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Entitled

Personality and Ostracism: Do Hope, Optimism, and Forgiveness Moderate the Effects of Social Exclusion?

For the degree of Master of Science

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PERSONALITY AND OSTRACISM:
DO HOPE, OPTIMISM, AND FORGIVENESS MODERATE
THE EFFECTS OF SOCIAL EXCLUSION?

A Thesis
Submitted to the Faculty
of
Purdue University
by
Courtney Beth Johnson

In Partial Fulfillment of the
Requirements for the Degree
of
Master of Science

December 2010
Purdue University
Indianapolis, Indiana

ACKNOWLEDGMENTS

If it takes a village to raise a child, then it takes a stellar committee, especially committee chair, to complete a thesis. The support and always-ready humor from my chair, Kevin Rand, Ph.D. provided me with the confidence I needed throughout this at-times harrowing process of completing this work. Top-notch feedback and encouragement from committee members Jesse Stewart, Ph.D. and Joan Poulsen, Ph.D. were invaluable on this journey as well. Many thanks to my committee members; I am so grateful to each of you and feel I am a better researcher due to your influence. To my family and friends who have relentlessly cheered me on from the sidelines of an activity they barely understood, your commitment to me warms my heart. Thank you for letting me work when I needed to work and for your ever-ready willingness to help me press on in whatever ways you could. The life lesson I have learned from this endeavor is to cherish the relationships that bring you fulfillment and to delight in the people that bring you joy. It is my privilege to do this as I am so richly blessed by family and friends. Thank you for giving me a place to belong.

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ABSTRACT

Johnson, Courtney Beth. M.S., Purdue University, December 2010. Personality and Ostracism: Do Hope, Optimism, and Forgiveness Moderate the Effects of Social Exclusion? Major Professor: Kevin L. Rand.

This study examined effects of ostracism on psychological well-being and self-control and the roles of the personality traits hope, optimism, and forgiveness as moderators of these effects. Undergraduate students ($N=104$) were randomly assigned to be included or excluded in a computerized ball-toss game, Cyberball. Facets of psychological well-being examined included belonging and self-esteem. Participants also completed cognitive and physical self-control measures via tracing and handgrip tasks. Ostracized participants experienced less belonging, but there was no significant difference between groups on self-esteem. Ostracized participants persisted for less time on the tracing task. There were no significant differences between groups for performance on the handgrip task. None of the personality traits were found to moderate the effects of ostracism on psychological well-being or self-control. Results are discussed in terms of implications and recommendations for future researchers.

INTRODUCTION

The methods may differ, but the impact remains: being left out makes people feel bad. The Amish “shun.” Parents place children in time-outs. Wardens put prisoners in solitary confinement. Governments exile. Spouses use the “silent treatment.” These forms of punishment persist throughout history because ostracism has powerful psychological effects.

Ostracism

Ostracism is defined as the experience of “being ignored and excluded, often without excessive explanation or explicit negative attention” (Williams, 2007b, p. 429). Ostracism includes experiences such as being avoided, socially excluded, cut off, shunned, rejected, or receiving the “silent treatment.” At times, ostracism can occur informally, without explanation given to the one who is ostracized (Williams, 1997). Ostracism may also involve physical distancing by individuals or groups. Regardless of its basis, ostracism causes psychological discomfort.

The experience of being ostracized is powerful and is not limited to face-to-face interaction. It can occur through less direct contexts, such as text-messaging, chat rooms, and even computerized ball-toss games (Smith & Williams, 2004; Williams et al., 2002). People report psychological discomfort even when ostracized by strangers or by members of a despised outgroup (Gonsalkorale & Williams, 2007; Williams et al., 2002). While experiencing ostracism from anyone is uncomfortable, being ostracized by members of groups for which people have permanent membership takes people longer to recover psychologically (Wirth & Williams, 2009). The psychological discomfort occurs even when being ostracized is accompanied by benefits such as monetary gain (van Beest & Williams, 2006). Eisenberger, Lieberman, and Williams (2003) found from viewing neuroimages that the anterior cingulate cortex was more activated for those who were

ostracized. This region is activated when individuals experience pain, which led Eisenberger and colleagues to conclude that social pain is comparable to physical pain. While physical pain serves to alert of harm to the body, social pain serves to alert of harm to social connections.

Effects of ostracism on psychological well-being

Based on the model developed by Williams (2007b), individuals who experience ostracism report declines in four distinct areas of psychological well-being: (a) sense of belonging, (b) self-esteem, (c) perceived control, and (d) meaningful existence. Previous research supports this model and the resulting decline in these four needs when people experience ostracism (Williams, Cheung, & Choi, 2000; Williams et al., 2002; Zadro, Boland, & Richardson, 2006). Richman and Leary (2009) assert that perceived control and meaningful existence may be threatened in instances unrelated to ostracism and can be viewed as secondary effects. All forms of ostracism seem to directly influence two areas of psychological well-being: 1) sense of belonging and, 2) self-esteem. Disapproval by others impacts how people feel about themselves, even for people who believe evaluations by others do not affect their self-esteem (Leary et al., 2003).

Experiencing ostracism can affect people beyond threatening their need to belong and their level of self-esteem. Although many instances of ostracism are brief, it can be experienced for long durations. People experiencing years of the “silent treatment” report reactions including depression, paranoia, eating disorders, and suicide attempts (Williams, 1997). Experiencing ostracism on a long-term basis can lead people to believe they are unworthy of attention and to perceive their life situation as unalterable, developing a sense of learned helplessness (Williams, 2007a). The social pains of ostracism may also exacerbate pain-related disorders (MacDonald & Leary, 2005). Ostracism may be linked with heightened suicide risk (Twenge, Catanese, & Baumeister, 2002). Similar to findings in suicidal individuals, those who are ostracized appear to adopt a protective cognitive distancing to avoid thoughts about their self-worth. In experimental settings, ostracized individuals avoided sitting in chairs facing mirrors (Twenge et al., 2002). This suggests a desire

to avoid thinking about oneself and the psychological distress evoked from being ostracized. Ostracism is a powerful means to damaging psychological well-being.

Hurt feelings and self-esteem

Hurt feelings and decreased self-esteem are the typical, global, immediate reactions to experiencing ostracism (Leary & Springer, 2001; Richman & Leary, 2009). Hurt appears to be a distinct emotional response of ostracism that relates to other terms such as rejected, neglected, unwanted, and suffering (Richman & Leary, 2009). These hurt feelings coincide with decreases in self-esteem. According to the *sociometer hypothesis*, sense of belonging is a core component of self-esteem (Leary, Baumeister, & Zanna, 2000). When belonging is threatened, self-esteem decreases. Therefore, self-esteem serves as a social monitor, or sociometer, that detects the likelihood of inclusion and helps people regulate their behaviors to remain included (Leary, Tambor, Terdal, & Downs, 1995). People strive to maintain a high sense of self-esteem. High self-esteem serves as a buffer, protecting against life stressors and facilitating adjustment to life changes (Leary et al., 1995). Threats to self-esteem bring into focus the potential for future instances of ostracism. This shift in self-esteem prompts behavior that is likely to maintain social connections. It is worth noting that targets of virtual ostracism report less of a decline in feelings of self-esteem than targets of face-to-face ostracism (Williams et al., 2002).

Why Ostracism Hurts

Ostracism is psychologically painful because it threatens the fundamental need to belong and decreases self-esteem. The need to belong is pervasive and innate. From an evolutionary perspective, belonging increases chances of survival and reproduction (Baumeister & Leary, 1995). This motivation to belong directs human thought, attitude, and behavior (Baumeister & Leary, 1995). Failure to belong, like other fundamental needs, leads to distress and dysfunction (Baumeister & Leary, 1995; Leary & Cox, 2008). Relationships provide a sense of belonging, fulfillment, and self-esteem (DeWall, Baumeister, & Vohs, 2008). When the

opportunity to participate in these relationships is threatened, people take notice. Ostracism is so powerful that it is likened to social death (Case & Williams, 2004).

Ostracism understood through self-regulation theory

Reactions to ostracism and other forms of interpersonal rejection can be understood within the framework of *self-regulation theory*. Self-regulation theory posits that humans are goal-oriented (Carver & Scheier, 1998). When goals are threatened or blocked, people modify their thoughts, feelings, or behaviors in order to reach their goals (Baumeister & DeWall, 2004). Because people are fundamentally social beings, belonging is a goal that drives much of behavior (Leary & Cox, 2008). People seek out friend groups, join clubs, and maintain family relationships to be a part of something beyond themselves. Individuals control their actions in order to ensure membership and acceptance within their group (Baumeister & DeWall, 2004; Baumeister, DeWall, Ciarocco, & Twenge, 2005). In fact, people will forgo self-serving desires in order to maintain acceptance within a social group. For example, people may agree with group consensus when the decision inconveniences them personally. Hence, people seem highly motivated to avoid rejection and achieve acceptance (Leary & Cox, 2008).

Effects of Ostracism on Self-regulation

Ostracism affects not only psychological well-being but also impairs the ability to self-regulate (see Table 1). Misguided self-regulation leads to self-defeating behavior (Azar, 2009; Baumeister & DeWall, 2004; Baumeister, DeWall, Ciarocco, & Twenge, 2005). For example, self-regulation is needed to maintain a diet or exercise regime and to monitor appropriate behavior in social situations. When people are ostracized, they lose the willingness to self-regulate (Baumeister et al., 2005; DeWall, Baumeister, & Vohs, 2008). Ostracism inhibits the cognitive motivation necessary to avoid impulsive acts like choosing an unhealthy snack alternative (Baumeister et al., 2005). Twenge, Baumeister, Tice, and Stucke (2001) developed an ostracism manipulation in which participants in a Future Alone condition are given bogus feedback indicating they are likely to be alone later in life

and to have unfulfilling relationships. In experiments, people in the Future Alone condition make riskier choices such as choosing lottery bets that are high risk and high payoff (Twenge, Catanese, & Baumeister, 2002). They also show a drop in intelligent performance as measured by speed and accuracy on intelligence tests (Baumeister & DeWall, 2004).

People are motivated to feel good and maintain a high sense of self-esteem (Leary, Tambor, Terdal, & Downs, 1995). Emotions serve as key inputs for self-regulation. Avoiding self-awareness or responding in adaptive or maladaptive ways are attempts at self-regulation. People self-regulate in order to feel good, or at least to not feel bad about themselves.

Self-control

An important component of self-regulation theory affected by ostracism is *self-control*. Self-control is consciously overriding one's impulses (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Self-control is a limited resource that, when expended in one domain, can cause self-regulation failures in other domains. For example, Baumeister et al. (1998) found that people who forced themselves to eat radishes instead of chocolates gave up sooner on subsequent puzzle tasks. This suggests that different acts requiring self-control draw from a single, central resource (Baumeister et al., 1998). Ostracism affects self-control in the social realm. Ostracized individuals draw upon self-control when they believe doing so will satiate the need to belong. For example, DeWall, Baumeister, and Vohs (2008) found ostracized participants performed better and exerted greater effort on subsequent tasks only when the tasks were presented as indicators of socially attractive traits. Self-control is also affected when individuals are asked to ostracize others. For example, Ciarocco, Sommer, and Baumeister (2001) found decrements in self-control when participants were asked to ostracize another individual through giving them the "silent treatment." It appears ostracizing others affects self-control beyond the social domain. It is unknown if being the target of ostracism causes similar influences on self-control.

Individual Differences

Despite the evidence of the pervasive, negative effects of ostracism on psychological well-being, not everyone reacts in the same way. There are individual differences in reactions to stressors (i.e., ostracism), so it follows that certain personality traits may moderate the effects of ostracism on psychological well-being and self-regulatory behaviors. Three personality traits that seem particularly relevant to ostracism are hope, optimism, and forgiveness because they are theoretically connected to self-regulation within social contexts. Ostracism thwarts the goal of social inclusion (Richman & Leary, 2009). Hope and optimism pertain to how people self-regulate to reach goals. Forgiveness is a personality trait that impacts how people respond to social situations when they are wronged. It may be that possessing these traits enables individuals to persist in self-regulatory behaviors that lead to achieving important goals, including social inclusion.

Hope

Hope is conceptualized within the framework of goal-pursuits (Snyder, 2002). *Hope* is defined as the perceived ability to achieve one's goals. Positive interpersonal interactions and relationships are basic goals for most people. Moreover, other goals are usually pursued within the greater realm of "social commerce" (Rand & Cheavens, 2009). With this understanding, the successes of social interactions fulfill basic human goals. They also serve as a launching point for other goals. As social interactions are social goals, hope levels may impact how social goals are envisioned and with how much confidence individuals pursue these goals.

Hope comprises two thought processes: (a) agency, which is defined as the perceived motivation to strive toward goals, and (b) pathways, which is defined as the perceived ability to generate routes to reach these goals (Rand & Cheavens, 2009). According to hope theory, emotions are the sequelae of an individual's success or failure in making progress toward or reaching goals (Snyder, Rand, & Sigmon, 2002). Positive emotions indicate progress and negative emotions indicate blocked goal attainment.

There is evidence that hope may influence people's reactions to ostracism. Hope is associated with greater self-esteem, even under stressful situations. For example, college students with higher levels of hope indicated higher levels of energy, confidence, and feel more challenged by their goals than peers with lower levels of hope (Snyder et al., 1991). As ostracism blocks the goal of belonging, individuals higher in hope may persist through ostracism with greater psychological well-being. Positive affect and positive thoughts also appear to correlate positively with high hope (Snyder et al., 1991; Snyder et al., 1996; Snyder, Hoza, Pelham, & Rapoff, 1997). College students indicating higher levels of hope also reported higher levels of self-worth (Snyder, Hoza, Pelham, & Rapoff, 1997). Further, trait hope and meaning in life demonstrate a strong correlation (Feldman & Snyder, 2005). Snyder and Pulvers (2001) posited that individuals higher in hope are better able to handle unforeseen stress and more likely to use effective coping methods. Individuals with high hope view their hope as a form of protection, which leads to a more positive perspective for the future (Snyder, Feldman, Taylor, Schroeder, & Adams, 2000). From these findings, it is of interest to determine if hope may serve as a moderator for the effects of being ostracized. The personality trait of hope has not yet been studied in relation to ostracism.

Optimism

Optimism is the belief that good things are generally more likely to happen than bad things (Scheier & Carver, 1985). This positive expectancy is not situation-specific, but a global belief that things will typically occur in a favorable way. Even when faced with the same situation, the expectancies or beliefs about what is likely to happen in the future impact the level of motivation put forth toward achieving a goal. Optimists are more likely to expect a favorable outcome and emerge with a sense of greater confidence than those who are pessimistic (Carver & Scheier, 1998).

There is evidence that optimism may influence people's reactions to ostracism. An optimistic attitude appears to enable people to respond to stress effectively (Scheier, Weintraub, & Carver, 1986). Optimists are more likely to use problem-focused coping when facing stressful situations. In comparison to

pessimists, optimists tend to use coping strategies that are more adaptive (Scheier et al., 1986). People who are high in optimism tend to actively seek ways to change and adjust to stressful situations (Carver & Connor-Smith, 2010). Optimism is also linked with greater self-esteem (Wu, Tsai, & Chen, 2009). For women with breast cancer, those higher in optimism maintain a positive mood easier and are better protected against possible negative repercussions of cancer treatment (Matthews & Cook, 2009). Optimism may impact how individuals respond to ostracism as the positive expectancy of good events occurring may buffer the negative effects of ostracism. From these findings, it is of interest to determine if optimism may moderate the effects of experiencing ostracism.

Dispositional Forgiveness

The personality trait of forgiveness is distinct from the mere act of forgiving. In research, forgiveness as a personality trait of is known as dispositional forgiveness, and will be the topic of discussion here. Forgiveness is evidenced in interpersonal and intrapersonal contexts. *Forgiveness* is the framing of transgressions (and reactions to transgressor, the act, and results of transgression) from negative to neutral or positive (Thompson et al., 2005). Forgiveness is a combination of thoughts, attitudes, and behaviors that are a responsive choice when someone is wronged. The act of forgiving is “prosocial motivational change on the victim’s part” (McCullough, 2001, p. 194). The conscious choice to forgive requires the forgiver to forgo the drive of seeking retribution. A transgression is understood to be an event that counters expectations about how situations or others should be or behave (Thompson et al., 2005). When transgressions occur, individuals typically react with negative thoughts toward the transgressor, the situation, and even themselves. When choosing to forgive, individuals must engage in the cognitive work necessary to reframe. Forgiveness is not equivalent to condoning or forgetting about the event. It is psychological work that often manifests behaviorally in how the individual who was transgressed against chooses to respond to the situation, the transgressor, and outcomes of the transgression (Thompson et al., 2005).

As forgiveness is based within social interactions, the tendency to choose forgiveness may protect against the deleterious effects of ostracism. The paradox of

forgiveness - that those who choose to forgive are themselves psychologically benefited (Enright, Freedman, & Rique, 1998) - may inform how individuals respond to encountering ostracism. It is posited that forgiveness facilitates the recovery from interpersonal offenses. Anxiety derived from ostracism, such as school bullying, may be alleviated by teaching forgiveness as an emotional coping response (Egan & Todorov, 2009).

There is evidence that forgiveness may influence people's reactions to ostracism. Those who are likely to forgive are more emotionally stable and agreeable (McCullough, 2001). Forgiveness is an adaptive trait and even a method of coping that relates to psychological well-being (Thompson et al., 2005). Forgiveness is negatively correlated with anger and hostility (Brown, 2003). Unforgiveness is positively correlated with psychopathology and stress (Mauger, Perry, Freeman, & Grove, 1992). In addition, people high in forgiveness also tend to have greater self-esteem (Brown, 2003). Those who are ostracized are unable to control their situation. It may be that those who are high in the personality trait of forgiveness are better able to recover from the effects of ostracism as they are willing to engage in the psychological work necessary to release perceived control and blame. From these findings, it is of interest to determine if forgiveness may moderate the effects of experiencing ostracism. The personality trait of forgiveness has not yet been studied in relation to ostracism.

The Present Study

The purpose of the current study is twofold: 1) to examine the effects of ostracism across domains of psychological well-being and self-control and 2) to examine the moderating role of personality traits on the effects of ostracism on psychological well-being and self-control. The first purpose is to replicate prior findings which indicate that experiencing ostracism does negatively affect psychological well-being and self-control. In addition, it is unknown if personality traits central to self-regulation (i.e., hope and optimism) and social goals (i.e., forgiveness) influence how individuals respond to ostracism. Personality traits that exacerbate the effects of ostracism are clearly identified (i.e., those high in social

anxiety, see Oaten, Williams, Jones, & Zadro, 2008), but traits that may buffer the effects are yet to be determined. This study will address two questions: 1) Does being ostracized negatively impact psychological well-being (i.e., belonging and self-esteem) and self-control (i.e., cognitive and physical persistence); 2) Does hope, optimism, or forgiveness moderate the effects of ostracism on psychological well-being and self-control?

Hypotheses

Hypothesis 1

Experiencing ostracism will negatively affect psychological well-being.

This is a replication hypothesis that ostracized individuals will report decreases in psychological well-being as previously indicated by researchers. Within William's model (1997), sense of belonging and self-esteem are the facets of psychological well-being most directly affected when experiencing ostracism. Richman and Leary (2009) posited that threatened belonging is the common theme across all forms of interpersonal rejection. For the purposes of this study, the examination of psychological well-being will involve sense of belonging and self-esteem only. Control and meaningful existence may be threatened through experiences other than ostracism and are described by Richman and Leary (2009) as secondary effects.

Hypothesis 2

Experiencing ostracism will cause decrements in self-control.

The first question of this study relates to ostracism and self-control (see Figure 1). Individuals asked to give the silent treatment displayed decrements in self-control (Ciarocco, Sommer, & Baumeister, 2001). Giving the silent treatment caused reductions in the persistence on subsequent anagram and handgrip tasks. It is unknown if being the target of virtual ostracism results in decreased self-control across domains. The tracing tasks represent a domain related to cognitive persistence, whereas the handgrip task represents physical persistence.

Hypothesis 3

Hope, optimism, and forgiveness will moderate the relationship between ostracism and psychological well-being.

As previously mentioned, these three personality traits appear to be protective when faced with stressful situations. It is expected that those higher in hope, optimism, or forgiveness may show less of a decline in reported psychological well-being after experiencing ostracism when compared to individuals low in these personality traits

Hypothesis 4

Hope, optimism, and forgiveness will moderate the relationship between ostracism and self-control.

Ostracized individuals higher in hope, optimism, or forgiveness will demonstrate greater self-control.

Potential Confounds

Persistence on the self-control tasks may be more of a measure of demand characteristics in the desire of the student to be a “good participant” and perform in the way they believe the experimenter hopes. For example, participants could persist for longer or make more attempts at the tracing task in an attempt to please the experimenter. To counteract this, participants attempted the tracing tasks in the room alone. When they wished to stop, participants rang a bell to notify the experimenter who was waiting in an adjoining room. It is also possible that decrements on the performance tasks could be due to other variables besides experiencing ostracism. To address this issue, baseline control measures were gathered, such as hand strength. Prior exposure to tracing tasks or the novelty of the handgrip may alter findings. While this is a potential concern, results from other studies served as a comparison to the results of the current study

METHOD

Participants

Participants ($N=105$; 23 males, 82 females) were students enrolled in introductory and select psychology undergraduate courses at Indiana University-Purdue University Indianapolis (IUPUI). Participation was not restricted based on gender or ethnicity. Participation was restricted based on age as participants were at least 18 years of age in order to secure informed consent. Participants were also required to understand, read, and speak English. Recruitment occurred through a subject pool generated at IUPUI in which psychology students may elect to participate in research studies to receive course credit. Students were brought into the lab on an individual basis. Data for one female participant were not included due to computer problems, resulting in a final sample size of 104.

See Table 2 for demographic information. See Table 3 for a comparison of demographic information of subgroups based on experimental condition. The groups did not differ significantly based on demographics or independent variables of interest, indicating successful randomization (all p -values $>.05$).¹

Design

This study explored the relationships among ostracism, personality traits, psychological well-being, and self-control using an experimental design with an ostracism manipulation. Predictor variables included: 1) the experimental condition

¹ While participants did not differ on independent variables of interest for the main hypothesis, ostracized participants did report lower baseline positive affect ($M = 27.70$, $SD = 7.61$) than included participants ($M = 31.86$, $SD = 8.75$), $t(102) = -2.56$, $p < .01$, $d = 0.51$, which has implications for exploratory analyses conducted.

(ostracized versus included), 2) levels of hope, 3) levels of optimism, and 4) levels of forgiveness. The dependent variables were: 1) sense of belonging, 2) self-esteem, and 3) persistence on the self-control tasks. Data were collected at three different time points.

Experimental manipulation

Cyberball, an interactive, ball-toss computer game developed by Williams, Cheung, and Choi (2000), was used as the ostracism manipulation. Cyberball remains one of the primary means to generate a laboratory analogue of real-life ostracism. The paradigm is powerful enough to elicit effects comparable to face-to-face ostracism, even when participants are told they are playing with the computer (Williams & Jarvis, 2006).

Cyberball is freely downloaded through the homepage of one of the originators, Kipling Williams, (<http://www2.psych.purdue.edu/~kip/cyberball/>) and offers a variety of manipulations. Researchers can select the number of players (three or four total), control who throws to whom and when, and the speed and length of the game. Researchers can also customize labels and pictures of the players visible to the participant (Williams & Jarvis, 2006). Manipulation checks by researchers confirm that individuals in the ostracism condition did indeed feel excluded more so than those intended to be included in the virtual game (Chow, Tiedens, & Govan, 2008; Zadro, Williams, & Richardson, 2004). For this study, participants' names were entered at the bottom of the screen below the automated hand they controlled. Participants participated in the ball-toss with two other players. These players were assigned gender-neutral names (e.g., Cameron and Jamie) that were consistent across experimental conditions. Pictures of other participants were not used to eliminate potential confounds introduced by these images (i.e. attraction to other players, reactions to others based on ethnicity or gender).

Virtual ostracism experienced through Cyberball elicited negative effects comparable to real-life social exclusion in interpersonal encounters (Zadro, Williams, & Richardson, 2004). Consistently, ostracized individuals reported decreased sense

of belonging and self-esteem. Cyberball elicited strong effects (effect sizes of 1.0-2.0) on measures completed after participants completed the ball-toss game (Williams & Jarvis, 2006).

Measures

Self-report data were gathered from participants at three different time points. Predictor variables were assessed using the Adult Trait Hope Scale, Life Orientation Test- Revised, and the Heartland Forgiveness Scale. Dependent variables were assessed using the Positive and Negative Affect Scale, Satisfaction with Life Scale, Cyberball-specific Reactions, Rosenberg Self-esteem Scale, Momentary Self-esteem, Manipulation Check, and Self-control Tasks. Demographic information was also gathered at Time 1. Measures are sorted by appearance in the three time points (see Table 4), and the measures in their entirety are located in Appendices A through C. Correlations, means, standard deviations, and alphas for each scale are located in Table 5.

Demographic Information

Participants were asked to provide demographic information such as gender, age, height, weight, level of education, and ethnicity (see Tables 2 and 3). Participants were able to leave these items blank if they did not wish to disclose this information.

Trait Hope

The Adult Hope Scale (AHS; Snyder et al., 1991) is a 12-item scale designed to measure levels of hope across situations and time using an 8-point ordered-response scale (1=*Definitely False*, 8=*Definitely True*). A sample item is “I can think of many ways to get out of a jam.” Four items are distracters; the rest are evenly split between agency and pathways concepts. The scale has demonstrated internal reliability (alphas from .74-.88 for total scale, .70-.84 for agency, and .63-.86 for pathways) and test-retest reliability of .85 after 3 weeks and .82 after 10 weeks (Snyder, 2002). Higher scores on the AHS indicate greater hope. For this sample, Cronbach’s alpha was .85.

Trait Optimism

The Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994) is a scale created to measure the extent respondents expect good versus bad things to happen to them (Scheier et al., 1994). There are 10 items, 4 of which are distracters, with a 5-point Likert scale (0=*Strongly Disagree*, 4=*Strongly Agree*). A sample item is “If something can go wrong for me, it will.” The scale has demonstrated test-retest reliability ranging from .68 at 6 months to .79 at 28 months. The scale has demonstrated acceptable internal consistency (Cronbach’s alpha of .78), and was normed on college students (Scheier et al., 1994). Higher scores on the LOT-R indicate greater optimism. For this sample, Cronbach’s alpha was .83.

Dispositional Forgiveness

The Heartland Forgiveness Scale (HFS; Thompson et al., 2005) is a self-report measure of dispositional forgiveness. The scale assesses forgiveness of the self, others, and the situation. The scale is unique in assessing forgiveness of situations as this component of forgiveness has not been tapped into by prior forgiveness scales. Respondents are instructed to think about how they typically respond to negative events caused by others, themselves, or a situation out of their control and complete the 18 items with a 7-point ordered-response scale (1=*Almost Always False of Me*, 7=*Almost Always True of Me*). A sample item is “When things go wrong for reasons that can’t be controlled, I get stuck in negative thoughts about it.” Subscales can be derived which measure forgiveness of the situation, others, and self (Thompson et al., 2005). The HFS has demonstrated acceptable test-retest reliability (.83 HFS total scale, .72 Self subscale, .73 Other subscale, and .77 Situation subscale) across a 3-week period, sufficient internal consistency measured by Cronbach’s alpha, and correlated significantly with three other scales meant to assess dispositional forgiveness (Thompson et al., 2005). For this sample, Cronbach’s alpha was .87 for total scale, .71 for Self subscale, .85 for Other subscale, and .78 for Situation subscale.

Mood

The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item measure intended to assess a range of emotions a person may be feeling presently. The items are evenly representative of positive and negative emotions. Respondents are asked to rate how much they identify with the emotions at the moment by a 5-point ordered-response scale (1=*Very slightly*, 5=*Extremely*). Some sample items include “upset,” “enthusiastic,” and “attentive.” The scale has demonstrated acceptable internal consistency reliability (.86 to .90 for Positive Affect, .84 to .87 for Negative Affect). For this sample, Cronbach’s alpha for Positive Affect was at least .90 and Negative Affect was at least .86.

Life Satisfaction

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) is a 5-item measure intended to assess global life satisfaction without tapping into positive affect or loneliness. Respondents are asked to indicate their level of agreement by a 7-point Likert scale (1=*Strongly disagree*, 7=*Strongly agree*). A sample item is “The conditions of my life are excellent.” The scale has demonstrated acceptable test-retest reliability (alpha of .87) and correlates moderately with other scales assessing subjective well-being (Diener et al., 1985). For this sample, Cronbach’s alpha no lower than .91 across administrations.

Cyberball-Specific Reactions

Drawing from the work of Poulsen (2006), participants reported their reactions to the computerized ball-toss (Cyberball) experience. All items were completed with a 7-point ordered-response scale (1=*not at all*, 7=*very much*). The questions assessed how participants felt directly after the ball-toss experience. A sample item is “I felt that I was a member of the group.” Items ranged from addressing how much participants felt they were a part of the group to an open-ended question asking participants to share why they thought they were included or excluded. For the total scale, Cronbach’s alpha for this sample was .83. For the 5-item Belonging subscale, the Cronbach’s alpha for this sample was .91.

Global Self-Esteem

The Rosenberg Self-esteem Scale (RSE; Rosenberg, 1979) is a scale created to measure global self-esteem. It is a 10-item measure with a 5-point Likert scale (1=*Strongly Agree*, 5=*Strongly Disagree*). A sample item is “On the whole, I am satisfied with myself.” Since its development, this scale has been widely used throughout psychological research for its high reliability, with alphas ranging from .72 to .88, and internal consistency with reported Cronbach’s alpha of .88 (Gray-Little, Williams, & Hancock, 1997). For this sample, Cronbach’s alpha was .88.

Momentary Self-Esteem

To assess self-esteem in the moment, a single-item measure was used. Used previously by Robins, Hendin, and Trzesniewski (2001), participants responded to the question “Right now, I feel good about myself.” A 5-point ordered-response scale was used (1=*Not very true of me*, 5=*Very true of me*).

Manipulation Check

The inclusion and ostracism conditions in the ball-toss game were intended to be obvious to participants. After completing the ball-toss game, participants were asked to indicate how included they were by other participants during the ball-toss game. This was done by using a continuous manipulation check item used by Zadro, Williams, and Richardson (2004). A 9-point ordered-response scale (1=*not at all*, 9=*very much so*) was used to complete the item: To what extent were you included by the other participants during the ball-toss game?

Self-control Tasks

Physical self-control: Handgrip Task 1

For Handgrip Task 1, participants were instructed to stand and hold a dynamometer in their non-dominant hand with their arm straight and extended down their side. The experimenter informed the participant that this task would provide normative data of strength needed for other studies to prevent suspicion of the

Handgrip Task 2. Participants were instructed to squeeze the handgrip as hard as they could. Strength for each participant was recorded in kg/m.

Physical self-control: Handgrip Task 2

For Handgrip Task 2, participants squeezed an exercise handgrip with their non-dominant hand. Following the design of Ciarocco, Sommer, and Baumeister (2001), a small ball was placed between the handgrip handles so participants had to apply enough pressure to hold the ball in place. Before asked to complete the task, the experimenter demonstrated how to grip the ball between the handles of the handgrip and hold their arm at a 90° angle from their body. Participants were asked to refrain from speaking or moving while completing the task. The experimenter remained in the room with the participant while they completed this task in order to time how long the participant was able to hold the handgrip without the ball dropping from between the handles. The experimenter began timing from when the participant was holding the handgrip as directed until the ball fell out from between the handles. Some participants were unable to hold the handgrip in their non-dominant hand as instructed, so they were allowed to complete the task using their dominant hand. The experimenter made note of any participants who needed this modification.

Cognitive self-control: Puzzles.

To examine cognitive self-control, participants were asked to complete four separate puzzles. Following the protocol of Baumeister, Bratslavsky, Muraven, and Tice (1998), the experimenter provided two practice puzzles for which the experimenter first read the directions before placing the puzzle on the table in front of the participant. Participants were instructed to trace the figure without tracing over the same line more than once and without lifting up their pen. Participants were encouraged to ask any questions before given the next puzzle and were provided feedback as to why their attempts were incorrect (i.e., lifting the pen or tracing over a line multiple times). Participants were instructed to place a new, blank transparency sheet over the paper with the puzzle for each attempt, tracing on the transparency sheets with black overhead pens. Puzzles were printed in red ink in order to help the participant know whether they were done solving the puzzle or not. For the third and

fourth puzzles (the non-practice puzzles), participants were left alone in the room and instructed to ring the bell when they had solved the puzzle or when they wished to stop trying. They were told to follow the same rules as used for the practice puzzles and that they would not be judged on how long they took to solve the puzzle, but on whether or not they could solve the puzzle. The fourth puzzle was purposely designed to be unsolvable to serve as a measure of persistence. The experimenter recorded the number of attempts and the time spent working on each puzzle. A maximum time of 20 minutes each was allotted for the third and fourth puzzles.

Procedure

Participants signed up to participate in the study through Experimentrix (see Figure 2 for visual depiction of study design). Participants had the option of discontinuing participation in the study after Time 1. For Time 1, participants received a link to an online survey with instructions to complete the measures at least 24 hours prior to the lab portion. The last page of the online survey contained a code word participants used to schedule a time for the lab portion of the study (Time 2 and Time 3). Participants were only required to sign up for the study two different times as Time 2 and 3 were completed during one lab session. A code word was used to prevent participants from signing up for Time 2 and 3 without completing Time 1 first.

Time 1

Participants were able to complete Time 1 of the experiment from any computer with internet access. Once signed up through Experimentrix, participants were given a link to the online survey which was compiled on SurveyMonkey, an online survey software resource (www.surveymonkey.com). The survey took the average participant less than 30 minutes to complete. The first page of the survey contained the informed consent, which participants were instructed to read thoroughly and in its entirety before completing the survey. Once completed, participants were eligible to sign up and complete the lab portion of the study.

The lab portion of the study is comprised of both Time 2 and Time 3. Participants were greeted by the experimenter at the research lab on the date and time the participant selected through Experimentrix. Upon entering the lab, the experimenter confirmed the participant completed the online survey at least 24 hours prior. No participant indicated they had not completed the survey upon arrival to the lab. Before beginning, the experimenter secured written informed consent, supplying the participant with a paper copy for them to keep. The experimenter asked if the participant had any questions based off of the informed consent and answered any questions thoroughly before continuing with the experiment.

Time 2

Time 2 consists of data gathered before participants experienced the experimental manipulation. Participants completed the Handgrip Task 1. The experimenter recorded their strength on the Data Sheet (see Appendix D). Next, participants were seated at a computer that had a SurveyMonkey link consisting of the Mood and Life Satisfaction measures. Participants were left alone in the lab room to complete the measures. Before the experimenter left the room, they instructed the participant to click a wireless door bell that would ring in the connected lab room once done with the measures. The ringing bell would notify the experimenter that the participant was ready to move on to the next portion of the experiment. The experimenter rang the bell for the participant to demonstrate that the bell could be heard in the connected room. The survey contained a page after the measures prompting the participant to stop the survey and ring the bell. Both the handgrip task 1 and the measures were completed to serve as baseline measures of comparison for data obtained after the experimental manipulation.

Time 3

Once completed, participants remained seated at the same computer. The experimenter ensured that the ostracism manipulation was pulled up on the screen before reading the following instructions:

Before you take part in the social interaction, I'd like for you to complete a few tasks that will help you get ready for what I will ask you to do later. The first is a mental visualization task. Other participants are signed in as well and

will be going through this preparation exercise with you. Please read through the directions on this screen and click on the Start Playing Now link when you are ready to begin. When you are finished with the exercise, ring this bell so I will know you are finished.

Participants were randomly assigned by coin toss to one of two conditions: inclusion or ostracism. In the inclusion condition, participants were included by two other confederate players in the ball-toss game. In the ostracism condition, participants received the ball two times near the beginning of the game, but then were left out for the remaining passes, providing around 3 minutes of ostracism after initial inclusion in the ball-passing activity. Again, the experimenter was not in the room for this portion of the study as the presence of another person in the room may alter how the participant perceived the experience. As mentioned previously, participants did not actually participate in the ball-toss with other participants. Deception is a necessary element of the design in order to garner true reactions to the inclusion or exclusion experienced.

Once participants rang the bell, the experimenter directed the participant back to the SurveyMonkey link on the computer which contained the Momentary-self Esteem, Cyberball-specific Reactions, Manipulation Check, Mood, and Life Satisfaction measures. Participants were instructed to complete the survey in its entirety, ringing the bell once they were finished. The last page of the survey contained prompts asking for the last four digits of their phone number and their birth date. These two data points were used to link information recorded on the Data Sheets with data from Time 1 and Time 3. The survey directly followed the experimental manipulation as the immediate reactions to ostracism are of interest to this study.

To finish Time 3, participants completed the remaining self-control tasks (Puzzles and Handgrip Task 2). To control for order effects, the cognitive and physical self-control tasks were counterbalanced among participants. The experimenter recorded results on the Data Sheet as well as any notable observations (i.e. unable to use non-dominant hand to complete the physical self-control portion). To check for suspicion, the experimenter asked before reading the debriefing with the participant if they had any ideas about what the experimenter was studying or what the hypotheses of the study were. The experimenter recorded participant responses on

the Data Sheet. Participants were then led through a thorough debriefing. Participants were given a copy of the debriefing which they were instructed to read along with as the experimenter read it aloud to them. Participants were provided with a copy of the debriefing to take with them. Within the debriefing, the need to capture true responses without awareness of experimenter intent was stated and checked for participant understanding. As well, the debriefing contained information on the current research findings on the effects of ostracism. Also, participants were informed of the purpose of the self-control measures. They were informed that the last puzzle needed to be unsolvable to see how persistent they would be in completing a task. Before leaving, the experimenter ensured that all questions of the participant were answered thoroughly.

Suspicion

Participants were asked at the end of the experiment, before the debriefing, if they had any guesses about study hypotheses. It is worth noting that 3.85% of participants indicated a clear understanding of study intent. An additional 8.65% indicated suspicion of whether the other players in the ball-toss were real people. Comparison analyses of these suspicious and non-suspicious participants indicate their responses did not differ significantly on dependent variables (p 's > .05). All participants were included in analyses.²

² Analyses were conducted without including participants who indicated suspicion and results were consistent with those reported here.

RESULTS

Based on previous research, I predicted that experiencing ostracism would lead to decreases in psychological well-being and self-control. In addition, I predicted that hope, optimism, and forgiveness would moderate the relationship between ostracism and psychological well-being and self-control. Hypothesis 1 is that experiencing ostracism will negatively affect psychological well-being. As mentioned previously, of interest to this study are two dependent variables from Williams' (2007): belonging and self-esteem. Hypothesis 2 is that experiencing ostracism will cause decrements in self-control. For this hypothesis, there is a measure of physical and cognitive self-control. Hypothesis 3 is that the hope, optimism, and forgiveness will moderate the relationship between ostracism and psychological well-being such that those higher in these traits will exhibit less of a decline in well-being than those lower in these traits. Hypothesis 4 is that hope, optimism, and forgiveness will moderate the relationship between ostracism and self-control such that those higher in these traits will exhibit more self-control than those lower in these traits.

Data Analysis Strategy

To examine Hypotheses 1 and 2, independent samples t-tests were conducted. To examine Hypotheses 3 and 4, 5 hierarchical regression analyses were conducted. All continuous predictor variables used in the creation of interaction terms were mean-centered prior to running analyses. For each analysis, gender and ethnicity were entered in step 1, along with other control variables (e.g., global self-esteem when the dependent variable of interest was momentary self-esteem).³ The personality trait and experimental

³ Regressions were also conducted without control variables entered in at step 1 (see Zadro, Boland, & Richardson (2006) and results were consistent with those reported here.

condition were entered in step 2. The interaction term of trait by condition was entered in step 3.⁴

The means, standard deviations, and correlations among study variables are presented in Table 5. Data were checked for normality via skewness and kurtosis checks. All data fell within normal limits once one outlier was removed for the number of attempts on puzzle 4 (43 attempts). Hope and forgiveness scores ($M = 50$, $M = 85$) were similar to scores obtained by researchers who used the same scales on college samples ($M \approx 50$, $M \approx 91$) (Rand, 2009; Thompson et al., 2005). Optimism scores for the present sample ($M = 14$) were lower than typical of college-student samples ($M \approx 21$). Moreover, the correlation between hope and optimism for the present sample ($r = .25$) was lower than typically obtained ($r \approx .51$) (Rand, 2009). Positive and negative affect scores for the present sample ($M = 30$, $M = 15$) on the PANAS were similar to scores from a college-student sample ($M \approx 26$, $M \approx 11$) (Twenge, Catanese, & Baumeister, 2002). In comparison to the findings of Baumeister, DeWall, Ciarocco, & Twenge (2005), ostracized participants of this study persisted for a shorter time on tracing tasks ($M = 472$ seconds) than those in the Baumeister et al. (2005) study who completed the same task after experiencing the Future Alone condition ($M = 1,260$ seconds). Handgrip persistence times cannot be compared to the findings of Ciarocco, Sommer, and Baumeister (2001) as they computed difference scores which were not possible with how data were collected for the current study.

Manipulation Check

Ostracized participants reported feeling significantly less included ($M = 2.38$, $SD = 1.55$) than included participants ($M = 6.80$, $SD = 2.04$), $t(102) = -12.21$, $p < .01$, $d = 2.42$.

⁴ To address issues of multicollinearity, regressions were conducted for each dependent variable with one independent variable of interest and interaction term entered at a time. Results did not differ from those reported here. These analyses are included in Appendix E.

H1: Effects of ostracism on psychological well-being

Ostracized participants experienced less belonging ($M = 7.10$, $SD = 2.73$) than included participants ($M = 10.95$, $SD = 3.82$), $t(102) = -5.81$, $p < .01$, $d = 1.15$. This finding provides support for H1. There was no significant difference, however, in self-esteem between the two groups, $t(102) = -1.77$, $p = .08$, $d = 0.35$, although the absolute difference was in the expected direction (ostracized $M = 3.72$, $SD = .95$, included $M = 4.00$, $SD = .68$). Together, these results offer partial support for H1.

H2: Effects of ostracism on self-control

There was no significant difference in persistence on the physical self-control task between ostracized ($M = 37.17$, $SD = 51.35$) and included participants ($M = 31.78$, $SD = 48.37$), $t(102) = .551$, $p = .58$, $d = 0.11$, even when controlling for initial hand strength $F(1, 104) = .35$, $p = .56$. Conversely, ostracized participants persisted for a significantly shorter time ($M = 472.40$, $SD = 310.54$) on the cognitive self-control task than included participants ($M = 739.34$, $SD = 357.58$), $t(98) = -3.94$, $p < .001$, $d = 0.80$ even when controlling for time on the previous solvable puzzle, $F(1,100) = 15.49$, $p < .01$. Together, these results offer partial support for H2.

H3: Moderating effects on the relationship between ostracism and psychological well-being

Belonging

As Table 6 shows, none of the personality traits were found to explain a significant amount of variance in belonging. None of the interactions between personality traits and ostracism condition were significant. Ostracized participants experienced less belonging, $\beta = .788$, $p < .01$. Those higher in hope experienced more belonging, $\beta = .14$, $p = .042$. These results do not offer support for H3.

Momentary Self-esteem

As Table 7 shows, there was a moderating effect of optimism on the relationship between ostracism and momentary self-esteem, $\beta = -.383$, $p = .019$. Figure 3 demonstrates the optimism by condition interaction for momentary self-esteem.

Following the procedure set forth by Aiken and West (1991), post hoc analyses were conducted in order to determine if the slopes of the regression lines were significantly different from one another. It was of interest to determine if the relationship between ostracism and momentary self-esteem differed depending on levels of optimism for participants. Comparison of high- and low-optimism participants was non-significant $t(103) = -.47, n.s., d = .09$. Comparison of high- and medium-optimism participants was also non-significant $t(103) = -.47, n.s., d = .09$. Comparison of medium- to low-optimism participants was also non-significant $t(103) = .00, n.s.$ This means that although the omnibus test revealed an interaction effect of optimism on the relationship between ostracism and momentary self-esteem, follow-up analyses failed to distinguish any differences of this relationship based on varying levels of optimism.

H4: Moderating effects on the relationship between ostracism and self-control

Physical self-control

As Table 8 shows, none of the personality traits were found to explain a significant amount of variance in physical self-control. None of the interactions between personality traits and condition were significant. Greater baseline hand strength enabled participants to persist longer on the task, $\beta = .215, p = .032$. Men also persisted longer on the task than women, $\beta = .346, p < .001$. These results do not provide support for H4.

Cognitive self-control

Table 9 shows that none of the interactions between personality traits and condition were significant for the length of time participants persisted on the cognitive self-control task. Those higher in dispositional forgiveness persisted for a shorter amount of time, $\beta = -.255, p = .031$. Also, included participants persisted for a longer amount of time, $\beta = .401, p < .01$. Together, these results do not offer support for H4.

Exploratory analyses

Although not included in the hypotheses of the study, two additional dependent variables of interest are life satisfaction and mood. Two different measures (Satisfaction with Life Scale and Positive and Negative Affect Scale) administered before and after the ball-toss portion of the study provided this information. Also, number of attempts on the cognitive self-control task and differentiating performance on the physical self-control task in terms of sex were examined. Number of attempts on the cognitive self-control task were examined in the interest of comparing these findings with the other self-control outcomes. Prior researchers have not examined number of attempts, but the strong correlation between number of attempts and number of tries on the cognitive self-control task suggests that this may be an additional measure of self-control ($r = .59, p < .01$). However, number of attempts did not correlate as would be expected with the handgrip task ($r = -.03$). It is worth noting that the correlation between time on the cognitive task and time on the physical task of self-control are lower than expected if both are measures of self-control ($r = .04$). Due to the influence of gender on performance for the physical self-control task, it is of interest to examine performance for females. As males comprised a small portion of total participants, additional analyses for male participants were not conducted.

Life Satisfaction

There was no significant difference in life satisfaction between ostracized ($M = 23.49, SD = 7.02$) and included participants ($M = 24.89, SD = 7.22$), $t(102) = -.998, p = .32, d = 0.20$. Table 10 shows that none of the interactions between personality traits and condition were significant. Those higher in optimism did report higher life satisfaction, $\beta = .064, p = .022$, even after controlling for baseline life satisfaction.

Mood

Ostracized participants ($M = 23.98, SD = 8.16$) experienced less positive affect than included participants ($M = 30.87, SD = 10.19$), $t(102) = -3.75, p < .001, d = 0.74$. Assessment of baseline affect indicated that participants randomly assigned to

the ostracized condition reported less positive affect before undergoing the ostracism manipulation than participants who were randomly assigned to the included condition. However, when controlling for baseline positive affect prior to the ball-toss, the finding that ostracized participants did experience less positive affect remained $F(1,104) = 7.98, p < .006$. There was no significant difference in negative affect between ostracized ($M = 14.94, SD = 4.95$) and included participants ($M = 13.82, SD = 5.57$), $t(102) = 1.07, p = .29, d = 0.21$, even when controlling for baseline negative affect prior to the ball-toss $F(1,104) = 1.51, p = .22$.

As Table 11 shows, none of the personality traits were found to explain a significant amount of variance in positive affect. None of the interactions between personality traits and condition were significant. Included participants reported more positive affect, $\beta = .161, p = .003$. Table 12 provides information about negative affect. Again, none of the personality traits or interactions between traits and condition were significant. Included participants reported less negative affect, $\beta = -.112, p = .003$.

Attempts on cognitive self-control task

There was no significant difference in number of attempts on the cognitive self-control task between ostracized ($M = 10.62, SD = 7.82$) and included participants ($M = 13.65, SD = 8.37$), $t(98) = -1.86, p = .07, d = 0.38$, even when controlling for number of attempts on the previous solvable puzzle $F(1,100) = 3.27, p = .07$, although this trend is in the hypothesized direction. As Table 13 shows, none of the personality traits were found to explain a significant amount of variance in number of attempts on the cognitive self-control task. None of the interactions between personality traits and condition were significant. Minority students made fewer attempts to solve than white students, $\beta = -.213, p = .028$. Participants who made more attempts at the solvable puzzle made more attempts on the unsolvable puzzle, $\beta = .294, p = .003$.

Physical self-control for females

Due to the gender effect on performance for the physical self-control portion of the study ($\beta = .346$), it was also of interest to examine the performance on this task with females separated out from males. Due to the small number of males in this study ($n = 23$), separate analyses for men were not conducted. Also, in an attempt to control for potential measurement error, a time of 25 seconds was set as the minimum. Ciarocco, Sommers and Baumeister (2001), reported average performances greater than 55 seconds on the same task. As Table 14 shows, none of the personality traits were found to explain a significant amount of variance in number of attempts on the physical self-control task for females. None of the interactions between personality traits and condition were significant.

DISCUSSION

The purpose of this study was to replicate findings that show ostracism affects psychological well-being and self-control. In addition, I examined whether the personality traits, hope, optimism, and forgiveness moderated the relationships between ostracism and psychological well-being or self-control.

In partial support for H1, ostracized participants experienced decreases in belonging. In contrast, there were no significant differences in self-esteem between ostracized and included participants. The latter finding may be due to a range restriction and poor reliability of the single-item measure used to assess momentary self-esteem (DeVellis, 2003). Extreme item means lack sufficient variance to detect meaningful differences. In comparison, Williams' lab uses a 30-item measure that contains 5 items devoted to assessing self-esteem (K.D. Williams, personal communication, October 6, 2009). Also, participants responded to multiple items related to the ostracism manipulation before completing the momentary self-esteem item. It may be that completing these other items served as a distracter, allowing participants to recover from any temporary detriments in self-esteem due to being ostracized. It could also be that ostracized participants intentionally inflated their self-esteem response due to social desirability (Chan, 2009). After completing items germane to the ostracism manipulation, participants may have wished to "fake good," thinking that they were intended to be unaffected by the ball-toss in terms of self-esteem. Based on current findings, it seems that ostracism affects certain subtypes of psychological well-being but not others (c.f. Williams, Cheung, & Choi, 2000; Williams et al., 2002). This would align with the findings of Blackhart, Nelson, Knowles, and Baumeister (2009) who reported from their meta-analysis of 129 studies examining social exclusion that participants experiencing rejection did not demonstrate immediate decreases in

self-esteem. People may not demonstrate immediate declines in self-esteem due to defensive responses meant to maintain their self-esteem levels. It may be that the findings of the current study are an accurate reflection of self-esteem levels after ostracized or it may be that my findings were confounded by reasons mentioned previously. As there is not enough compelling evidence from my study to favor one conclusion over the other, further research is needed to understand the relationship between ostracism and self-esteem.

Hypothesis 2 was that ostracized individuals would demonstrate decreases in self-control compared to their included peers, for which I found partial support. There was no significant difference in persistence on the physical self-control task among ostracized and included participants. However, ostracized participants did persist for a shorter amount of time on the cognitive task, which provides partial support for H2. This finding replicates the work of Baumeister, DeWall, Ciarocco, and Twenge (2005), who found that ostracized participants gave up sooner on tracing tasks. While the method of ostracism differed, the finding that ostracized participants persisted for a shorter amount of time on the tracing task remains. The current finding also supports the work of Ciarocco, Sommer, and Baumeister (2001) who found that individuals who gave the silent treatment persisted for a shorter amount of time on subsequent anagram tasks. So in terms of persistence on a difficult cognitive task, my results support previous findings.

In terms of physical self-control, Ciarocco et al. (2001) found decrements in persistence on a similar handgrip task, which was not corroborated by the current findings. This may be due to the novelty of the stimulus. Although the experimenter demonstrated how to hold the handgrip in the non-dominant hand and how to pick up the ball between the handles, the novelty of the task may have confounded the results. Participants may not have realized how tightly they would need to squeeze the handles to hold the ball into place, resulting in them dropping the ball prematurely. In addition, some participants did have difficulty with holding the handgrip in their non-dominant hand and used their dominant hand to complete the task.⁵ The

⁵ Analyses were conducted without including participants who used their dominant hand for the tracing task. Results were consistent with those reported here.

correlation between the handgrip task and tracing task is low ($r = .04$). It is reasonable to expect that if the handgrip and tracing tasks were both measuring self-control, they would be at least moderately correlated. In this sample, 83.65% of participants ($n = 87$) persisted for less than 60 seconds on the task ($M = 34.22$, $SD = 49.56$), which differs from the findings of Ciarocco et al. It is also important to note that the standard deviation for this variable is greater than the mean, which indicates issues with the quality of this data. For this sample, 41.35% ($n = 43$) of participants persisted for less than 10 seconds on this task. These participants tended to be those who were surprised that the ball had already fallen from between the handles and would ask if they could complete the task again. For some participants (mostly female), it was difficult to grip the handgrip due to the size of their hands. As it was difficult for participants to properly set up for this task, it is not likely that the time the participants persisted is an actual measure of self-control. For this study, measurement error is of concern when considering the results. Based on the large proportion of participants persisting for such a short amount of time, difficulty with gripping the handgrip in the non-dominant hand, and low correlation with other self-control outcomes frequently used in this domain of research, it is not likely that the data gathered for the physical self-control variable is a true measure of self-control. Based on my findings, measuring self-control by the protocol used in this study leads to undesired measurement error.

In response to the first study question, difficulty with measurement of the construct of self-control led to inconclusive results. While ostracism did impair persistence on the cognitive task, it did not impair persistence on the physical task. It is worth noting that prior research examining the relationship between ostracism and self-control used ostracism manipulations other than Cyberball (see Table 1). In addition, prior researchers have not measured number of attempts as an indicator of self-control. It may be that ostracism only affects certain subtypes of self-control. Based on my findings with the tracing task, it appears that ostracism affects the ability to persist at a difficult task, but not the ability to initiate the task. It may be that ostracized participants are willing to initiate the task, but they give up sooner than their included peers when they realize the difficulty of the task. This would

support previous findings in which those ostracized demonstrated lower performance scores as the difficulty of the items increased (Baumeister & DeWall, 2004). For the handgrip task, it may have been better to use time difference scores for the task as done by Ciarocco et al. (2001) and have participants do handgrip task 2 twice instead of only after the ostracism manipulation. This may have decreased measurement error due to the novelty of the stimulus as participants would have used the handgrip before and after the ostracism manipulation. For this study, the data for the handgrip task do not appear to be an accurate measure of self-control for participants.

No support was found for H3 which predicted that hope, optimism, or forgiveness moderate the relationship between ostracism and psychological well-being. None of the personality traits affected the relationship between ostracism and psychological well-being. Although previously found to be protective in stressful situations, none of these personality traits were able to buffer the effects of experiencing ostracism. Part of the difficulty with testing these moderating relationships is that ostracism only affected one of my measures of psychological well-being. When testing for moderation, power becomes a key component for detecting potential relationships (Frazier, Tix, & Barron, 2004). For example, the unequal sample sizes between my ostracism ($n = 47$) and inclusion groups ($n = 57$) is one factor that decreased power in my study. In addition, outcome variables without enough response options also decrease power (Frazier et al., 2004). This would be true for the momentary self-esteem variable in my study. To test H1, which does not involve moderating relationships, based on the work of Lipsey (1990), with a predetermined alpha set at .05 (two-tailed) and expected effect size of at least .50, to achieve a power level of .80, 65 participants are needed for each group. I did not reach this number for either group. Due to the smaller than desired sample size and additional issues discussed, it is likely that moderating relationships were not detectable because my study is underpowered.

No support was found for H4, which predicted that hope, optimism, or forgiveness would moderate the relationship between ostracism and self-control. For the physical self-control task, men persisted longer as did those who had stronger baseline hand strength. For the cognitive self-control task, ostracized participants

persisted for a shorter amount of time as did those participants who were higher in forgiveness. As with H3, part of the difficulty with testing these moderating relationships is that ostracism only affected one of the self-control measures. As previously discussed, detection of any moderating relationships is hindered in my study because it is underpowered.

Based on these findings, the answer to the second study question is that hope, optimism, or forgiveness do not seem to moderate the relationship between ostracism and psychological well-being or self-control. These results are consistent with other studies which failed to find potential moderators in variables such as self-esteem and attribution for the ostracism experience (Williams, Cheung, & Choi, 2000; Zadro, Williams, & Richardson, 2004). This has led researchers to believe that it may be that the response to being ostracized is so automatic that other variables such as personality traits are too distal to affect the response (Williams & Nida, 2009). One group of researchers did find that ostracized participants high in social anxiety experienced the negative effects of ostracism longer (Zadro, Boland, & Richardson, 2006). In their design, assessment of psychological well-being occurred directly after participants participated in the Cyberball game and then 45 minutes later. They found that social anxiety did not moderate the relationship between ostracism and psychological well-being directly after the experience, but this relationship did appear when assessed 45 minutes later. It is also important to note that Zadro et al. (2006) found evidence for moderation of social anxiety on ostracism and psychological well-being with 56 participants total who were randomly assigned to either the ostracism or inclusion condition of Cyberball. It may be that moderating effects of hope, optimism, or forgiveness could be detected if assessed at a later time point.

Kazdin (2002) provides a useful framework to interpret null findings in a study. First, null findings could be reflective of the actual situation, meaning there is no meaningful relationship between study variables. Second, null findings could be the result of methodological issues that prevent the researcher from observing the real relationship between study variables. I believe that my study demonstrates some of these methodological issues Kazdin proposes. I will review the potential

methodological issues and provide support for why I think my study does or does not demonstrate these issues.

Due to prior research demonstrating the link between ostracism and psychological well-being and self-control, it is unlikely that the null findings are an accurate reflection of these relationships. As previously discussed, researchers have demonstrated the declines in psychological well-being in support of Williams' (2007) model. Also, researchers have demonstrated the declines in self-control due to experiencing ostracism (see Table 1). As H1 and H2 were replication hypotheses, it is unlikely that no relationship exists between the variables of interest.

Most likely for this study, Type II error and inadequate power could have influenced the results of this study (Kazdin, 2002). As previously mentioned, a power analysis for H1 called for 65 participants per condition. Moreover, to test for moderation, larger sample sizes are needed (Aiken & West, 1991). It is likely that due to my study being underpowered, meaningful differences between groups were not detected (Pagano, 2010). It is worth noting that some results were marginally significant. For example, the variables of momentary self-esteem $t(102) = -1.77, p = .08$ and number of attempts on the tracing task $t(98) = -1.86, p = .07$. Due to the total sample size and difference in number of participants in each condition, it is likely that power is a contributing factor to the null findings of this study.

Another potential methodological issue could be related to failed protocol and uncontrolled error (Kazdin, 2002). An example of what this might look like would be if several different researchers were administering the protocol differently. This would introduce additional variance into the data that could be avoided. As I was the only experimenter running this study, it is unlikely that my results are affected by "extra noise" due to such variables as mentioned. I read directly from the protocol for each participant and the directions for both conditions were identical. Also, I demonstrated the handgrip task to all participants and every participant completed the practice puzzles. Due to my strict adherence to my protocol, I think it is unlikely that null findings can be attributed to failed protocol and uncontrolled error.

Finally, null findings may also be attributed to differences in measurement between dependent and independent variables (Kazdin, 2002). The independent

variables (personality traits) were assessed by self-report measures, as was the case for the psychological well-being measures. In addition, these self-reports were all completed within SurveyMonkey, so participants were familiar with the format of SurveyMonkey when they completed their well-being measures. For the dependent variables of self-control, I chose methods commonly used by those researching self-control in order to increase the generalizability of my findings (see Ciarocco, Sommer, & Baumeister, 2001). It is possible that null findings of this study are due to differences in measurement of variables, but I think that additional factors beyond those highlighted by Kazdin are more likely. These factors are discussed next.

Limitations

There are several factors that may have served as limitations for this study. To start, the use of a convenience sample may have influenced study results. The use of a college student population resulted in a restricted age range as the average range for this sample was 23 years old. However, most research within this area uses a convenience sample of college students (Williams et al., 2002). Volunteer bias is also a potential issue (Wiederman, 1999). As the study was advertised as relating to social interactions and would involve interacting with other students, it is likely that students who do not enjoy interacting with others did not self-select to participate in this study. There may be meaningful differences in how ostracism affects those who enjoy and who do not enjoy social interactions in terms of how ostracism affects their well-being and self-control. It may also be that findings were affected by demand characteristics of the sample. For example, participants may have sensed they should persist longer on the cognitive self-control task as a large stack of transparencies was left on the table. This large stack could have served as a cue that the experimenter expected them to persist for a reasonably long period of time. It could also be that participants persisted for longer on the self-control tasks in an effort to please the examiner and receive positive feedback. Prior research indicates that people who are ostracized are motivated to restore social connections once ostracized (Richman &

Leary, 2009). This positive feedback could serve as an indicator of social acceptance and restore feelings of social connectedness.

Currently, researchers within this field do not use the same scales to measure key dependent variables, which greatly reduces generalizability of findings. It may be that if the same scale used by Williams' lab (see Williams et al., 2002) was used for this study, there could have been more meaningful and consistent outcomes with prior research. Without the use of well-validated measures across labs researching ostracism, it is difficult to compare findings. To assess mood and life satisfaction, I selected validated measures that are commonly used within psychological research in order to better compare my findings to other research. For the variables more specific to the model of ostracism (belonging and self-esteem), I had several options based on previous research of how to assess these outcomes as there is currently no consensus. The key difference with Williams' scale is the number of items devoted to assessing momentary self-esteem. I used a single item, which did not capture meaningful differences in self-esteem.

Overall, I may have found more consistent results with previous research if the current study were split into two smaller studies. I support the use of Cyberball as the ostracism manipulation as it enabled me to see if I could replicate prior findings with a different ostracism manipulation, particularly in terms of decrements to self-control. To think of my study conceptually, it may have been easier to detect meaningful changes in psychological well-being and self-control if these two dependent variables were assessed in separate studies. For participants to first complete the self-report measures before the self-control tasks, this could have depleted self-control before participants reach that portion of the study. As self-control is believed to be a limited resource, tapping into that resource prematurely by asking participants to focus on the self-report measures could interfere with detecting meaningful differences in performance on self-control that are based solely on the ostracism manipulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998). On the other hand, for participants to first complete the self-control tasks eliminates the assessment of any momentary well-being outcomes, which is a central focus of this study. I designed the study so that participants did complete the well-being measures

first, but it is likely at the expense of finding additional meaningful self-control outcomes. As mentioned, even within the well-being items, the momentary self-esteem item should have been first if not entirely replaced by multiple items which would increase the chances of finding meaningful information (DeVellis, 2003).

Implications

Following the recommendation of Blackhart, Nelson, Knowles, and Baumeister (2009), researchers interested in examining the relationship between ostracism and self-esteem should examine possible immediate defensive responses. It may be that defenses block declines in self-esteem for single rejection episodes. While laboratory manipulations may be less salient in eliciting effects on self-esteem, Blackhart et al. (2009) found that chronic rejection is linked with lower self-esteem. In addition, more direct ostracism manipulations (i.e., explicit, face-to-face rejection vs. implicit, rejection priming) demonstrate greater effects on self-esteem (see also Poulsen, 2006).

Drawing from the findings of Zadro, Boland, and Richardson (2006) researchers interested in moderating variables on the relationship between ostracism and psychological well-being should assess well-being both directly after experiencing ostracism and at a later time point (see also Oaten, Williams, Jones & Zadro, 2008). This later assessment is telling of the duration of the aversive affects of ostracism and this could be a way that hope, optimism, and forgiveness demonstrate a meaningful effect by affecting how people cope instead of their immediate reactions. This would support prior research that demonstrates the positive role of these traits with healthy coping styles (Snyder & Pulvers, 2001; Scheier, Weintraub, & Carver, 1986; Thompson et al., 2005). The lack of an immediate moderating effect is consistent with Zadro et al. (2006), but an assessment at a later time point was not used in this study.

In addition, based on the findings of this study, it seems that using Cyberball as an ostracism manipulation may be less effective than other manipulations such as face-to-face interactions. While other researchers have found effects of ostracism on psychological well-being using the Cyberball method (Williams et al., 2002; Zadro,

Boland, & Richardson, 2006), this was not completely replicated in the current study. It may be that using a different method of ostracism, such as the Future Alone condition, may elicit more salient effects despite the convenience of using such a brief and accessible method like Cyberball. In addition, researchers interested in examining the relationship between ostracism and self-control may wish to consider using an ostracism manipulation other than Cyberball as this study found less meaningful outcomes and prior research used other methods. Researchers using the Future Alone condition found meaningful results for similar self-control measures used in this study with sample sizes smaller than those of the current study (see Table 1). This further supports the recommendation of using a manipulation other than Cyberball for self-control outcomes. Researchers interested in the relationship between ostracism and self-control should further research the potential for number of attempts on the cognitive task as an additional measure of self-control. Also, researchers should use caution when using the handgrip task and ensure that issues such as hand size do not interfere with data quality.

Conclusions

Experiencing ostracism is deleterious not only to one's psychological well-being, but also has ramifications for self-regulation, specifically in terms of self-control. People are goal-oriented, and the social nature of people creates the goal of belonging, which drives much of behavior (Carver & Scheier, 1998; Leary & Cox, 2008). The need to belong is so fundamental that emotions provide feedback to inform people that change is needed in order to restore social connections (DeWall, Baumeister, & Vohs, 2008). This feedback comes in the form of decreased belonging and self-esteem. In order to reach goals and maintain social connections, people self-regulate their behavior (Leary & Cox, 2008). Ostracism effects self-regulation negatively in that self-control is diminished after experiencing ostracism (Baumeister, DeWall, Ciarocco, & Twenge, 2005).

The findings from my study provided partial support for H1 and H2: Experiencing ostracism will negatively affect psychological well-being and experiencing ostracism will cause decrements in self-control. Ostracized participants

experienced less belonging than their included peers. Ostracized participants also persisted for less time on the cognitive self-control task than their included peers. No support was found for H3 or H4: Hope, optimism, and forgiveness will moderate the relationship between ostracism and psychological well-being and hope, optimism, and forgiveness will moderate the relationship between ostracism and self-control. For both of these hypotheses, I posited that those higher in these traits would exhibit less of the expected decline in both psychological well-being and self-control. No moderating relationships were found in my study.

As discussed previously, methodological issues may have contributed to my null findings. A larger sample size and equal number of participants in each condition would have increased power which may have altered study findings. Different measures for momentary self-esteem and self-control may also have altered findings to be consistent with previous research. Overall, it may have been better to separate the goals of this study into two smaller studies, assessing the psychological well-being outcomes in one study and the self-control outcomes in another.

In conclusion, ostracism is a powerful experience that does affect people not only in how they feel about themselves and others, but also in their behavior. While my results did not find any protective abilities of the personality traits of interest, it is important for researchers to assess potential moderating relationships further, especially in terms of coping at time points beyond directly after the ostracism experience. It may be that ostracism is so powerful that initially these traits are too distal to make an impact. Given time, there may be individual differences due to these traits that would surface in terms of how people make attributions about their ostracism experience and also how the experience affects their behavior. As it is likely that everyone will encounter ostracism in some form during their life, it is important to understand the impact of ostracism and to explore what can be done to buffer the effects of social exclusion.

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TABLES

Table 1
Previous Studies Examining the Relationship between Ostracism and Self-control

Authors	Ostracism manipulation Number of participants (N/n)	Self-control measures	Findings
Baumeister, DeWall, Ciarocco, & Twenge (2005)	Future Alone condition n = 36, 38, 45, & 30	Consumption, persistence, & attentional control	Future Alone ppts. drank less of an unpleasant beverage & ate more cookies, persisted for less time on unsolvable puzzles, & demonstrated poorer attentional control
Baumeister & DeWall (2004)	Future Alone condition	Performance on the General Mental Abilities Test & Reading Comprehension section of the GRE	Future Alone ppts. demonstrated less speed & accuracy on both measures, GRE performance affected only when recall required
Ciarocco, Sommer, & Baumeister (2001)	Giving the silent treatment n = 37, 25	Persistence on unsolvable anagrams & handgrip task	Ppts. who gave the silent treatment persisted for less time on both tasks
DeWall, Baumeister, & Vohs (2008)	Future Alone condition n = 36	The game Operation	Future Alone ppts. made more errors on Operation game, no time difference between groups
Twenge, Catanese & Baumeister (2002)	Future Alone condition n = 50, 36, & 39	Risk-taking with lottery bets, healthy behavior choices, procrastination & practice before taking non-verbal intelligence test less.	Future Alone ppts. chose high risk, high payoff options, less healthy snack options, & procrastinated more & practiced less.

Note. Ppts. = participants, GRE = Graduate Record Examination

Table 2

Demographic Information of Sample (N=104)

Variable	<i>M</i> or number	(<i>SD</i> or %)
Age	23	(6.22)
Gender		
Female	81	(78%)
Male	23	(22%)
Ethnicity		
Caucasian	78	(75%)
African American	10	(9.6%)
Biracial/Multiethnic	7	(6.7%)
Asian/Pacific Islander	4	(3.8%)
Hispanic/Latino	4	(3.8%)
Native American	1	(1.0%)
College year		
Freshman	45	(43.3%)
Sophomore	28	(27.0%)
Junior	17	(16.3%)
Senior	11	(10.6%)
Other	3	(2.9%)

Note. *M* is the mean, *SD* is standard deviation, and % is percentage.

Table 3

Demographic Information of Participants by Condition

Variable	Included (<i>n</i> = 57) <i>M</i> or <i>N</i> (<i>SD</i> or %)	Ostracized (<i>n</i> = 47) <i>M</i> or <i>N</i> (<i>SD</i> or %)
Age	24 (7.20)	22 (4.56)
Gender		
Female	44 (77%)	37 (79%)
Male	13 (23%)	10 (21%)
Ethnicity		
Caucasian	43 (75.4%)	34 (72.3%)
African American	5 (8.8%)	5 (10.6%)
Biracial/Multiethnic	4 (7.0%)	4 (8.5%)
Asian/Pacific Islander	3 (5.3%)	1 (2.1%)
Hispanic/Latino	2 (3.5%)	2 (4.3%)
Native American	0 (0.0%)	1 (2.1%)
College year		
Freshman	26 (45.6%)	19 (40.4%)
Sophomore	16 (28.1%)	12 (25.5%)
Junior	6 (10.5%)	11 (23.4%)
Senior	6 (10.5%)	5 (10.6%)
Other	3 (5.3%)	0 (0.0%)

Note. *M* is the mean, *N* is the total number, *SD* is standard deviation, and % is percentage

Table 4

Measures Used Sorted by Time Point 1, 2, and 3

Construct	Measure
<u>Time 1</u>	
Trait Hope	Adult Trait Hope Scale
Trait Optimism	Life Orientation Test- Revised
Dispositional Forgiveness	Heartland Forgiveness Scale
Global Self-esteem	Rosenberg Self-esteem Scale
Life Satisfaction	Satisfaction with Life Scale
Demographic Information	
<u>Time 2</u>	
Mood	Positive and Negative Affect Scale
Life Satisfaction	Satisfaction with Life Scale
<u>Time 3</u>	
Mood	Positive and Negative Affect Scale
Life Satisfaction	Satisfaction with Life Scale
Self-control	Tracing Tasks
	Handgrip Tasks
Belonging	Cyberball-specific Reactions
Self-esteem	Momentary-self Esteem

Table 5

Correlations, Means, Standard Deviations, and Alphas for Study Measures

	AHS	LOT-R	HFS	RSE	SWL(1)	PAN-PA(1)	PAN-NA(1)	SWL(2)
AHS	—	.25**	.46**	-.38**	.56**	.47**	-.11	.47**
LOT-R		—	.45**	-.57**	.51**	.22*	-.20*	.45**
HFS			—	-.36**	.56**	.22*	-.19	.44**
RSE				—	.48**	-.31**	.29**	-.46**
SWL (1)					—	.21*	-.17	.86**
PAN-PA(1)						—	.14	.25*
PAN-NA(1)							—	-.20*
SWL (2)								—
PAN-PA (2)								
PAN-NA(2)								
SWL (3)								
SC-CTi								
SC-CTr								
SC-PTi								
BEL								
MSE								
HGS								
EXP								
RAC								
SEX								
Mean	49.57	14.22	85.22	22.30	22.76	29.98	15.04	24.64
SD	7.70	4.57	14.78	6.70	7.56	8.48	5.64	6.78
α	.85	.83	.87	.88	.91	.90	.86	.92

Note. $N=104$. AHS = Adult Hope Scale, LOT-R = Life Orientation Test- Revised, HFS = Heartland Forgiveness Scale, RSE = Rosenberg Self-esteem Scale, SWL (1) = Satisfaction with Life Scale Time 1, PAN-PA (1) = PANAS-Positive Affect Time 1, PAN-NA (1) = PANAS-Negative Affect Time 1, SWL (2) = Satisfaction with Life Scale Time 2, PAN-PA (2) = PANAS-Positive Affect Time 2, PAN-NA (2) = PANAS-Negative Affect Time 2, SWL (3) = Satisfaction with Life Scale Time 3, SC-CTI = Cognitive Self-control Task-Time, SC-CTr = Cognitive Self-control Task Tries, SC-PTi = Physical Self-control Time, BEL = Belonging, MSE = Momentary Self-esteem, HGS = Hand strength, EXP = Experimental Condition, RAC = Race, SEX = sex, * $p < .05$, ** $p < .01$.

Table 5 Contd.

Correlations, Means, Standard Deviations, and Alphas for Study Measures

	PAN-PA(2)	PAN-NA(2)	SWL(3)	SC-CTi	SC-CTr	SC-PTi	BEL	MSE
AHS	.42**	-.10	.49**	-.07	.15	-.13	.18	.29**
LOT-R	.20*	-.08	.49**	-.05	-.03	-.02	.02	.11
HFS	.22*	-.15	.47**	-.16	-.11	-.03	.10	.23*
RSE	-.31**	.19	-.48**	.20	.01	.00	-.05	-.25*
SWL (1)	.21*	.03	.87**	-.15	.09	-.11	-.01	.22*
PAN-PA(1)	.84**	.07	.26**	.08	.10	-.10	.31**	.34**
PAN-NA(1)	.02	.78**	-.24*	-.03	-.17	-.06	-.01	-.31**
SWL (2)	.19	.03	.97**	-.15	.06	-.09	.03	.23*
PAN-PA (2)	_____	-.06	.24	.08	.06	-.09	.43**	.47**
PAN-NA(2)		_____	.00	-.01	-.06	.05	-.18	-.36**
SWL (3)			_____	-.14	.05	-.09	.05	.29**
SC-CTi				_____	.59**	.04	.32**	-.06
SC-CTr					_____	-.03	.21*	.04
SC-PTi						_____	-.08	.15
BEL							_____	.30**
MSE								_____
HGS								
EXP								
RAC								
SEX								
Mean	27.76	14.32	24.26	623.23	12.59	34.22	20.55	3.87
SD	9.90	5.31	7.13	361.58	8.74	49.56	9.57	0.82
α	.94	.88	.93				.91	

Note. N=104. AHS = Adult Hope Scale, LOT-R = Life Orientation Test- Revised, HFS = Heartland Forgiveness Scale, RSE = Rosenberg Self-esteem Scale, SWL (1) = Satisfaction with Life Scale Time 1, PAN-PA (1) = PANAS-Positive Affect Time 1, PAN-NA (1) = PANAS-Negative Affect Time 1, SWL (2) = Satisfaction with Life Scale Time 2, PAN-PA (2) = PANAS-Positive Affect Time 2, PAN-NA (2) = PANAS-Negative Affect Time 2, SWL (3) = Satisfaction with Life Scale Time 3, SC-CTI = Cognitive Self-control Task-Time, SC-CTr = Cognitive Self-control Task Tries, SC-PTi = Physical Self-control Time, BEL = Belonging, MSE = Momentary Self-esteem, HGS = Hand strength, EXP = Experimental Condition, RAC = Race, SEX = sex, *p<.05, ** p <.01.

Table 5 Contd.

Correlations, Means, Standard Deviations, and Alphas for Study Measures

	HGS	EXP	RAC	SEX
AHS	-.10	.07	.09	-.14
LOT-R	-.02	.08	-.11	-.06
HFS	.02	.12	.04	.00
RSE	.02	-.05	.19	.07
SWL (1)	-.05	.04	-.06	-.15
PAN-PA(1)	.11	.25*	.01	-.17
PAN-NA(1)	-.07	-.01	.19	-.14
SWL (2)	-.08	.06	.01	-.21*
PAN-PA (2)	.13	.35**	-.06	-.05
PAN-NA(2)	-.03	-.11	.23*	-.13
SWL (3)	-.04	.10	-.03	-.18
SC-CTi	.04	.38**	.02	.09
SC-CTr	.07	.20*	.24*	-.01
SC-PTi	.39**	-.05	.04	.45**
BEL	.06	.79**	.06	.04
MSE	.27**	.17	-.01	.06
HGS	—	-.00	.12	.48**
EXP		—	-.01	.02
RAC			—	-.02
SEX				—
Mean	27.56			
SD	9.17			
α				

Note. N=104. AHS = Adult Hope Scale, LOT-R = Life Orientation Test- Revised, HFS = Heartland Forgiveness Scale, RSE = Rosenberg Self-esteem Scale, SWL (1) = Satisfaction with Life Scale Time 1, PAN-PA (1) = PANAS-Positive Affect Time 1, PAN-NA (1) = PANAS-Negative Affect Time 1, SWL (2) = Satisfaction with Life Scale Time 2, PAN-PA (2) = PANAS-Positive Affect Time 2, PAN-NA (2) = PANAS-Negative Affect Time 2, SWL (3) = Satisfaction with Life Scale Time 3, SC-CTI = Cognitive Self-control Task-Time, SC-CTr = Cognitive Self-control Task Tries, SC-PTi = Physical Self-control Time, BEL = Belonging, MSE = Momentary Self-esteem, HGS = Hand strength, EXP = Experimental Condition, RAC = Race, SEX = sex, *p<.05, ** p <.01.

Table 6

Hierarchical Linear Regression Analysis Predicting Belonging

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.027	.027	2, 100	1.377	.257
Gender	1.021	.044					.653
Ethnicity	-3.482	-.158					.112
Step 2:			.667	.640	4, 96	32.012	.001
Hope-centered	.178	.143					.042
Optimism-centered	-.126	-.060					.370
Forgiveness-centered	-.015	-.023					.764
Condition	15.143	.788					.001
Step 3:			.675	.008	3, 93	21.448	.001
HopeXcondition	-.210	-.123					.258
OptimismXcondition	-.140	-.050					.622
ForgivenessXcondition	.016	.019					.882

Note. *N* = 104.

Table 7

Hierarchical Linear Regression Analyses Predicting Momentary Self-esteem

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.065	.065	3, 99	2.287	.083
Gender	.135	.069					.482
Ethnicity	.073	.039					.695
Global Self-esteem	-.031	-.253					.012
Step 2:			.147	.082	4, 95	2.333	.031
Hope-centered	.023	.220					.058
Optimism-centered	-.015	-.084					.498
Forgiveness-centered	.003	.057					.641
Condition	.259	.158					.102
Step 3:			.222	.076	3, 92	2.629	.007
HopeXcondition	.044	.303					.075
OptimismXcondition	-.091	-.383					.019
ForgivenessXcondition	-.013	-.183					.349

Note. *N* = 103.

Table 8

Hierarchical Linear Regression Analysis Predicting Physical Self-control

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.256	.256	3, 99	11.342	.001
Gender	41.060	.346					.001
Ethnicity	14.479	.127					.146
Hand strength	1.164	.215					.032
Step 2:			.267	.012	4, 95	4.955	.001
Hope-centered	-.096	-.015					.885
Optimism-centered	.602	.056					.577
Forgiveness-centered	-.336	-.100					.379
Condition	-4.321	-.043					.625
Step 3:			.307	.039	3, 92	4.074	.001
HopeXcondition	1.955	.222					.165
OptimismXcondition	-3.305	-.229					.131
ForgivenessXcondition	.568	.131					.478

Note. *N* = 103.

Table 9

Hierarchical Linear Regression Analysis Predicting Cognitive Self-control by Time

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.020	.020	3, 96	.660	.579
Gender	67.403	.076					.456
Ethnicity	32.139	.039					.701
Puzzle 3 Time	.255	.107					.296
Step 2:			.214	.194	4, 92	3.580	.002
Hope-centered	1.897	.039					.715
Optimism-centered	2.337	.029					.776
Forgiveness-centered	-6.361	-.255					.031
Condition	291.626	.401					.001
Step 3:			.235	.021	3, 89	2.730	.006
HopeXcondition	-9.357	-.146					.400
OptimismXcondition	22.765	.219					.177
ForgivenessXcondition	-.415	-.013					.948

Note. *N* = 100.

Table 10

Hierarchical Linear Regression Analyses Predicting Life Satisfaction

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.941	.941	3, 99	526.862	.001
Gender	.437	.025					.310
Ethnicity	.199	.012					.621
Baseline L. S.	1.028	.976					.001
Step 2:			.948	.007	4, 95	246.949	.001
Hope-centered	.038	.041					.157
Optimism-centered	.101	.064					.022
Forgiveness-centered	.004	.007					.815
Condition	.489	.034					.152
Step 3:			.950	.002	3, 92	173.694	.001
HopeXcondition	.048	.038					.375
OptimismXcondition	-.138	-.066					.101
ForgivenessXcondition	.007	.011					.825

Note. Baseline L.S. = Baseline Life Satisfaction. *N* = 103.

Table 11

Hierarchical Linear Regression Analyses Predicting Positive Affect

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.723	.723	3, 99	85.130	.001
Gender	2.268	.096					.077
Ethnicity	1.287	.057					.295
Baseline P. A.	1.012	.871					.001
Step 2:			.749	.026	4, 95	40.497	.001
Hope-centered	.092	.072					.276
Optimism-centered	.027	.012					.833
Forgiveness-centered	-.023	-.034					.610
Condition	3.184	.161					.003
Step 3:			.754	.005	3, 92	28.210	.001
HopeXcondition	.063	.036					.711
OptimismXcondition	.278	.097					.278
ForgivenessXcondition	-.107	-.124					.267

Note. Baseline P. A. = Baseline Positive Affect. *N* = 103.

Table 12

Hierarchical Linear Regression Analyses Predicting Negative Affect

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.616	.616	3, 99	53.029	.001
Gender	-.221	-.017					.783
Ethnicity	-.449	-.037					.556
Baseline N. A.	.736	.782					.001
Step 2:			.637	.021	4, 95	23.810	.001
Hope-centered	-.018	-.027					.276
Optimism-centered	.120	.103					.833
Forgiveness-centered	-.004	-.012					.610
Condition	-1.197	-.112					.003
Step 3:			.639	.002	3, 92	16.266	.001
HopeXcondition	.057	.061					.598
OptimismXcondition	.060	.039					.719
ForgivenessXcondition	-.027	-.058					.665

Note. Baseline N. A. = Baseline Negative Affect. *N* = 103.

Table 13

Hierarchical Linear Regression Analysis Predicting Cognitive Self-control by Attempts

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.136	.136	3, 95	4.980	.003
Gender	-.902	-.044					.647
Ethnicity	-3.978	-.213					.028
Puzzle 3 Attempts	.890	.294					.003
Step 2:			.205	.069	4, 91	3.344	.003
Hope-centered	.212	.193					.078
Optimism-centered	-.044	-.024					.817
Forgiveness-centered	-.118	-.209					.080
Condition	2.848	.173					.070
Step 3:			.215	.010	3, 88	2.411	.014
HopeXcondition	-.060	-.042					.813
OptimismXcondition	.209	.089					.590
ForgivenessXcondition	-.116	-.164					.424

Note. *N* = 99.

Table 14

Hierarchical Linear Regression Analysis Predicting Physical Self-control for Females

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.065	.065	2, 17	.592	.564
Ethnicity	12.722	.162					.502
Hand strength	.854	.177					.465
Step 2:			.104	.039	4, 13	.252	.950
Hope-centered	.970	.227					.516
Optimism-centered	.299	2.468					.905
Forgiveness-centered	-.418	-.187					.673
Condition	-8.502	-.125					.676
Step 3:			.509	.405	3, 10	1.154	.410
HopeXcondition	.015	.002					.996
OptimismXcondition	-8.228	-1.002					.096
ForgivenessXcondition	.508	.158					.822

Note. $N = 19$.

FIGURES

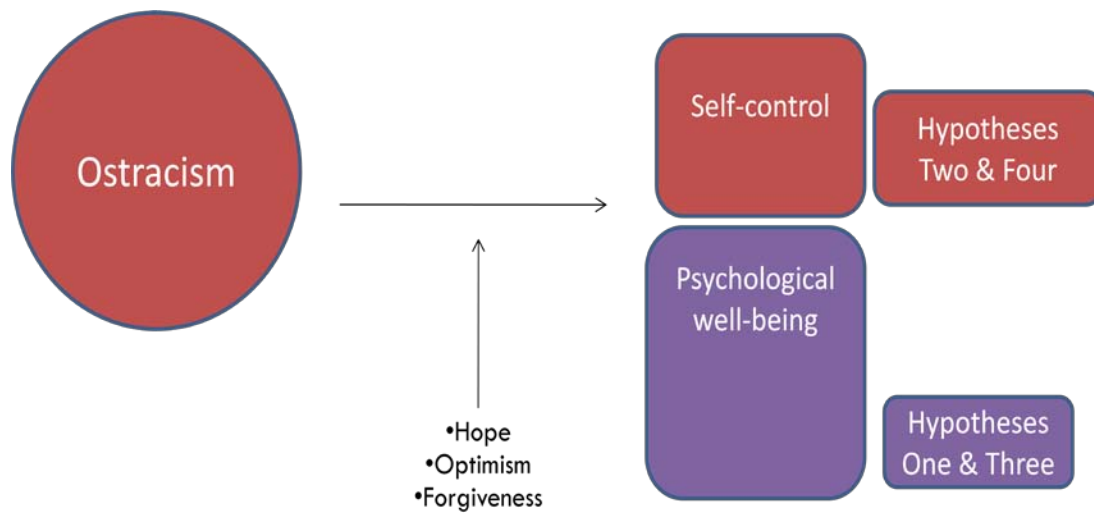


Figure 1. Proposed theoretical model for study hypotheses.

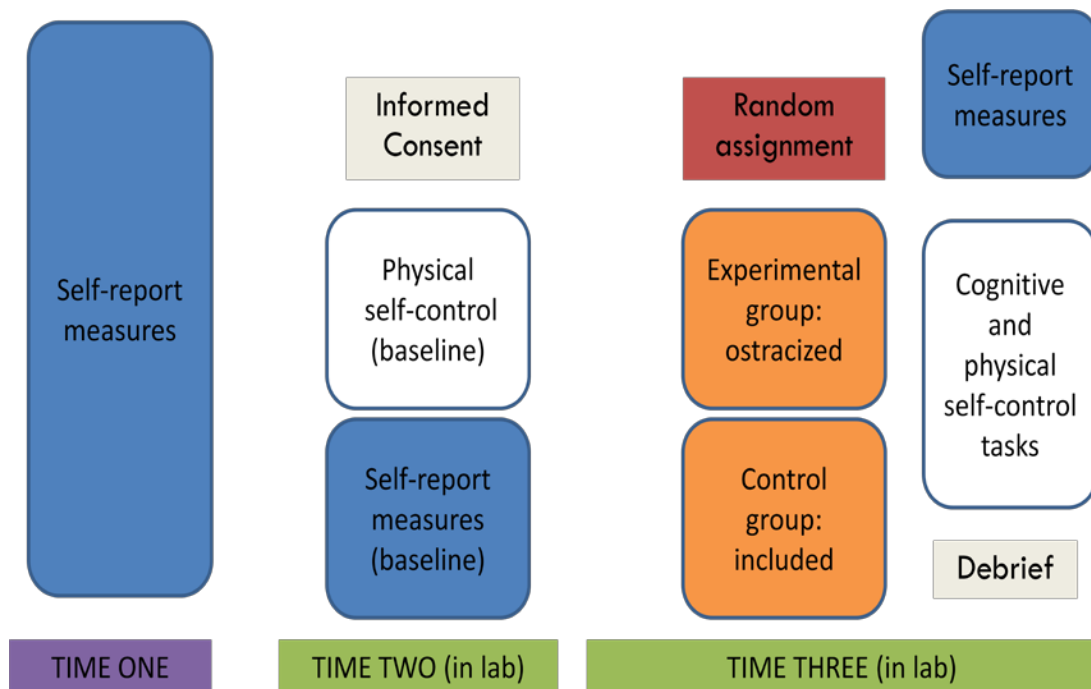


Figure 2. Model of research design.

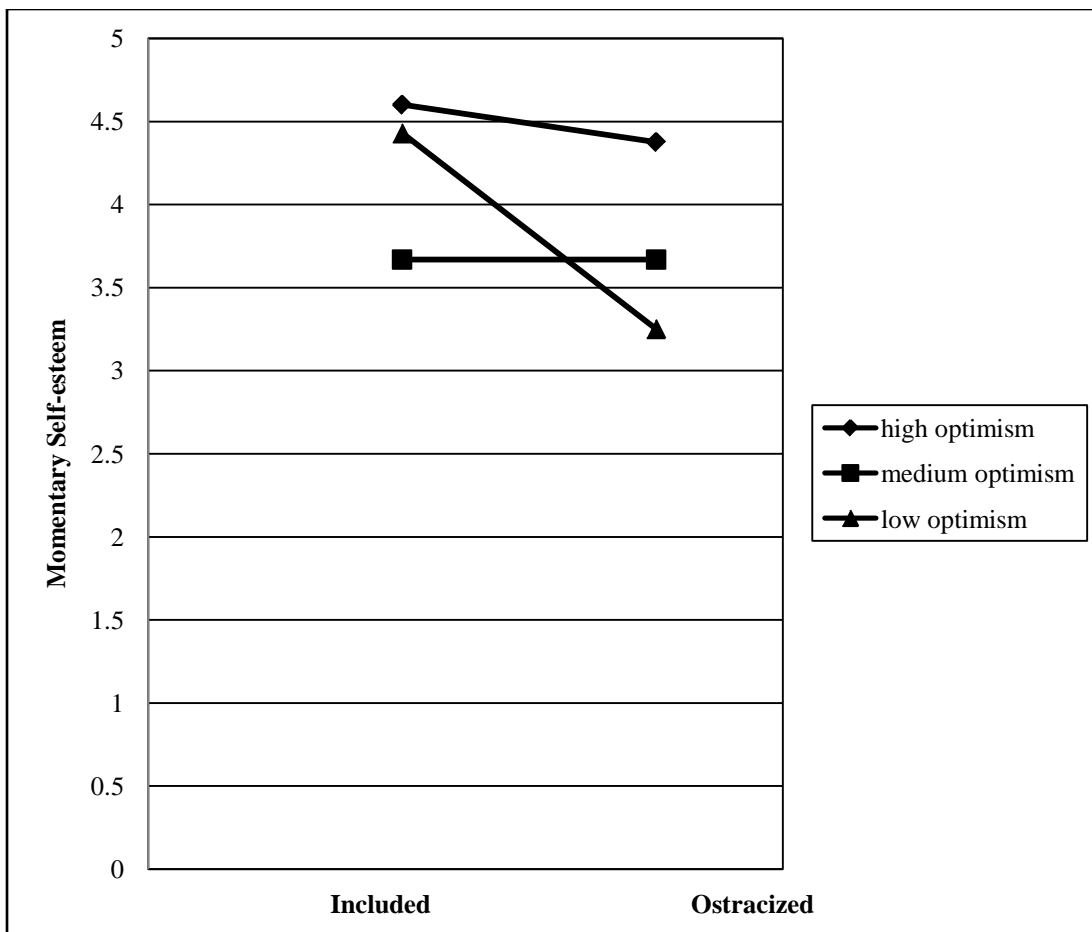


Figure 3. Relationship of optimism with momentary self-esteem for ostracized and included participants.

APPENDICES

Appendix A: Measures Completed at Time 1

Adult Hope Scale

Read each item carefully. Using the scale shown below, please select the number that best describes YOU.

1 = Definitely False

2 = Mostly False

3 = Somewhat False

4 = Slightly False

5 = Slightly True

6 = Somewhat True

7 = Mostly True

8 = Definitely True

1. I can think of many ways to get out of a jam.
2. I energetically pursue my goals.
3. I feel tired most of the time.
4. There are lots of ways around any problem.
5. I am easily downed in an argument.
6. I can think of many ways in life to get the things that are most important to me.
7. I worry about my health.
8. Even when others get discouraged, I know I can find a way to solve the problem.
9. My past experiences have prepared me well for my future.
10. I've been pretty successful in life.
11. I usually find myself worrying about something.
12. I meet the goals I set for myself.

Life Orientation Test-Revised

In this next set of questions, please be as honest and accurate as you can throughout. Try not to let your response to one statement influence your responses to other statements. There are no "correct" or "incorrect" answers. Answer according to your own feelings, rather than how you think "most people" would answer.

0 = Strongly Disagree

1 = Disagree

2 = Neutral

3 = Agree

4 = Strongly Agree

1. In uncertain times, I usually expect the best.
2. It's easy for me to relax.
3. If something can go wrong for me, it will.
4. I'm always optimistic about my future.
5. I enjoy my friends a lot.
6. It's important for me to keep busy.
7. I hardly ever expect things to go my way.
8. I don't get upset too easily.
9. I rarely count on good things happening to me.
10. Overall, I expect more good things to happen to me than bad.

Heartland Forgiveness Scale

In the course of our lives negative things occur because of our own actions, the actions of others, or circumstances beyond our control. For some time after these events, we may have negative thoughts or feelings about ourselves, others, or the situation. Think about how you typically respond to such negative events. Select the number (from the 7-point scale below) that best describes how you typically respond to the type of negative situation described. There are no right or wrong answers. Please be as open as possible in your answers.

1= Almost Always False of Me

2

3= More Often False of Me

4

5= More Often True of Me

6

7= Almost Always True of Me

1. Although I feel bad at first when I mess up, over time I can give myself some slack.
2. I hold grudges against myself for negative things I've done.
3. Learning from bad things that I've done helps me get over them.
4. It is really hard for me to accept myself once I've messed up.
5. With time I am understanding of myself for mistakes I've made.
6. I don't stop criticizing myself for negative things I've felt, thought, said, or done.
7. I continue to punish a person who has done something that I think is wrong.
8. With time I am understanding of others for the mistakes they've made.
9. I continue to be hard on others who have hurt me.
10. Although others have hurt me in the past, I have eventually been able to see them as good people.
11. If others mistreat me, I continue to think badly of them.
12. When someone disappoints me, I can eventually move past it.
13. When things go wrong for reasons that can't be controlled, I get stuck in negative thoughts about it.
14. With time I can be understanding of bad circumstances in my life.
15. If I am disappointed by uncontrollable circumstances in my life, I continue to think negatively about them.
16. I eventually make peace with bad situations in my life.
17. It's really hard for me to accept negative situations that aren't anybody's fault.
18. Eventually I let go of negative thoughts about bad circumstances that are beyond anyone's control.

Rosenberg Self-esteem

For these questions, please select the appropriate number for each statement depending on whether you strongly agree, disagree, or strongly disagree with it.

1 = Strongly Agree

2 = Agree

3 = Neither Agree nor Disagree

4 = Disagree

5 = Strongly Disagree

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

Satisfaction with Life Scale

Below are five statements that you may agree or disagree with. Using the 1-7 scale below, indicate your agreement with each item. Please be open and honest in your responding.

1 = Strongly Disagree

2 = Disagree

3 = Strongly Disagree

4 = Neither Agree nor Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

1. In most ways my life is close to ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

Demographics

1. Please indicate your gender

Male

Female

2. Please indicate your age.

3. Please indicate your ethnicity.

Asian/Pacific Islander

Black/African American

Hispanic/Latino

Native American/Eskimo/Aleut

White/Caucasian

Other (please specify)

4. Please indicate your college year.

Freshman

Sophomore

Junior

Senior

Other (please specify)

Appendix B: Measures Completed at Time 2

Positive and Negative Affect Scale

Please indicate to what extent you currently feel this way, that is, how you feel right now. Use the following scale to record your answers.

1 = Very slightly

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

Satisfaction with Life Scale

Listed in Appendix A

Appendix C: Measures Completed at Time 3

Positive and Negative Affect Scale

Listed in Appendix B

Satisfaction with Life Scale

Listed in Appendix A

Cyberball-specific Reactions (Belonging Items)

During the game of catch with the other participants, to what extent were the following statements true:

1 = not at all 2 3 4 5 6 7 = very
much

1. I felt a sense of belonging to my group.
2. I felt a sense of loss.
3. I felt that I was a member of the group.
4. I felt rejected by the group members.
5. I saw myself as part of the group.

Momentary Self-esteem

Please rate the extent to which the following statement applies to you right now, at this moment.

1 = Not very true of me 2 3 4 5 = Very true of me

Right now, I feel good about myself.

Appendix D: Data Sheet

Subject #: _____

Date/Time: _____

Experimenter: _____

ID (Birth date): _____

ID (4 digits of phone #): _____

Handgrip (Strength)

Strength: _____ Non-dominant hand: _____

Tracing Task

Time for Item 3: _____ # tries for Item 3: _____

Time for Item 4: _____ # tries for Item 4: _____

Handgrip Task (Endurance)

Time: _____

Taken any pain medications today (Yes/No, if yes, what?):

Check: Do you have any ideas about what we are studying or what our hypotheses are?

Observations:

Appendix E: Separate Regression Analyses for Dependent Variables

Table 15

Hierarchical Linear Regression Analyses Predicting Belonging

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.027	.027	2, 100	1.377	.257
Gender	1.021	.044					.653
Ethnicity	-3.482	-.158					.112
Step 2:			.662	.635	2, 98	48.012	.001
Hope	.145	.117					.054
Condition	15.030	.782					.001
Step 3:			.667	.005	1, 97	38.935	.001
HopeXcondition	-.185	-.108					.216
Step 1:			.027	.027	2, 100	1.377	.257
Gender	1.021	.044					.653
Ethnicity	-3.482	-.158					.112
Step 2:			.650	.623	2, 98	45.550	.001
Optimism	-.075	-.036					.552
Condition	15.237	.793					.001
Step 3:			.656	.006	1, 97	37.006	.001
OptimismXcondition	-.324	-.116					.203
Step 1:			.027	.027	2, 100	1.377	.257
Gender	1.021	.044					.653
Ethnicity	-3.482	-.158					.112
Step 2:			.649	.623	2, 98	45.381	.001
Forgiveness	.014	.021					.731
Condition	15.132	.787					.001
Step 3:			.656	.007	1, 97	36.995	.001
ForgivenessXcondition	-.110	-.131					.176

Note: *N* = 104.

Table 16

Hierarchical Linear Regression Analyses Predicting Momentary Self-esteem

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.065	.065	3, 99	2.287	.083
Gender	.135	.069					.482
Ethnicity	.073	.039					.695
Global Self-esteem	-.031	-.253					.012
Step 2:			.142	.077	2, 97	3.208	.010
Hope	.025	.240					.022
Condition	.260	.159					.096
Step 3:			.146	.005	1, 96	2.739	.017
HopeXcondition	.014	.098					.491
Step 1:			.065	.065	3, 99	2.287	.083
Gender	.135	.069					.482
Ethnicity	.073	.039					.695
Global Self-esteem	-.031	-.253					.012
Step 2:			.096	.031	2, 97	2.051	.078
Optimism	-.010	-.054					.650
Condition	.284	.173					.077
Step 3:			.160	.065	1, 96	3.058	.009
OptimismXcondition	-.093	-.391					.008
Step 1:			.065	.065	3, 99	2.287	.083
Gender	.135	.069					.482
Ethnicity	.073	.039					.695
Global Self-esteem	-.031	-.253					.012
Step 2:			.107	.042	2, 97	2.317	.049
Forgiveness	.007	.127					.238
Condition	.258	.157					.108
Step 3:			.127	.021	1, 96	2.335	.038
ForgivenessXcondition	-.017	-.231					.135

Note: *N* = 103.

Table 17

Hierarchical Linear Regression Analyses Predicting Physical Self-control

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.256	.256	3, 99	11.342	.001
Gender	41.060	.346					.001
Ethnicity	14.479	.127					.146
Hand strength	1.164	.215					.032
Step 2:			.261	.005	2, 97	6.854	.001
Hope	-.329	-.051					.566
Condition	-4.863	-.049					.578
Step 3:			.283	.022	1, 96	6.316	.001
HopeXcondition	1.943	.221					.090
Step 1:			.256	.256	3, 99	11.342	.001
Gender	41.060	.346					.001
Ethnicity	14.479	.127					.146
Hand strength	1.164	.215					.032
Step 2:			.259	.003	2, 97	6.766	.001
Optimism	.072	.007					.940
Condition	-5.260	-.053					.548
Step 3:			.263	.005	1, 96	5.722	.001
OptimismXcondition	-1.548	-.107					.428
Step 1:			.256	.256	3, 99	11.342	.001
Gender	41.060	.346					.001
Ethnicity	14.479	.127					.146
Hand strength	1.164	.215					.032
Step 2:			.265	.009	2, 97	6.992	.001
Forgiveness	-.274	-.082					.361
Condition	-4.203	-.042					.631
Step 3:			.275	.010	1, 96	6.073	.001
ForgivenessXcondition	.705	.163					.248

Note: *N* = 103.

Table 18

Hierarchical Linear Regression Analyses Predicting Cognitive Self-control by Attempts

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.136	.136	3, 95	4.980	.003
Gender	-.902	-.044					.647
Ethnicity	-3.978	-.213					.028
Puzzle 3 Attempts	.890	.294					.003
Step 2:			.168	.033	2, 93	3.767	.004
Hope	.098	.090					.356
Condition	2.556	.155					.106
Step 3:			.170	.002	1, 92	3.139	.008
HopeXcondition	-.087	-.060					.682
Step 1:			.136	.136	3, 95	4.980	.003
Gender	-.902	-.044					.647
Ethnicity	-3.978	-.213					.028
Puzzle 3 Attempts	.890	.294					.003
Step 2:			.166	.030	2, 93	3.712	.004
Optimism	-.136	-.076					.430
Condition	2.675	.162					.091
Step 3:			.167	.001	1, 92	3.080	.009
OptimismXcondition	-.110	-.047					.753
Step 1:			.136	.136	3, 95	4.980	.003
Gender	-.902	-.044					.647
Ethnicity	-3.978	-.213					.028
Puzzle 3 Attempts	.890	.294					.003
Step 2:			.176	.040	2, 93	3.982	.003
Forgiveness	-.072	-.128					.187
Condition	2.808	.170					.076
Step 3:			.192	.016	1, 92	3.654	.003
ForgivenessXcondition	-.153	-.215					.179

Note: *N* = 99.

Table 19

Hierarchical Linear Regression Analyses Predicting Cognitive Self-control by Time

Predictor	<i>b</i>	β	R^2	ΔR^2	<i>df</i>	<i>F</i>	<i>p</i>
Step 1:			.020	.020	3, 96	.660	.579
Gender	67.403	.076					.456
Ethnicity	32.139	.039					.701
Puzzle 3 Time	.255	.107					.296
Step 2:			.170	.149	2, 94	3.842	.003
Hope	-3.705	-.077					.426
Condition	278.363	.383					.001
Step 3:			.171	.002	1, 93	3.202	.007
HopeXcondition	-3.881	-.061					.679
Step 1:			.020	.020	3, 96	.660	.579
Gender	67.403	.076					.456
Ethnicity	32.139	.039					.701
Puzzle 3 Time	.255	.107					.296
Step 2:			.169	.149	2, 94	3.829	.003
Optimism	-5.743	-.072					.447
Condition	279.349	.384					.001
Step 3:			.176	.006	1, 93	3.300	.005
OptimismXcondition	12.945	.124					.400
Step 1:			.020	.020	3, 96	.660	.579
Gender	67.403	.076					.456
Ethnicity	32.139	.039					.701
Puzzle 3 Time	.255	.107					.296
Step 2:			.212	.192	2, 94	5.065	.001
Forgiveness	-5.573	-.224					.018
Condition	291.817	.402					.001
Step 3:			.212	.001	1, 93	4.182	.001
ForgivenessXcondition	-.796	-.025					.871

Note: *N* = 100.