INTERACTION EFFECT OF GAMING STATUS AND EXPERIENCE OF OSTRACISM ON FUNDAMENTAL NEEDS

A Dissertation

by

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ABSTRACT

The ability to play with others online is commonly rated as one of the most important features of video games by gamers, with many gamers reporting the social aspect of video games as being a primary motivation for play. Cyberball, a computerized task in which a participant throws a digital back and forth with other computer-controlled players, has been previously shown to be effective at inducing feelings of ostracism (i.e., exclusion from a group) in participants, resulting in a depletion of basic fundamental needs in humans (i.e., sense of belonging, control over environment, self-esteem, and meaningful existence) and producing negative emotional experiences. The current study expands our knowledge of ostracism by inducing ostracism in participants via the Cyberball task and examining whether gaming status (i.e., whether the participant identifies as regularly playing video games or not) influences how participants react to ostracism induced via Cyberball, a digital environment similar to those seen in video games. Participants' reactions were measured via a survey of fundamental needs and the Self-Assessment Manikin (SAM), a measure designed to assess different domains of affective responses to various stimuli.

ANOVA analyses revealed several interaction effects approaching significance between whether the participant was included or excluded during Cyberball, gaming status, and gender on select fundamental needs. Overall, male non-gamers who were excluded during Cyberball tended to report lower levels of belonging and self-esteem than did gamers. However, the main effect sizes of Cyberball condition status alone were consistently greater in magnitude than the effects of the detected interactions including gaming status and gender. Implications of the current findings in regards to the relationship between gaming status and reactions to ostracism experienced in a digital environment as well as directions for future research are discussed.

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INTRODUCTION

Video game use has risen steadily in popularity as a hobby over the past several decades alongside the advancement and increasing availability of technology. In 2009, 63% of Americans reported having played a video game in the past six months, outnumbering those who have gone out to see a movie (Graham, 2009). A market survey conducted in 2013 by the Entertainment Software Association (ESA) found that the average U.S. household now owns at least one dedicated gaming console, PC, or smartphone.

Although video game use as a pastime is typically associated with adolescent males, industry reports suggest that the audience for video games has expanded across several demographics. The largest section of people who report playing video games are over the age of 36 (35%), followed closely by players between the ages of 18 and 35 (32%) and players under the age of 18 (32%; ESA, 2013). Furthermore, although several studies have documented the trend that men are more likely to spend more hours per week playing video games than are women (Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010; Gentile, 2009), the ESA reports that as many as 45% of people who play video games are female. Clearly then, researchers would be wise not to limit their conceptualization of gaming as limited to any one demographic group.

People engage in video game play for a variety of reasons. Some people play video games because it helps them to relax, in order to experience competency and autonomy, or to escape from the demands of reality (Ryan, Rigby, & Przybylski, 2006; Gentile, 2009). Others play video games because they get a sense of achievement through competition (Yee, 2006a).

Additionally, as video game use has grown in popularity across all ages, more people have started to see video game use as a social activity that they can share with friends whom they know in real life or use it as a platform to meet their needs for social interaction over the Internet. Market data suggests that as many as 63% of adult gamers report that they play video games with others, spending an average of 4.8 hours playing with others online and 3.5 hours playing with others in person every week (ESA, 2019). Additionally, 40 to 60% of gamers under age 55 report a preference for playing video games with other people, further highlighting the growing social nature of video games. Currently, several genres of video games market the social components of their games (e.g., in-game voice and text communication, teamwork, group membership, leaderboards) as core features of their games, and gamers rate these features as being important to them (Griffiths, Davies, & Chappell, 2004). Given that many people fulfill at least some of their needs for social interaction through the use of video games, an increasing amount of attention has been paid to the relationship between social functioning and video game use over the past couple decades.

Video Games and Social Systems

As noted previously, many gamers report having a preference for playing with others and that playing with others is a common occurrence (ESA, 2019). A group of researchers interested in examining common motivations for video game use found that the social aspects of video game use were among the most prominent motivations reported amongst adolescent and emerging adult gamers (Sherry, Lucas, Greenberg, & Lachlan, 2006). Gamers were not only interested in performing well in the game, but they also valued performing better than their friends (i.e., competition) as well as the social interaction that took place within the game.

Massively Multiplayer Online Role-Playing Games. One video game genre in particular that has received attention amongst researchers interested in the social aspects of video games is the genre of Massively Multiplayer Online Role-Playing Games (MMORPGs), to which there are over 20 million active subscribers worldwide (White, 2012). The most popular MMORPG in the world, World of Warcraft, at one pointed boasted nearly 8 million subscribers alone, with other notable examples of the genre including such titles as *Lineage II*, *Star Wars: The Old Republic*, *Guild Wars 2*, and *EVE Online* (Karmali, 2013).

In a typical MMORPG, the player logs into a persistent, online, virtual world where they are able to create and control their own digital avatar as they perform a series of quests that provide their character with some form of reward (e.g., in-game currency, items, or experience points required to obtain new skills or abilities in the game). Players are often required to join in-game organizations called "guilds" or join up with other players in the game in order to complete more difficult game content, which introduces a social aspect to the game that many users find compelling (Williams et al., 2006). A survey of MMORPG players revealed that 44% of adolescents and 54% of adult players of MMORPGs rated the social component of the game as their favorite feature (Griffiths, Davies, & Chappell, 2004). There is also evidence to suggest that approximately half of gamers who play MMORPGs feel that they made friends within the game who were comparable or better than their friends in real life (Yee, 2006b; Whippey, 2011).

Relatedly, social reinforcement may play some role in the decision of many users to spend increasing amounts of time on these games (Charlton & Danforth, 2009). As players progress through these games a certain amount of pride and acclaim is afforded to those who obtain the best items, most of which can only be obtained through hard work, dedication, and continued collaboration with other players in-game. Charlton and Danforth (2009) go on to argue that this in-game acclaim may serve as social reinforcement for gamers who may not otherwise receive positive social reinforcements from their peers in their daily face-to-face interactions, thereby encouraging their continued use of the game as a way to get their interpersonal needs met. This use of social reinforcement may be one explanation for why gamers who primarily play MMORPGs tend to play video games for more hours per week than other gamers and may even be related to the development of pathological use patterns in some individuals (Ng & Weimer-Hastings, 2005; Smyth, 2007).

Social Capital. One line of research further examining the social aspects of video games and their effects on players concerns social capital. Although many definitions of social capital exist, Ellison, Steinfield, and Lampe (2011) define social capital as "the benefits individuals derive from their social relationships and interactions" (p. 1). When studying social capital, researchers often distinguish between two main types of social capital: bridging and bonding (Zhang & Kaufman, 2015). Bridging social capital broadly refers to generally weak social ties formed between individuals from different backgrounds across varying social networks. Meanwhile, bonding social capital refers to closer emotional ties with others from similar backgrounds who share similar beliefs, often resulting in more personal connections (Zhang & Kaufman, 2015). Williams' (2006) study of MMORPG players found that frequent in-game social interactions that were viewed as enjoyable experiences were positively associated with increases in both forms of social capital (i.e., bridging and bonding). Similarly, Zhang and Kaufman (2015) found that increases in both forms of social capital were associated with participants' reporting that they received more enjoyment out of their in-game relationships in older adult MMORPG players. Although this line of research offers some interesting insights into the importance of understanding the social components to online video games, research in this area has been relatively limited thus far.

Ostracism

Given the ubiquity of social components in video games, the frequency with which these social aspects of games are utilized by players, and the importance ascribed to social components by many players, it may be useful to consider the effects of ostracism, often defined as being ignored or excluded, on gamers within these digital environments.

Ostracism has been identified by researchers as a powerful social tool for exerting influence over others that has a profound effect on our emotions and behavior (Riva, Williams, Torstrick, & Montali, 2014). According to Williams' (2009) temporal needs-threat model of ostracism, the ability to detect ostracism serves an evolutionary purpose for humans: Burdensome or problematic members of a group who become ostracized may face death without the protective and supportive aspects of group membership that are necessary for an organism's survival.

Previous research suggests that ostracism can have numerous effects when detected by an individual. Ostracism threatens fundamental human needs such as the need to belong (Baumeister & Leary, 1995), the need to maintain high self-esteem (Steele, 1988), the need to perceive control over one's social environment (Burger, 1992), and the need to feel recognized for existing and worthy of attention (Greenberg, Pyszczynski, & Solomon, 1986; Greenberg et al., 1990). Researchers have also found that ostracism can influence affect by leading to either affective numbness or negative affect in an individual after experiencing ostracism, although these findings are less consistent than those regarding need threat (Twenge, Catanese, & Baumeister, 2003; Williams, 2009).

According to the temporal needs-threat model of ostracism, these negative experiences resulting from the detection of ostracism serve an important evolutionary function. These largely aversive experiences of threat to our fundamental needs and affect redirect our attention to the looming threat of ostracism, which allows us to take immediate corrective action to prevent ostracism, achieve continued group membership, and ensure our survival (Williams, 2009).

Ostracism and Cyberball. One common method researchers have used for invoking a sense of ostracism in individuals is through the use of Cyberball, a virtual ball-toss paradigm in which participants, alone with their computers, are led to believe they are playing a virtual game in which they toss a ball back and forth with two other players (Carter-Sowell, Chen, & Williams, 2008; Williams, 2009). In this paradigm, the participant receives the ball a few times in the beginning and then never receives it again throughout the rest of the task while the other two players continue to pass the virtual ball back and forth amongst each other. Although there is no overt declaration of rejection, nor even is there an explicit expectation of the participant meeting with the other virtual players at a later time, researchers have found that the Cyberball task is an effective paradigm for inducing feelings of ostracism and researching its effects on needs threat, mood, and social susceptibility (Williams, 2009).

Recent meta-analytic findings examining 120 studies involving the Cyberball task support the notion that the experience of ostracism induced via the Cyberball task, which takes place in a digital environment similar to those found in video games, consistently produces a variety of responses in excluded participants, particularly in the form of depletion of the aforementioned fundamental needs and inducing negative affect (Hartgerink, Van Beest, Wicherts, & Williams, 2015). Furthermore, these same meta-analytic findings suggest that the effects of ostracism on the depletion of fundamental needs are relatively robust and occur regardless of participant age, gender, or country of origin.

Another line of research on ostracism induced via Cyberball provides evidence suggesting that individuals who experience ostracism or the threat of ostracism may become particularly susceptible to the influence of others in an effort to be readmitted into the group, and furthermore, that this susceptibility may put the person at risk to become excessively compliant with the demands of others even if it is not in the best interest of the individual (Carter-Sowell, Chen, & Williams, 2008). For example, participants who were ostracized during a behavioral task were subsequently more likely to donate money to a stranger afterward and agree to a greater number of additional research tasks than individuals who were not excluded (Carter-Sowell, Chen, & Williams, 2008).

Under the temporal needs-threat model of ostracism, Williams (2009) also suggests that the short-term effects of ostracism (e.g., depletion of fundamental needs, negative affect) can lead to long-term consequences if an individual experiences ostracism repeatedly over a prolonged period of time. Although much of the research regarding the long-term consequences of ostracism is qualitative in nature and based on retrospective interviews, some common themes reported by individuals who have experienced chronic ostracism include depressed mood, feelings of helplessness, tendency to avoid social interactions out of fear of further rejection, and low sense of self-worth (Cacioppo & Hawkley, 2005).

Pathological Video Game Use

The majority of people who play video games are able to enjoy the benefits of playing without reporting significant problems associated with their use. As mentioned earlier, a common motivation for many people who play video games is social in nature, where the individual engages in video game use with family members, real-life friends, or friends they have made online through their use of video games. They also report that they find these social interactions to be enjoyable and positive in nature. However, there is also evidence to suggest that some users go on to develop a pathological style of video game use and that this pattern of pathological video game use (PVGU) is associated with various negative psychosocial outcomes (Ferguson, Coulson, & Barnett, 2011). Although it is important to acknowledge that for the majority of individuals, video game use is not problematic or pathological and that one should not over-pathologize normative behavior, it is also important to understand how video game use may also be linked to negative outcomes.

Broadly speaking, these pathological users can be conceptualized as individuals for whom their video game use has negatively affected their life in significant ways across one or more domains (e.g., school, work, interpersonal relationships). Although methodological considerations for defining and identifying pathological video game use in an individual have an influence on identified prevalence rates, meta-analytical studies suggest that anywhere between 3% to 10% of video game players go on to exhibit pathological patterns of play (Ferguson, Coulson, & Barnett, 2011). This prevalence rate is concerning given previous research findings suggesting that PVGU may be comorbid with several other problematic behaviors such as substance use disorders, mood disorders, anxiety, social phobia, and depression (Black, Belsare, & Schlosser, 1990; Gentile, 2009; Gentile, Choo, Liau, Sim, Fung, et al., 2011; Yoo, Cho, Ha, Yune, Kim, et al., 2004). Given the widespread use of video games across many different ages and the potential for gamers to develop a pathological style of use that may negatively influence their lives, this area of study has begun to draw the attention of researchers over the past several decades.

The precise etiology of pathological video game use is currently unknown, but some researchers have begun to speculate about what risk factors may predispose someone to develop a pathological pattern of use (Sim, Gentile, Bricolo, Serpelloni, & Gulamoydeen, 2012). Davis (2001) proposes a model for the development of PVGU focused primarily on maladaptive cognitions and patterns of reinforcement. In this cognitive-behavioral model of PVGU, the individual first makes use of technology in such a way that they find some behavioral reinforcement that encourages them to repeat the behavior in the future (Davis, 2001). At this point, their use is non-pathological and merely reinforcing on a basic level (e.g., the game is experienced as pleasant, challenging, fun, relaxing, and may fill some basic needs for social interaction).

According to this model, pre-existing psychopathology, situational cues, and impairment in life domains such as a lack of social support may predispose the individual to seek out this reinforcement from technology while neglecting other important aspects of their life. Over time, the individual develops negative cognitions about themselves and the world that serve to further reinforce the pattern of pathological use in a vicious cycle (Davis, 2001). For example, these individuals may start to view themselves as unable to cope with the difficulties associated with functioning in the real world after a prolonged period of engaging in this maladaptive behavior pattern. In order to cope with these negative cognitions, they may continue to engage in video game use as a means to experience competency or to avoid stressors associated with real world difficulties and responsibilities, which serves to reinforce the person’s maladaptive pattern of use.

Given the research evidence to suggest that the manner in which people engage with video games has an effect on various aspects of psychosocial functioning, and that social reinforcement is a driving component behind many players’ motivation to use video games, it is prudent for researchers to further study how social factors related to video game use may have an effect on an individual.

Current Study

The current study seeks to establish whether or not people who regularly play video games experience ostracism induced via the Cyberball task (another digital environment similar in some ways to video games) differently than individuals who do not play video games. Online communication has become an increasingly common experience for the majority of people living in industrialized nations in the form of email (both for social and work use), social networking websites (e.g., Facebook, Instagram), and even recreational video games. Given that many video games have social components built into them as core features and that many gamers report having a preference for playing video games with other people, people who play video games regularly may have learned a different way of perceiving and responding to social interactions that occur in a digital environment over the Internet. In this regard, it is possible that people who play video games regularly (especially video games with a stronger emphasis on the social component and interacting with others, such as MMORPGs) may respond differently to the experience of ostracism in digital environments (such as during Cyberball). For individuals who regularly use video games to get their social needs met (such as individuals who engage in regular, frequent use of online video games), it may be that they become sensitized overtime to recognizing threats of ostracism in a digital environment and therefore respond to threats of ostracism via Cyberball with greater reactivity. Perhaps regular exposure to threats of ostracism in online video games has conditioned players to respond with more intensity to experiences of ostracism in digital environments than non-gamers.

Therefore, the primary hypothesis of the current study was that individuals who regularly engage in video game use (especially those who play either online video games or MMORPGs) will experience a greater depletion of fundamental needs and more negative affect in response to ostracism on the Cyberball task than non-gamers. Additionally, a secondary aim of this study was to explore whether participants' report of experiencing ostracism in their life is related to their report of symptoms of various psychosocial problems (e.g., stress, anxiety, depression) and the size of and satisfaction with their social support network.

METHODS

Participants

Using Cohen's (1992) suggestions regarding required sample sizes for a two-by-two ANOVA and a medium effect size, 160 participants were recruited locally through the use of fliers, email advertisements in local email lists, and the Texas A&M undergraduate research subject pool. In order to be eligible for participation in the study, participants were required to be (a) at least 13 years of age and (b) a fluent, native English speaker.

Measures

Demographic Questionnaire (DQ). The DQ was designed to collect basic demographic information including gender, age, ethnicity, and academic performance.

General Media Habits Questionnaire (GMHQ). The GMHQ is a self-report measure adapted from Gentile, Lynch, Linder, and Walsh (2004) that directly asks participants about their habits and interests concerning video game use. Example items include questions about (a) amount of time spent playing video games per week, (b) identified preference for a particular genre of video game, and (c) time spent playing their identified favorite genre of video game. Information gathered via the GMHQ regarding preference for video game genre will be used to identify gamers who primarily play MMORPGs or video games that are commonly played online versus those who do not for statistical analyses.

Fundamental Needs Survey (FNS) and Cyberball Check (CBC). After completion of the Cyberball task, participants answered a series of self-report questions using a 5-point Likert scale (from 1 = not at all, to 5 = extremely) adapted from the questions used by Zadro and Richardson (2004). These questions ask about the participant's feelings of belonging, self-esteem, control, and meaningful existence (i.e., fundamental needs) that they experienced during the Cyberball task. Additionally, participants were asked several questions about their mood following the Cyberball task (e.g., how happy, sad, or angry they felt). Previous research indicates acceptable reliability coefficients for each of the needs measured with this instrument (Cronbach's α = 0.69 to 0.80). The obtained reliability coefficients for both the FNS and CBC in the current study were acceptable (Cronbach's α = .79 and .91, respectively).

Self-Assessment Manikin (SAM). The SAM is a picture-based assessment technique designed by Lang (1980) to directly measure three different aspects of a person's affective response to a variety of stimuli. The participant is shown three sets of images with each image depicting a human figure. Each set of images is meant to represent one of three aspects of a person's affective response: valence, arousal, and dominance. For each set, the images of the figure are arranged such that the figure shows a low level of a particular affective response on one end, and a high level of an affective response on the other (e.g., for valence, frowning on one end of the scale, smiling on the other end). The participant is then asked to circle which figure best represents how they are currently feeling. The participant's responses are scored on a scale from 0 to 8, with higher scores reflecting a higher level of the respective domain of affect (i.e., valence, arousal, dominance).

Depression Anxiety Stress Scale (DASS). The DASS is a 42-item self-report instrument measuring current symptoms of depression, anxiety, and stress (Lovibond & Lovibond, 1996). Each scale consists of 14 items where the participant is provided with a statement regarding possible symptoms related to one of the three aforementioned subscales. Participants are asked to respond to each item in terms of how much said statement applied to them over the past week using a scale from 0 to 3, where 0 means the statement did not apply to them at all, and 3 meaning that the statement applied to them very much or most of the time. Each subscale has a range of possible scores from 0 to 42, with higher scores reflecting greater symptomatology. The obtained reliability coefficients for the DASS subscales for the current study were acceptable (Cronbach's α = .92 for depression subscale, .87 for anxiety subscale, .90 for stress subscale).

Fear of Negative Evaluation Scale – Brief Version (FNEB). The FNEB is a 12-item self-report measure (Leary, 1983) that assesses the degree to which the respondent experiences apprehension at the prospect of being evaluated negatively. Respondents who score highly on the FNEB tend to have a strong aversion to negative evaluation, as implied by the nature of the measure, and will often strive to avoid instances where they could be evaluated by others, such as most common social situations. The obtained reliability coefficient for the FNEB for the current study was acceptable (Cronbach's α = .91).

Social Support Questionnaire – Short Form (SSQ). The SSQ is a 12-item self-report measure that assesses the respondent's perceived level of social support (Sarason, Sarason, Shearin, & Pierce, 1987). The questionnaire consists of six sets of two questions. The first question in each set asks the respondent to list the number of people the individual feels is available for the respondent to turn to in times of need in a variety of situations. The second question in each set asks the respondent to rate their satisfaction with the perceived social support available in that particular domain. The obtained internal reliability coefficients for both the number of people the individual feels is available for support (Cronbach's α = .89) and their satisfaction with their amount of social support (Cronbach's α = .87) for the current study were both acceptable.

Ostracism Experiences Scale (OES). The OES is an 8-item self-report measure based off of the Ostracism Experiences Scale for Adolescents (OES-A; Gilman, Carter-Sowell, DeWall, Adams, & Carboni, 2013) that assesses the respondent's perceived experiences of ostracism in their life. Participants are presented with a series of statements to which they are asked to respond on a 1 to 7 Likert scale, with higher scores reflecting a greater degree of experiencing ostracism in their life. The obtained internal reliability coefficient for this measure in the current study was acceptable (Cronbach's α = .86).

Procedure

Participants were first asked to report to the lab where they were consented by the experimenter. Following the consent process, the experimenter explained that the purpose of the study was to analyze the effects of mental visualization on subsequent task performance, as per standard Cyberball instructions. Prior to completing the Cyberball tasks, participants were asked to complete the demographics questionnaire, the GMHQ, a pre-test version of the SAM, and other measures of psychosocial functioning for secondary analyses (i.e., DASS, OES, FNEB, SSQ).

In the next phase of the experiment, participants were told to complete a warm up task (i.e., the Cyberball task) on the computer in order to warm up their mental visualization abilities. Following standard instruction procedures for the Cyberball task, participants were instructed not to worry about the actual game itself, but to instead use it as a means to engage their mental visualization abilities by imagining what the other players might look like, the setting of the task, what the weather might be like, and so forth. The mental visualization cover story is emphasized to reduce the likelihood participants will view the task as something to be successful at or fail.

The Cyberball task depicted three players on a computer screen, two of which were positioned to the left and right of an animated hand that represented the participant. Although the two other players were computer generated and pre-programmed, the participant was led to believe that the other two players are controlled by other humans over the Internet. The game consisted of 30 total throws between the three players, with the entire interaction lasting approximately five minutes. When participants received the ball from a pass, they were instructed to choose the player to whom they wished to throw the ball by clicking one of the other players with their mouse. The game continued in this fashion until the designated number of total throws was completed.

During the Cyberball task, participants were randomly assigned to either the inclusion or exclusion group. Participants in the inclusion group received the ball during approximately one-third of the total amount of throws. Participants in the exclusion group received two throws at the beginning of the game, after which the two computer-controlled players threw the ball back and forth exclusively between themselves (excluding the participant).

Immediately after completion of the Cyberball task, participants completed a self-report questionnaire regarding their experience of fundamental needs (i.e., feelings of belonging, self-esteem, control, and meaningful existence) and their mood afterward via a post-test version of the SAM. Additionally, participants answered a series of questions that served as a manipulation check (e.g., their experience of feeling ignored, estimate of the percentage of throws they received during the task). Once all post-experimental questionnaires were completed, participants were fully debriefed, provided their compensation for study completion, and subsequently dismissed.

Statistical Analyses

Participants were first separated into a series of categories based on their video game habits. In terms of gaming status, players were classified as either gamers or non-gamers based on their response to the question, “Do you play video games?” Additionally, participants were also classified according to (a) whether or not they reported playing video games that could be classified as MMORPGs or video games that are commonly played online, over the Internet, with other people (assessed via the GMHQ) and (b) their status as a part of either the inclusion or exclusion group on the Cyberball task. Following this, 2x2 ANOVA analyses were used to examine whether these groups differed based on their responses to the measures of fundamental needs and affect completed during the second phase of the study. Pearson’s correlation analyses of the relationships between demographic variables, fundamental needs, and affect measured by the SAM were also used to identify additional relationships of interest between these variables.

All analyses were conducted using the Statistics Package for the Social Sciences software (SPSS for Windows Version 26.0; IBM Corp, 2019). The Bonferonni correction (Dunn, 1961) was utilized in all appropriate analyses in order to control for increased risk of type I error due to the use of multiple statistical analyses.

RESULTS

Participant Characteristics

The study sample was composed of 160 participants (51% female, 49% male) ranging in age from 13 to 22 years old (*M* = 18.55, *SD* = 1.82). The majority of participants identified as White Non-Hispanic (60.6%), followed by Hispanic (12.5%), Asian (12.5%), other or mixed ethnicity (10.0%), and African American (4.4%). Demographic information for gender and ethnicity are presented in Table 1.

When asked whether or not they play video games, 55.6% of participants (n = 89) reported that they do play video games and 44.4% (n = 71) reported they do not. Those who do play video games reported playing video games for an average of 1.76 hours per day (*SD* = 1.92) and an average of 10.09 hours per week (*SD* = 13.91).

Pearson correlational analyses were used to determine whether age was significantly related to time spent gaming, levels of social support, previous experiences of ostracism, symptoms of psychopathology (i.e., depression, anxiety), levels of stress, fear of negative evaluation, affect (i.e., valence, arousal, dominance), and reported levels of fundamental needs (i.e., belonging, control, self-esteem, meaningful existence). Age was negatively correlated with reported number of hours spent playing video games per day (r = -.205, n = 156, p = .010), reported hours spent playing video games per week (r = -.235, n = 157, p = .003), and reported total number of people in the person's online social support network (r = -.156, n = 160, p = .049). The correlation matrix for age as it relates to the aforementioned variables is presented in Table 2.

Several one-way ANOVA analyses were conducted to determine whether time spent gaming, levels of social support, previous experiences of ostracism, symptoms of psychopathology (i.e., depression, anxiety), levels of stress, fear of negative evaluation, aspects of affect (i.e., valence, arousal, dominance), and reported levels of fundamental needs (i.e., belonging, control, self-esteem, meaningful existence) varied by gender. There was a significant effect of gender on self-esteem, time spent playing video games per day and per week, number of people in their social support system, levels of depression, anxiety, and stress, and fear of negative self-evaluation. Results for ANOVA tests for gender as well as relevant group means are presented in Table 3.

Additional one-way ANOVA analyses were conducted to determine whether time spent gaming, levels of social support, previous experiences of ostracism, symptoms of psychopathology (i.e., depression, anxiety), levels of stress, fear of negative evaluation, aspects of affect (i.e., valence, arousal, dominance), and reported levels of fundamental needs (i.e., belonging, control, self-esteem, meaningful existence) varied by ethnicity. There was a significant effect of ethnicity on the total number of people the participant reported as being a part of their social support system and reported levels of depression. Results for ANOVA tests for ethnicity as well as relevant group means are presented in Table 4.

ANOVA Analyses for Cyberball Manipulation Check

Multiple ANOVA analyses were used to test the relationship between Cyberball condition status (i.e., whether participants were included or excluded during the Cyberball game) and the participants' perception of being ostracized during the Cyberball game. As expected, participants who were in the exclusion condition reported that they felt more rejected, ignored, and excluded during the Cyberball task than those who were in the inclusion condition.

Conversely, participants who were in the inclusion condition felt more included during Cyberball than did the participants in the exclusion condition. Results for ANOVA tests for the Cyberball condition manipulation check as well as relevant group means are presented in Table 5.

ANOVA Analyses for Cyberball Condition, Affect, and Fundamental Needs

Multiple ANOVA analyses were used to test whether Cyberball condition status was significantly related to reported levels of fundamental needs and changes in affect. To test for changes in affect, difference scores were calculated by subtracting scores on the SAM for valence, dominance, and arousal collected prior to the Cyberball task from scores on those same variables collected after the Cyberball task was completed. Lower scores on these calculated difference variables reflect a decrease in affect after completing the Cyberball task. Results for ANOVA tests for the effect of Cyberball condition on the aforementioned psychosocial variables are reported in Table 5 along with relevant group means and standard deviations. A significant relationship in the expected direction was detected for the effect of Cyberball condition status on all measured fundamental needs (i.e., control, self-esteem, belonging, and meaningful existence) as well as reports of dominance and positive affect on the SAM.

ANOVA for Interaction of Gaming Status and Cyberball Condition

One of the primary aims of this study was to determine whether gaming status (i.e., whether or not participants reported that they play video games) interacts with Cyberball condition status (i.e., whether participants were included or excluded during the Cyberball task) to predict participants' responses on measures of fundamental needs and affect. Multiple three-way ANOVAs were performed to test the effects of gaming status, Cyberball condition, and gender on changes in affect measured by the SAM (i.e., valence, arousal, and dominance) as well as the fundamental needs (i.e., belonging, control, self-esteem, and meaningful existence) measured by both the FNS and the CBC. Results of these analyses are reported (including partial eta-squared effect sizes) in Tables 6 through 16.

A significant three-way interaction was found between the effects of gaming status, Cyberball condition, and gender on belonging measured by the FNS. A follow-up analysis of the simple two-way interaction revealed a two-way interaction approaching significance between Cyberball condition and gender for non-gamers [$F(1,152) = 3.83$, $p = .052$], but no such relationship was found for gamers ($p = .296$). A follow-up simple simple effects analysis revealed that female non-gamers who were excluded during the Cyberball task reported decreased feelings of self-belonging on the FNS compared to female non-gamers who were included [$F(1,152) = 30.12$, $p < .001$]. Similarly, male non-gamers who were excluded during the Cyberball task also reported decreased feelings of belonging on the FNS compared to male non-gamers who were included [$F(1,152) = 17.08$, $p < .001$]. Relevant means and standard deviations for group comparisons are presented in Figure 8.

Another significant three-way interaction was found between the effects of gaming status, Cyberball condition, and gender on self-esteem measured by the FNS. A follow-up analysis of the simple two-way interaction revealed a significant two-way interaction between gaming status and gender for participants who were excluded during Cyberball [$F(1,152) = 6.14$, $p = .014$]. A follow-up simple simple effects analysis revealed that male non-gamers who were excluded during the Cyberball task reported decreased feelings of self-esteem on the FNS compared to males gamers who were excluded [$F(1,152) = 6.00$, $p = .015$]. No such relationship was found for females ($p = .476$). Relevant means and standard deviations for group comparisons are presented in Figure 9.

A two-way interaction approaching significance was found between the effects of Cyberball condition and gaming status on SAM Dominance difference scores. A follow-up simple effects analysis revealed that non-gamers ($p = .001$) who were excluded during Cyberball reported decreased feelings of dominance compared to their non-gamers peers who were in the inclusion condition. Relevant means and standard deviations for group comparisons are presented in Figure 1.

Another two-way interaction was found between the effects of Cyberball condition and gender on belonging measured by the CBC. A follow-up simple effects analysis revealed that both females ($p = .004$) and males ($p < .001$) who were excluded during Cyberball reported less feelings of belonging than their same-gender peers who were in the inclusion condition. Relevant means and standard deviations for group comparisons are presented in Figure 2.

Another two-way interaction was found between the effects of Cyberball condition and gender on meaningful existence measured by the FNS. A follow-up simple effects analysis revealed that males ($p < .001$) who were excluded during Cyberball reported less feelings of meaningful existence than their same-gender peers who were in the inclusion condition. Relevant means and standard deviations for group comparisons are presented in Figure 3.

Main effects of Cyberball condition status were found for the following measures: SAM dominance difference scores, belonging, control, self-esteem, and meaningful existence (all fundamental needs measured by both the FNS and CBC). Relevant means and standard deviations for group comparisons for these factors are presented in Table 5.

ANOVA for Interaction of Online Gaming Status and Cyberball Condition

Another stated goal of the study was to determine if participants who play specific types of video games respond differently to exclusion via the Cyberball task in terms of their responses on measures of fundamental needs and affect. To address this goal, participants who reported that they played video games were asked to list the three video game titles that they played most often. Afterward, every video game mentioned by participants was compiled into a list that was then presented to a panel of 14 expert gamers. For each video game, expert gamers were asked, “Is this video game most commonly played online, over the internet, with other people?” The panel experts could respond with “Yes,” “No,” or “I don’t know.” If a game received at least seven votes and a majority of votes were affirmative, that game was classified as an online game. Following this step, participants were then categorized according to whether or not they commonly played online video games, based off of whether or not they reported playing any of the games previously identified as a game most commonly played online by the panel of experts. This information was used to create the variable of online gaming status. Results of these analyses are reported (including partial eta-squared effect sizes) in Tables 17 through 27.

In summary, there were no detected interaction effects between online gaming status and Cyberball condition on affect as measured by the SAM or on reported fundamental needs. All other detected two-way interaction effects between Cyberball condition and gender, as well as main effects of Cyberball condition, are already described elsewhere in this report.

ANOVA for Interaction of MMORPG Gaming Status and Cyberball Condition

Another study goal was to determine if participants who play MMORPGs respond differently to exclusion via the Cyberball task in terms of their responses on measures of fundamental needs and affect compared to participants who do not play MMORPGs, but still report playing video games, and participants who reported they do not play video games. To address this goal, participants were provided a brief description of several characteristics of an MMORPG, several popular, current examples of MMORPGs, and then directly asked via the

GMHQ whether or not they play MMORPGs. Participants were categorized according to whether or not they reported playing MMORPGs (i.e., MMORPG gaming status). Results of these analyses are reported (including partial eta-squared effect sizes) in Tables 28 through 38.

A significant three-way interaction was found between the effects of MMORPG gaming status, Cyberball condition, and gender on self-esteem measured by the FNS. A follow-up analysis of the simple two-way interaction revealed a significant two-way interaction between MMORPG gaming status and gender for those in the exclusion Cyberball condition [$F(2,145) = 4.84$, $p = .009$], but no such relationship was found for those in the inclusion condition ($p = .166$). A follow-up simple simple effects analysis revealed that, for males, both MMORPG-gamers [$F(1,145) = 8.38$, $p = .004$] and gamers who did not play MMORPGs ("non-MMORPG-gamers") [$F(1,145) = 4.28$, $p = .040$] differed significantly from non-gamers, but not from one another (MMORPG-gamers and non-MMORPG-gamers). Male MMORPG-gamers and non-MMORPG-gamers both reported higher levels of self-esteem than non-gamers. Relevant means and standard deviations for group comparisons are presented in Figure 10.

A significant two-way interaction was found between the effects of Cyberball condition and gender on SAM Valence difference scores. A follow-up simple effects analysis revealed that males ($p = .018$) who were excluded during Cyberball reported a greater decrease in valence than their same-gender peers who were in the inclusion condition. Relevant means and standard deviations for group comparisons are presented in Figure 4.

Another two-way interaction was found between the effects of Cyberball condition and gender on belonging measured by the CBC. A follow-up simple effects analysis revealed that both females ($p = .009$) and males ($p < .001$) who were excluded during Cyberball reported less feelings of belonging than their same-gender peers who were in the inclusion condition. Relevant means and standard deviations for group comparisons are presented in Figure 2.

A two-way interaction was found between the effects of MMO gaming status and gender on control measured by the FNS. A follow-up simple effects analysis revealed that female participants who reported playing MMORPG games ("MMORPG-gamers") reported less feelings of control than male MMORPG-gamers. Relevant means and standard deviations for group comparisons are presented in Figure 7.

Main effects of Cyberball condition status were found for the following measures: SAM dominance difference scores, belonging, control, self-esteem, and meaningful existence (i.e., all fundamental needs measured by both the FNS and CBC). Relevant means and standard deviations for group comparisons for these factors are presented in Table 5.

DISCUSSION

The primary aim of the current study was to determine whether the effects of the experience of ostracism induced via Cyberball differed depending on whether the person regularly plays video games, especially if they report playing video games that include a social component as a core feature (e.g., MMORPGs). Given the ubiquity of social features present in many current video games and that the social aspect of certain genres of video games (i.e., MMORPGs) is frequently cited as a primary reason individuals choose to play said video games, it was hypothesized that online gamers might be more sensitive to online social interactions based upon their previous experiences with online video games, and therefore report a greater decrease in both affect and fundamental needs after being ostracized during the Cyberball task. The nature of the results of this study and possible implications are presented below.

Video Game Use and Response to Ostracism

Overall, mild support was found for the hypothesis that gaming status (i.e., whether or not the participant engages in video game use) may interact with Cyberball condition status (i.e., whether the participant was included or excluded during the Cyberball game) to predict scores on measures of fundamental needs and affect. However, there are some important qualifications: (a) interaction effects were only found for two of the four fundamental needs (i.e., self-esteem and sense of belonging) and one dimension of affect (i.e., dominance), (b) the effect sizes of the interactions were relatively small compared to the main effects of Cyberball condition status alone, and (c) the detected interaction effects no longer reached statistical significance after applying the Bonferonni correction to adjust for excess Type I error.

The general findings regarding the main effect of Cyberball condition status alone are not wholly surprising given previous meta-analytic research findings suggesting that the effects of ostracism induced via Cyberball are relatively robust (e.g., similar effects have been found consistently regardless of age, gender, or country of origin; Hartgerink et al., 2015). According to Williams' (2009) temporal needs-threat model of ostracism, the ability to detect ostracism serves an evolutionary purpose for humans, seeing as ostracism from the group could be a death sentence for those ostracized. Under this model, it is this largely aversive experience of threat to our fundamental needs and our negative affective experiences that redirects our attention to the looming threat of ostracism, which allows us to take immediate corrective action to ensure our survival through continued group membership (Williams, 2009). Viewing human reactions to ostracism through this universal lens, it makes sense that the findings of the current study support that the experience of ostracism affected the participants' experiences of fundamental needs threat regardless of gaming status.

With that said, results of the current study offer some mild support for the interaction effect of gaming status and Cyberball condition on participants' reactions to ostracism. For example, a two-way interaction effect trending toward significance was found between gaming status and Cyberball condition status on participants' difference scores on dominance measured by the SAM. Non-gamers who were excluded reported a greater decrease in feelings of dominance following the Cyberball task than did non-gamers who were included. This difference between non-gamers was greater than that observed between gamers, suggesting the possibility that gamers were less affected by the experience of ostracism during the digital ball-toss task than their non-gamer peers. This finding is interesting in that it differs from the current study's original hypothesis that gamers would be more sensitive (i.e., experience a greater decrease in positive affect and fundamental needs) than non-gamers to the experience of ostracism.

Similar interactions effects were found between gaming status, Cyberball condition status, and gender on the fundamental needs of belonging and self-esteem. For male participants in particular, a larger discrepancy in sense of belonging and self-esteem was found between non-gamers based on Cyberball condition status (i.e., those who were included or excluded) than the size of the discrepancy between gamers based on condition status. When comparisons were made specifically between gamers who were identified as having played MMORPGs, gamers who did not play MMORPGs, and non-gamers, another similar three-way interaction was detected between MMORPG-gaming status, Cyberball condition, and gender on self-esteem. Non-gamers who were excluded during the Cyberball task reported significantly lower levels of self-esteem following the task than did MMORPG-gamers who were excluded.

These findings suggest the possibility that those who frequently play video games may experience less of an effect on fundamental needs and affect when exposed to exclusion via the Cyberball task than non-gamers. One possible explanation may have to do with exposure to digital violence, and the tendency for people who frequently play violent video games to dehumanize other players within games (Greitemeyer & McLatchie, 2011). It is possible that people who spend more time playing video games are naturally exposed to more violence within video games, resulting in a tendency to dehumanize other players in video games. This same tendency to dehumanize others in video games may serve a somewhat protective factor against feelings of ostracism that occurs in a digital environment, such as the one during Cyberball or when playing games online, reducing the individual’s sensitivity to the negative social feedback they are getting from others in said digital environment.

Similarly, national survey data suggests that a great deal of harassment of others occurs online, such that 40% of internet users report having experienced harassment over the Internet (Pew Research Center, 2014). In this regard, video games are no different. The competitive nature of some online video games, the relative anonymity of playing online (and therefore degree of protection from real-world repercussions for their behavior), and inherent aggression in some genres of video games may be tied to a person's likelihood to experience harassment or ostracism while playing online games (Tang & Fox, 2016). There is also research to suggest that some users experience discrimination in the form of sexist or racist remarks during their online play if they are perceived as not belonging to the majority group (Tang & Fox, 2016; Kuznekoff & Rose, 2013; Gray, 2012). One possible interpretation of the results of the current study could be that gamers may be exposed to more intense or provocative forms of ostracism more regularly online in the form of various types of harassment, and therefore are more de-sensitized to the comparatively tame form of ostracism that occurs during Cyberball. This desensitization may help to further buffer against the experience of negative affect and depletion of fundamental needs that one experiences from ostracism during Cyberball compared to non-gamers. Alternatively, it may be that gamers who are regularly exposed to ostracism and harassment from playing online video games have had the opportunity to develop coping skills from their prior experiences with ostracism or harassment that occurs in online video games. These coping skills may serve to help somewhat buffer gamers against the negative effects of ostracism in Cyberball.

Another possible explanation can be tied to the manner in which feelings of ostracism were induced. For example, it may simply be that individuals who have a tendency to play video games in their free time have more exposure to receiving all types of feedback in a digital environment similar to Cyberball (e.g., online video games). It may be that, over time, gamers become less sensitized to negative social feedback in digital environments due to the understanding that receiving occasional negative feedback while playing video games is relatively low risk in the context of the game, and therefore they may be less sensitive than non-gamers who are not as accustomed to receiving messages of social rejection in a digital environment.

Additionally, it may be possible that frequent gamers are better able to detect the difference between human players and computer-controlled players like the ones used in the Cyberball task. Although previous research suggests that participants experience a depletion of fundamental needs and heightened negative affect even when the other ball-toss partners in Cyberball are computer-controlled (Zadro, Williams, & Richardson, 2004), it may be that prior experience in interacting with various computer-controlled characters in video games may somewhat lessen gamers' reactions to experiencing ostracism during Cyberball. Future studies may seek to address these considerations by comparing gamers' response to ostracism when induced via a digital task (e.g., Cyberball) to reactions from ostracism in face-to-face interactions.

Lastly, it may simply be that gamers experience a greater sense of comfort, confidence, or enjoyment during Cyberball due to the task's similarities to the structure of a video game. This familiarity with performing a task in a format reminiscent of playing a video game, a hobby which they presumably find pleasure in, may serve to somewhat buffer the negative effects of ostracism that are typically observed.

Ostracism and Depletion of Fundamental Needs

As expected based on previous research, Cyberball condition status had a statistically significant main effect on all measured fundamental needs, such that participants who were excluded during Cyberball reported lower levels of belonging, personal control, self-esteem, and sense of meaningful existence following the Cyberball task than did participants who were included. These findings are commensurate with previous research previously outlined regarding the temporal needs-threat model of ostracism and the importance of our ability to detect ostracism through the depletion of our fundamental needs (Williams, 2009), as well as previous meta-analytic findings (Hartgerink et al., 2015) supporting the robustness of similar findings regarding depletion of fundamental needs following ostracism across a variety of study conditions (e.g., varying age, country of origin, duration of the Cyberball task itself, and number of throws used).

Interestingly, interaction effects between Cyberball condition and gender were observed for the fundamental needs of sense of belonging and meaningful existence, such that males experienced a greater drop in both fundamental needs than did females. However, the same qualifications noted earlier about the interaction effects between gaming status and Cyberball condition also apply here: (a) the effect sizes of the main effect of Cyberball condition alone were larger than either of the detected interaction effects, and (b) these interaction effects no longer reached statistical significance after applying the Bonferonni correction to control for excess Type I error.

Recent meta-analytic findings examining 120 studies involving the Cyberball task (Hartgerink et al., 2015) suggest that gender does not significantly influence responses to the Cyberball task. However, findings regarding gender have been mixed. There is some evidence to suggest that the cognitive processes of males and females may be affected differently by ostracism via the Cyberball task (Hawes et al., 2012), that our perceptions of ostracism may differ according to gender, especially in young children (Galen & Underwood, 1997), and that although gender may not moderate the effects of ostracism on fundamental needs, males and females tend to respond differently in terms of their behavioral reactions to ostracism (Williams & Sommer, 1997). Although the results of the current study suggest only a mild interaction effect of gender on reactions to exclusion on the Cyberball task, it suggests the possibility that further research should be devoted to this area.

Ostracism and Affect

The experience of ostracism during the Cyberball task also had a significant effect on the participants' affect as measured by the SAM. Participants who were excluded during the Cyberball task reported greater decreases in both positive valence and dominance following the Cyberball task than participants who were included. These findings are in line with previous research suggesting that experiences of ostracism not only threaten our fundamental needs, but also bring about heightened negative emotions (Gerber & Wheeler, 2009). In the context of the temporal needs-threat model of ostracism, it makes sense that any negative reactions to the experience of ostracism (i.e., depletion of fundamental needs, negative emotional reactions) may serve an evolutionary purpose such that they redirect our attention to the threat of ostracism, allowing us to engage in corrective actions to avoid the impending group exclusion and ensure our continued survival (Williams, 2009).

Exploratory Analyses

Several secondary, exploratory analyses were also conducted as a part of the current study. One such analysis involved examining the relationships between participants' general experiences of ostracism in their life (measured via the OES), perceptions regarding the amount and quality of social support they receive from their environment, and symptoms of depression, anxiety, and stress.

Previous research has provided some support for the theory that prolonged exposure to ostracism depletes an individual's resources over time, resulting in long-term negative outcomes for the person (Williams, 2009). Although much of the research regarding the long-term consequences of ostracism is qualitative in nature and based on retrospective interviews, some common themes reported by individuals who have experienced chronic ostracism include depressed mood, feelings of helplessness, a tendency to avoid social interactions out of fear of further rejection, and low sense of self-worth (Cacioppo & Hawkley, 2005). Based on these findings, it was hypothesized that high scores on the OES would be positively correlated with a greater number of symptoms of depression, anxiety, and stress reported on the DASS. Moderate positive correlations were observed between scores on the OES and all subscales of the DASS, suggesting that participants who harbored the perception of themselves as experiencing ostracism in their life also report increased symptoms of depression, anxiety, and stress. These findings provide some support for the notion that prolonged exposure to ostracism is associated with negative psychological outcomes based on the temporal needs-threat model (Williams, 2009).

As a further follow-up to this relationship, correlational analyses were used to examine whether social support was related to experiences of ostracism and symptoms of psychopathology on the DASS. The number of people identified by the participant as being a part of their social network and self-reported satisfaction regarding the amount of social support they receive (both measured via the SSQ) were both moderately negatively correlated with symptoms of depression, anxiety, and stress reported via the DASS. Additionally, both size of the participants' social support networks and satisfaction with the amount of social support they receive were also moderately negatively correlated with reported experiences of ostracism.

Given that all of the aforementioned findings are based upon correlational data, there are several possible interpretations of these relationships. One possible explanation is that individuals who experience heightened levels of depression, anxiety, and stress throughout their lives may be less likely to have the available interpersonal resources to avoid the experiences of ostracism. It is also plausible that individuals who report greater levels of depression exhibit a pessimistic explanatory style wherein they are more likely to perceive themselves as being a victim of ostracism, even when that may not necessarily be the case. Lastly, it is also possible the observed relationship between past experiences of ostracism and symptoms of psychopathology can be attributed to some unknown third variable, such as levels of social support.

Limitations and Future Directions

Although this study attempts to expand the field's understanding of ostracism, video game use, and their relationships with various psychosocial variables, there are certain limitations to the current study that must be recognized. One such limitation lies in the demographic characteristics of the sample used for the current study. In terms of age, although a small percentage of participants were recruited from the community and under the age of 18-years-old, the majority of study participants were drawn from a young-adult, college undergraduate student population. In terms of ethnicity, the majority of participants self-identified as white / non-Hispanic. Given the growing diversity in gamers from different age groups, education histories, and ethnic backgrounds, the results of this study may be limited in their ability to generalize beyond the aforementioned groups. In follow-up studies, it may be beneficial to either make a more concerted effort to specifically recruit young adolescent participants or emerging adults from a wider socioeconomic and educational background to enhance generalizability.

Similarly, although roughly equal rates of male and female participants were recruited to take part in the study and there were members of both genders represented as gamers and non-gamers, the majority of self-identified gamers were male and the majority of non-gamers were female. In an attempt to statistically control for this difference, gender was included as an independent variable in the primary ANOVA interactions utilizing gaming status.

Another limitation of the study lies in how gaming status was assessed. In particular, participants were categorized according to whether they played games in which online play was a core feature of the game based off of their self-report of the three games that they have played the most in the past month. A group of experts reviewed the list of all games reported by participants and classified each game according to whether they were considered an online game or not (i.e., commonly played online, over the Internet, and with other people). This information was then used to categorize participants according to which games they reported playing the most over the past month. Although this method provides some insight into participants' preferences for particular gaming experiences, future studies may seek to ask participants directly about their preferences for specific aspects or features of video games that they have played regularly over the past month, rather than approximating this information via categorizing the video games they report playing. This may enhance one's ability to more directly assess the social aspects of video game use that are of interest.

Another related limitation is that it can be difficult to accurately and meaningfully distinguish between video game genres. Several video games possess a great deal of overlap between multiple genres. For example, a video game may be classified as both an MMORPG and as a strategy game, or both MMORPG and first-person shooter (FPS). This blending of multiple genres within a single game may make it difficult to accurately assess the effects of certain features thought to be a core component of a particular genre (e.g., comparing the social aspects of a pure MMORPG genre video game to another game that is a blend of MMORPG and genres of video games). Once again, asking participants more directly about their experience with particular features or aspects of games they play (e.g., prosocial features, online competitive features) may be helpful in this regard.

Clinical Implications

The findings of the current study suggest that experiences of ostracism are related to the immediate depletion of fundamental needs, decreases in certain affective experiences (i.e., valence and dominance), and self-reported symptoms of depression, anxiety, and stress. These findings support the temporal needs-threat model of ostracism, which proposes that individuals who experience ostracism are subject to both short-term and long-term negative consequences (Williams, 2009). Although the concept of ostracism is distinct from social isolation and chronic loneliness, a qualitative study of people who experienced chronic ostracism found that social isolation, feelings of hopelessness regarding their situation, and depression were common themes reported among these individuals (Zadro, 2004). Although a great deal of research has already been dedicated to understanding the positive benefits of social support, it is equally important for researchers and clinicians to strive to expand the available knowledge on the negative outcomes associated with experiences of ostracism, rejection, and isolation, especially given the theorized link between these experiences and related psychopathology (e.g., depression) so as to better serve those who may experience chronic ostracism from others.

Additionally, although only tentative support was found for the hypothesis that people who regularly play video games have a tendency to be less sensitive to acute experiences of ostracism induced via Cyberball than non-gamers, the current study highlights the notion that it may be fruitful to understand how experiences of ostracism may differ based upon a person's history (e.g., experiences with playing video games). Given the ubiquity of online features in current video games (e.g., a majority of video games listed by gamers in the current study were identified by a panel of experts as containing an online component that was core to the gameplay experience) and the findings in previous research studies suggesting that social features are an important aspect in several video game genres (Griffiths, Davies, & Chappell, 2004), it is likely that some degree of ostracism occurs in the course of engaging with others in online video games. If experiences of ostracism are linked to experiences of depression and social isolation, both of which may act as risk factors for the development of pathological video game use, it may be beneficial for researchers and clinicians to have a better understanding of how ostracism may interact with this unique population (i.e., gamers).

CONCLUSIONS

In conclusion, mild support was found for the hypothesis that video game use interacts with the experience of ostracism during the Cyberball task to predict various psychosocial outcomes. Non-gamers had a tendency to report lower levels of the fundamental needs of self-esteem and sense of belonging than did gamers, but the effects were small in comparison to the main effects of Cyberball condition status alone across all the fundamental needs and the majority of affective experiences (i.e., positive valence and dominance). However, given the widespread use of video games and the growing number of video games that possess some type of online, social component, it may be beneficial for clinicians and researchers alike to have a better understanding of how digital interactions may influence one's reactions to the experience of ostracism online. Future studies may seek to ask participants directly about their in-game activities and preferences for different types of social activities in video games or their experiences with ostracism in digital settings in order to provide a more thorough understanding of this relationship between video game use and reactions to ostracism.

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APPENDIX A

TABLES

Table 1. Gender and Ethnicity Sample Information

	N	*Percentage*
Gender		
Female	81	50.6
Male	79	49.4
Ethnicity		
White / Non-Hispanic	97	60.6
Hispanic	20	12.5
Asian	20	12.5
Other / Mixed Race	16	10.0
African American	7	4.4

Table 2. Means, Standard Deviations, and Correlations for Age by Psychosocial Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	--											
2. Gaming per day	-.205*	--										
3. Gaming per week	-.235**	.950**	--									
4. DASS Depression	-.012	.074	.084	--								
5. DASS Stress	-.044	.053	.044	.668**	--							
6. DASS Anxiety	-.009	-.022	-.056	.584**	.707**	--						
7. FNEB	.061	-.229**	-.254**	.210**	.383**	.354**	--					
8. SSQ # of People	-.080	-.015	.004	-.303**	-.237**	-.196*	-.068	--				
9. SSQ Satisf.	-.041	.012	.016	-.296**	-.230**	-.159*	-.094	.557**	--			
10. SSQ-O # of People	-.156*	.364**	.380**	.132	.169**	.145	.116	.083	.060	--		
11. SSQ-O Satisf.	.005	-.019	-.030	.042	-.051	.008	-.044	.128	.251**	.029	--	
12. OES	-.121	.034	.053	.375**	.376**	.443**	.147	-.399**	-.390**	.074	-.045	--
13. SAM Valence[a]	-.092	-.067	-.089	.180*	.106	.026	.023	-.091	.027	.059	.247**	.080
14. SAM Arousal[a]	.123	-.019	-.040	.014	-.032	.017	-.160	-.102	-.084	-.134	.010	.012
15. SAM Dom.[a]	-.130	-.204*	-176*	.033	-.031	-.031	-.004	-.011	-.022	.105	.201*	.094
16. FNS Belonging	-.019	-.120	-.099	-.048	-.147	-.005	-.072	.003	.053	.013	.182*	-.037
17. FNS Control	-.145	-.060	-.041	-.106	-.208**	-.115	-.083	.036	.051	.035	.088	-.014
18. FNS Self-Esteem	.009	-.016	-.015	-.195*	-.280**	-.146	-.175*	.177*	.165*	-.031	.214**	-.196*
19. FNS Mean. Exist.	.044	-.107	-.127	-.075	.016	.028	-.061	-.001	-.003	.017	.082	.020
20. CBC Belonging	-.003	.051	.099	-.092	-.214*	-.171	-.135	-.019	.053	.073	.080	-.052
21. CBC Control	-.066	-.039	-.026	.040	-.051	.055	-.082	.043	.056	.081	.099	-.007
22. CBC Self-Esteem	.055	.182	.159	-.219*	-.204*	-.240**	-.121	.095	.158	.094	.157	-.141
23. CBC Mean. Exist.	.012	.089	.146	-.109	-.207*	-.085	-.092	-.001	.135	.064	.086	.010

Table 2. Continued

Variables	13	14	15	16	17	18	19	20	21	22	23
1. Age											
2. Gaming per day											
3. Gaming per week											
4. DASS Depression											
5. DASS Stress											
6. DASS Anxiety											
7. FNEB											
8. SSQ # of People											
9. SSQ Satisf.											
10. SSQ-O # of People											
11. SSQ-O Satisf.											
12. OES											
13. SAM Valence[a]	--										
14. SAM Arousal[a]	-.228**	--									
15. SAM Dom.[a]	.462**	-.144	--								
16. FNS Belonging	.387**	-.197*	.418**	--							
17. FNS Control	.321**	-.210*	.373**	.700**	--						
18. FNS Self-Esteem	.380**	-.173*	.322**	.702**	.662**	--					
19. FNS Mean. Exist.	.066	.012	.128	.268**	.235**	.128	--				
20. CBC Belonging	.309**	-.061	.290**	.778**	.683**	.674**	.269**	--			
21. CBC Control	.135	-.089	.259**	.496**	.489**	.436**	.206*	.386**	--		
22. CBC Self-Esteem	.353**	-.021	.235*	.508**	.535**	.627**	.213*	.504**	.510**	--	
23. CBC Mean. Exist.	.242**	-.099	.229*	.731**	.659**	.701**	.215*	.792**	.411**	.513**	--
Mean	-.57	-.10	-.23	3.79	3.80	5.35	4.48	3.00	1.99	2.90	3.50
Standard Deviation	1.30	1.36	1.22	2.10	1.75	2.02	1.07	1.26	.93	.88	1.30

**Denotes significance at the $p < .05$ level (2-tailed).*
***Denotes significance at the $p < .01$ level (2-tailed).*
[a]*Reported SAM scores are contrast scores calculated by subtracting pre-Cyberball SAM scores from post-Cyberball SAM scores.*

Table 3. ANOVA for Gender and Psychosocial Variables

	F(df)	*p*	*Females* *M (SD)*	*Males* *M (SD)*
1. Gaming per day	32.699 (1,154)	.000**	.28 (.68)	1.66 (2.04)
2. Gaming per week	28.260 (1,155)	.000**	1.13 (2.80)	10.12 (14.77)
3. DASS Depression	5.253 (1,158)	.023*	6.98 (7.41)	4.54 (5.91)
4. DASS Stress	8.521 (1,158)	.004*	13.22 (9.18)	9.48 (6.83)
5. DASS Anxiety	8.013 (1,158)	.005*	8.33 (7.50)	5.44 (5.18)
6. FNEB	21.403 (1,158)	.000**	41.74 (10.08)	34.77 (8.92)
7. SSQ # of People	5.285 (1,158)	.023*	29.14 (12.04)	33.52 (12.07)
8. SSQ Satisf.	1.809 (1,158)	.181	30.49 (5.52)	31.53 (4.13)
9. SSQ-O # of People	1.131 (1,158)	.289	5.11 (7.66)	3.94 (6.21)
10. SSQ-O Satisf.	.779 (1,158)	.379	29.37 (7.07)	30.34 (6.85)
11. OES	3.679 (1,115)	.058	16.77 (8.09)	14.40 (4.72)
12. SAM Valence[a]	.124 (1,138)	.725	-.53 (1.23)	-.61 (1.38)
13. SAM Arousal[a]	.026 (1,138)	.872	-.08 (1.42)	-.12 (1.30)
14. SAM Dom.[a]	.210 (1,138)	.647	-.27 (1.29)	-.18 (1.14)
15. FNS Belonging	1.383 (1,158)	.241	3.60 (2.01)	3.99 (2.19)
16. FNS Control	2.459 (1,158)	.119	3.58 (1.64)	4.02 (1.84)
17. FNS Self-Esteem	6.144 (1,158)	.014*	4.97 (1.96)	5.75 (2.02)
18. FNS Mean. Exist.	1.795 (1,158)	.182	4.59 (1.00)	4.36 (1.13)
19. CBC Belonging	1.064 (1,115)	.305	2.88 (1.20)	3.12 (1.31)
20. CBC Control	2.0566 (1,115)	.154	1.87 (.82)	2.12 (1.02)
21. CBC Self-Esteem	4.452 (1,115)	.037*	2.73 (.82)	3.07 (.91)
22. CBC Mean. Exist.	2.519 (1,114)	.115	3.32 (1.26)	3.70 (1.31)

**Denotes significance at the $p < .05$ level.*
***Denotes significance at the $p < .001$ level.*
[a]*Reported SAM scores are contrast scores calculated by subtracting pre-Cyberball SAM scores from post-Cyberball SAM scores.*

Table 4. ANOVA for Ethnicity and Psychosocial Variables

	F(df)	*p*	*White / Non-Hispanic M (SD)*	*Hispanic M (SD)*	*Asian M (SD)*	*Other / Mixed-Race M (SD)*	*African American M (SD)*
1. Gaming per day	1.070 (1,151)	.373	.94 (1.47)	1.32 (1.81)	.68 (.96)	.57 (1.03)	1.86 (4.49)
2. Gaming per week	.888 (1,152)	.473	5.44 (10.46)	6.71 (10.65)	4.55 (7.06)	3.25 (7.04)	12.57 (31.53)
3. DASS Depression	2.507 (1,155)	.044*	5.10 (5.72)	5.00 (6.60)	6.60 (6.57)	6.63 (6.99)	13 (15.14)
4. DASS Stress	.887 (1,155)	.473	12.19 (8.48)	8.75 (8.69)	10.05 (6.90)	11.00 (5.67)	12.29 (12.71)
5. DASS Anxiety	.130 (1,155)	.971	7.19 (7.12)	6.75 (7.28)	6.40 (5.33)	6.13 (4.28)	6.71 (5.96)
6. FNEB	1.796 (1,155)	.132	38.84 (10.84)	37.65 (8.86)	40.00 (8.06)	37.88 (6.68)	28.86 (12.09)
7. SSQ # of People	2.858 (1,155)	.025*	32.86 (11.92)	32.85 (12.59)	25.45 (10.28)	31.50 (13.37)	21.57 (11.39)
8. SSQ Satisf.	.699 (1,155)	.594	31.04 (4.87)	32.10 (4.42)	30.80 (4.14)	30.75 (5.35)	28.57 (7.53)
9. SSQ-O # of People	.094 (1,155)	.984	4.64 (6.18)	4.95 (7.13)	4.30 (9.39)	3.63 (6.99)	4.57 (10.83)
10. SSQ-O Satisf.	.330 (1,155)	.857	29.69 (7.01)	30.50 (6.26)	28.75 (7.68)	31.19 (6.13)	30.29 (9.00)
11. OES	1.141 (1,112)	.341	15.74 (6.59)	15.15 (7.01)	12.79 (4.23)	18.23 (8.94)	16.20 (7.19)
12. SAM Valence[a]	.597 (1,135)	.665	-.59 (1.33)	-.94 (1.34)	-.35 (1.46)	-.31 (1.01)	-.60 (.89)
13. SAM Arousal[a]	1.890 (1,135)	.946	-.05 (1.23)	-.12 (1.67)	-.35 (1.66)	-.12 (1.50)	.00 (1.41)
14. SAM Dom.[a]	1.451 (1,135)	.221	-.31 (1.13)	-.62 (1.20)	.06 (1.89)	.12 (.81)	.40 (.55)
15. FNS Belonging	.098 (1,155)	.983	3.80 (2.16)	3.57 (2.06)	3.90 (2.01)	3.73 (1.75)	4.05 (2.87)
16. FNS Control	.469 (1,155)	.758	3.87 (1.72)	3.40 (1.34)	3.77 (2.17)	3.69 (1.90)	4.33 (1.91)
17. FNS Self-Esteem	.560 (1,155)	.692	5.46 (2.02)	5.28 (2.21)	4.88 (1.74)	5.63 (1.70)	4.76 (2.98)
18. FNS Mean. Exist.	.252 (1,155)	.908	4.54 (1.15)	4.35 (1.08)	4.37 (.79)	4.50 (.91)	4.29 (.99)
19. CBC Belonging	.310 (1,112)	.871	3.08 (1.23)	2.74 (1.31)	3.05 (1.31)	2.82 (1.15)	2.80 (1.76)
20. CBC Control	.055 (1,112)	.994	2.00 (.91)	2.05 (1.15)	1.95 (.79)	1.90 (1.03)	2.00 (1.03)
21. CBC Self-Esteem	.531 (1,112)	.713	2.93 (.89)	2.92 (.94)	3.02 (.59)	2.72 (.94)	2.47 (1.19)
22. CBC Mean. Exist.	.168 (1,111)	.954	3.46 (1.34)	3.67 (1.11)	3.67 (1.21)	3.44 (1.32)	3.27 (1.69)

**Denotes significance at the $p < .05$ level.*

***Denotes significance at the $p < .001$ level.*

[a]*Reported SAM scores are contrast scores calculated by subtracting pre-Cyberball SAM scores from post-Cyberball SAM scores.*

Table 5. ANOVA for Cyberball Condition and Psychosocial Variables

	F(df)	*p*	*Inclusion Cond. M (SD)*	*Exclusion Cond. M (SD)*
1. Rejected	35.188 (1,158)	.000**	3.37 (2.11)	5.62 (2.63)
2. Ignored	117.847 (1,115)	.000**	2.60 (1.09)	4.46 (.73)
3. Excluded	93.619 (1,114)	.000**	2.80 (1.14)	4.69 (.75)
4. Included	85.542 (1,158)	.000**	5.36 (1.70)	2.63 (2.00)
5. SAM Valence[a]	4.733 (1,138)	.031*	-.36 (1.17)	-.83 (1.40)
6. SAM Arousal[a]	1.695 (1,138)	.195	-.24 (1.20)	.06 (1.52)
7. SAM Dom.[a]	13.589 (1,138)	.000**	.11 (1.09)	-.62 (1.25)
8. FNS Belonging	117.236 (1,158)	.000**	5.23 (1.64)	2.49 (1.56)
9. FNS Control	60.305 (1,158)	.000**	4.76 (1.79)	2.92 (1.17)
10. FNS Self-Esteem	43.284 (1,156)	.000**	6.28 (1.74)	4.51 (1.89)
11. FNS Mean. Exist.	17.822 (1,158)	.000**	4.83 (1.03)	4.15 (1.00)
12. CBC Belonging	65.806 (1,115)	.000**	3.56 (1.04)	1.99 (.93)
13. CBC Control	11.004 (1,115)	.001**	2.20 (.93)	1.63 (.93)
14. CBC Self-Esteem	13.344 (1,113)	.000**	3.09 (.82)	2.55 (.87)
15. CBC Mean. Exist.	73.631 (1,114)	.000**	4.10 (1.02)	2.41 (1.01)

**Denotes significance at the p < .05 level.*

***Denotes significance at the p < .001 level.*

[a]*Reported SAM scores are contrast scores calculated by subtracting pre-Cyberball SAM scores from post-Cyberball SAM scores.*

Table 6. ANOVA for SAM Valence Difference Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	1.237 (1,132)	.268	.009
Gender	2.033 (1,132)	.156	.015
Gaming Status	3.251 (1,132)	.074	.024
CC*Gender	3.627 (1,132)	.059	.027
CC*Gaming Status	.922 (1,132)	.339	.007
Gender*Gaming Status	.529 (1,132)	.468	.004
CC*Gender*Gaming Status	1.497 (1,132)	.223	.011

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 7. ANOVA for SAM Arousal Difference Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	2.948 (1,132)	.088	.022
Gender	.382 (1,132)	.538	.003
Gaming Status	1.062 (1,132)	.305	.008
CC*Gender	1.047 (1,132)	.308	.008
CC*Gaming Status	1.537 (1,132)	.217	.012
Gender*Gaming Status	.001 (1,132)	.977	.000
CC*Gender*Gaming Status	.879 (1,132)	.350	.007

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 8. ANOVA for SAM Dominance Difference Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	12.911 (1,132)	.000**	.089
Gender	.366 (1,132)	.546	.003
Gaming Status	1.986 (1,132)	.161	.015
CC*Gender	3.481 (1,132)	.064	.026
CC*Gaming Status	3.206 (1,132)	.076	.024
Gender*Gaming Status	.007 (1,132)	.935	.000
CC*Gender*Gaming Status	.965 (1,132)	.328	.007

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 9. ANOVA for FNS Belonging Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	85.034 (1,152)	.000**	.359
Gender	2.472 (1,152)	.118	.016
Gaming Status	.090 (1,152)	.764	.001
CC*Gender	.996 (1,152)	.320	.007
CC*Gaming Status	.060 (1,152)	.806	.000
Gender*Gaming Status	.022 (1,152)	.883	.000
CC*Gender*Gaming Status	4.858 (1,152)	.029*	.031

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 10. ANOVA for CBC Belonging Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	37.988 (1,109)	.000**	.427
Gender	1.647	.202	.015
Gaming Status	.077	.782	.001
CC*Gender	4.174	.043*	.037
CC*Gaming Status	2.773	.099	.025
Gender*Gaming Status	1.936	.167	.017
CC*Gender*Gaming Status	.005	.946	.000

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 11. ANOVA for FNS Control Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	38.348 (1,152)	.000**	.201
Gender	4.308 (1,152)	.040*	.028
Gaming Status	.468 (1,152)	.495	.003
CC*Gender	.833 (1,152)	.363	.005
CC*Gaming Status	.186 (1,152)	.667	.001
Gender*Gaming Status	.630 (1,152)	.429	.004
CC*Gender*Gaming Status	.963 (1,152)	.328	.006

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 12. ANOVA for CBC Control Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	8.417 (1,109)	.004*	.072
Gender	4.881 (1,109)	.029*	.043
Gaming Status	2.123 (1,109)	.148	.019
CC*Gender	.006 (1,109)	.936	.000
CC*Gaming Status	.004 (1,109)	.949	.000
Gender*Gaming Status	.787 (1,109)	.377	.007
CC*Gender*Gaming Status	.418 (1,109)	.520	.004

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 13. ANOVA for FNS Self-Esteem Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	43.124 (1,152)	.000**	.221
Gender	1.778 (1,152)	.184	.012
Gaming Status	.809 (1,152)	.370	.005
CC*Gender	8.351 (1,152)	.004*	.052
CC*Gaming Status	3.263 (1,152)	.073	.021
Gender*Gaming Status	1.700 (1,152)	.194	.011
CC*Gender*Gaming Status	6.240 (1,152)	.014*	.039

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 14. ANOVA for CBC Self-Esteem Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	8.021 (1,109)	.006*	.069
Gender	1.086 (1,109)	.300	.010
Gaming Status	.957 (1,109)	.330	.009
CC*Gender	1.133 (1,109)	.290	.010
CC*Gaming Status	2.381 (1,109)	.126	.021
Gender*Gaming Status	.305 (1,109)	.582	.003
CC*Gender*Gaming Status	.025 (1,109)	.876	.000

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*

Table 15. ANOVA for FNS Meaningful Existence Score by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	14.206 (1,152)	.000**	.085
Gender	1.851 (1,152)	.176	.012
Gaming Status	1.347 (1,152)	.248	.009
CC*Gender	4.382 (1,152)	.038*	.028
CC*Gaming Status	.038 (1,152)	.846	.000
Gender*Gaming Status	2.653 (1,152)	.105	.017
CC*Gender*Gaming Status	.943 (1,152)	.333	.006

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*

Table 16. ANOVA for CBC Meaningful Existence by Cyberball Condition, Gender, Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	57.109 (1,108)	.000**	.346
Gender	1.025	.314	.009
Gaming Status	.406	.525	.004
CC*Gender	3.268	.073	.028
CC*Gaming Status	2.463	.120	.022
Gender*Gaming Status	2.506	.116	.023
CC*Gender*Gaming Status	2.802	.097	.025

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 17. ANOVA for SAM Valence Difference Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	1.212 (1,130)	.273	.009
Gender	2.737 (1,130)	.100	.021
Online-Gaming Status (O-GS)	2.173 (2,130)	.118	.032
CC*Gender	4.449 (1,130)	.037*	.033
CC*O-GS	1.128 (2,130)	.327	.017

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 18. ANOVA for SAM Arousal Difference Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	1.936 (1,130)	.167	.015
Gender	2.579 (1,130)	.111	.019
Online-Gaming Status (O-GS)	1.920 (2,130)	.151	.029
CC*Gender	3.687 (1,130)	.057	.028
CC*O-GS	2.189 (2,130)	.116	.033

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 19. ANOVA for SAM Dominance Difference Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	8.308 (1,130)	.005*	.060
Gender	.835 (1,130)	.363	.006
Online-Gaming Status (O-GS)	1.310 (2,130)	.273	.020
CC*Gender	4.056 (1,130)	.046*	.030
CC*O-GS	1.808 (2,130)	.168	.027

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 20. ANOVA for FNS Belonging Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	51.168 (1,150)	.000**	.254
Gender	3.731 (1,150)	.055	.024
Online-Gaming Status (O-GS)	.362 (2,150)	.697	.005
CC*Gender	.317 (1,150)	.574	.002
CC*O-GS	.033 (2,150)	.967	.000

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 21. ANOVA for CBC Belonging Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	17.800 (1,108)	.000**	.141
Gender	2.307 (1,108)	.132	.021
Online-Gaming Status (O-GS)	.537 (2,108)	.586	.010
CC*Gender	1.333 (1,108)	.251	.012
CC*O-GS	1.413 (2,108)	.248	.026

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 22. ANOVA for FNS Control Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	24.082 (1,150)	.000**	.138
Gender	2.491 (1,150)	.117	.016
Online-Gaming Status (O-GS)	1.068 (2,150)	.346	.014
CC*Gender	1.172 (1,150)	.281	.008
CC*O-GS	.363 (2,150)	.697	.005

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 23. ANOVA for CBC Control Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	3.264 (1,108)	.074	.029
Gender	4.083 (1,108)	.046*	.036
Online-Gaming Status (O-GS)	1.040 (2,108)	.357	.019
CC*Gender	.058 (1,108)	.810	.001
CC*O-GS	.134 (2,108)	.875	.002

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 24. ANOVA for FNS Self-Esteem Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	17.839 (1,150)	.000**	.106
Gender	3.991 (1,150)	.048*	.026
Online-Gaming Status (O-GS)	.111 (2,150)	.895	.001
CC*Gender	3.225 (1,150)	.075	.021
CC*O-GS	.367 (2,150)	.694	.005

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 25. ANOVA for CBC Self-Esteem Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	3.288 (1,108)	.073	.030
Gender	.306 (1,108)	.581	.003
Online-Gaming Status (O-GS)	1.344 (2,108)	.265	.024
CC*Gender	1.480 (1,108)	.226	.014
CC*O-GS	1.519 (2,108)	.224	.027

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 26. ANOVA for FNS Meaningful Existence Score by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	15.001 (1,150)	.000**	.091
Gender	3.667 (1,150)	.057	.024
Online-Gaming Status (O-GS)	1.410 (2,150)	.247	.018
CC*Gender	6.962 (1,150)	.009*	.044
CC*O-GS	.784 (2,150)	.459	.010

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 27. ANOVA for CBC Meaningful Existence by Cyberball Condition, Gender, Online-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	38.961 (1,107)	.000**	.267
Gender	.295 (1,107)	.588	.003
Online-Gaming Status (O-GS)	.264 (2,107)	.768	.005
CC*Gender	2.812 (1,107)	.096	.026
CC*O-GS	1.421 (2,107)	.246	.026

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*O-GS and CC*Gender*O-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Male non-online gamers who were excluded).*

Table 28. ANOVA for SAM Valence Difference Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	1.934 (2,126)	.167	.015
Gender	.667 (1,126)	.416	.005
MMORPG-Gaming Status (MMORPG-GS)	1.704 (2,126)	.186	.026
CC*Gender	4.540 (1,126)	.035*	.035
CC*MMORPG-GS	.205 (2,126)	.815	.003
Gender*MMORPG-GS	.227 (2,126)	.797	.004
CC*Gender*MMORPG-GS	2.074 (2,126)	.152	.016

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 29. ANOVA for SAM Arousal Difference Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	2.560 (1,126)	.112	.020
Gender	.251 (1,126)	.617	.002
MMORPG-Gaming Status (MMORPG-GS)	.679 (2,126)	.509	.011
CC*Gender	.671 (1,126)	.414	.005
CC*MMORPG-GS	.870 (2,126)	.421	.014
Gender*MMORPG-GS	.015 (2,126)	.985	.000
CC*Gender*MMORPG-GS	1.247 (2,126)	.266	.010

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 30. ANOVA for SAM Dominance Difference Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	8.995 (1,126)	.003**	.067
Gender	.040 (1,126)	.842	.000
MMORPG-Gaming Status (MMORPG-GS)	1.676 (2,126)	.191	.026
CC*Gender	3.107 (1,126)	.080	.024
CC*MMORPG-GS	1.748 (2,126)	.178	.027
Gender*MMORPG-GS	.224 (2,126)	.800	.004
CC*Gender*MMORPG-GS	1.025 (2,126)	.313	.008

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*

Table 31. ANOVA for FNS Belonging Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	62.578 (1,145)	.000**	.301
Gender	5.382 (1,145)	.022*	.036
MMORPG-Gaming Status (MMORPG-GS)	.176 (2,145)	.839	.002
CC*Gender	.369 (1,145)	.544	.003
CC*MMORPG-GS	.046 (2,145)	.956	.001
Gender*MMORPG-GS	1.970 (2,145)	.143	.026
CC*Gender*MMORPG-GS	2.015 (2,145)	.137	.027

**Denotes significance at the $p < .05$ level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.*

Table 32. ANOVA for CBC Belonging Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	43.044 (1,106)	.000**	.289
Gender	1.687 (1,106)	.197	.016
MMORPG-Gaming Status (MMORPG-GS)	.199 (2,106)	.820	.004
CC*Gender	4.231 (1,106)	.042*	.038
CC*MMORPG-GS	1.546 (2,106)	.218	.028

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*MMORPG-GS and CC*Gender*MMORPG-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Female MMORPG players who were excluded).*

Table 33. ANOVA for FNS Control Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	33.100 (1,145)	.000**	.186
Gender	8.337 (1,145)	.004*	.054
MMORPG-Gaming Status (MMORPG-GS)	.401 (2,145)	.670	.006
CC*Gender	.745 (1,145)	.390	.005
CC*MMORPG-GS	.177 (2,145)	.838	.002
Gender*MMORPG-GS	3.067 (2,145)	.050*	.041
CC*Gender*MMORPG-GS	.966 (2,145)	.383	.013

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 34. ANOVA for CBC Control Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	4.774 (1,106)	.031*	.043
Gender	4.432 (1,106)	.038*	.040
MMORPG-Gaming Status (MMORPG-GS)	1.086 (2,106)	.341	.020
CC*Gender	.008 (1,106)	.931	.000
CC*MMORPG-GS	.220 (2,106)	.803	.004

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*MMORPG-GS and CC*Gender*MMORPG-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Female MMORPG players who were excluded).*

Table 35. ANOVA for FNS Self-Esteem Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	30.693 (1,145)	.000**	.175
Gender	10.102 (1,145)	.002**	.065
MMORPG-Gaming Status (MMORPG-GS)	.938 (2,145)	.394	.013
CC*Gender	2.263 (1,145)	.135	.015
CC*MMORPG-GS	1.276 (2,145)	.282	.017
Gender*MMORPG-GS	4.640 (2,145)	.011*	.060
CC*Gender*MMORPG-GS	3.097 (2,145)	.048*	.041

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 36. ANOVA for CBC Self-Esteem Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	3.910 (1,106)	.051	.036
Gender	.697 (1,106)	.406	.007
MMORPG-Gaming Status (MMORPG-GS)	.822 (2,106)	.442	.015
CC*Gender	1.182 (1,106)	.279	.011
CC*MMORPG-GS	1.259 (2,106)	.288	.023

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*
*Gender*MMORPG-GS and CC*Gender*MMORPG-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Female MMORPG players who were excluded).*

Table 37. ANOVA for FNS Meaningful Existence Score by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	15.914 (1,145)	.000**	.099
Gender	1.678 (1,145)	.197	.011
MMORPG-Gaming Status (MMORPG-GS)	.896 (2,145)	.410	.012
CC*Gender	.402 (1,145)	.527	.003
CC*MMORPG-GS	.961 (2,145)	.385	.013
Gender*MMORPG-GS	1.171 (2,145)	.313	.016
CC*Gender*MMORPG-GS	1.258 (2,145)	.287	.017

**Denotes significance at the p < .05 level.*
***Denotes significance after using the Bonferonni method to control for excess Type I error, p < .002.*

Table 38. ANOVA for CBC Meaningful Existence by Cyberball Condition, Gender, MMORPG-Gaming Status

	F(df)	*p*	*Partial η2*
Cyberball Condition (CC)	46.964 (1,105)	.000**	.309
Gender	1.502 (1,105)	.223	.014
MMORPG-Gaming Status (MMORPG-GS)	.087 (2,105)	.917	.002
CC*Gender	2.058 (1,105)	.154	.019
CC*MMORPG-GS	.725 (2,105)	.487	.014

*Denotes significance at the $p < .05$ level.
**Denotes significance after using the Bonferonni method to control for excess Type I error, $p < .002$.
*Gender*MMORPG-GS and CC*Gender*MMORPG-GS interactions were excluded from analyses due to insufficient sample size for one of the relevant cells (i.e., Female MMORPG players who were excluded).*

APPENDIX B

FIGURES

Figure 1. Cyberball Condition*Gaming Status and SAM Dominance Difference Score

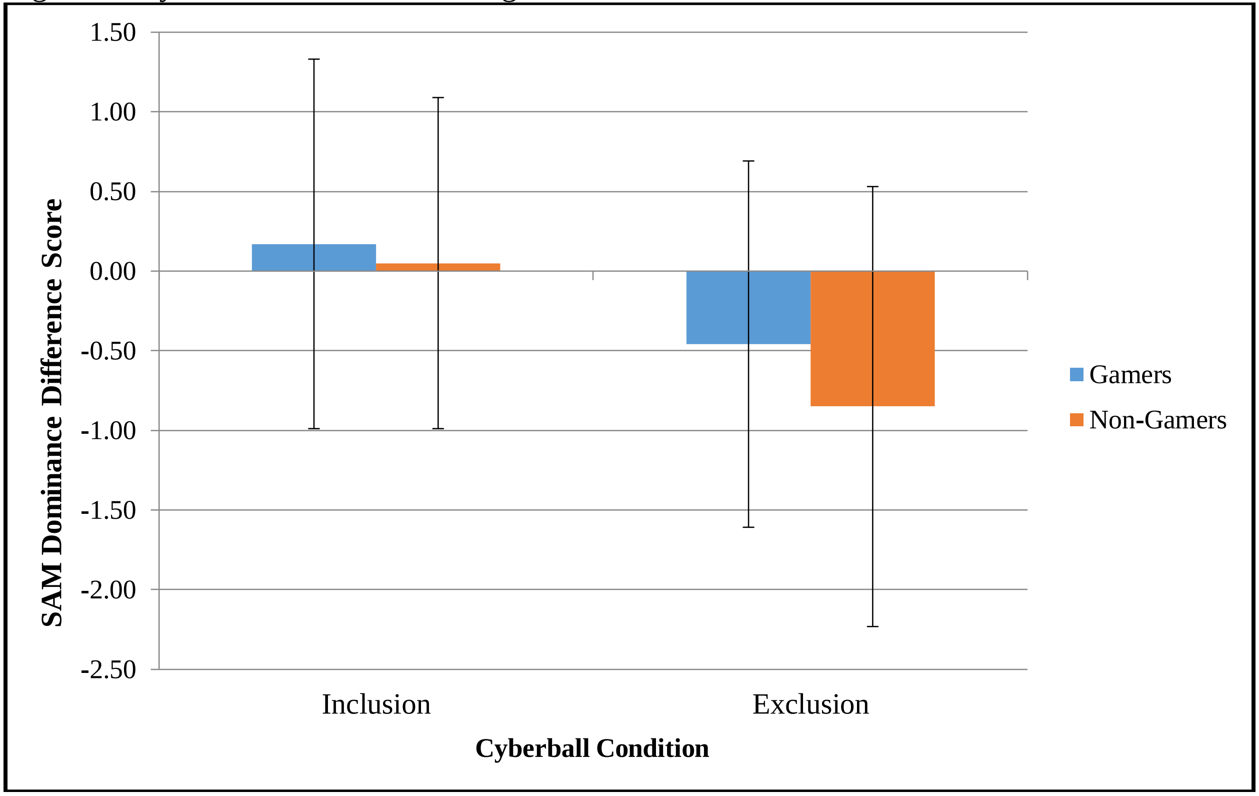

Figure 2. Cyberball Condition*Gender and CBC Belonging

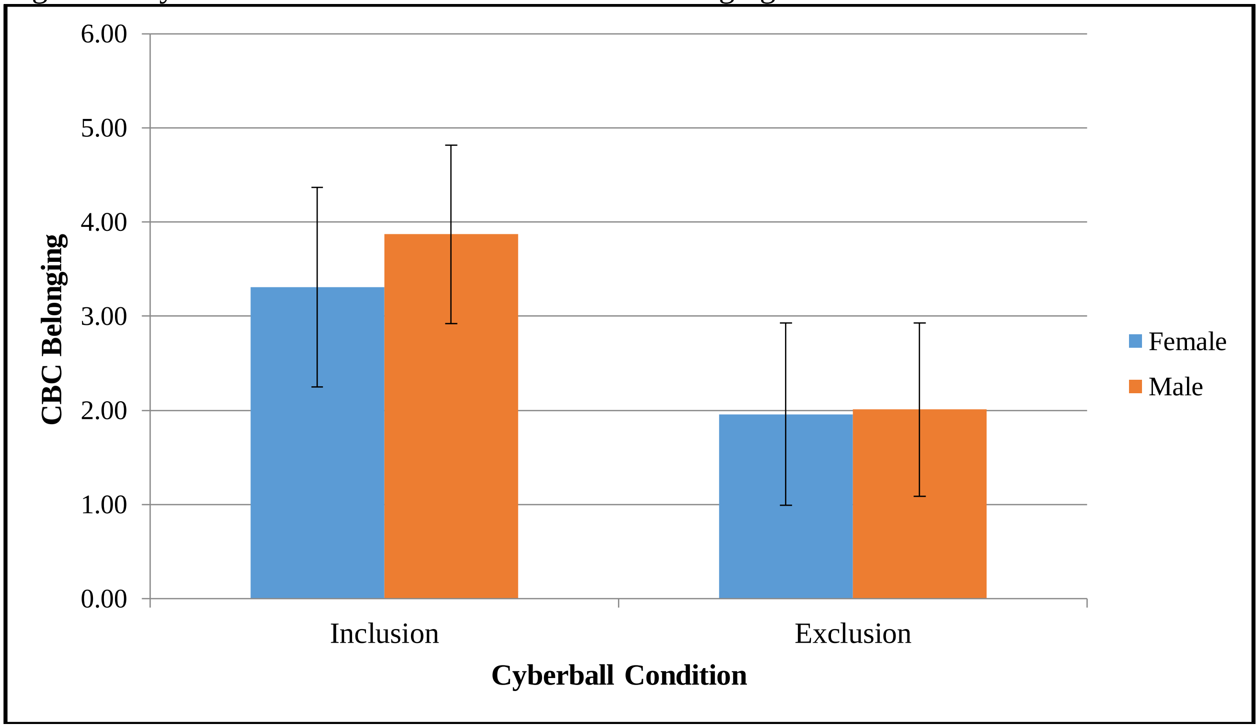

Figure 3. Cyberball Condition*Gender and FNS Meaningful Existence

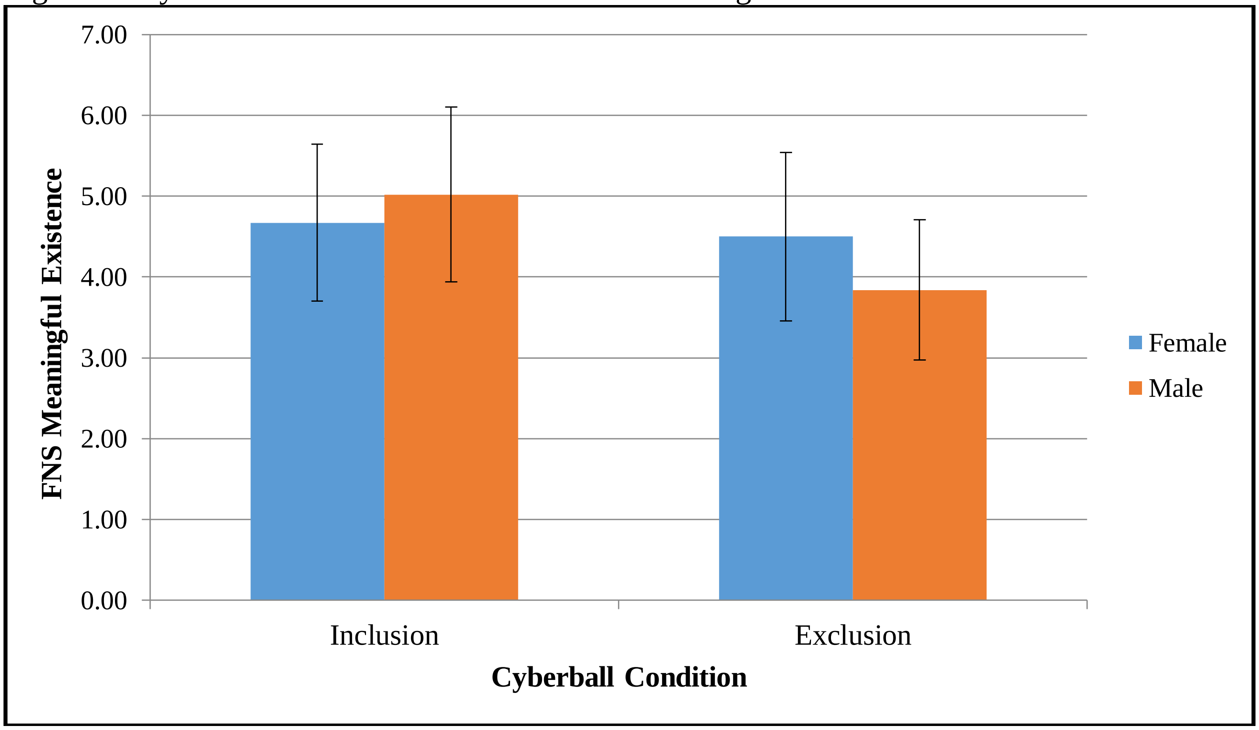

Figure 4. Cyberball Condition*Gender and SAM Valence Difference Score

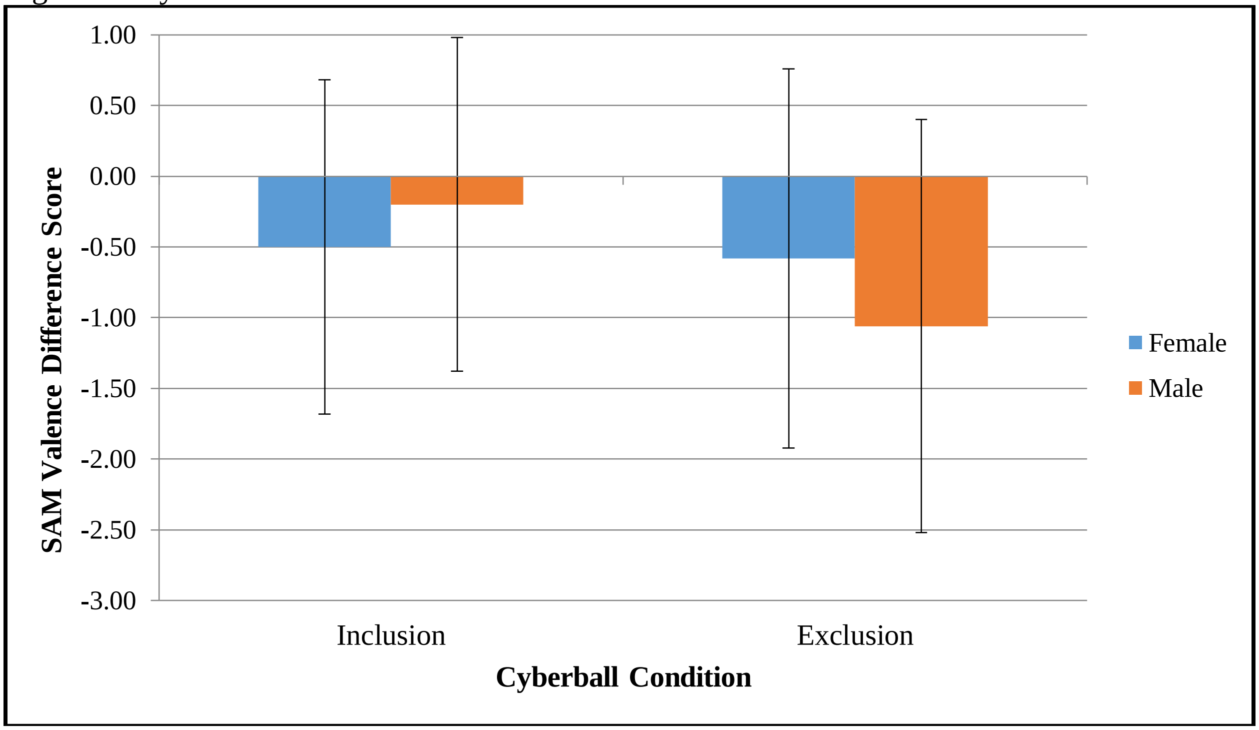

Figure 5. Cyberball Condition*Gender and SAM Arousal Difference Score

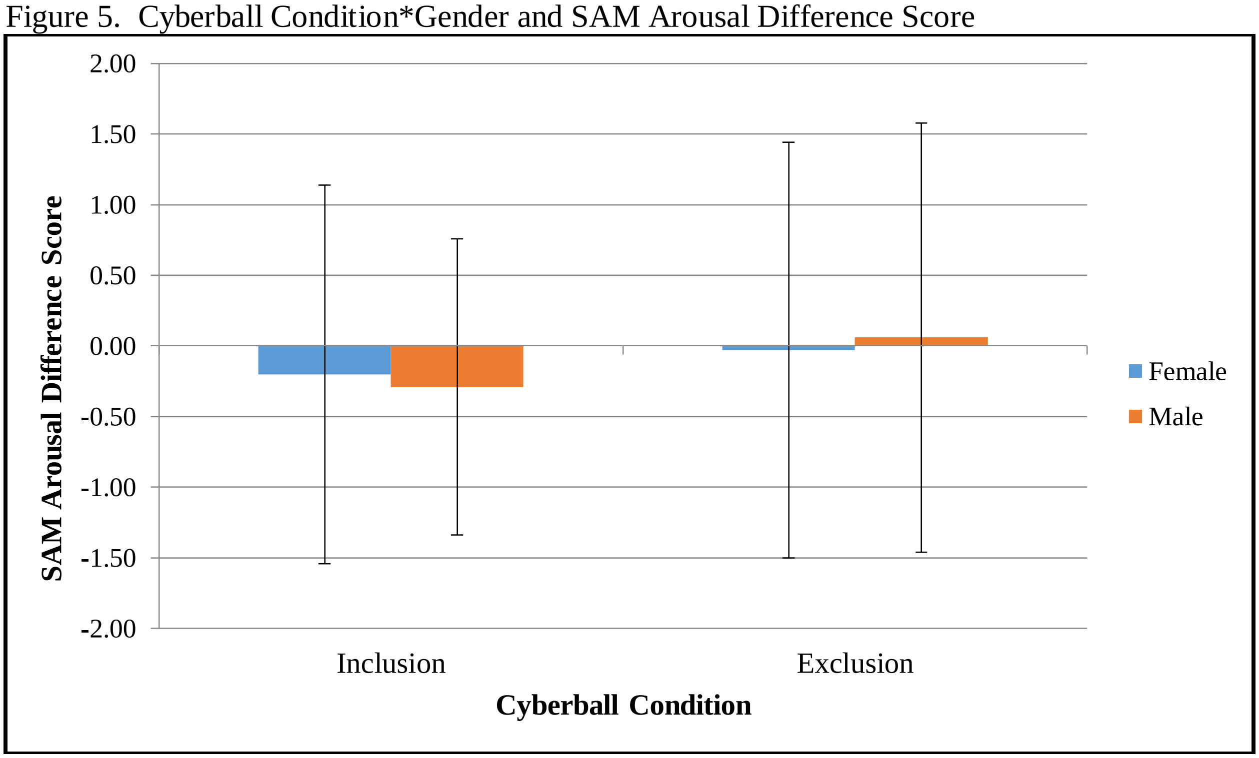

Figure 6. Cyberball Condition*Gender and SAM Dominance Difference Score

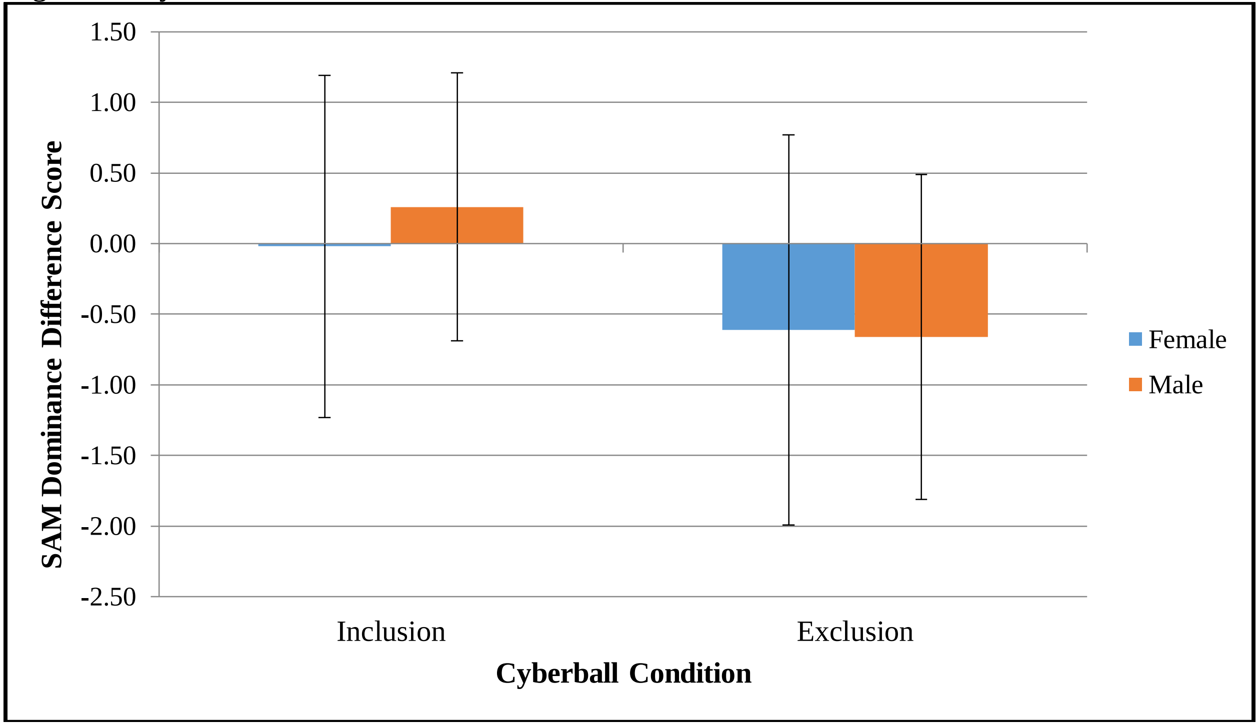

Figure 7. Gender*MMORPG-Gaming Status and FNS Control

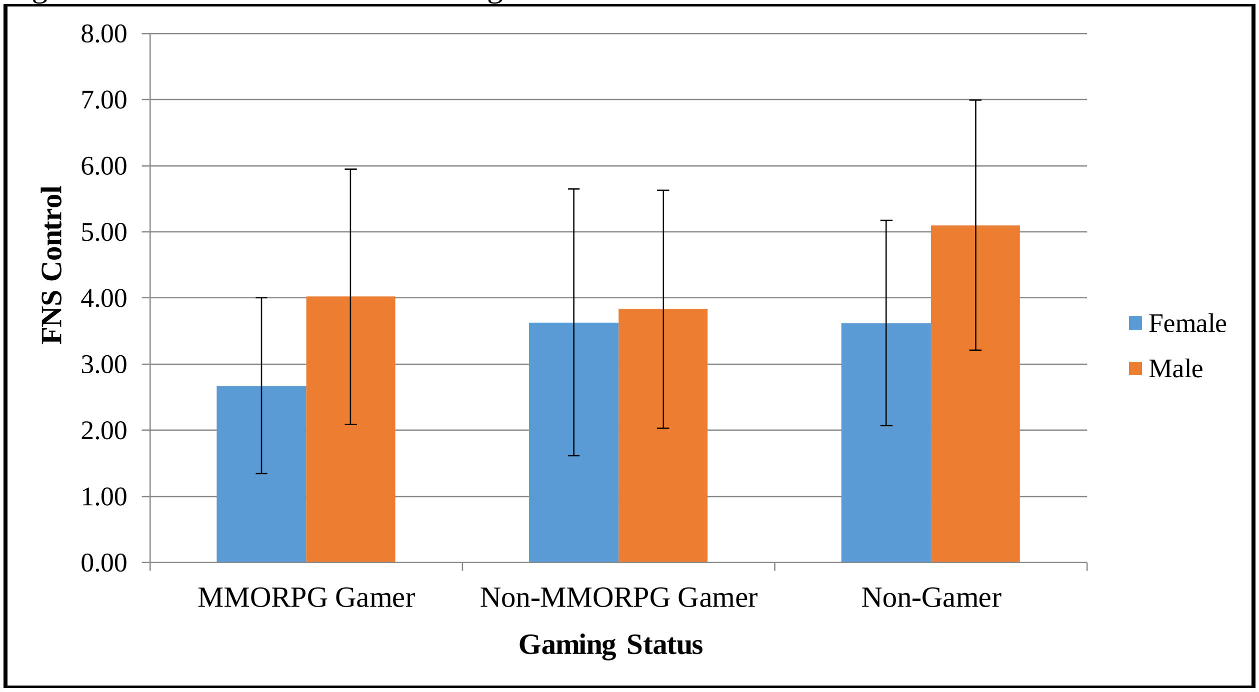

Figure 8. Cyberball Condition*Gender*Gaming Status and FNS Belonging

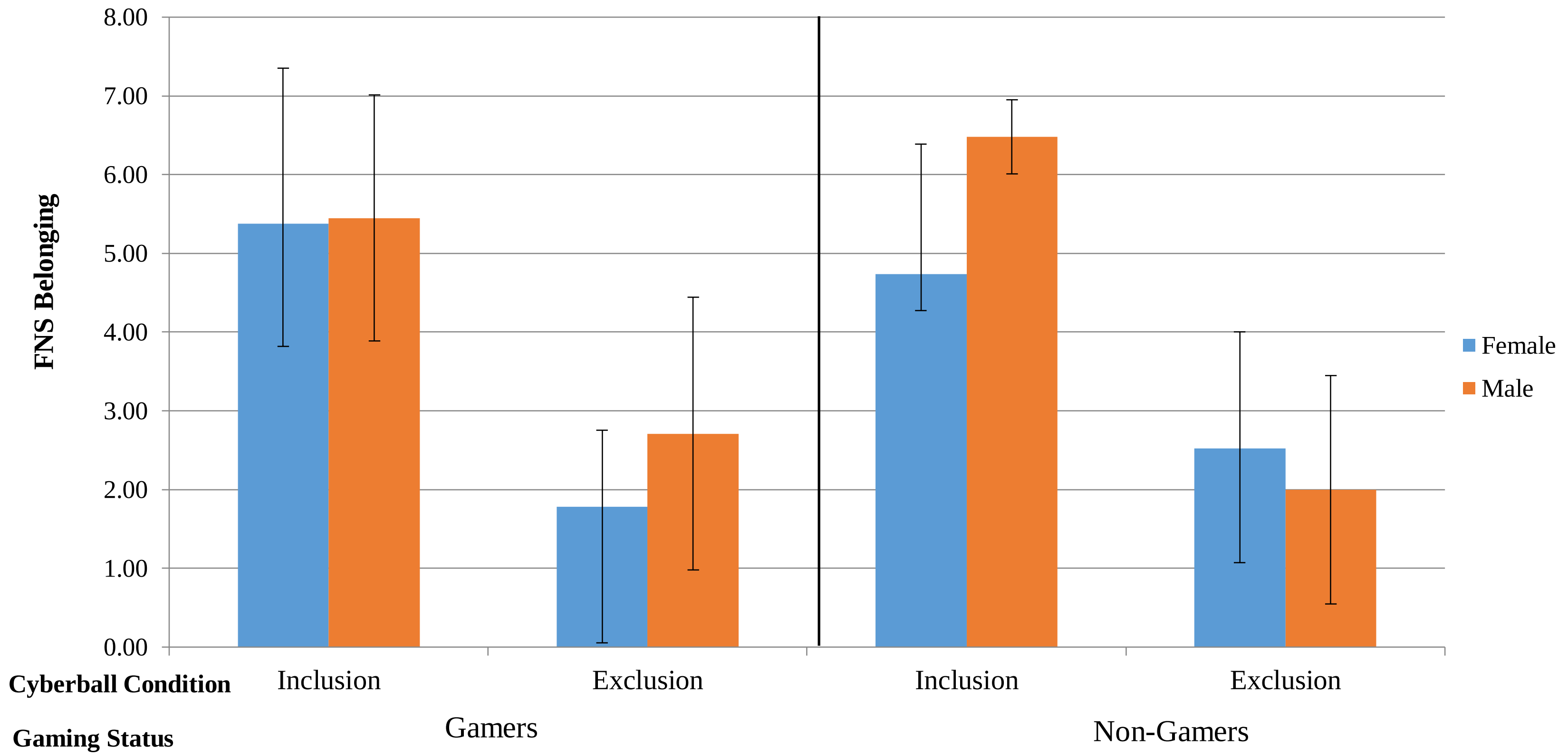

Figure 9. Cyberball Condition*Gender*Gaming Status and FNS Self-Esteem

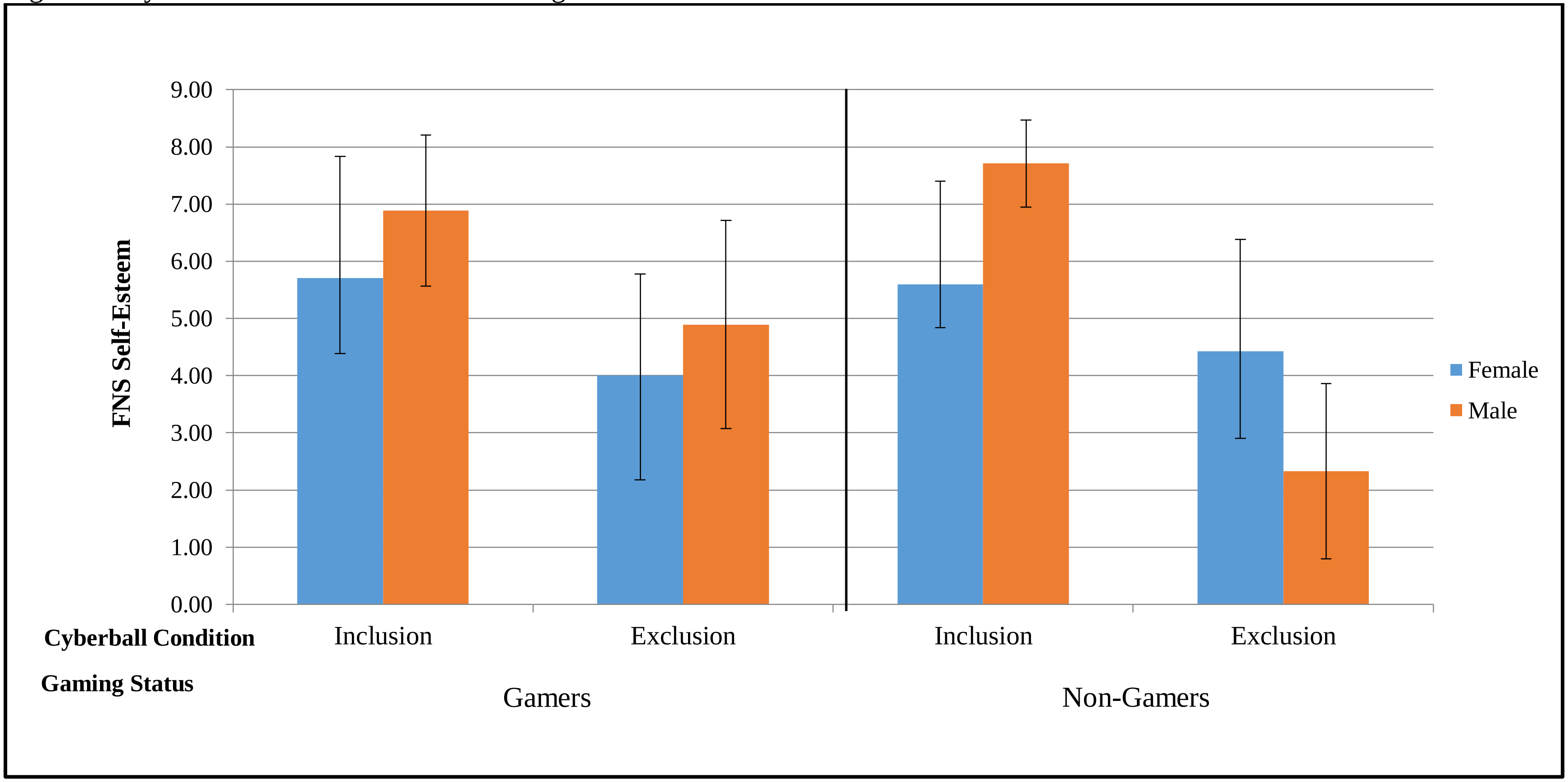

Figure 10. Cyberball Condition*Gender*MMORPG-Gaming Status and FNS Self-Esteem