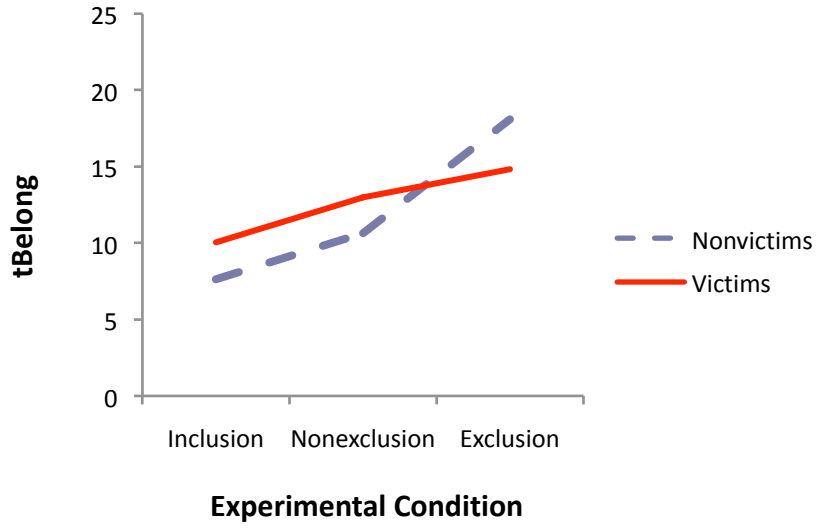

Figure 3.7 Interaction of relational victimization and condition on tBelong

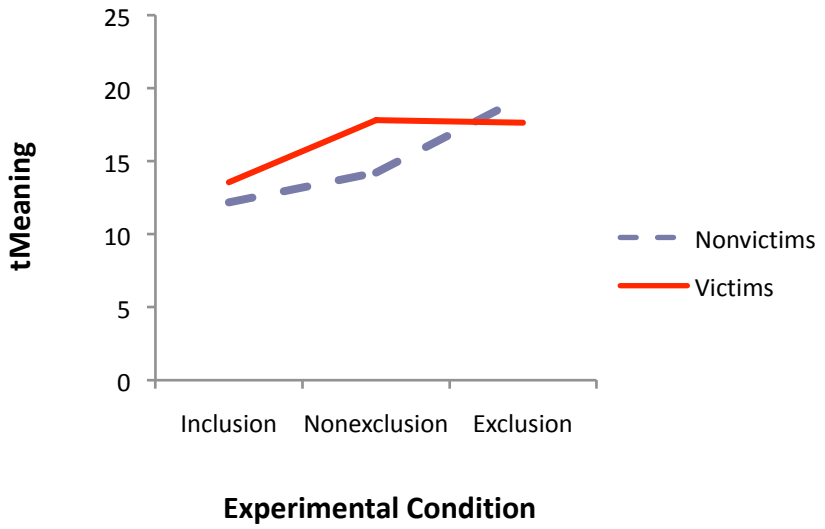

Figure 3.8 Interaction of relational victimization and condition on tMeaning

Taking a person-centered approach, I conducted a MANOVA with the subscale threatened needs (tBelong, tMeaning, tEsteem, tControl) as dependent measures, using relational victimization as the independent variable. There was a significant multivariate relational victimization X condition interaction, Pillai's trace = 0.09, $F(8, 362) = 2.20$, $p = 0.03$, $\eta^2 = 0.05$. To further probe these effects, I used Roy-Bargmann's step-down procedure, prioritizing outcome variables according to theoretical assumptions about their contributions to the model (based partially on effect sizes) such that I entered tEsteem, tControl, tBelong, and tMeaning sequentially. The interaction of condition and relational victimization did not significantly contribute to predicting tEsteem, but did contribute to predicting tControl after controlling for tEsteem, $F(2, 182) = 3.40$, $p = 0.04$, $\eta^2 = 0.04$. For tControl, pairwise comparisons using a Bonferroni correction revealed that nonvictims in the exclusion condition ($M = 16.32$, $SD = 3.12$) experienced greater tControl than those in the nonexclusion ($M = 11.72$, $SD = 3.37$) or inclusion ($M = 9.49$,

SD = 3.37) conditions (*p*s < 0.05), but the nonexclusion and inclusion conditions did not differ significantly. Relational victims did not significantly differ from one another in the exclusion, nonexclusion, or inclusion conditions. In support of the theoretical model, victims differed significantly on tControl from nonvictims in the nonexclusion condition, $t(61) = -2.00$, $p = .05$, but not in the exclusion or inclusion conditions.

The next step-down analysis tested contributions to tBelong controlling for tEsteem and tControl. Results were significant, $F(2, 181) = 3.07$, $p = 0.05$, $\eta^2 = 0.03$. For tBelong, pairwise comparisons indicated that nonvictims experienced greater threat in the exclusion condition (*M* = 18.09*, SD* = 4.14) than the nonexclusion (*M* = 10.63*, SD* = 4.27) or inclusion (*M* = 7.63*, SD* = 4.32) conditions (*p*s < 0.05) but did not differ when comparing the nonexclusion with the inclusion condition. Again, relational victims did not significantly differ from one another in the exclusion, nonexclusion, or inclusion conditions. With respect to tBelong, a somewhat unexpected result emerged when examining differences between victims and nonvictims. While victims in the nonexclusion condition did, as expected, differ marginally significantly from nonvictims in their reports of tBelong, $t(61) = -1.74$, $p = 0.09$, they also differed in the inclusion and exclusion conditions, *t*s(61) = -1.98, 2.28, *p*s = 0.05, 0.03. Though not entirely as predicted, this result provides partial support for the RAB model. Step-down analysis for tMeaning was nonsignificant after controlling for tEsteem, tControl, and tBelong.

Having examined results for relational victims, I next conducted a series of regression analyses to examine effects of overall victimization and condition on the same set of threatened needs outcome variables. There was an overall main effect for condition

for total threatened needs, $F(2, 183) = 46.10$, $\Delta R^2 = 0.33$, $p < 0.001$. Using contrast effects, I observed greater total threatened needs reports from participants in the exclusion and nonexclusion conditions than in the inclusion condition, $b = -6.07$, $t(183) = -7.54$, $sr^2 = 0.20$, $p < 0.001$. Additionally, the exclusion condition was associated with higher threatened needs than the nonexclusion condition, $b = -7.97$, $t(183) = -5.85$, $sr^2 = 0.12$, $p < 0.001$. There was an overall main effect of condition for tBelong, tMeaning, tEsteem, and tControl, Fs(2, 185) = 66.91, 24.39, 17.29, 44.93, ΔR^2s = 0.42, 0.21, 0.15, 0.32, ps < 0.001. Using contrast effects, I found that participants in the exclusion and nonexclusion conditions reported greater tBelong, tMeaning, tEsteem, and tControl than participants in the inclusion condition, bs = -2.00, -1.54, -1.09, -1.45, ts(183) = -8.45, -5.53, -5.01, -7.63, sr^2s = 0.22, 0.13, 0.11, 0.21, ps < 0.001. In addition, participants in the exclusion condition reported greater tBelong, tMeaning, tEsteem, and tControl than participants in the nonexclusion condition, $b = -3.13, -1.97, -1.11, -1.77$, $t(183) = -7.79, -4.19, -3.01, -5.52$, sr^2s = 0.19, 0.07, 0.04, 0.11, ps < 0.003.

The main effect of overall victimization on total threatened needs, tMeaning, tEsteem, and tControl (but not tBelong) was significant, Fs(1, 183) = 3.24, 3.24, 5.99, 3.74, ΔR^2s = 0.01, 0.01, 0.03, 0.01, ps = 0.07, 0.07, 0.02, 0.06, with greater victimization associated with greater threat, bs = 0.12, 0.04, 0.04, 0.03, ts(183) = 1.80, 1.80, 2.45, 1.94, sr^2s = 0.01, 0.01, 0.03, 0.01, ps = 0.07, 0.07, 0.02, 0.06. For total threat and tControl (but not for tBelong, tMeaning, tEsteem), the total victimization X condition interaction also approached significance, Fs(1, 183) = 2.26, 2.79, ΔR^2s = 0.02, 0.02, ps = 0.12, 0.06. For the exclusion condition, total victimization was negatively but nonsignificantly related to

total threat (r = -0.07, p = 0.68). For nonexclusion, the relationship between total victimization and threat was positive and significant (r = 0.29, p = 0.02). For inclusion, the relationship was positive but nonsignificant (r = 0.16, p = 0.21). Furthermore, for the exclusion condition, total victimization was negatively but not significantly related to tControl (r = -0.10, p = 0.45). For nonexclusion, the relationship between total victimization and tControl was positive (r = 0.28, p = 0.03). For inclusion, there was a marginally significant positive relationship between total victimization and tControl (r = 0.21, p = 0.10).

Again taking a person-centered approach, I conducted a MANOVA with the subscale threatened needs as dependent measures, this time using overall victimization rather than relational, however the multivariate test was nonsignificant.

3.4.1.4 Does Victimization Influence Neurological Responses?

I conducted multiple regression analyses for the RPFC sites (FP_2, F_4, F_8) and the difference scores for right-relative-to-left activation (FP_1 minus FP_2, F_3 minus F_4, F_7 minus F_8) obtained through EEG. Consistent with the literature previously presented, I expected lower right-relative-to-left activation in the PFC for victims, demonstrating their failure to control feelings of distress and anxiety produced by the ostracism manipulation. For neural activity at the FP_2 site (not the difference score for right-relative-to-left activation), a marginally significant main effect of condition occurred, $F(2, 54) = 2.41$, $\Delta R^2 = 0.08$, $p = 0.099$. I then used contrast effects to examine this effect, and while the exclusion and nonexclusion conditions were not significantly different from the inclusion condition, they did significantly differ from one another, $b = -0.20$, $t(54) = -2.19$, sr^2 =

0.08, $p = 0.03$. Activation at sites F_4 and F_8 did not produce significant results for main or interaction effects. For right-relative-to-left activation values, neither FP_1-minus-FP_2 nor F_3-minus-F_4 were significant, however there was a marginally significant main effect of relational victimization on F_7-minus-F_8, $F(1, 54) = 5.08$, $\Delta R^2 = 0.08$, $p = 0.03$, with relational victimization negatively associated with differential activity, $b = -0.01$, $t(54) = -2.25$, $sr^2 = 0.08$, $p = 0.03$.

Again, I used multiple regression analyses to assess RPFC activity, this time using overall victimization. The main effect of condition on FP_2 activation was marginally significant, $F(2, 54) = 2.35$, $\Delta R^2 = 0.08$, $p = 0.12$. Contrast effects revealed FP_2 activity was not significantly different for exclusion and nonexclusion compared with inclusion. However, the exclusion and nonexclusion conditions differed significantly, $b = -0.20$, $t(54) = -2.16$, $sr^2 = 0.07$, $p = 0.04$. The main effect of victimization approached significance for right-relative-to-left activation at the same site (F_7-minus-F_8) that was significant for relational victims, $F(1, 54) = 4.60$, $\Delta R^2 = 0.07$, $p = 0.04$, with victimization negatively associated with differential activity, $b = -0.003$, $t(54) = -2.15$, $sr^2 = 0.07$, $p = 0.04$.

3.4.2 Hypothesis 3

I expected that, for chronically victimized participants, higher nBelong would heighten the RAB demonstrated in the NE condition. That is, I examined the moderating influence of nBelong for participants in the NE condition only using multiple regression. After centering all relevant variables, I entered nBelong, victimization (relational or

overall), and their cross-products into the regression equation. Dependent measures were identical to those used in the analysis of Hypothesis 2.

3.4.2.1 Does nBelong Influence Feelings of Exclusion or Mood?

Unfortunately multiple regression analyses revealed that relational victimization and nBelong did not contribute independently or in combination to predicting feeling rejected or ignored. Analysis did, however, reveal a marginally significant main effect of nBelong on feelings of exclusion, $F(1, 58) = 2.99$, $\Delta R^2 = 0.05$, $p = 0.09$, with higher nBelong related to increased feelings of exclusion, $b = .04$, $t(58) = 1.73$, $sr^2 = 0.05$, $p = 0.09$. The model was not significant for change in positive or negative mood.

For overall victims, neither main effects of overall victimization and nBelong nor their interaction were significant influences on feeling rejected, ignored, or excluded. Similarly, no significance was found for mood variables.

3.4.2.2 Does nBelong Influence Threatened Needs?

Although neither the main effect of nBelong nor the interaction of nBelong and relational victimization were significant, there were main effects of relational victimization on total threatened needs and tEsteem, Fs$(1, 58) = 4.35, 5.78$, ΔR^2s $= 0.07, 0.09$, ps $= 0.04, 0.02$, with higher relational victimization related to increased total threatened needs and tEsteem, bs $= 1.06, .36$, ts$(58) = 2.09, 2.41$, sr^2s $= 0.07, 0.09$, ps $= 0.04, 0.02$. Additionally, I found a marginal main effect of relational victimization for tMeaning and tControl, Fs$(1, 58) = 3.55, 2.71$, ΔR^2s $= 0.05, 0.04$, ps $= 0.07, 0.11$, with higher levels of relational victimization associated with higher threat, bs $= 0.33, 0.20$, ts$(58) = 1.88, 1.65$, sr^2s $= 0.05, 0.04$, ps $=0.07, 0.11$, but again there was no main effect

of nBelong or significant interaction effect. No significant effects of relational victimization, nBelong, or their interaction existed for tBelong.

There was a marginal main effect of overall victimization on total threatened needs, $F(1, 58) = 2.83$, $\Delta R^2 = 0.04$, $p = 0.098$, with higher victimization associated with higher threat, $b = 0.20$, $t(58) = 1.68$, $sr^2 = 0.04$, $p = 0.098$. Furthermore, the interaction of overall victimization and nBelong was marginally significant, $F(1, 58) = 3.43$, $\Delta R^2 = 0.05$, $p = 0.07$. Examination of the simple slopes of nBelong on total victimization at high and low victimization revealed significant differences in total threatened needs for high, moderate, and low nBelong (See Table 3.2 and Figure 3.9). While neither overall victimization nor nBelong produced significant main effects on tBelong, their interaction was significant, $F(1, 58) = 4.17$, $\Delta R^2 = 0.07$ $p = 0.05$. Examination of the simple slopes of nBelong at high and low levels of overall victimization revealed significant differences in tBelong for high, moderate, and low nBelong (See Table 3.2 and Figure 3.10).

Table 3.2 Moderating Effects of nBelong on Threatened Needs

	$t(61)$	p	sr^2	*B*-weights		
				-1 *SD*	0 *SD*	+1 *SD*
Total Threat	1.85	0.07	0.05	-0.08	0.20*	0.48**
tBelong	2.04	0.05	0.07	-0.09	0.01	0.06*
tMeaning	2.04	0.05	0.06	-0.03	0.07*	0.18**
tEsteem	2.42	0.02	0.08	-0.04	0.06*	0.17**

* $p < 0.10$, ** $p < 0.01$

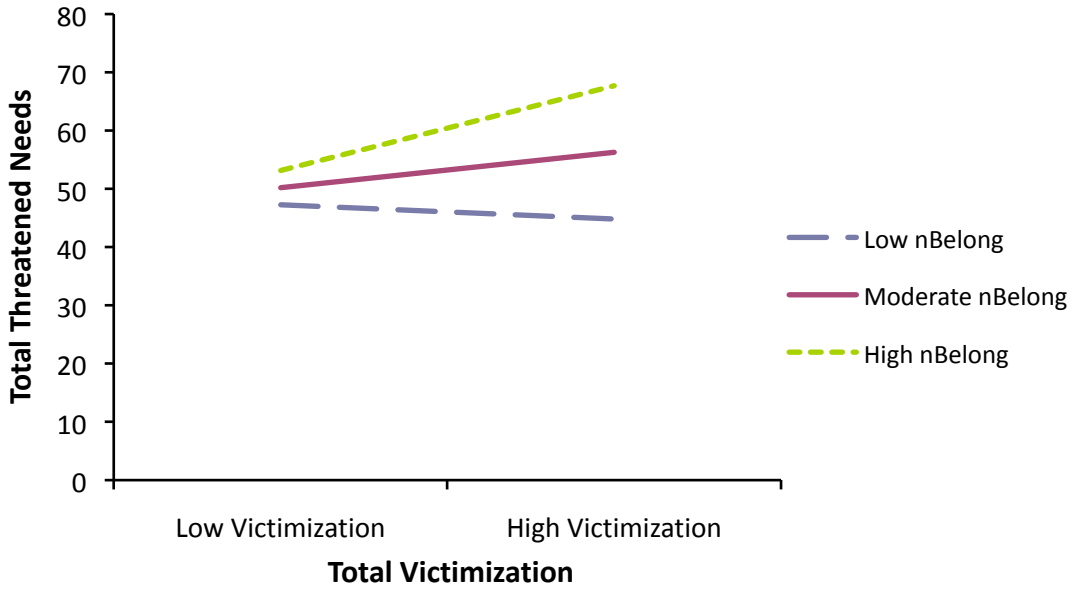

Figure 3.9 Simple slopes of nBelong at levels of total victimization for total threat

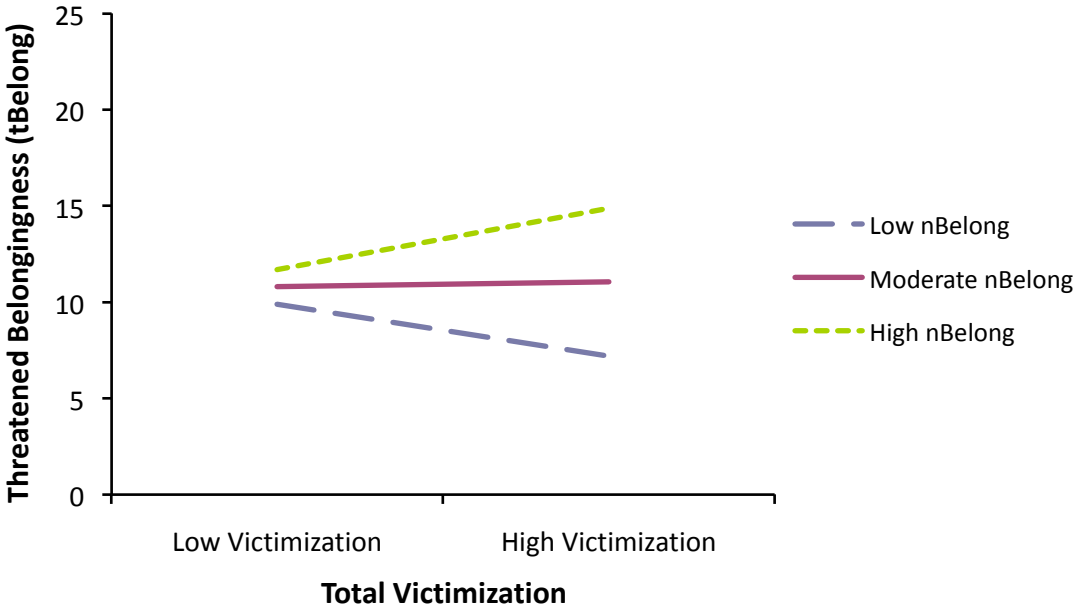

Figure 3.10 Simple slopes of nBelong at levels of total victimization for tBelong

While nBelong did not significantly influence tMeaning, tEsteem, or tControl, overall victimization did have a significant main effect, Fs(1, 58) = 3.30, 3.22, 4.09, ΔR^2 = 0.05, 0.05, 0.06, ps = 0.08, 0.09, 0.05, with higher victimization associated with greater threat, bs = 0.07, 0.06, 0.06, ts(58) = 1.82, 1.79, 2.02, ps = 0.08, 0.08, 0.05. The interaction of overall victimization and nBelong was also significant for tMeaning and tEsteem, Fs(1, 58) = 4.17, 5.86, ΔR^2 = 0.06, 0.08, ps = 0.05, 0.02, but not significant for tControl. Examination of the simple slopes of nBelong on tMeaning and tEsteem at high and low victimization revealed significant differences for high, moderate, and low nBelong (See Table 3.2 and Figures 3.11 and 3.12).

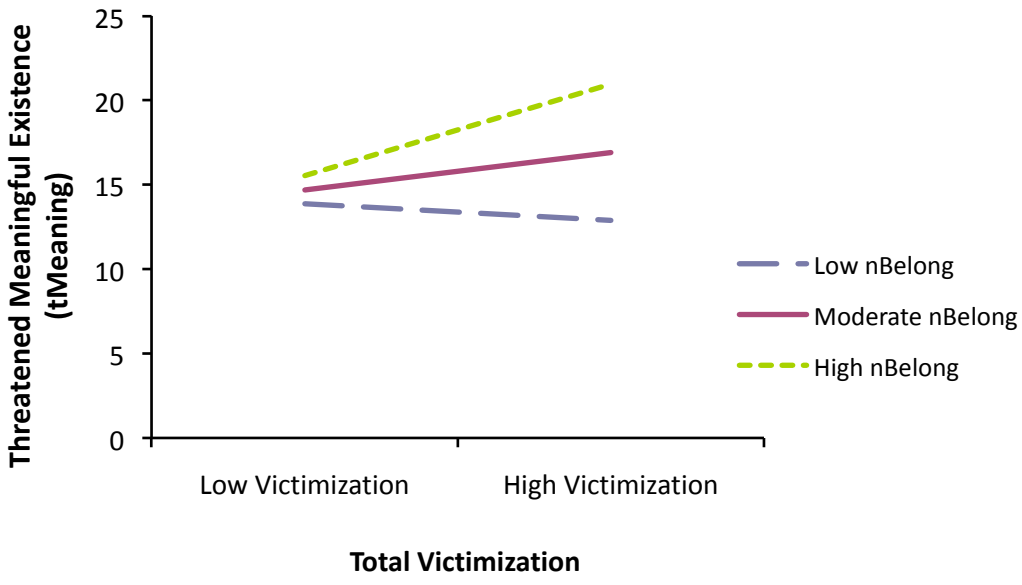

Figure 3.11 Simple slopes of nBelong at levels of total victimization for tMeaning

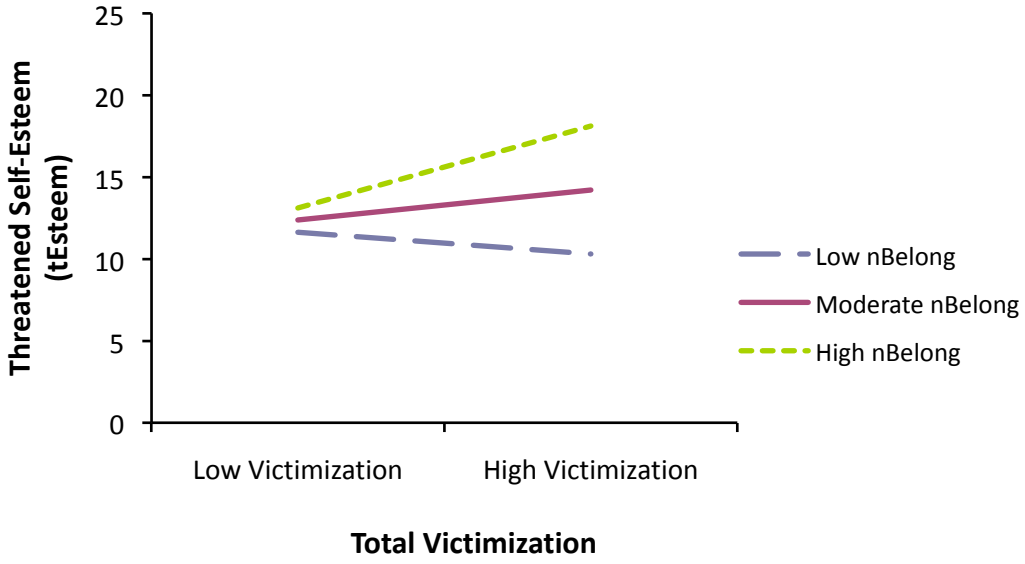

Figure 3.12 Simple slopes of nBelong at levels of total victimization for tEsteem

3.4.2.3 Does nBelong Influence Neurological Responses?

Unfortunately in the relational victimization model, although several of the EEG variables seemed to trend toward significance for both main and interaction effects, none were significant enough to consider here.

Overall victims were again examined using MMR to assess influences on brain activity at the RPFC sites previously mentioned. Despite a lack of main effect of victimization or the interaction of victimization and nBelong for FP_2, F_4, and F_8, I did find significant and marginally significant main effects of nBelong, Fs(1, 15) = 4.57, 4.30, 2.96, ΔR^2s = 0.21, 0.20, 0.15, p = 0.05, 0.06, 0.11, with higher nBelong related to less neurological activity at that site, bs = 0.04, 0.04, 0.03, ts(58) = 2.14, 2.07, 1.72, sr^2s = 0.21, 0.20, 0.15, ps = 0.05, 0.06, 0.11. For the right-relative-to-left variables (e.g., FP_1-minus-FP_2), I did not find any significant main or interaction effects.

3.4.3 Hypothesis 4

Finally, I examined the influence of rejection sensitivity (RS) for participants in the ambiguous condition, with dependent variables identical to those used in Hypotheses 2 and 3. To conduct the mediation analyses, I used procedures outlined by Baron and Kenny (1986), MacKinnon and colleagues (2002), and Preacher and Hayes (2004). First, as recommended by Baron and Kenny, I evaluated the relationship between RS and chronic victimization. I anticipated that there would be a small to moderate, but significant positive relationship between chronic victimization and rejection sensitivity. Unfortunately, the relationship between RS and chronic victimization (both total and relational) was nonsignificant. Next, I assessed the predictive relationship of rejection sensitivity to the RAB for participants in the ambiguous condition. Contrary to my predictions, none of the regression analyses used to test this assumption were significant. The last step, testing whether rejection sensitivity mediates the relation between chronic victimization and the RAB, was unnecessary because of the lack of significant association between the two variables in the first step. Ultimately, the series of steps taken to validate my mediation model did not provide support for the hypothesis that, in the NE condition, RS would mediate the relationship between chronic victimization and the psychological and physiological markers of a RAB. However, for most analyses, total victimization did directly affect the outcome variables, indicating that it is the most important component in predicting reactions to social exclusion.

CHAPTER 4

DISCUSSION

The current study set out to accomplish three primary goals: first, to replicate and extend previous research on social pain; second, to identify effects of individual differences in chronic victimization on acute social pain experiences, thereby validating the RAB model; and third, to identify any moderating effects of nBelong or mediating effects of RS. The model presented in Figure 1.1 outlines assumptions of the RAB, namely that individuals who have experienced chronic victimization would perceive neutral or ambiguous situations as intentional rejection. I further expected that, as a result of the RAB, neurological changes in the functioning of RPFC and ACC regions would show marked differences for victims relative to nonvictims. Specifically, I anticipated lower RPFC for victimized individuals than for their nonvictimized counterparts, indicating a failure to self-regulate in a time of acute distress resulting from perceived exclusion. With respect to moderating and mediating influences of nBelong and RS, the RAB model predicted heightened effects of the bias. In sum, I expected that chronically victimized individuals, particularly those in the nonexclusion condition, would experience greater distress and threatened needs as well as decreased RPFC activity.

4.1 General Reactions to the Experimental Manipulation

The first step in effectively testing the RAB was to develop an experimental manipulation that appropriately presented both clearly exclusive and inclusive situations

as well as ambiguity. As expected based on previous research by Williams et al. (2000, 2007), Zadro et al. (2004), and Eisenberger et al. (2003, 2004, 2005, 2006), the experimental manipulation (Cyberball) was highly successful. Participants (both victims and nonvictims) perceived clear differences in the degree of exclusion they felt and the percent of throws they received during the game. This not only replicates previous research on cyberostracism mentioned above, but also provides justification for the addition of an ambiguous condition, extending the literature to include a more realistic condition that better approximates the type of situation one might encounter in daily life. Anecdotally, participant reactions to the game after debriefing indicated that they were fully invested in the game despite its seemingly superficial nature. Some reported feeling upset and angry when the other players stopped throwing the ball to them, despite learning that the game was only a computer program (exclusion and nonexclusion conditions). Others left the lab more cheerful and optimistic than when they came, stating that they felt important and liked even though they were told the players were not real (inclusion condition). Though no analysis was done on these post-debriefing remarks, these ad hoc observations certainly suggest a strong effect of the manipulation that matches the effects observed in the data.

A main effect of condition existed for both Hypothesis 2 and 3 such that, except when moderated by the influence of victimization or nBelong, individuals in the exclusion condition felt significantly more distress than those in the nonexclusion condition, and participants in the nonexclusion condition felt significantly more distress than those in the inclusion condition. This provides additional support for the success of

the experimental manipulation, and replicates studies by Kip Williams' research team on the effectiveness of the Cyberball program (2000, 2007).

4.2 Influence of Victimization on Behavioral and Physiological Reactions to Ostracism

If indeed a RAB exists for chronically victimized individuals, there must first be a link between victimization and the behavioral and physiological responses that people have to real or perceived exclusion. Hypothesis 2 aimed to test that assumption, with encouraging results that are supported by the work of Eisenberger et al. (2003, 2004, 2005, 2006) and Vaillancourt et al. (2008, 2009). Interestingly, main effects of victimization were not present for relational or overall victims on self-reported feelings of being rejected, ignored, or excluded. Furthermore, for relational victims, the interaction of condition and victimization was nonsignificant for rejection and exclusion, and only marginally significant for feeling ignored.

However, analysis involving the total sample of victims provided considerably more support for the RAB model, with results indicating a significant multivariate victimization X condition interaction. Further probing of this interaction using the Roy-Bargmann step-down method resulted in significance for feeling ignored. More importantly, the pairwise comparisons from this analysis demonstrated that, precisely as predicted, nonvictims differed in feelings of being ignored for the exclusion and nonexclusion conditions, but did not differ between the nonexclusion and inclusion conditions. This indicates that they were not upset in the ambiguous situation, contrary to the results for victims. Reports of feeling ignored in the exclusion and nonexclusion conditions, on the other hand, did not differ for victimized participants. However, victims

felt significantly more ignored in the nonexclusion than inclusion condition, indicating that they were upset by the ambiguous situation as expected. This is strong evidence for the presence of a RAB in chronically victimized individuals.

Additionally, though no significant effects of victimization or condition were found on positive and negative mood, a good deal of information can be taken from analyses pertaining to threatened needs. For relational victims, a main effect of victimization existed for total threatened needs and three of the four subscales (tMeaning, tEsteem, tControl) with increased levels of victimization positively associated with threat. This again supports the RAB model, indicating that chronically victimized individuals are more sensitive to exclusion than their nonvictimized counterparts.

Victimization also contributed via interaction with condition for all measures of threat (total and subscales). Most relationships for this interaction were in the expected direction, with the exception of the relationships in the exclusion condition for all threatened needs except for tEsteem. One possible explanation for this difference is that victimized participants, having a good deal of exposure to overt rejection, subconsciously or consciously recognize the exclusion condition and are able to shut down their dominant responses to social pain, essentially dampening activity of the HPA axis as a protection from impending distress (Vaillancourt et al., 2008, 2009; Bremner & Vermetten, 2001). If this is the case, their lowered reactivity to overt exclusion could pull the relationship in the opposite direction from what was originally anticipated. It is important to note, however, that this is not the same idea as the numbing hypothesis discussed previously (MacDonald & Leary, 2005; DeWall & Baumeister, 2006). Victims

are not numb to ostracism in the ambiguous situation (nonexclusion), feel less included in the inclusion condition, and therefore are not completely numb to the experience of rejection. In order to appropriately reconcile this unexpected result that falls somewhere between theories of pain sensitization (Cicchetti & Walker, 2003; McKeever & Huff, 2003; Vaillancourt et al., 2008; Vaillancourt et al., 2009) and numbing (MacDonald & Leary, 2005; DeWall & Baumeister, 2006), it is important to further investigate whether there is a temporary numbing effect of chronic victimization for overt exclusion situations, and if so, how strong and lasting these effects are.

Further support for the RAB model was found in the multivariate relational X victimization interaction and subsequent step-down analyses. Again, nonvictims felt significantly greater tControl and tBelong in the exclusion condition than in the nonexclusion condition, but did not significantly differ from nonexclusion to inclusion, as predicted in the theoretical model. Conversely, relational victims did not significantly differ on any of the three conditions.

For overall victims, I found a main effect of victimization, such that higher levels of victimization were associated with higher threatened needs (total, tMeaning, tEsteem, tControl), again with the exception of tBelong. Furthermore, the interaction of overall victimization and condition was significant for total victimization and tControl. While I expected that victims in the nonexclusion and exclusion conditions would not differ on measures of threatened needs, I found the opposite. The relationship between threatened needs and victimization was in the expected direction for the nonexclusion and inclusion conditions, however victims in the exclusion condition actually reported less threat. This

result was unexpected, but as previously discussed, may be due to vicitms shutting down in response to overt exclusion. Indeed, recent research by Vaillancourt and colleagues (2008) provides the basis for this theoretical explanation, suggesting that for chronically victimized individuals the HPA axis is taxed by the demands of social stress. As previously discussed, the dysregulation of cortisol reactivity may result in a "maxing out" of the HPA system in overt exclusion situations, temporarily numbing victims to the effects of ostracism. Overall victims showed no multivariate interaction effect for threatened needs.

Despite a small sample size, some neurological activity also supported the RAB model, with results in the same direction as a previous study by Eisenberger, Lieberman, and Williams (2003), who found decreased RPFC and increased dACC activity in response to exclusion. Relational and overall victims both evidenced a main effect of victimization, with lower F_7-minus-F_8 right-relative-to-left activity associated with higher victimization as predicted. These results provide preliminary evidence for failure of the RPFC in regulating alarm system functions of the ACC during distress brought on by social pain. With a larger sample size as originally intended, it is likely that these effects would appear in other RPFC sites (FP_2, F_4,) as well.

4.3 Influence of nBelong and RS on Behavioral and Physiological Reactions to Ostracism

Having effectively supported the RAB model proposed in Hypothesis 2, my next goal was to investigate potential moderating effects of individual differences in nBelong. As previously discussed, nBelong should be present to some degree in every participant (Baumeister & Leary, 2005). I was interested in whether having high, moderate, or low

levels of nBelong would significantly influence the strength of the bias for participants (specifically, victims) in the nonexclusion condition.

As with Hypothesis 2, while not all analyses resulted in the expected effects, important findings were present. For relational victims, a main effect of nBelong existed, such that higher nBelong was associated with greater feelings of exclusion. While this main effect of nBelong did not hold for overall victims, the overall sample yielded a significant victimization X nBelong interaction effect for total threatened needs, tBelong, tMeaning, and tEsteem, each with relationships in the expected direction (see Figures 3.9, 3.10, 3.11, and 3.12 for simple slopes).

Moreover, neurological responses provided interesting results. I observed a main effect of nBelong, such that higher nBelong was associated with less activity in FP_2, F_4, and F_8. While I expected that the interaction of nBelong and victimization would result in decreased RPFC activation, I did not make predictions about main effects of nBelong on these same areas. Therefore, further research is needed to determine whether this effect is appropriate, or contrary to potential theoretical expectations. Again, these analyses were limited by the small sample size of participants for whom EEG data existed, and therefore these results should be interpreted with caution. I expect that with a larger sample size, the relationship of nBelong and victimization to neurological activity would become even more evident, and future research should investigate the strength and direction of this link.

Though my mediation model for RS was nonsignificant, I strongly recommend further investigation of these possible effects. Small sample size for the mediation model

may have influenced the nonsignificance of these results. Furthermore, use of different measures of rejection sensitivity may better assess the effects, and should be considered.

4.4 General Conclusions

Overall, this study significantly contributed to current understanding of the relationship between chronic victimization, nBelong, and acute instances of social pain. These results generally support the RAB model, with a limited number of exceptions requiring further investigation. Nonsignificant mediation effects RS should not be interpreted as a failure to find important effects, but as an indication that victimization history may be even more influential than originally thought. Perhaps its impact is so strong that the lasting effects of chronic victimization will override personality differences and color all future interactions. Implications for victimized individuals are quite serious, as this bias could lead to a vicious cycle of feeling left out even in ambiguous situations, behaving in an antisocial or withdrawn manner as a result, and therefore not being included in groups. Given emerging research on the long-term impact of victimization on health, not breaking this cycle could result in potentially devastating health effects later in life including risk for metabolic syndrome, diabetes, depression, and other negative outcomes (see Vaillancourt et al., 2008 for a more extensive review).

4.5 Alternative Explanations and Future Directions

This study approaches the RAB as a cognitive style, that is, it considers the bias from the standpoint of how schemas are altered and information is perceived. However, one possible alternative is that chronic victimization leads to dysregulation of cortisol via the HPA axis. Cortisol reactivity differences could be altering the underlying structure of

the brain, particularly the frontal areas responsible for self-regulation and memory (Vaillancourt et al., 2009). Future studies should examine the PFC, medial frontal cortex (MFC), hippocampus from a volumetric standpoint, as well as investigating effects on glucocorticoid receptors.

An important caveat to note is the sample size of the EEG data, particularly detrimental to statistical power for Hypothesis 3 and 4. I hope to eventually compile this data set with another Phase II study offered to participants who completed the "Who Am I?" survey online, since that study collected the same measures and used an identical manipulation. In doing so, I may be able to detect effects not found in the current set of analyses due to limited power. Future directions also include use of LORETA, as originally proposed, to assess activity in the ACC. I expect that, given the pattern of activity observed in the RPFC, significantly increased right-relative-to-left ACC activity is present for victimized participants (as observed in Eisenberger, Lieberman, & Williams, 2003, among other studies) but not able to be detected through traditional EEG analysis methods.

Moreover, in any study including self-report data, the issue of participant honesty arises. Since my cluster percentages for victims and nonvictims approximated the literature, I do not have any reason to believe that participants underreported or overreported instances of victimization. However, while I did observe significant effects in many of the areas I expected, it is possible that participants were underreporting their distress and threat levels in response to Cyberball because they were engaging in impression management. Several participants confessed to doing so after debriefing,

stating that they felt silly admitting to being upset by a computer game. I do not expect that increased honesty would hinder any of my findings, but rather that it would strengthen the relationships I observed.

Given the support for the RAB model found in this study, future directions include probing physiological outcomes of this bias. In addition to measuring cortisol reactivity, future studies should investigate genetic markers and health outcomes associated with the RAB and chronic victimization. Furthermore, as Vaillancourt (2008, 2009) suggests, changes in memory (particularly memory for social events in the MFC and hippocampus) result from dysregulation of the HPA axis. These changes may provide important insight into how the social schemas that support the RAB are formed and modified. Identifying this schema modification process and determining how long-term social stress alters the underlying mechanisms may offer an opportunity for intervention, and could provide a means of buffering against the negative effects of a RAB resulting from chronic victimization.

APPENDIX A

MEASURES

Children's Social Experiences Questionnaire – Self Report (Modified)

Crick & Grotpeter (1996)

(Modifications and additions by Marc A. Gómez and Haylie L. Gomez)

Here is a list of things that sometimes happen to people your age at school. How often do they happen to you at school? Please respond using the following scale:

1 = Never
2 = Almost never
3 = Sometimes
4 = Almost all the time
5 = All the time

1. How often does one of your peers give you help when you need it?

2. How often does one of your peers hit, slap, or punch you?

3. How often are you intentionally excluded from participating in group activities?

4. How often does one of your peers yell at you and call you demeaning names?

5. How often does one of your peers try to cheer you up when you feel sad or upset?

6. How often does one of your peers who is angry with you seek revenge by excluding you from their group?

7. How often do you get pushed or shoved by one of your peers on campus?

8. How often does one of your peers do something that makes you feel happy?

9. How often does a classmate tell lies and/or spread rumors about you to make others not like you anymore?

10. How often are you involved in a confrontation in which one of your peers kicks you or pulls your hair?

11. How often does one of your peers threaten to exclude or ignore you unless you do what they want you to do?

12. How often does one of your peers say something positive to you?

13. How often does one of your peers try to keep others from liking you by making insulting or judgmental remarks about you?

14. How often does one of your peers threaten to physically harm you if you don't do what they want you to do?

15. How often do other peers let you know that they care about you?

16. How often are you the victim of "cyberbullying"? (i.e., derogatory or false information about you posted on Facebook, Myspace, websites, or blogs; cruel e-mails)

17. How often do you feel you are in physical danger due to an overly aggressive driver? (i.e., being a victim of "road rage")

18. How often does someone hold open a door, or hold the elevator, for you?

19. How often do people give you the cold shoulder?

20. How often does another person rebuff your attempts to interact with them?

21. How often does another person snub you?

CSEQ-SR (Modified) Scoring:

This measure consists of three scales each containing five items. There are no items which need to be recoded. Items correspond to the three scales as follows:

Overt Victimization: 2, 4, 7, 10, and 14 [addition: 17]

Relational Victimization: 3, 6, 9, 11, and 13 [addition: 16, 19-21]

Recipient of Prosocial Behavior: 1, 5, 8, 12, and 15 [addition: 18]

Psychology Department General Pre-Test Section

Please respond to both multiple-choice and free-response questions as accurately and honestly as possible.

1. If you would like the investigator to be able to contact you via e-mail for studies you qualify for, please provide your e-mail address here: _____

2. If you would like the investigator to be able to contact you via telephone for studies you qualify for, please provide your phone number here (otherwise, you will only be contacted via e-mail): _____

3. What is your gender?
   a) male
   b) female

4. What is your current weight in lbs (estimate if you are not sure)? _____

5. What is your current height? _____

6. Please select the option that best describes your vision:
   a) normal 20/20
   b) normal 20/20 vision with glasses
   c) normal 20/20 vision with contacts
   d) other

7. What is your date of birth (month/day/year)? _____

8. Indicate your preference in the use of hands (e.g., writing, drawing, throwing, using a scissors, and using a toothbrush):
   a) left (strong preference)
   b) left (preference)
   c) indifferent
   d) right (preference)
   e) right (strong preference)

9. Which foot do you prefer to kick with?
   a) left (strong preference)
   b) left (preference)
   c) indifferent
   d) right (preference)
   e) right (strong preference)

10. Are you Spanish/Hispanic/ Latino?
    a) no, not Spanish/Hispanic/Latino
    b) yes, Mexican, Mexican-American, Chicano
    c) yes, Puerto Rican
    d) yes, Cuban
    e) yes, other Spanish/Hispanic/Latino Group

11. What is your racial background?
    a) White/ Anglo-American
    b) Black/African-American
    c) Asian
    d) Native American or Alaskan Native
    e) Native Hawaiian
    f) Pacific Islander
    g) Other/Multiracial

12. If you are Asian, are you
    a) Chinese
    b) Japanese
    c) Korean
    d) Vietnamese
    e) Filipino
    f) Indian
    g) Southeast Asian
    h) Other

13. What is the very *first* language that you learned to speak?
    a) English
    b) Spanish
    c) an Asian language (Chinese, Japanese, Korean, Vietnamese)
    d) other

14. What is the language that you feel most comfortable with and prefer to use the most?
    a) English
    b) Spanish
    c) an Asian language
    d) other

15. Which of the following best describes your father's (or legal guardian's) level of education?
    a) no high school diploma or GED
    b) a high school diploma or GED
    c) some college or university education but no degree
    d) a two-year degree from a community college or university

e) a four-year (bachelor's) degree from a college or university
f) a master's degree from a college or university
g) a doctoral (Ph.D.) degree from a college or university

16. Which of the following best describes your mother's (or legal guardian's) level of education?
    a) no high school diploma or GED
    b) a high school diploma or GED
    c) some college or university education but no degree
    d) a two-year degree from a community college or university
    e) a four-year (bachelor's) degree from a college or university
    f) a master's degree from a college or university
    g) a doctoral (Ph.D.) degree from a college or university

17. In which of the following ranges is your family's [or your legal guardian's] annual household income?
    a) less than $30,000
    b) $30,000 to $50,000
    c) $50,000 to $70,000
    d) $70,000 to $90,000
    e) $90,000 to $110,000
    f) $110,000 to $130,000
    g) more than $130,000

18. How important is your racial/ethnic group membership to your sense of personal identity?
    a) not at all important
    b) slightly important
    c) moderately important
    d) quite important
    e) extremely important

19. Please choose the religious group that you belong to, or that best describes you:
    a) Agnostic / Atheist / no religion
    b) Christian – Catholic
    c) Christian – Protestant (specify below, in next question)
    d) Christian – no denomination
    e) Buddhist
    f) Hindu
    g) Islam
    h) Judaism
    i) Other religion (specify below, in next question)

20. Please indicate your specific religion / denomination here:
    _____

21. How important is your religious group membership to your sense of personal identity?
    a) not at all important
    b) slightly important
    c) moderately important
    d) quite important
    e) extremely important

22. What is your major? _____

23. If your major is undecided, which area would you be interested in?
    _____

24. What is your political affiliation?
    a) Republican Party
    b) Democratic Party
    c) Libertarian Party
    d) Green Party
    e) Reform Party
    f) Constitution Party
    g) Socialist Party USA
    h) No affiliation / none of these

25. How important is your political affiliation to your sense of personal identity?
    a) not at all important
    b) slightly important
    c) moderately important
    d) quite important
    e) extremely important

26. What do you consider to be your political orientation (regardless of your party affiliation)?
    a) very liberal
    b) liberal
    c) slightly liberal
    d) neither liberal nor conservative; middle of the road; moderate
    e) slightly conservative
    f) conservative
    g) very conservative

27. Please indicate your FIRST most important group membership:
    a) political affiliation
    b) gender
    c) religion
    d) sexual orientation
    e) age
    f) race/ethnicity
    g) sports team
    h) nationality
    i) military group
    j) other

28. Please indicate your SECOND most important group membership:
    a) political affiliation
    b) gender
    c) religion
    d) sexual orientation
    e) age
    f) race/ethnicity
    g) sports team
    h) nationality
    i) military group

Need to Belong Scale

Leary, Kelly, Cottrell, & Schreindorfer (2005)

For each of the statements below, indicate the degree to which you agree or disagree with the statement by choosing the response that best represents your answer using the scale below:

1 = Strongly disagree
2 = Moderately disagree
3 = Neither agree nor disagree
4 = Moderately agree
5 = Strongly agree

1. If other people don't seem to accept me, I don't let it bother me.

2. I try hard not to do things that will make other people avoid or reject me.

3. I seldom worry about whether other people care about me.

4. I need to feel that there are people I can turn to in times of need.

5. I want other people to accept me.

6. I do not like being alone.

7. Being apart from my friends for long periods of time does not bother me.

8. I have a strong need to belong.

9. It bothers me a great deal when I am not included in other people's plans.

10. My feelings are easily hurt when I feel that others do not accept me.

Positive and Negative Affect Schedule – General and Moment

Watson, Clark, & Tellegen (1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you…[insert appropriate time instruction for PANAS – General or PANAS – Moment].

The following time instructions were used for two separate administrations of the PANAS:

> PANAS – General: "…generally feel this way, that is, how you feel on average."
> PANAS – Moment: "…feel this way right now, that is, at the present moment."

Use the following scale to record your answers:

> 1 = very slightly or not at all
> 2 = a little
> 3 = moderately
> 4 = quite a bit
> 5 = extremely

1. Interested
2. Distressed
3. Excited
4. Upset
5. Strong
6. Guilty
7. Scared
8. Hostile
9. Enthusiastic
10. Proud
11. Irritable
12. Alert
13. Ashamed
14. Inspired
15. Nervous
16. Determined
17. Attentive
18. Jittery
19. Active
20. Afraid

Rejection Sensitivity Questionnaire
Downey & Feldman (1996)

Each of the items below describes things college students sometimes ask of other people. Please imagine that you are in each situation. You will be asked to answer the following questions:

1) How concerned or anxious would you be about how the other person would respond?
2) How do you think the other person would be likely to respond?

You ask someone in class if you can borrow his/her notes.

1. How concerned or anxious would you be over whether or not the person would want to lend you his/her notes?

very unconcerned very concerned
A B C D E

2. I would expect that the person would willingly give me his/her notes.

very unlikely very likely
A B C D E

You ask your boyfriend/girlfriend to move in with you.

3. How concerned or anxious would you be over whether or not he/she also would want to move in with you?

very unconcerned very concerned
A B C D E

4. I would expect that he/she would want to move in with me.

very unlikely very likely
A B C D E

You ask your parents for help in deciding what programs to apply to.

5. How concerned or anxious would you be over whether or not your parents would want to help you?

very unconcerned very concerned
A B C D E

6. I would expect that they would want to help me.

very unlikely very likely
A B C D E

You ask someone you don't know well out on a date.

7. How concerned or anxious would you be over whether or not the person would want to go out with you?

very unconcerned very concerned
A B C D E

8. I would expect that the person would want to go out on a date with me.

very unlikely very likely
A B C D E

Your boyfriend/girlfriend has plans to go out with friends tonight, but you really want to spend the evening with him/her, and you tell him/her so.

9. How concerned or anxious would you be over whether or not your boyfriend/girlfriend would decide to stay in?

very unconcerned very concerned
A B C D E

10. I would expect that he/she would willingly choose to stay in with me.

very unlikely very likely
A B C D E

You ask your parents for extra money to cover living expenses.

11. How concerned or anxious would you be over whether or not your parents would help you?

very unconcerned very concerned
A B C D E

12. I would expect that my parents would not mind helping me out.

very unlikely very likely
A B C D E

After class, you tell your professor that you have been having some trouble with a section of the course and ask if he/she can give you some extra help.

13. How concerned or anxious would you be over whether or not your professor would want to help you out?

very unconcerned very concerned
A B C D E

14. I would expect that the professor would want to help me.

very unlikely very likely

A B C D E

You approach a close friend to talk after doing or saying something that seriously upset him/her.

15. How concerned or anxious would you be over whether or not your friend would want to talk with you?

very unconcerned very concerned

A B C D E

16. I would expect that he/she would want to talk with me to try to work things out.

very unlikely very likely

A B C D E

You ask someone in one of your classes to coffee.

17. How concerned or anxious would you be over whether or not the person would want to go?

very unconcerned very concerned

A B C D E

18. I would expect that he/she would want to go with me.

very unlikely very likely

A B C D E

After graduation you can't find a job and you ask your parents if you can live at home for a while.

19. How concerned or anxious would you be over whether or not your parents would want you to come home?

very unconcerned very concerned

A B C D E

20. I would expect that I would be welcome at home.

very unlikely very likely

A B C D E

You ask your friend to go on vacation with you over Spring Break.

21. How concerned or anxious would you be over whether or not your friend would want to go with you?

very unconcerned very concerned

A B C D E

22. I would expect that he/she would want to go with me.

very unlikely very likely

A B C D E

You call your boyfriend/girlfriend after a bitter argument and tell him/her you want to see him/her.

23. How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to see you?

very unconcerned very concerned

A B C D E

24. I would expect that he/she would want to see me.

very unlikely very likely

A B C D E

You ask a friend if you can borrow something of his/hers.

25. How concerned or anxious would you be over whether or not your friend would want to loan it to you?

very unconcerned very concerned

A B C D E

26. I would expect that he/she would willingly loan it to me.

very unlikely very likely

A B C D E

You ask your parents to come to an occasion important to you.

27. How concerned or anxious would you be over whether or not your parents would want to come?

very unconcerned very concerned

A B C D E

28. I would expect that they would want to come.

very unlikely very likely

A B C D E

You ask a friend to do you a big favor.

29. How concerned or anxious would you be over whether or not your friend would want to help you out?

very unconcerned very concerned

A B C D E

30. I would expect that he/she would willingly agree to help me out.

very unlikely very likely

A B C D E

You ask your boyfriend/girlfriend if he/she really loves you.

31. How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?

very unconcerned very concerned

A B C D E

32. I would expect that he/she would answer yes sincerely.

very unlikely very likely

A B C D E

You go to a party and notice someone on the other side of the room, and then you ask them to dance.

33. How concerned would you be over whether or not the person would want to dance with you?

very unconcerned very concerned

A B C D E

34. I would expect that he/she would want to dance with me.

very unlikely very likely

A B C D E

You ask your boyfriend/girlfriend to come home to meet your parents.

35. How concerned would you be about whether or not your boyfriend/girlfriend would want to meet your parents?

very unconcerned very concerned

A B C D E

36. I would expect that he/she would want to meet my parents.

very unlikely very likely

A B C D E

Direct and Indirect Aggression Scales – Victim Version (DIAS)
Bjorkqvist, Lagerspetz, & Osterman (1992)

How do other people act toward you when they have problems with or get angry with you? Answer each question by choosing the answer that seems to most closely describe how others behave toward you, using the scale below:

0 = Never
1 = Seldom
2 = Sometimes
3 = Quite often
4 = Very often

1. How often are you hit by other people?

2. How often are you shut out of a group by other people?

3. How often do other people yell at or argue with you?

4. How often do other people become friends with another person as a kind of revenge?

5. How often are you kicked by other people?

6. How often are you ignored by other people?

7. How often are you insulted by other people?

8. How often do other people who are angry with you gossip about you?

9. How often are you tripped by other people?

10. How often do other people tell bad or false stories about you?

11. How often do other people say that they are going to hurt you?

12. How often do other people plan secretly to bother you?

13. How often do other people shove you?

14. How often do other people say bad things behind your back?

15. How often do other people call you names?

16. How often do people tell others, "Let's not be with him/her!"?

17. How often do other people take things from you?

18. How often do other people tell your secrets to a third person?

19. How often are you teased by other people?

20. How often do other people write notes where you are criticized?

21. How often are you pushed down to the ground by other people?

22. How often do other people criticize your hair or clothing?

23. How often do other people pull at you?

24. How often do other people who are angry with you try to get others to dislike you?

DIAS Scoring:

The DIAS measures three types of aggression: physical, verbal, and indirect. The items belong to the three subscales as follows:

Physical aggression: 1, 5, 9, 13, 17, 21, 23

Verbal aggression: 3, 7, 11, 15, 19

Indirect aggression: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24

Cyberball Questionnaire – Version 2

1. To what extent were you included during the game? 1 2 3 4 5 6 7 8 9
Rejected Accepted

*For each question, please circle the number to the right that best represents **feelings** you experienced **during** the game.*	Not at all				Extremely
I felt "disconnected"	1	2	3	4	5
I felt rejected	1	2	3	4	5
I felt like an outsider	1	2	3	4	5
I felt I belonged to the group	1	2	3	4	5
I felt the other players interacted with me a lot	1	2	3	4	5
I felt good about myself	1	2	3	4	5
My self-esteem was high	1	2	3	4	5
I felt liked	1	2	3	4	5
I felt insecure	1	2	3	4	5
I felt satisfied	1	2	3	4	5
I felt invisible	1	2	3	4	5
I felt meaningless	1	2	3	4	5
I felt non-existent	1	2	3	4	5
I felt important	1	2	3	4	5
I felt useful	1	2	3	4	5
I felt powerful	1	2	3	4	5
I felt I had control over the course of the game	1	2	3	4	5
I felt I had the ability to significantly alter events	1	2	3	4	5
I felt I was unable to influence the action of others	1	2	3	4	5
I felt the other players decided everything	1	2	3	4	5
I felt good	1	2	3	4	5
I felt bad	1	2	3	4	5
I felt friendly	1	2	3	4	5
I felt unfriendly	1	2	3	4	5
I felt angry	1	2	3	4	5
I felt pleasant	1	2	3	4	5
I felt happy	1	2	3	4	5
I felt sad	1	2	3	4	5
I felt distressed	1	2	3	4	5
I was ignored	1	2	3	4	5
I was excluded	1	2	3	4	5

What percentage of the throws did you receive? _____

TNS Subscale Scoring:

Threatened Belongingness: 2-6 (5 and 6 reverse-coded)
Threatened Self-Esteem: 7-11 (7, 8, 9, and 11 reverse-coded)
Threatened Meaningful Existence: 12-17 (15, 16, and 17 reverse-coded)
Threatened Control: 18-21 (18 and 19 reverse-coded)

APPENDIX B

CONSENT AND DEBRIEFING

Informed Consent

Principal Investigator: Haylie L. Gomez

Project Title: Individual Differences in Social Interaction and Brain Activity

Introduction: You are being asked to participate in a research study. Your participation is voluntary. Before agreeing to participate, it is important that you read the following explanation of this study. This statement describes the purpose, procedures, benefits, and risks of the program. You have the right to withdraw from the study at any time without penalty. Please ask questions if you do not understand any aspect of this experiment.

Purpose: The purpose of this study is to investigate individual differences in brain activity and emotional responses to group experiences.

Duration: This study will be conducted in the lab and should take approximately 60 minutes to complete fitting of an EEG cap and several experimental tasks.

Procedure: After you finish reading and signing this consent form, the researcher will take your picture to be loaded into the online game program Cyberball, so that the participating players at other universities can see who they are playing with. Your picture will not be visible to anyone outside of this study, and will be removed from the internet as soon as you finish playing the game.

The researcher will then fit you with an EEG cap that will allow collection of brain activity data during the experiment. Fitting and aligning the cap will involve the use of Electro-Gel on your scalp to provide contact for the electrodes monitoring your brain activity. In addition, it may be necessary to remove any oils or makeup from your face using rubbing alcohol on a cotton swab. Researchers will be wearing latex gloves during the EEG cap fitting and alignment. **IF YOU HAVE A LATEX ALLERGY, PLEASE INFORM THE RESEARCHER IMMEDIATELY.**

After the researcher has checked to ensure all EEG equipment is properly set up, you will begin to play Cyberball with other research participants online. You will be given two questionnaires about the game and your feelings at the moment you are answering the questions. You may decline to answer any item you are uncomfortable with. At the conclusion of the Cyberball task, the researcher will remove the EEG cap and debrief you as to the purpose and design of the study. At this time you will be given the opportunity to ask questions or comment on your experience in the lab.

Possible Benefits: You will receive 1 research credit for participation in this study.

Possible Risks and Discomforts: There are no anticipated risks to this study.

Alternatives to Participation: Researchers are not able to offer alternatives to participation, however the department and individual instructors often offer additional means of gaining research credit, such as writing papers.

Withdrawal from the Study: No penalty will be assessed for withdrawal. Participants are able to withdraw at any time, and will still receive credit for the phase in question.

Number of Participants: We expect approximately 200 UTA undergraduates to volunteer for participation in this study.

Confidentiality: Every attempt will be made to protect the names of the participants in this study. However, there is no guarantee that the information cannot be obtained by legal process or court order. Institutional authorities such as the Secretary of the Department of Health and Human Services or the UTA IRB have access to the study records. All personal and identifying information will be kept in a locked file cabinet in the lab, separate from any data. Each participant will be assigned an anonymous ID number to maintain confidentiality. All data will also remain stored in a locked file in the psychology department for at least three (3) years after the end of this research. The result of this study may be published and/or presented at meetings without naming you as a subject.

Contact for Questions: Questions about this study may be directed to Haylie L. Gomez or Dr. Lauri A. Jensen-Campbell, 817-272-6039 during normal working hours.

I have read the above information and have been given an opportunity to ask questions. I understand that my participation is voluntary and that I may withdraw at any time. I am 18 years or older. I agree to participate in this study.

_____ _____

Signature of Volunteer Date

_____ _____

Signature of Person Obtaining Consent Date

Debriefing Participant

All participants **MUST** be debriefed using this script.

All points must be covered during the debriefing, however the participant's responses to each question may alter the flow of the script. The debriefing process below follows guidelines set forth by Aronson & Carlsmith (1968) in *The Handbook of Social Psychology*. Three goals should be accomplished – ensuring the participant is in a healthy state of mind, ensuring that the experiment is an educational experience for the participant, and using the participant's input to gain information about positive and negative aspects of the process. Participants will first answer several questions about their general experience with the study, and then the researcher should explain the details of the experiment. Researchers should be aware of the participants' feelings during the debriefing process, allowing them to discuss and ask questions freely.

Each participant should leave the lab in an **identical or improved** mindset about him or herself as when he or she began the study. Any distressed participant should remain in the lab until all of his or her questions can be answered, or should be strongly encouraged to seek assistance through UTA Counseling Services.

In the script below, all italicized text represents what the researcher should say to the participant during the debriefing process:

- *What did you think about this experiment?*
- *Were you comfortable with the EEG procedure?*
- *Did you enjoy playing Cyberball? Did you feel the other players liked you?*
- *How do you feel about the questions we asked between rounds of the game?*
- *Do you have any questions about why we used those specific questionnaires?*

Thanks for your input – it helps us to design better experiments in the future! I want to tell you a little bit about the purpose of our study before you go. We are looking at how people react to being excluded from a group, and whether or not personality traits or past experiences affect their ability to cope with being ostracized. We expect that people with a higher need to belong or those who have experienced chronic victimization will feel stronger effects of exclusion. This should result in increased brain activity, which we measured using the EEG cap, and different answers on the questionnaires that you were given between rounds of Cyberball.

You may have noticed that while you were playing Cyberball, there were times when it seemed like the other players never threw the ball to you. We told you that the other players were participants in the same experiment at another school – in reality the other players are just computer programs designed to throw the ball to you more or less at different points in the game. If we had told you that the participants were not real people, you would not have felt like they were really excluding you from a group, and your brain activity and questionnaire responses would not reflect your natural reaction to exclusion.

- *Do you understand why we could not tell you the truth about the other players in Cyberball?*
- *Do you have any questions or concerns about the experiment that I have not addressed today?* (Continue to answer questions until participant is at ease.)

Okay, great! I know that begin excluded can bring up bad memories or create unnecessary stress, so at the end of the experiment I always give each participant some information on the free counseling services offered by UTA. If you ever need to discuss personal issues with a professional, all the information you need about getting group or individual counseling is on this sheet.

Hand the participant the Counseling Services information at this time, and make sure they have their copy of the signed consent form.

Thank you so much for participating – I'd like to ask you to please keep the true nature of our study private. Sharing details about our study with future participants could lead to inaccurate data, and would jeopardize our research. Can you help us by keeping the study details confidential? (If participant says no, explain again why it is crucial that details remain private until he or she is willing to maintain confidentiality.)

Thanks again! Enjoy the rest of your day!

COUNSELING SERVICES

helping students find their way . . .

THE UNIVERSITY OF TEXAS AT ARLINGTON

Contact Information:
Box 19156
216 Davis Hall
(817) 272-3671

www.uta.edu/caacs/counseling

Hours of Operation:
8:00 am – 7:00 pm (M,Th)
8:00 am – 5:00 pm (T,W, F)

Participating in a study that asks questions about the pain you are experiencing may highlight emotional, behavioral, or relationship problems that you might want to discuss with a professional. Information about obtaining individual and group counseling at the University of Texas at Arlington is provided below. Counseling Services are free to UTA students.

Individual Counseling:

A student can meet with a counselor for personal, emotional, behavioral, or relationship problems. Students also often seek personal counseling when they are having difficulties adjusting to college or juggling obligations (like attending college while working or raising a family). Counseling sessions are made by appointment, or a student may meet with the walk-in counselor without an appointment on a first-come, first-served basis. Information revealed in counseling will be treated with the utmost respect to your privacy and confidentiality; all records or communications will be kept confidential to the full extent of the law and professional ethics (see below for more information).

Each counselor has his or her own counseling approach and style. The counseling goal is to help you resolve your concerns and reach your goals in the pursuit of more satisfying, fulfilling life circumstances. UTA Counseling Services generally adheres to short-term, goal-oriented counseling approaches. The exact type of assistance you receive will be based on a collaboration between your counselor and yourself. Individuals will be informed when we are unable to provide the services you require. In such cases, we will assist you as much as possible in the referral process so that you can get in touch with someone who can meet your needs. Counseling Services are free to UTA students.

Group Counseling:

Many students may benefit from various forms of group counseling. In the past, Counseling Services has been able to offer groups focusing on intensive relaxation training techniques, women and self-esteem, and general group counseling. General group counseling is often helpful for people who experience relationship problems, high social anxiety, depression, and a variety of other concerns.

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BIOGRAPHICAL INFORMATION

Haylie Gomez earned her bachelor's degree at Vanderbilt University in Nashville, TN, with a double-major in psychology and music. Upon successful defense of this thesis, she will earn a Master of Science in Psychology from the University of Texas at Arlington. She will then go on to pursue a doctoral degree at the same institution, continuing to work with Dr. Lauri Jensen-Campbell. Haylie's present line of research is focused on chronic and acute social stressors and their associated psychological and physical health outcomes. She maintains involvement in the Social and Personality Development lab at the University of Texas at Arlington, contributing in various ways to projects involving self-regulation, fMRI, and tympanic membrane temperature. Haylie has also worked with various researchers and practitioners to gain experience with fMRI technology and autism. Upcoming projects include a study of peer relationships and health, during which Haylie hopes to use measurements of metabolic and immune functioning to further probe the rejection attribution bias. While she is currently investigating social pain in a typically developing population, her career goal is to study the same construct in children and adolescents on the autism spectrum.