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Reactions to Ostracism and Their Predictors

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Acknowledgements

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Abstract

This study was conducted to examine how individual differences in personality predict variance in reactions to ostracism, and to explore the effects of re-inclusion on ostracism reactions. Participants completed five personality measures before the ostracism was delivered in a chat-room paradigm. The chat-room consisted of phases during which participants were included, excluded, and re-included in the discussion, and enjoyment and participation were measured after each chat-room phase. Enjoyment and participation decreased during exclusion and increased during re-inclusion. Throughout all phases of the chat-room, enjoyment and participation were positively correlated with social competence and negatively correlated with loneliness and social isolation. Although moderate correlations between personality measures and reactions to ostracism emerged, these results were not significant. Given the preliminary nature of this study, more complete interpretation of results will occur after all participants have been assessed.

Introduction

The upsurge of shootings in American schools over the past decade demonstrates that adolescents who experience peer rejection sometimes become violent; an analysis of US school shooting reports indicates that social ostracism was involved in thirteen of the fifteen recent episodes (Leary, Kowalski, Smith, & Phillips, 2003). The emergence of such serious violence in American schools by socially-isolated adolescents amplifies the importance of understanding the consequences of ostracism. Although ostracism is a common component of the human social experience from an early age through adulthood (Williams & Gerber, 2004), it may clearly have destructive affects on some individuals. The goal of this study is to examine the range of reactions to ostracism and personality factors that might predict this variation.

Anthropological, sociological, and biological research has confirmed that ostracism is ever-present across time, cultures, and even species. Defined as the act of being excluded or ignored by an individual or group (Williams, 1997; Williams & Zadro, 2001), it is distinct from other forms of social-rejection in a number of ways. First, it can be expressed in several ways including verbal unresponsiveness, exclusion from group activities, avoidance of eye contact, and other physical signals (e.g. orientation away from the target). Second, ostracism is typically ambiguous (the target is often uncertain whether and why it occurs); unlike physical or verbal abuse, it leaves individuals feeling shunned rather than targeted (Williams et al., 2002). Despite this ambiguity, ostracism is so potent that its victims perceive it and experience its negative consequences even when it is deliberately artificial and remote (Williams, Cheung, & Choi, 2000).

Need-Threat Model of Ostracism

Williams (1997) proposed a need-threat model to illustrate ostracism's dimensions and predict and explain its effects on individuals. He claims that ostracism poses a distinct threat to four fundamental human needs. The need to belong represents a drive to experience frequent, caring interactions with others (Baumeister & Leary, 1995). Self-esteem is the desire to feel worthy (Leary, Tambor, Terdal, & Downs, 1995). The need for control reflects people's longing for some perception of control over their environment (Skinner, 1996). Finally, meaningful existence refers an individual's need to feel that his or her life is worthwhile (Solomon, Greenberg, & Pyszczynski, 1991).

Williams and Gerber (2004) illustrate the strength of ostracism's effect on these needs by comparing it to an argument. During an argument, both people feel as if they belong in the interchange, whereas during ostracism, an individual is excluded from belonging. Both parties engaged in an argument also possess some control over the situation, as either can influence the course of the argument; in contrast, ostracism removes any opportunity for control from the target. Similarly, an argument implies that the target is worthy enough to fight with, while ostracism implies that targets are not worthy of notice. Finally, though an individual's self-esteem may be damaged during an argument if criticism is involved, this effect is exaggerated during ostracism when the target is given no clear reason for exclusion and is forced to speculate on all the possibilities.

Ostracism has been studied using a variety of paradigms. In the sections below, a brief overview of some of the methods that have been used will be reviewed. Because a cyber-ostracism chat-room manipulation will be used in the present study, the review will focus primarily on this. In the next section, typical reactions to ostracism and cyber-ostracism will be

explored. The introduction will conclude with a discussion of assessing ostracism reactions and an overview of the present study.

Manipulations of Ostracism

Researchers have studied ostracism in a wide variety of ways, including ball-tossing games, cell phone text-messages, "forecasts" of a life without friendship, virtual reality, field studies, face-to-face conversations, chat-rooms, computer programs, role-plays (Williams, Bernieri, Faulkner, Grahe, & Gada-Jain, 2000; Zadro, Williams, & Richardson, 2004), interviews, surveys, and diaries (Williams, Nezlek, Wheeler, & Govan, 2004, as cited in Williams & Gerber, 2004; Williams, Wheeler, & Harvey, 2001). One distinction that has been made among ostracism manipulations is whether they occur face-to-face or remotely (e.g,, in cyberspace. This section begins with a general review of experimental manipulations of ostracism and cyber-ostracism, and then focuses more specifically on cyber-ostracism manipulations in a chat-room environment, as developed by Williams et al. (2002). In the subsequent section, I will explain the effects of these operational manipulations of ostracism.

Social Ostracism

The earliest experimental manipulation of ostracism used face-to-face paradigms in which individuals were excluded by confederates. Snoek (1962), for example, manipulated whether or not confederates conversed with participants for personal or impersonal reasons. To deliver the ostracism manipulation, he had groups of confederates reject individuals by not talking to them and continuing to talk amongst themselves.

In another social-ostracism paradigm, researchers manipulated a ball-tossing game to ostracize male students (Predmore & Williams, 1983; Williams, 1997). The ball-tossing manipulation was staged by two confederates pretending to wait with the participant to take part

in an unrelated study on hemispheric lateralization. The waiting room contained a box of children's toys. One confederate reached into the box and picked up a racquet ball, grinning and throwing it to the other confederate. The second confederate then grinned, looked at the participant, and threw him the ball. This pattern continued for about 30 seconds, until the confederates continued with the game together, excluding the participant. This ostracism manipulation was delivered without warning and without out any apparent reason.

Zadro and Williams (1998) utilized an innovative "train ride" paradigm to manipulate ostracism by asking three participants to engage in role-play using a script before boarding a simulated "train car" lab. The lab resembled a train, with ten rows of three seats each and tape-recorded "train sounds" playing in the background. Participants were given role-playing instructions according to their seating assignments, instructing them to speak to some individuals and not others. These instructions were designed so that some participants delivered an ostracism manipulation to other participants by speaking only to those designated by their script.

These examples illustrate the innovative and ecologically valid paradigms that researchers have used to manipulate social-ostracism. These procedures have yielded strong effects and shed light on the consequences of social-exclusion. The use of role-playing participants or confederates, however, can complicate efforts to standardize experimental procedures. For this reason, ostracism researchers have increasingly manipulated ostracism in cyberspace.

Cyber-Ostracism

Researchers have recently begun assessing ostracism over the internet, in what has been labeled "cyber-ostracism." The use of the internet to study social interaction is particularly useful since this medium has emerged as a popular and convenient mode of communication via

email, chat-rooms, instant messaging programs, and online games. As Williams et al. (2002) indicates, this increase in opportunities for social interactions also demonstrates an increase in occasions for individuals to be excluded—cyber-ostracism. Researchers have primarily studied cyber-ostracism using two paradigms: the virtual ball-toss and the chat-room.

Virtual ball-toss paradigm. Experimental studies of cyber-ostracism began with the development by Williams et al. (2000) of an elementary virtual ball-toss program. This program consists of a web-site that depicts a three-person game of virtual catch, in which each person is represented by his or her photo and a 'hand' graphic to catch and throw the ball. The participant is told that all the other members of the game are also participants (though they are actually pre-programmed confederates) and instructed to click on the member he or she wishes to throw the ball to. Researchers can use this paradigm to manipulate ostracism by controlling how often confederates toss the ball to the participant.

Although the virtual ball-toss paradigm is an economical and controllable way to manipulate ostracism, it has limitations. First, it does not appear to represent any situation people generally experience in their own everyday lives. Second, there is a question of the extent to which the virtual ball-toss differs from social ostracism. In this paradigm, the ball-toss is the only medium for exclusion, and 'ball-toss' exclusion may differ from other forms of ostracism, such as verbal exclusion. Despite these potential limitations, individuals who experience ostracism in the virtual ball-toss paradigm typically exhibit the behavior and experience the mood states associated with ostracism that is produced using other manipulations.

Chat-room paradigm. Williams et al. (2002) suggests that internet users are more likely to experience ostracism in communication with others by email or chat-rooms. Thus, to address

the limitations of the cyber-ball paradigm, Williams et al. (2002) developed a chat-room paradigm. This chat-room resembled an actual chat-room and consisted of three members: the participant and two confederates (members of either an in- or out-group of the participant). In the ostracism condition, participants were included in the discussion for four minutes and then ignored for five minutes. During ostracism, the confederates followed a pre-determined script and ignored any participant responses.

The chat-room paradigm has a number of advantages over the virtual ball-toss and face-to-face paradigms: first, it allows a high level of experiment control in an ecologically valid environment. Unlike face-to-face ostracism, chat-room ostracism can be pre-programmed such that each participant receives the same manipulation, and unlike the virtual ball-toss ostracism, a chat-room is a familiar and realistic setting. Second, Williams et al. (2002) have demonstrated that although some minor differences exist in the effects of cyber- and social-ostracism, the chat-room paradigm produces the same general reactions as a face-to-face ostracism paradigm does.

Reactions to Ostracism

Ostracism may be a particularly significant occurrence because it typically elicits very strong and negative reactions. This section begins with a general review of reactions to ostracism, first addressing the general response stages of reactions. Next, the effects of ostracism on mood and behavior will be discussed in detail. This section will conclude with a review of the specific effects of cyber-ostracism.

Response Stages of Ostracism

Though reactions to brief episodes of ostracism vary widely between individuals, they generally occur in two distinct stages defined in terms of the need-threat model: immediate reactions and coping.

Stage 1: Immediate reactions to ostracism. The first stage occurs during and immediately after ostracism. During this stage, individuals across the board experience depletions in need-satisfaction levels, negative affect, and anxiety levels(Williams & Gerber, 2004). Immediate reactions to ostracism are also powerful. Statistically, they produce large effect sizes and require few participants to achieve reliability. Even minimal exposure to ostracism produces this immediate effect; researchers have demonstrated significant effects with manipulations as short as four minutes of ostracism. The immediate effects are indiscriminate because individuals perceive it as painful regardless of why it is occurring, who is executing it, or to whom it is targeted.

In a number of studies, researchers have found that virtually any exposure to ostracism elicits immediate strong effects. Though it seems that ostracism would require human rejection, Zadro, Williams, and Richardson (2004) found effects when participants using the virtual ball-toss paradigm were told that they were interacting only with a computer. It also seems reasonable that ostracism effects should occur only when individuals perceive ostracism as intentional, but another study showed significant reduction in need-satisfaction levels even when participants are told the ostracism experience was randomly assigned (Zadro, Williams, & Richardson, 2004, Study 2).

Not only are immediate reactions to ostracism powerful, but they also have shown to be indiscriminately aversive. Gonsalkorale and Williams (2003) demonstrated that even when the ostracism manipulation was delivered by a 'despised out-group' (the KKK), depletion in need satisfaction levels matched ostracism by in-group and 'respected out-group' members. It also appears that the rationale for the ostracism is also insignificant at this immediate stage. Kosasih & Williams (2004) found that individuals who were ostracized because they performed better

than others in a task still experienced negative effects of ostracism. From these findings, it seems that the immediate effects of ostracism appear to affect individuals indiscriminately.

Stage 2: Coping with ostracism. The second stage occurs as soon as 45 minutes after ostracism and is characterized by individuals' exhibition of coping responses and their varying ability to regain need satisfaction levels (Williams & Gerber, 2004). Individuals typically employ cognitive, emotional, physiological, and behavioral resources in an effort to recover their need-satisfaction levels which were lowered in stage 1. Whereas almost everyone experiences similar effects in stage 1, an individual's coping in stage 2 is determined by several moderators.

The first important moderator is the attributions a person makes as to why ostracism is occurring. During attribution, people may ameliorate the negative feelings from ostracism by considering the motives behind it. Ostracism can be intuitively attributed to reasons independent of the targeted individual, such as a mistake, a social role (e.g., the president of a company ignoring an intern), or a defense mechanism (ostracizers are afraid of social-rejection themselves). These attributions and others can defuse the negative consequences of ostracism and allow ostracized individuals to regain their need-satisfaction levels.

A second type of moderator can be conceptualized as discounting factors, which reduce the salience of ostracism and include judgments regarding the importance of the ostracism. For example, such judgments as to whether ostracism was delivered by an out-group (e.g. a baseball team ignoring the members of the opposing team), or whether ostracism was intentional might affect the ability of people to recover from ostracism during the coping stage.

Finally, individual differences in various personality traits might also impact recovery from ostracism. In the past, ostracism research has typically focused on the range of ostracism's effects on individuals; fewer studies have explored the effect of individual personality

characteristics on reactions to ostracism. Early investigations into potential moderators of reactions to ostracism immediately after the manipulation (e.g., self-esteem, Williams et al., 2000) failed to find significant effects. The effects of personality variables, however, might be more strongly associated with post-ostracism than with ostracism behavior.

In a recent study, Zadro et al. (2005) examined individual differences in social-anxiety as a moderator of ostracism's detrimental effects. There were no differences in the reactions of high social-anxiety vs. low social-anxiety participants in the immediate aftermath of ostracism. When ostracism reactions were measured 45 minutes after the manipulation, high socially-anxious individuals demonstrated a slower recovery from ostracism's effects than low socially-anxious individuals. They concluded that moderating effects on reactions to ostracism may only be apparent when researchers also examine the duration of ostracism's effects, and may impact the coping stage rather than immediate responses. They also suggest that previous research examining ostracism's immediate effects may have failed to find evidence of moderators that have an impact on ostracism recovery.

Affective Responses

Past research has also demonstrated ostracism's powerful effect on affective states. In support of the need-threat model, many studies have demonstrated that ostracism works to reduce mood and need-satisfaction levels. Specific moods associated with exposure to ostracism include frustration (Geller, Goodstein, Silver, & Sternberg, 1974) and anger (Geller et al., 1974; Twenge, Baumeister, Tice, & Faber, 2000; Williams et al., 1998). Geller et al. (1974) also found ignored individuals feel more alone, shy, dull, anxious, nervous, and bored. Need-satisfaction level refers to the extent to which an individual's four fundamental needs of belonging, self-esteem, control, and meaningful existence are being met (Williams et al., 1998, 2000). Related

to these needs, social satisfaction and negative self-appraisal have also been associated with exposure to ostracism (Geller et al., 1974; Williams & Sommer, 1997).

Behavioral Effects

Figure 1 shows the two dimensions of ostracism's behavioral effects: engagement and valence. These dimensions interact to comprise four major categories of behavioral reactions to ostracism.

Pro-social engagement. Some individuals respond to ostracism with pro-social responses as an attempt to be 're-included.' Williams et al. (2000) examined ostracism in a Cyberball paradigm by in-group or out-group members and found that ostracized participants conformed more to an incorrect group decision than non-ostracized participants. Ostracized participants were also more likely to work diligently on group tasks (Williams & Sommer, 1997), and were more likely to join a new group regardless of the group's appeal (Wheaton, 2001), engage in unconscious mimicry (particularly with ingroup members) (Lakin & Chartrand, 2003), and imitate a good organizational citizen (Ouwerkerk, Van Lange, Gallucci, & Kerr). Baumeister and Leary (1995) found that individuals presented themselves in a more favorable manner, changed their attitudes, and worked harder to be re-included in a group after an ostracism experience. Previous studies examining re-inclusion after ostracism have typically delivered an ostracism manipulation in one paradigm, and then studied re-inclusion attempts in another separate setting with different people. In this study, we expanded our study of re-inclusion by examining reactions to being re-included into the the group that previously ostracized them.

Pro-social withdrawal. Individuals may also withdraw from interactions in a pro-social manner. Baumeister and Leary (1995) found that some individuals inhibit socially-undesirable behavior and withdraw politely from interaction after ostracism.

Anti-social engagement and withdrawal. In other cases, ostracism provokes anti-social responses (Twenge, Baumeister, Tice, & Stucke, 2001). Individuals may react to ostracism by displaying signs of aggression or, in cyber-ostracism, 'virtual bravado.' Some people might also react to ostracism by withdrawing in an antisocial manner, for example, giving others the 'silent treatment' (Williams, Shore, & Grahe, 1998).

Figure 1

The Dimensions of Ostracism's Behavioral Effects

Valence	Engagement: Withdrawal	Engagement: Engagement
Pro-social	Polite withdrawal, inhibiting socially undesirable behavior	Conforming, cooperation, positive self-presentation
Anti-social	The 'silent treatment'	Aggression, arguments, virtual bravado

Reactions to Cyber-Ostracism

Williams et al. (2002) completed four studies investigating the differences between the effects of social- and cyber-ostracisms on targeted individuals by comparing face-to-face ostracism with virtual ball-toss and chat-room ostracism, They found evidence that cyber-ostracism is more likely than social-ostracism to induce provocative reactions—cyber-ostracized individuals responded with more 'bravado' and maintained their levels of participation in group discussions. One example of virtual bravado is provided by Williams et al. (2002).

> u 2 can keep talking btw yourselves and ignore me I don't mind!!! . . . maybe I should start a conversation with myself . . . hi, how are yah . . . I'm fine how are

> you . . . I'm fine too . . . come on talk to me! I feel like a nigel . . . oh okay now you are gonna answer her I bet . . . I asked that question only 2000 years ago.

Williams et al. (2002) also found that while all three manipulations lowered need-satisfaction levels, the cyber-ostracism had less of an effect on participants' levels of control and self-esteem. They suggest that this difference exists because either cyber-ostracism is less threatening to these needs, or the more provocative action serves as a buffer against ostracism's threat to these needs.

Assessment of Ostracism Reactions

Temporal Influences on Attributional Processes

One concern in ostracism assessment is the amount of time that passes between the ostracism event and the administration of post-ostracism measures. Williams and Gerber (2004) suggest the impact of ostracism can either increase or decrease over time as a function of the individuals' attributions regarding the cause of the ostracism. For example, the impact of unintentional ostracism (e.g. due to a computer malfunction) might diminish while the effects of purposeful ostracism might strengthen. Previous research indicates that this attribution can occur in less than 45-minutes (Zadro, Bowland, & Richardson, 2004). It may be possible to control for this effect by assessing changes to ostracism reactions over time and specifically assessing the attributions individuals use to account for ostracism.

Facial Expression, Non-Verbal Behavior, and Chat-Room Engagement

Facial expressions and physical signals such as gestures, eye-rolling, talking to the computer, and leaning back in the chair can indicate agitation and other mood effects associated with ostracism. Likewise, verbal responses (or lack thereof) during ostracism may reflect social engagement and mood effects. Though Williams et al, (2002) noticed differences in cyber-

ostracized participants' bravado in both written chat-room responses and videotapes during ostracism, they did not quantify this data.

Implicit Assessment

Though existing research has relied primarily on explicit measures of ostracism reactions, it is important to include implicit measures as well because researchers have found discrepancies in ostracized individuals' implicit and explicit attitudes. Govan, Case, and Williams (2002) found that while both ostracized and included individuals portrayed themselves as unprejudiced against their ostracizers in explicit measures, ostracized participants demonstrated significantly higher levels of implicit prejudice than included participants. Therefore, implicit assessment may be an innovative way to assess reactions to an ostracism experience.

Present Study

Figure 2 shows the phases of this experiment and the measures that occur at each point in time. In this study, we used a chat-room paradigm to manipulate ostracism and assess individual difference in reactions to this experience. A correlational design was used to determine the relation between pre-ostracism personality measures (i.e., loneliness, fear of negative evaluation, internal-external locus of control, social-isolation, and social-competence) and concurrent and post-ostracism affective and behavioral reactions to chat-room ostracism. We measured reactions to ostracism by assessing mood and social engagement after exclusion, as well as during and after the recovery phase, using both questionnaires and actual participation (i.e,, lines typed in the chat room) in the discussion. Finally, preference for or against the confederates was examining with the IAT and post-experimental questionnaires. This experiment is part of a larger study that includes an EEG reading during chat-room ostracism.

Figure 2

Experimental Sequence and Associated Measures

	Chat-Room Phase			
Pre-Chat-Room	Inclusion	Exclusion	Re-Inclusion	Post-Chat-Room
Personality measures Affective measures: ♦ Enjoyment ♦ Interest Behavioral measures: ♦ Participation ♦ Nonverbals	Affective measures: ♦ Enjoyment ♦ Interest Behavioral measures: ♦ Participation ♦ Nonverbals	Affective measures: ♦ Enjoyment ♦ Interest Behavioral measures: ♦ Participation ♦ Nonverbals	Affective measures: ♦ Enjoyment ♦ Interest Behavioral measures: ♦ Participation ♦ Nonverbals	Affective Measures: ♦ Enjoyment ♦ Interest Nonverbals IAT

Ostracism Manipulation

Ostracism was manipulated using a chat-room paradigm. In this chat-room, participants were included in a discussion with two confederates, and ostracism was delivered when the confederates stopped responding to the participant and conversed independently of any responses she made. A re-inclusion phase was included after ostracism for two reasons. First, we want to explore the effects of an immediate re-inclusion period on ostracism reactions. Second, together with an inclusion phase before ostracism, this re-inclusion phase provides for a repeated measures design so that we can compare reactions to ostracism with two non-ostracism phases.

Pre-Ostracism Assessment

Prior to the ostracism manipulation, mood was assessed to provide a baseline assessment. Behavioral engagement and valence was also assessed by counting participant responses in the chat-room discussion and a video-recording of participants' nonverbal behavior.

This study is a preliminary test of the predictors of individual differences in recovery from the ostracism experience. A series of personality measures that were hypothesized to predict recovery from ostracism were administered. They include: the UCLA Loneliness Scale (Russell et al., 1980); the Fear of Negative Evaluation Scale (Leary, 1983); the Rotter Internal-External Scale (Rotter, 1966); the Differential Loneliness Scale (Schmidt & Sermat, 1983), and the Texas Social Behavioral Inventory (Helmreich, Stapp, & Ervin, 1974).

Concurrent Assessment

During the ostracism manipulation, we continued to measure mood with the same measure used in the pre-ostracism phase. We also continued to examine behavioral engagement and valence.

Post-Ostracism Assessment

After the chat-room manipulation, we continued the mood and behavioral measures from earlier phases of the experiment. In addition, we added several affective measures addressing participants' like/dislike of confederates, need-satisfaction levels, and implicit reactions to ostracism.

To measure participants' implicit prejudice against the ostracizing confederates, we administered an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). The IAT measures preference for two opposing concepts, in this case science (chat-room members will both major in a hard science) vs. humanities. Because previous research has established a baseline score among college students indicating a preference for science, we compared participants' preferences for science with this baseline to determine the existence of a bias against the other chat-room members.

Method

Participants

Participants were 26 female undergraduate students enrolled in introductory psychology at Illinois Wesleyan University, who volunteered to take part in the study for course credit or a ten dollar gift certificate. Only females were studied because of known sex differences in self-report ostracism reactions and because females comprise the majority of the population studied (psychology students). More specifically, students in several courses were given the option of participating in experiments or writing short papers for credit, and this study will be presented as one option counting for the experimental participation.

Pre-ostracism measures

Loneliness

The UCLA Loneliness Scale (Version 2) is a 45 item scale that measures loneliness as a unidimensional emotional response to an inconsistency in desired and actual levels of social contact (Russell et al., 1980). This scale consists of ten positively-worded statements ("I feel part of a group of friends") and ten negatively-worded statements ("I lack companionship"), and each item is presented with a four-point frequency scale ranging from: 4, I often feel this way; to 1, I never feel this way. Russell et al. (1980) found the scale's coefficient α to be .94.

Fear of Negative Evaluation

Leary's (1983) revised, brief Fear of Negative Evaluation (FNE) Scale contains 12 items and is designed to measure levels of apprehension over the evaluations of others, distress over negative evaluations, and the expectation that others will evaluate oneself negatively: "I worry about what people will think of me even when I know it doesn't make any difference," "I am unconcerned even if I know people are forming an unfavorable impression of me" (Watson &

Friend, 1969). Participants answered each item on a five-point scale (1, not at all characteristic of me; 5, extremely characteristic of me) which is scored on an FNE range from 12 (lowest FNE) to 60 (highest FNE). In previous research, the brief FNE scale's internal consistency has been high ($\alpha = .90$) and this brief version correlates with the original FNE scale .96.

Internal-External Locus of Control

We measured participants' general expectancy regarding the causes of outcomes using a unidimensional scale of internal vs. external called the Rotter I-E Scale (Rotter, 1966), An internal locus of control reflects an individual's belief that she is responsible for reinforcements she experiences; an external locus of control indicates her belief that reinforcements are due to external factors. The scale consists of 23 question pairs and 6 filler question pairs and uses a forced-choice format, where each item couples an internal and an external statement (e.g. 1, "No matter how hard you try, some people just don't like you"; 2, "People who can't get others to like them don't understand how to get along with others").

Social Competence

The revised Texas Social Behavioral Inventory (TSBI) (Helmreich, Stapp, & Ervin, 1974) is a 16-item scale that measures individuals' feelings of social competence, or social self-worth. Items address the degree of self-confidence in groups of people, fear of speaking to strangers, and security in social situations (e.g. When in a group of people, I have trouble thinking of the right things to say.) and are answered on a five-point scale (a, not at all characteristic of me; e, very much characteristic of me). Scores on the scale range from 0 to 64, with high scores indicating high social self-esteem. In previous research, the TSBI's internal consistency has been high ($\alpha = .92$).

Social Isolation

We measured social isolation with a fourteen-item scale by combining nine items from the Differential Loneliness Scale (Schmidt & Sermat, 1983)with four of our own items. These items addressed participants' degree of discrepancy between desired social-interaction and actual social-interaction (e.g. "I don't get invited out by friends as often as I'd really like"). The Differential Loneliness Scale contains items focusing on an individual's relationships with friends, family, and romantic partners. We used only items concerning friends, and then added more questions attempting to emphasize the discrepancy between desired and actual social-interaction. Participants answered items on a five-point scale (1, Strongly agree; 5, Strongly disagree).

Ostracism Manipulation and Concurrent Measures of Reactions to Ostracism

Chat-Room Paradigm

The participant was seated in front of a PC computer and asked to log-in to the chat-room program with a username and password provided by the experimenter. The log-in page displayed a logo exhibiting the mascots of the three universities to reinforce the claim that the chat-room members were students from colleges other than Illinois Wesleyan University.

Participants were then instructed to fill-out a profile asking them to specify a preferred nickname and major, year in school, hometown, activities and interests, favorite TV shows, and their ideal characteristics in a long-term relationship (see Appendix A). These topics were discussed respectively in the chat-room in four phases: the introduction phase, basic information; the inclusion phase, Interests and Extracurricular Activities; the exclusion phase, TV Shows; and the re-inclusion phase, Ideal Relationships. The pre-experimental profile (which was viewable by all of the chat-room members during the manipulation) was intended to make the topics more

salient and assure that the participants have information to discuss during each phase of the chat-room.

After completing their profile, participants received a description of the specific procedure of the chat-room experience (see Appendix B). Most importantly, this account explained the format of the chat-room paradigm as consisting of four eight-minute phases during which the members were expected to introduce themselves and discuss the topics addressed by the pre-experimental profile. After reading this description, the experimenter further strengthened the belief that this was a tri-university project by staging a phone call to the other experimenters, ensuring that all participants were ready to enter the chat-room. The experimenter then instructed the participant to select "OK" and wait for further instructions from the chat-room administrator, then leaving the participant alone in the lab.

By selecting "OK," participants were logged-in to the chat-room and informed that the two other members (confederates 'Steph' and 'Jen'), along with the 'administrator,' had also entered the room. The chat-room was modeled after popular chat-room programs and contained a box displaying the conversation, a box for the participant to type responses in, and on the right, a list of the members present and the option to view their profiles and pictures (see Appendix C—a print-out of the chat-room layout along with the pictures of the confederates and their profiles). The option to view members' profiles was intended to increase the personalization of the ostracism.

A pre-programmed message by the administrator began the introduction to the chat-room discussion: "Welcome and thank you for participating in the Inter-University Chat-room. Please use the next eight minutes to introduce yourselves, discussing your hometowns, universities, year in school, majors, and future plans." The confederates then discussed these topics with the

participant for eight minutes. They participated in the discussion and responded to questions with information from their (the confederates') profiles.

After eight minutes, the administrator interrupted the discussion by instructing participants to complete the first set of affective measures. After one minute, the administrator introduced the inclusion phase of the chat-room paradigm: "For the next eight minutes, please discuss your interests and extracurricular activities." Again, the participants took part in a discussion on this topic with the two confederate members, who followed a pre-determined script. After the inclusion phase, the administrator again interrupted the discussion by asking participants to fill out a second set of affective measures.

Television shows were discussed during the exclusion (ostracism) phase. The confederate members proceeded in exclusive conversation, and ignored the participant. The confederates carefully followed a script to ensure that the conversation was completely unaffected by participant responses and each participant received the same ostracism manipulation. To make ostracism even more explicit and guarantee that participants did not interpret questions or ambiguous comments to be directed at themselves, confederates addressed each other by name (e.g. "So, Steph, what is your favorite TV show?"). Once the eight minute exclusion period was completed, the administrator again asked each participant to complete a third set of affective measures.

After one minute, the administrator announced the beginning of the re-inclusion phase, asking the chat-room members to discuss their ideal relationship partner. During the re-inclusion phase, the confederates re-included participants in the discussion. Once the eight-minute period was over, the administrator stopped the conversation by thanking participants for their

involvement in the chat-room. The administrator then instructed chat-room members to log-out and wait for instructions from the experimenter.

Affective Measures

Following each phase of the chat-room, the participant completed a series of items serving both as a manipulation check for the ostracism manipulation and as a measure of reactions to ostracism (see Appendix B). The administrator stopped the phase, introduced the next topic, and instructed participants to complete a particular page (numbered to correspond with the previous phase) of ten items. A five-point scale measured interest in the discussion ("How interesting do you find this topic?"), social engagement ("How much did you contribute to this conversation?") of both self and other members, and enjoyment ("How much are you enjoying this chat-room?"). Upon finishing the page, the participants followed instructions to put the page in an envelope and wait for the next chat-room phase to begin.

Behavioral Measures

Coding of chat-room responses for social engagement. We examine the participants' reactions to ostracism and re-inclusion totaling each participant's number of responses. This variable will be subsequently labeled "participation."

We intend to also code the participants' communications during phases 3 and 4 of the chat-room for participation, aggression, 'virtual bravado,' and re-inclusion attempts. Two raters, blind to the experiment's purpose, will be trained to rate subjects' interaction on scales measuring these factors. We required a high level of reliability between raters on sample discussions before coding the experimental discussions. This has not yet been completed.

Video-taped recording of behavior in chat-room. We also recorded the participants' nonverbal behavior with a video-recorder, and will train additional raters to code the recordings

for nonverbal signs of agitation, such as talking out loud, leaning back in the chair, standing, pacing, and other demonstrative acts. Raters will also globally rate participants' facial expressions on agitation. Again, we will train these raters to assign each tape a global rating on a 9-point scale: (1, not at all agitated; 9, extremely agitated), until they reach a high level of inter-rate reliability. The raters will be randomly assigned to the recordings and blind to the participants' identity.

Post-Ostracism Measures

Affective Measures

After each phase of the chat-room discussion, the participant was given one minute to complete a series of items that served as a manipulation check for their perception of the ostracism manipulation. The items' topics mirrored the concurrent ostracism mood-ratings.

Implicit Association Task (IAT).

An Implicit Association Task (IAT; Greenwald, McGhee, & Schwartz, 1998) was delivered to serve as an implicit measure of participants' preferences for or against the other chat-room members' majors (civil engineering and geology) as sciences vs. humanities. Previous research has demonstrated that without manipulation, college students in general demonstrate a preference for science. We chose these specific majors because they are not offered at IWU and thus participants were less likely to hold strong associations. These majors are also common enough to avoid the suspicion that chat-members were confederates.

The IAT was delivered on the same PC computer as the chat-room manipulation and used five examples of both science and humanities disciplines as target categories; these examples included the confederate's majors (e.g. geology, engineering, biology, chemistry, physics, history, art, music, philosophy, English). The pleasant attributes consisted of good, happy,

vacation, gift, and sunshine. The unpleasant attributes were bad, awful, disease, trouble, and pain.

The program first instructed participants to complete two single-category practice blocks, each consisting of 20 items. In these blocks, the program required participants to match presented stimuli (e.g. "happy") with their categories (e.g. Pleasant). After completing the practice blocks, participants began two dual-category blocks of 60 items each. These blocks were counter-balanced so that participants encountered science + pleasant and humanities + pleasant blocks either first or second. In these blocks, the program presented participants with both categories at once (e.g. Pleasant/Sciences, Unpleasant/Humanities) and stimuli from all categories (e.g. good, bad, geology, history). Participants were asked to match each stimulus in the appropriate dual category. High scores indicated participants' preference for science over humanities. The data from this measure have not yet been analyzed.

Procedure

Participants arrived at a research lab and were asked to read and sign an informed consent agreement (see Appendix C) explaining that the study plans to examine how brain activity changes during interaction in a virtual environment (see Appendix A). The experimenter also presented participants with another form that asked if the participants had heard anything about the experiment beforehand. If the participant had heard too much about the experiment, she would have been presented with an abbreviated procedure that did not include deception and her data would have been thrown out; this, however, did not occur. The experimenter then informed each participant that two other students, from the University of Illinois and Illinois State University, were going to participate in the chat-room as well. The experimenter took the participant's picture with a digital camera and explained that this picture was going to be

displayed in the participant's profile, and that she would be able to view the pictures of other members. This feature was designed to aid the effectiveness of the ostracism manipulation by personalizing the participant's identity in the chat-room.

The experimenter then fitted the Electrocap for the EEG reading to the participants' head (see Appendix D for detailed EEG procedure). Once the cap was comfortably in place, the experimenter instructed the participant to log-in to the Inter-University Chat-Room. Once the chat-room session was finished, the experimenter returned, removing the Electrocap and instructing the participants to complete the IAT and fill-out post-experimental questionnaires (see Appendix E). Once the participants completed these measures, they received a full debriefing of the experiment, along with the contact information of the experimenters for any questions they might have later (see Appendix F). Finally, the experimenter explained the importance of the study's deception and requested that the participant refrain from discussing the experiment with other students until data collection for the study was completed.

Results

Descriptive Statistics

Internal consistency, means, and standard deviations for personality measures are presented in Table 1. Correlations between personality measures are shown in Table 2. Finally, means and standard deviations for enjoyment and participation are depicted in Table 3.

Table 1

Cronbach's Alpha, Means, and Standard Deviations for Personality Measures

Personality Measure	Cronbach's α	Mean	Standard Deviation
Loneliness	.91	2.03	(.52)
FNE	.94	3.02	(.83)
Locus of Control	.57	.49	(.13)
Social Competence	.84	3.38	(.58)
Social Isolation	.76	.19	(.19)

Note: Loneliness, FNE, and social competence were answered on a five-point scale. Loneliness and social isolation were answered on a dichotomous scale.

Table 2

Correlations between Personality Measures

	Loneliness	Fear of Negative Evaluation	Locus of Control	Social Competence	Social Isolation
Loneliness	___	.10	.27	-.49*	.86**
Fear of Negative Evaluation		___	.27	-.47*	-.09
Locus of Control			___	-.19	.19
Social Competence				___	-.38
Social Isolation					___

*. Correlation is significant at the .05 level (two-tailed).

**. Correlation is significant at the .01 level (two-tailed).

Table 3

Means and Standard Deviations for Enjoyment and Participation

	N	Inclusion	Exclusion	Re-Inclusion
Enjoyment	24	$3.88\ (1.04)_1$	$2.96\ (1.04)_2$	$4.08\ (.97)_1$
Participation	22	$22.86\ (9.84)_1$	$16.05\ (8.99)_2$	$23.36\ (11.90)_1$

Note: Means that do not share subscripts are significantly different.

The analyses in this thesis focus on the personality, enjoyment, and participation data. The EEG findings are presented in Genevieve Nehrt's thesis and other measures (e.g., videotape, content analysis of participant, and IAT) have yet to be analyzed The first section focuses on differences in enjoyment and participation during different chat-room phases. The second section addresses how individual differences in personality predict enjoyment and participation in the chat-room. Finally, the third section focuses on how personality is related to changes in enjoyment and participation during exclusion and re-inclusion.

Differences in Enjoyment and Participation between Chat-Room Phases

The first set of analyses explores the differences in enjoyment and participation across chat-room phases. Means and standard deviations for enjoyment and participation across phases are presented in Table 3. Because two participants misunderstood instructions for self-reporting enjoyment and four of the participants' participation data was saved incorrectly, N is less than 26 for these analyses.

A repeated measures one-way ANOVA was used to compare differences in enjoyment and participation in the three chat-room phases. Enjoyment differed significantly in the phases, $F\ (2, 46) = 20.31$, $p < .001$. Participation also differed significantly across phases, $F\ (2, 42) = 16.01$, $p < .001$. A post-hoc test for repeated measures was computed to analyze differences in enjoyment and participation between the three phases. The Bonferroni method was used to adjust the alphas for three comparisons ($\alpha = .05/3$) in these post-hoc tests. Enjoyment differed

significantly between the inclusion and exclusion phases, and between the exclusion and re-inclusion phases. The difference in enjoyment in the inclusion and the re-inclusion phases was not significant. Participation also differed significantly in the inclusion and exclusion phases, and in the exclusion and re-inclusion phases. The difference in participation in the inclusion and re-inclusion phases was also not significant.

Personality Predictors of Enjoyment and Participation in the Chat-Room

Table 4

Correlations with Personality Measures and Enjoyment and Participation Rates

		Chat-Room Phases		
	N	Inclusion	Exclusion	Re-Inclusion
Loneliness	24			
Enjoyment		-.32	-.30	-.39
Participation		-.32	-.13	-.38
Fear of Negative Evaluation	24			
Enjoyment		.05	-.07	.09
Participation		.13	-.05	.06
Locus of Control	24			
Enjoyment		-.21	-.31	-.03
Participation		-.22	-.18	-.09
Social Competence	24			
Enjoyment		.61**	.45*	. 47*
Participation		.23	.36	.21
Social Isolation	21			
Enjoyment		-.33	-.28	-.44*
Participation		-.33	-.18	-.36

**. Correlation is significant at the .001 level (2-tailed).

*. Correlation is significant at the .05 level (2-tailed).

The second set of analyses examined correlations between the five personality measures and enjoyment and participation in the three phases of the chat-room. These correlations are presented in Table 4.

Personality Traits and Changes in Enjoyment and Participation during Exclusion and Re-Inclusion

The third set of analyses consisted of correlations between personality measures and changes in enjoyment and participation across chat-room phases. To assess changes in enjoyment and participation across phases, difference scores were calculated. The decrement from baseline to exclusion was computed by subtracting enjoyment and participation means during the exclusion phase from the respective means during inclusion. The "rebound effect" refers to the difference between enjoyment and participation means during re-inclusion and exclusion. Pearson's correlations were computed between the five personality measures and these difference scores of enjoyment and participation, and are presented in Table 5. The partial correlation presented in Table 5 refers to this rebound effect while statistically controlling for enjoyment and participation during inclusion.

Analyses of loneliness, fear of negative evaluation, social competence, and social isolation did not yield significant correlations with differences in enjoyment. A moderate but non-significant positive correlation emerged between external locus of control and the rebound effect of enjoyment controlling for baseline.

Analysis of personality correlations with participation revealed that locus of control was not significantly correlated with differences in participation. Fear of negative evaluation showed a low negative correlation with participation, and social competence showed a low positive correlation with differences in participation in each comparison. Loneliness and social isolation

were moderately correlated with differences in participation in each condition, and loneliness was significantly correlated with differences in participation in the rebound effect from exclusion and re-inclusion phases.

Table 5

Correlations between Difference Scores in Enjoyment and Participation and Personality

	Baseline to Exclusion	Exclusion to Inclusion (Rebound)	Column 2 Controlling for Baseline[a]
Loneliness			
Enjoyment	-.03	-.07	-.02
Participation	-.29	-.55*	-.47
Fear of Negative Evaluation			
Enjoyment	.13	.17	.21
Participation	.25	.13	.10
Locus of Control			
Enjoyment	.10	.29	.33
Participation	-.08	-.04	-.07
Social Competence			
Enjoyment	.18	.01	-.11
Participation	-.14	-.24	-.30
Social Isolation			
Enjoyment	-.05	-.14	-.11
Participation	-.23	-.42	-.30

*. Correlation is significant at the 0.05 level (2-tailed).

[a] Partial correlations of rebound effect (exclusion to re-inclusion) controlling for baseline.

Discussion

Differences in Enjoyment and Participation between Chat-Room Phases

This study's first set of analyses was designed to assess differences in enjoyment and participation over three chat-room phases. I expected that enjoyment would decrease in the exclusion phase, in accordance with the ostracism effect that Williams & Gerber (2004) cite in their ostracism research. My results support this hypothesis, showing a significant decrease in enjoyment during the exclusion phase.

Although not specifically hypothesized, the possibility that enjoyment and participation during re-inclusion would be higher than during inclusion was also considered. In fact, there was a very small increase in both enjoyment and participation from inclusion to re-inclusion that I refer to as the "rebound effect." Though statistically insignificant with my small sample size, I plan to explore this rebound effect in future research with more participants. One possible confound that might explain this rebound effect was differences across phases in the topic of conversation. Participants may have found the topic of the re-inclusion phase (desirable romantic partners) particularly interesting, and this might have led to both increases in enjoyment and participation. This will be explored in our subsequent research by counterbalancing topics.

I also expected participation to decrease during the exclusion phase of the chat-room. The results support this hypothesis, as participation significantly decreased during the exclusion phase. In Williams et al.'s (2002) research on cyber-ostracism, they did not measure participation, so this addition is new to the study of chat-room ostracism, and these findings are particularly important as they indicate that the effects of ostracism can be seen even when a behavioral measure is used.

This study was also designed to explore how the presence of a re-inclusion phase affects reactions to ostracism. Because this "re-inclusion" phase is a novel addition to research on chat-room ostracism, to discuss it in the framework of previous research requires some new terminology. Williams and Gerber (2004) defined two response stages to ostracism: an immediate stage occurring during and at least 45 minutes after ostracism, and a recovery stage occurring as early as 45 minutes after ostracism. Because the present study's re-inclusion phase occurs immediately after ostracism, it technically falls under Williams and Gerber's "immediate" response stage. However, for the purposes of this discussion, I will refer to four ostracism response stages. Here, the exclusion phase occurs during the episode of ostracism, the immediate phase occurs up to 45 minutes after ostracism, the re-inclusion phase more specifically refers to the 8 minute period that directly follows ostracism in the present study, and the recovery phase begins as early as 45 minutes after ostracism.

Using this new terminology, I can compare my finding that enjoyment and participation are recovered during re-inclusion with Williams and Gerber's (2004) findings of the immediate effects of ostracism. I initially hypothesized that during re-inclusion, individuals' responses would reflect decreases in their enjoyment and participation relative to baseline, similar to those decreases observed during exclusion. In my results, however, these depressed enjoyment and participation levels are not present. Rather, my results demonstrate that during re-inclusion, participants' levels of enjoyment and participation increased significantly, returning to their pre-ostracism levels.

The increases in enjoyment and participation during re-inclusion may contradict previous descriptions of the response stages of ostracism (Williams & Gerber, 2004). Williams and Gerber (2004) described the painful, immediate reactions as occurring during and immediately

after ostracism, and the coping stage as occurring approximately 45 minutes after ostracism. However, my results suggest that with immediate re-inclusion from ostracism, coping can begin immediately after ostracism. Because previous research did not include a re-inclusion phase, this inconsistency suggests that response stages may be modified by the presence of re-inclusion. It seems that re-inclusion may speed recovery, and more broadly suggests that recovery from ostracism may be moderated by other social interactions following ostracism.

There are a few hypotheses that might reasonably explain this increase in enjoyment and participation during the re-inclusion phase of the chat-room. First, re-inclusion may comprise a manipulation of its own, altering the effects of the ostracism manipulation. Second, immediate re-inclusion may not allow individuals the time to form negative attributions that they might otherwise make. Finally, the present study measured reactions to ostracism by levels of enjoyment and participation. Williams and Gerber (2004) used different measures of reactions to ostracism, focusing on mood and the satisfaction of the four fundamental needs emphasis in the need-threat model of ostracism (belonging, self-esteem, control, and meaningful existence).

It is also possible that attributions regarding the reason for ostracism affect enjoyment and participation during re-inclusion. Snoek (1962) conducted a study in which participants were rejected by a group by not talking to them. Their rejection was explain as occurring either because they were unworthy of membership (personal reason) or because the group was too full (impersonal reason). He found that the nature of their reason for ostracism affected their desire to belong to the group. Individuals who were excluded for impersonal reasons demonstrated a decreased desire to affiliate with the group, whereas individuals excluded for personal reasons maintain their desire to belong. Snoek concluded that individuals excluded for personal reasons possess a "need for social reassurance" that can be fulfilled only by remaining in the group.

These results suggest the possibility that attributions generated by ostracized individuals may mediate their subsequent desire to be re-included in the group.

Williams (2001) also proposes that attributions about the nature of ostracism mediate the reactions to ostracism during the recovery stage. However, Jackson and Saltzstein (1957) found that ostracism targets' desires for group membership does not decrease when a rejecting group is viewed as highly attractive. This research suggests the possibility that attributions may play a role in how people respond to re-inclusion from ostracism, but this hypothesis should be studied by explicitly measuring attributions and controlling for factors such as group attractiveness before conclusions are made.

Personality Predictors of Enjoyment and Participation in the Chat-Room

A second set of analyses was designed to assess correlations between personality characteristics and enjoyment and participation throughout the chat-room experience. I hypothesized that high scores on loneliness, fear of negative evaluation, external locus of control, and social isolation, as well as low scores on social competence, would predict lower enjoyment and participation during and after ostracism. My results did not entirely support this aspect of my hypothesis, though they do demonstrate other interesting trends.

It appears that various personality characteristics are related to enjoyment and participation in the overall chat-room experience. Individuals with high social competence enjoyed the chat-room paradigm more and participated more than individuals with low social competence. The trends were consistent across all phases of the chat-room. Loneliness and social isolation were moderately negatively correlated with enjoyment and participation during all three phases of the chat-room. Clearly people who are lonely or socially-isolated found this chat-room environment less enjoyable. Fear of negative evaluation showed very little relation to

enjoyment and participation in all three phases of the chat-room. It appears that fear of negative evaluation does not predict enjoyment and participation in chat-rooms.

Findings that individual differences in social competence, loneliness, and social isolation are correlated with enjoyment and participation suggest that the chat-room may be a particularly socially-challenging environment. Socially-competent individuals may find chat-room interactions to be relatively easy, while lonely or socially-isolated individuals may find them to be difficult.

A mixed pattern of correlations emerged between locus of control and enjoyment and participation in the three chat-room phases. Locus of control was negatively correlated with enjoyment and participation during inclusion and exclusion, but this correlation changed during re-inclusion. During re-inclusion, locus of control showed almost no relationship with enjoyment and participation. Because at this point in data collection this effect is small and non-significant, it will be re-examined with a larger sample size.

The relation between individual differences in personality and people's enjoyment and participation in the overall chat-room suggests that the chat-room's socially-challenging nature may make it a particularly useful paradigm for studying personality differences. If a paradigm presents an unchallenging social interaction, such as ordering food from a server at a restaurant, then personality differences will probably not emerge because almost everyone can perform the task well. On the other hand, if a social interaction is too difficult, it may not reflect personality differences because anyone performs poorly. Due to the chat-room's moderately socially-challenging nature, it may be a useful way for researchers to assess personality differences in social interactions.

Personality Traits and Changes in Enjoyment and Participation during Exclusion and Re-Inclusion

A third set of analyses was designed to assess whether personality characteristics explain people's changes in enjoyment and participation from inclusion to exclusion. None of the personality measures showed strong correlations with changes and enjoyment and participation from inclusion to exclusion. This trend indicates that there is not a strong association between the tested personality characteristics (loneliness, fear of negative evaluation, locus of control, social competence, and social isolation) and immediate reactions during ostracism. During an episode of ostracism, reactions seem to be independent of personality. This finding that personality measures did not correlate with reactions to ostracism specifically is consistent with Williams and Gerber's (2004) hypothesis that negative reactions during ostracism are indiscriminately experienced by all individuals, regardless of personality differences.

However, it appears that external locus of control, fear of negative evaluation, and social isolation were more strongly correlated with the rebound effect of enjoyment and participation from exclusion to re-inclusion than they were with the decrement from baseline to exclusion. Locus of control, which was moderately positively correlated with enjoyment, represented the strongest association with the rebound effect of enjoyment during re-inclusion. This finding is consistent with my prediction that locus of control would play a particularly important role in coping with ostracism. Locus of control, however, was not correlated with the rebound effect of participation during re-inclusion.

The role that locus of control may have in moderating the coping response to ostracism is particularly interesting, considering contradictions in previous research on its association with reactions to ostracism. On one hand, this finding would support Williams and Gerber's (2004)

claim that recovery from ostracism is moderated by attributions a person makes as to why the ostracism occurred. They assert that attributions that explain ostracism from a source other than the targeted individual (e.g. "There must be something wrong with my internet connection and they are not receiving my messages.") work to defuse the negative consequences of ostracism. Because locus of control is defined as whether an individual attributes responsibility to him- or herself (internal locus) or to factors in the environment (external locus), it is intuitive that attribution-making during the recovery from ostracism may be moderated by an individual's locus of control.

In addition, Zadro et al. (2000) found that individuals with a high external locus of interpersonal control reacted more negatively than individuals with internal locus of interpersonal control to physiological measures of ostracism reactions. However, this effect was not present for self-report measures of ostracism reactions. Thus, they found a negative correlation between external locus of control with behavioral measures of ostracism reactions, but found no such correlation for self-report measures. These findings regarding locus of control's differential effect on behavioral and self-report measures of ostracism reactions are consistent with the direction of my findings that locus of control is negatively (albeit very slightly) correlated with my behavioral measure of participation during re-inclusion, and positively correlated with my self-report measure of enjoyment. However, such findings do not explain the magnitude of my correlations.

There are several important differences between the present study and previous research assign the relation between locus of control and ostracism reactions and recovery that might account for these inconsistent findings. First, previous research has measured reactions to ostracism during exclusion, whereas I assess reactions to ostracism during re-inclusion. Second,

the study by Zadro, Walker, Williams, and Richardson (2000) measured interpersonal locus of control, a concept highly related to, but distinct from general locus of control. Third, this previous study used physiological measures, which are more implicit than my behavior measure of participation. Finally, Zadro, Walker, Williams, and Richardson assessed correlations between locus of control and ostracism reactions, whereas I assess correlations between locus of control and difference scores in ostracism reactions over time. Clearly, the present findings on locus of control and changes in enjoyment and participation during re-inclusion from ostracism are not completely comparable to previous research, and should be further investigated both in future research and in the expansion of this study once a larger sample size is obtained.

It was hypothesized that persons with high levels of loneliness and social isolation would not rebound from ostracism. The results partially supported this prediction. In fact, loneliness was not correlated with the rebound effect for enjoyment during re-inclusion, but had a significant, moderate, negative correlation with the rebound effect for participation. Likewise, social isolation had a low negative correlation with the rebound effect for enjoyment, but a moderate negative correlation with the rebound effect for participation. The negative correlation of loneliness and social isolation with changes in the rebound effect for participation during re-inclusion is consistent with previous findings that people who score higher on loneliness are more likely to react negatively to ostracism than those who are not lonely (Williams et al., 2002). Because loneliness and social isolation were highly and significantly positively correlated, it makes sense that social isolation is also consistent with previous findings for loneliness. However, these findings do not explain the lack of an association between these personality traits and the rebound effect for enjoyment during re-inclusion. Besides this study, little research has

been conducted on loneliness and ostracism reactions and recovery, and these findings should be investigated further in future research.

Because no previous research exists examining fear of negative evaluation and ostracism, no predictions were made regarding this personality trait. A small, positive correlation emerged between fear of negative evaluation and the rebound effect of enjoyment during re-inclusion. Correlations between fear of negative evaluation and the rebound effect of participation were much smaller. However, these effects are too small to interpret before more participants are tested. Though interesting, a more specific interpretation of this finding cannot occur until we obtain more participants, and in particular we need to test differences between correlations. A larger sample size of 50-60 participants will give these results more statistical power. Also, these findings currently rely on difference scores, and stronger statistical analyses would allow a more accurate interpretation of the data.

Limitations and Directions for Future Research

The final portion of my discussion will focus on the study's strengths, limitations, and directions for future research. The biggest limitation is the small sample size, a problem that will be addressed with additional testing in the fall of 2007. With a projected sample of 60 participants, we will have sufficient power to detect relatively modest effects and will be able to assess the extent to which some of the patterns seen here are robust.

One strength of this study that has not yet been mentioned is its use of a mixed measures design (affective and behavioral) to measure reactions to ostracism. The study's biggest limitation is its small sample size. Directions for future research include investigations into sex differences in ostracism reactions, the virtual bravado phenomenon, analysis of its additional measures, and associations between EEG brain activity and personality.

One strength of this study is that it used participation as a behavioral measure of ostracism reactions. Measuring participation is important because it provides a behavioral measure of reactions to ostracism, and allows me to use a mixed-measures design to reduce shared method error in my analysis. The shared method error may have led the self-report personality measures and self-report enjoyment levels to correlate well. However, the finding that ostracism reactions are consistent against a mixed-measures design incorporating both self-report and behavioral measures is noteworthy.

One area that future ostracism research should focus on is sex differences in ostracism reactions. Many studies and theories have addressed the importance of attributions in ostracism recovery, but sex differences in the nature of ostracism attributions have also been reported. Williams and Sommer (1997) conducted a study to examine specifically how individuals make personal or impersonal attributions about their ostracism, and how these attributions affect "social-compensation," or working hard at a group task in order to gain acceptance by the group. Giving no explicit reason for ostracism, they found that females were more likely than males to make personal attributions for ostracism, and demonstrated increased social-compensation. Williams and Sommer's (1997) findings suggest that when given no explicit explanation for ostracism, females are more likely to make personal attributions about the reasons for ostracism and attempt to be re-included in the ostracizing group. Although we cannot directly compare the present study to these findings, which examined both females and males, the fact that females show a tendency to attempt to be re-included in an ostracizing group may be relevant to the present study's finding that females participate more when re-included in a group after ostracism. This relationship should be more explicitly explored in future research.

Also, though data collected on the content of participants' contributions to the chat-room was not analyzed, we did not observe that the 'virtual bravado' reported by Williams et al. (2002) was present. Virtual bravado, refers to provocative actions as attempts to be re-included during ostracism. The lack of virtual bravado in the present study is inconsistent with the finding reported by Williams et al. that these responses occur more during chat-room ostracism than in other ostracism paradigms. If the finding that virtual bravado does not occur in this particular chat-room is confirmed with a larger sample size, future research should explore what conditions of a chat-room paradigm invoke these provocative reactions.

There were also several measures that were included in the present study that were not analyzed in this thesis. These include affective measures of ostracism reactions such as interest level and ratings of the contributions of self/others. Behavioral measures that have not yet been analyzed include video-tapes of nonverbal behavior and the coded chat-room discussions. Finally, due to a lack of complete data, the IAT has not yet been analyzed. These measures were included in the study because they may provide important improvements over previous research. These measures will be analyzed when data collection has been completed for 50-60 participants.

Finally, the present study is part of a larger study assessing EEG activity during chat-room ostracism. Our findings show that brain activity in the right frontal lobe and the midline of the frontal lobe change during exclusion and re-inclusion compared to baseline. In fact, these readings closely parallel the patterns of enjoyment and participation measures, even demonstrating a similar trend toward a rebound effect during re-inclusion.

The EEG activity is also correlated with personality measures. This is the first examination of EEG waves, ostracism, and personality in the ostracism literature, and will be very interesting to explore as we expand this project. Locus of control was moderately positively

correlated with EEG activity in the left and right frontal lobes in every phase of the chat-room. Fear of negative evaluation showed a moderate negative correlation with EEG activity in the left and right frontal lobes during every phase of the chat-room. Social competence showed a low to moderate positive correlation with EEG activity in the left and right frontal lobes. Analysis of loneliness and social isolation revealed no significant correlations with brain activity. Ultimately, we intend to pair the personality data assessed in this thesis with the EEG data reported in Genieveve Nehrt's thesis after achieving a larger sample size.

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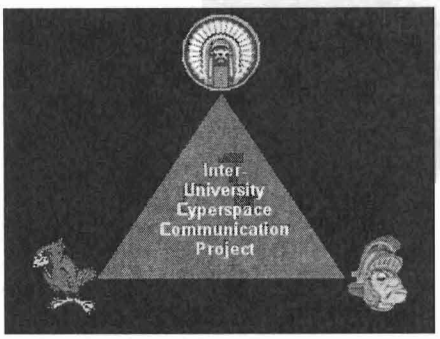
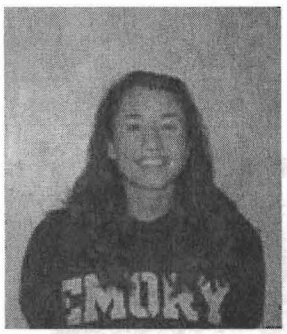
Appendix

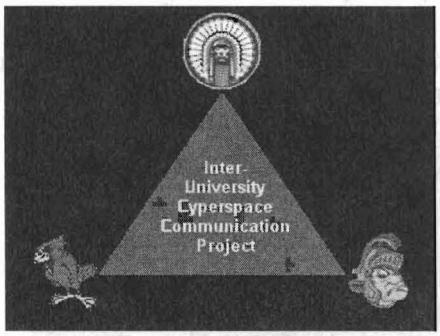
Confederate Profiles

Nickname: Steph
Age: 18
Gender: Female
University: Illinois State University (IL)
Favorite Movies: The big Lebowski, Bridget Jones Diary 1 and 2
Favorite TV Shows: The Girls Next Door, Food Network
Favorite Books: The Great Gatsby, Fountain head, and The brothers K
Favorite Bands: Johnny Cash, Willie Nelson, and Bob Dylan
Favorite Sports: Running, Intermural softball
Activities/Interests: shopping!!
Ideal traits in a relationship partner: fun, smart, good personality
Picture:



Nickname: Jenny
Age: 19
Gender: Female
University: University of Illinois - Urbana-Champaign
Favorite Movies: Pirates of the Carribean, Wedding Planner
Favorite TV Shows: the discovery channel, Friends
Favorite Books: Harry Potter, Lord of the Rings
Favorite Bands: DMB, SR71, John Mayer
Favorite Sports: I'm not really that athletic :)
Activities/Interests: Choir, Volunteering for Habitat for Humanity, Watching movies, hanging out with friends
Ideal traits in a relationship partner: good sense of humor!!!
Picture:





Appendix B

Affective Measures Questionnaire

Instructions: To complete this survey, please rate each statement on its corresponding five-point scale. When you are finished with the page, place it face down in the paper tray on your desk.

1.) How interesting did you find this part of the chat-room discussion?

1	2	3	4	5
Not at all interesting		Moderately interesting		Extremely interesting

2.) Please rate the other chat-room members for their contributions to this part of the discussion.

Student from U of I:

1	2	3	4	5
Not at all involved		Moderately involved		Extremely involved

Student from ISU:

1	2	3	4	5
Not at all involved		Moderately involved		Extremely involved

3.) Please rate yourself for your contribution to this part of the discussion.

1	2	3	4	5
Not at all involved		Moderately involved		Extremely involved

4.) How much did you enjoy this part of the chat-room experience?

1	2	3	4	5
Not at all		Neutral		Very Much

Appendix C

Informed Consent

Informed Consent

We are requesting that you participate in a research study being conducted at Illinois Wesleyan University under the supervision of Dr. Joseph Williams, Dr. Weiyu Zhu and Dr. Doran French. At the end of this form, you will be asked to indicate your willingness or unwillingness to participate and give your signature.

This study is designed to understand how brain activity changes when interacting with other persons in a virtual environment. You will be seated at a computer and connected to a chat room in which you will interact with other college students from the University of Iowa and Illinois State University. You will interact with them for approximately 32 minutes in this chat room environment. You will be communicating about relatively non-intimate topics. You will not be asked to engage in discussion of any sensitive topics. But as in any social interaction, you might experience some discomfort as a function of the nature of the conversation.

To examine how the brain functions in a chat room environment, you will be hooked up to an EEG monitor designed to assess brain wave activity. This will involve being fitted with an electrode cap which contains small recording electrodes that, when placed over the skull, can record brain activity. This is a non-invasive procedure. The cap is similar in nature to a swim cap or a snug-fitting hat. After the cap is placed onto the head, the recording electrodes will be filled with gel and the gel will be worked into the hair and scalp underneath the electrode site to aid in the ability to detect brain signals. This gel is similar in consistency to hair gel and can easily be washed out after the experiment.

Your data will be classified and stored by participant ID number only and your name will never be attached to the data. The only information about yourself that you will be asked to provide will be your gender and your handedness.

If you have any questions regarding this project, please feel free to contact the supervising faculty member, Dr. Joseph Williams at (309) 556-3006 or Dr. Doran French at (309) 556-3662. If you have any concerns regarding this project, please feel free to contact Dr. Bill Walsh, the chair of IWU's independent review board for ethics in experimentation, at (309) 556-3174.

I have read the above information pertaining to computer-based working memory study described above.

____ I am 18 years or older and agree to participate in this research. I understand that I may stop participation at any time without penalty.

____ I do not agree to participate in this research.

_____	_____	_____
Participant Name (print)	Participant Signature	Date
_____	_____	_____
Researcher Name (print)	Researcher Signature	Date

Appendix D

Detailed EEG Procedure

The experimenter will then begin preparation for EEG recording, following the instructions provided by Electro-Cap International, Inc. (Eaton, OH). The circumference of the participant's head will be measured with a special Color-Coded Head Measuring Tape at points one inch above both the nasion (the bridge of the nose) and the inion (the protrusion at the base of the skull). This measurement will determine whether the participant will wear a medium- or large-sized electro-cap.

Then the distance from nasion to inion (across the top of the head) will be measured in centimeters with measuring tape to ensure the correct placement of the cap's electrodes. This resultant measurement will be divided by ten and measured, in calipers, up from the nasion. Three horizontal dashes will be placed on the participant's forehead at this distance with a washable marker.

Next, two adhesive sponges will be attached to the front electrodes on the cap. These electrodes will be aligned with the reference marks on the participant's forehead, as the experiment attaches them to the forehead and pulls the cap over the head. A clip-style grounding electrode will be attached to the participant's left earlobe, and a blunt needle secured to a syringe will be inserted into its disk cavity. A small amount of Electro-Gel will then be injected into the cavity to assure conductivity. The experimenter will fasten a Velcro strap under the participant's chin, adjusting until the cap is fitted but comfortable and placing a pad between the skin and the strap for additional comfort. The participant will then be asked to confirm that she is comfortable before the study proceeds.

Appendix E

Debriefing Questionnaire

Instructions: To complete this survey, please rate each statement on its corresponding five-point scale. When you are finished, place is face down in the folder provided.

1) How would you rate your experience in this experiment?

1	2	3	4	5
Didn't enjoy at all		Moderately enjoyed		Enjoyed immensely

2) How upsetting (aversive) did you find this experiment to be?

1	2	3	4	5
Not at all upsetting		Moderately upsetting		Extremely upsetting

3) Would you choose to participate in this experiment again?

1	2	3	4	5
Definitely no		Maybe		Definitely yes

4) Did you ever feel excluded during the time you were chatting?

1	2	3	4	5
Definitely no		Maybe		Definitely yes

5) What was your reaction to being ignored by the other chatters?

Appendix F

DEBRIEFING FORM

Thank you very much for your participation in this study! The computer-based task you completed will help us better understand the principles by which the brain is involved in social interaction processes in a chat room environment.

First, as you may have suspected, you were not interacting with real participants. These interactions were recorded previously according to a specific script.

Second, we were interested in what neurological processes occur when a person is socially rejected. Thus, you were in one condition. Participants in one condition were told that because of technical problems, you were unable to communicate to the two other members of the chat room. In the other condition, participants were presented with a situation in which the two virtual members of the chat room ignored the participant. Neither of these was true; we manipulated this in an effort to assess reaction to social rejection.

In an article recently published in Science, Eisenberger et al., (2003), assessed the neurological response of participants to the experience of rejection. They found that social rejection activated neural processes similar to those associated with physical pain.

In the Eisenberger et al. study, individuals were exposed to one of two conditions, both of which involved participants engaging in a virtual

reality ball tossing activity. Participants believed that they were interacting with two others; although in reality, there was only one participant. Thus the participant was lying in an fMRI machine and tossed balls back and forth with two others whom the participant mistakenly believed were also in fMRIs. Social rejection was manipulated by having the two virtual participants play the ball tossing game within their dyad, no longer throwing the ball to the participant. In one condition, this exclusion was attributed to equipment failure and was presented as inadvertent. In the second condition, participants were initially included in the ball tossing activity, but then excluded. These manipulations, although very mild, generated feelings of exclusion in the participants. These experiences generated a significant increase in activation of the dorsal anterior cingulate region of the prefrontal cortex during times of social exclusion relative to times of social inclusion. In addition, there was a significant positive correlation between prefrontal activation and the degree of social distress self-reported by the participants, with higher levels of social stress being associated with increased activity in the dorsal anterior cingulate region of the prefrontal cortex. We are assessing the extent to which we can duplicate these effects using a chat room environment instead of the virtual reality procedure, and an EEG measure rather than a fMRI.

If you have any questions regarding this project, please feel free to contact the supervising faculty member, Dr. Joseph Williams at (309) 556-3006, Dr. Doran French at (309) 556-3662 or Dr. Weiyu Zhu at (309) 556-3668. If you have any concerns regarding this project, please feel free to contact Dr. Bill Walsh, the chair of IWU's independent review board for ethics in experimentation, at (309) 556-3174.