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ANALYZING GENDER DIFFERENCES IN AGGRESSIVE COGNITION AND HOSTILITY
FOLLOWING SOCIAL EXCLUSION

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ABSTRACT

Humans have a desire to belong by feeling connected to others. Social exclusion has been considered a psychosocial stressor that can lead to negative mental and physical health outcomes. Social exclusion can disrupt one's sense of belonging and potentially lead individuals to exhibit aggressive behaviors. This thesis was conducted as a secondary data analysis in part of a larger study, known as The Social Interactions and Health Study. One of the primary goals of this thesis was to determine how social exclusion affects one's aggressive thoughts and hostile emotions, which have both been linked to the development of aggressive behaviors. Another aim of this research was to analyze whether gender accounts for differences in aggressive cognition and hostility following social exclusion. To examine the associations between gender, social exclusion, aggressive cognition, and hostility, a two-group, randomized controlled experiment was conducted using a well-known paradigm for testing social exclusion known as "Cyberball" (Hartgerink, Van Beest, Wicherts, & Williams, 2015). Participants (N= 120 college students) were randomly assigned to either an inclusion (n=40) or exclusion condition (n=80). It was hypothesized that social exclusion would be significantly, positively associated with higher aggressive cognition and greater changes in hostility. In addition, it was also hypothesized that excluded males would be significantly, positively associated with higher aggressive cognition and greater changes in hostility compared to socially excluded females. These findings may point to potential mechanisms for understanding how one's gender may lead to certain aggressive thoughts and behaviors following social exclusion. Results from this thesis may provide useful in developing gender-tailored interventions for socially excluded individuals.

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Chapter 1

Introduction

Social Exclusion

The need to belong and form personal bonds is seen as a fundamental motivation in human relationships in order to protect one's well-being, safety, and reproductive success (Baumeister & Leary 1995). Potential pain and distress can result when a person feels they have been excluded, ignored or rejected. Social exclusion, also referred to as ostracism, includes the act of excluding or isolating an individual from a group that may be done with unintentional or explicitly intended actions (Williams, 2007). Meanwhile, social rejection includes the explicit intent of a group or individual to exclude another person (Williams, 2007).

Kipling Williams (1997) argued that humans are reactive to social exclusion more than other negative social situations because ostracism particularly leads to the threatening of an individual's four fundamental needs. The four fundamental needs include the need for belonging, self-esteem, control, and a meaningful existence (Williams, 1997). It was proposed that ostracism can lead to immediate, short term, and long-term responses. When social exclusion leads to immediate reactions, an individual's cognitive interpretation of ostracism may be altered (Williams, 2001). This can lead to increased negative mood and feelings. The short-term effects of social exclusion include the desire to regain an individual's four fundamental needs (Williams, 2001). Individuals who have been socially excluded may react by attempting to reestablish

relationships with others or fulfill their fundamental needs that have been threatened by exclusion.

Socially excluded individuals tend to respond with either prosocial or antisocial actions in an attempt to fulfill their threatened desires and relationships after ostracism (Williams, 2007). Prosocial actions include behaviors that attempt to regain relationships with those who excluded or rejected them. Meanwhile, antisocial behaviors included aggressive or angered actions that may result in a person attempting to exhibit control or gain recognition (Williams, 2007). In particular, socially excluded people can develop a hostile mindset, which has been shown to be associated with an increase in aggressive behavior (Geniole, Carré, & McCormick, 2011).

Potential Health Outcomes

Prior research has shown relationships between social exclusion and negative health outcomes. In general, it has been shown that those who form more meaningful relationships with others have overall more positive health outcomes compared to those who feel disconnected and isolated from others (Williamson, Thomas, Eisenberger, & Stanton, 2018). Potential outcomes that can result from insufficient social interactions with others may affect mental well-being and cardiovascular health (Williamson, Thomas, Eisenberger, & Stanton, 2018). An individual may develop consistent feelings of low self-worth and feelings of hopelessness and despair, which may lead to the development of mental illnesses such as depression (Riva et al., 2017; Williams, 2001). Social exclusion has been found as a type of psychosocial stressor that can occur in everyday life, which can lead to the activation of stress reactivity pathways (Williamson, Thomas, Eisenberger, & Stanton, 2018). Immediate, or short-term social exclusion has been

linked cardiovascular reactivity, such as significant increases in heart rate and blood pressure (Williamson, Thomas, Eisenberger, & Stanton, 2018). Knowing some of the short-term health consequences of social exclusion alone is important for understanding how repeated exposure to exclusion can potentially lead to unhealthy mental states and poor cardiovascular health.

Socially excluded individuals who respond with significant increases in hostility and aggressive cognitions, may experience even greater risks for health-related outcomes. In a meta-analysis analyzing prospective cohort studies, it was evident that hostility was a major risk factor for developing Coronary Heart Disease (CHD) (Chida & Steptoe, 2009). In fact, hostility in healthy individuals was significantly associated with an increased risk of CHD, and the effects were greater for males compared to females (Chida & Steptoe, 2009). Therefore, individuals who experience increases in hostility in response to social exclusion may be at an even greater risk for the development of negative health consequences, such as CHD. Although the health consequences related to aggressive cognition are not as well understood, this thesis can provide a meaningful basis to explore potential relationships between aggressive cognition and related health outcomes in future experimentation.

Testing Psychological and Physiological Responses to Social Exclusion

Many paradigms have been developed to experimentally test the effects of social exclusion. In 2000, Cyberball, a web-based virtual computer game, was developed as a brief scenario of ball toss designed for testing individual's physiological and psychological responses to social exclusion (Williams, Cheung, & Choi, 2000). Cyberball has been found experimentally proven as a valid exclusion paradigm that leads to the development of negative moods, threats to

basic psychological needs, and antisocial behaviors (Scheithauer, Alsaker, Wölfer, & Ruggieri, 2013).

Participants who are randomly assigned to the inclusion condition constantly receive the ball throughout the game and also have an equal number of ball tosses as the other virtual “players” (Hartgerink, Van Beest, Wicherts, & Williams, 2015). However, participants in the exclusion condition only receive the ball twice in the beginning and do not receive any additional passes for the entirety of the game (Hartgerink, Van Beest, Wicherts, & Williams, 2015). In contrast to other paradigms used to study social exclusion, participants are not explicitly told if they will be excluded (Hartgerink, Van Beest, Wicherts, & Williams, 2015). Instead, study participants are informed that the online game of ball toss is designed to test their mental visualization skills. In addition, participants are manipulated into believing that they would be interacting with two other, real participants. However, the other participants are fictitious. Prior to 2000, experiments analyzing the effects of social exclusion utilized human confederates, which was often difficult and time consuming since training was required (Williams & Jarvis, 2006). However, Cyberball, an online simulation of ball toss, was a more efficient paradigm to test social exclusion as it did not involve the use of real people (Williams & Jarvis, 2006).

Researchers who tested Cyberball were amazed to observe how a web-based simulation of social exclusion was able to powerfully elicit a wide range of responses in participants (Hartgerink, Van Beest, Wicherts, & Williams, 2015). Through experiments using Cyberball, researchers have examined a variety of psychological and behavioral effects resulting from ostracism. For instance, it has been found that socially excluded individuals who played Cyberball typically reported increases in aggressive behaviors, negative mood, anger, and sadness (Hartgerink, Van Beest, Wicherts, & Williams, 2015).

Past research studies have utilized other paradigms to experimentally test the effects of social exclusion. In a procedure developed by Vorauer, Cameron, Holmes, and Pearce (2003), participants were instructed to send video messages back and forth to an assigned “partner”. Participants in the exclusion condition were told that their assigned partner refused to meet with them after the video messages. Meanwhile, participants in the inclusion condition were informed that their partner had to leave the experiment early. This exclusion test helped to analyze hostile cognition in response to social exclusion, which is discussed in this thesis (DeWall, Twenge, Gitter, & Baumeister, 2009). In addition, Operator Challenge was a math-based exclusion paradigm developed by Birk et al. (2016), which will be discussed in this thesis to assess hostility. It involved study participants interacting with other “participants” by answering math problems. Participants in the exclusion condition were allowed to answer two times in the beginning of the game, but not for the remainder (Birk et al., 2016). Participants in the inclusion condition were allowed to answer questions throughout the allotted time. Lastly, the Interpersonal Failure Paradigm is discussed to assess hostility and overall aggressive behaviors. Participants in the exclusion condition received feedback that their future life would be lonely, while participants in the inclusion condition were told that their future lives would be successful (DeWall, Twenge, Gitter, & Baumeister, 2009). Although these 3 models for testing social exclusion are not Cyberball, they can serve as useful exclusion methods to measure aggressive or aggressive cognition and hostility.

Potential Social and Biological Mechanisms of Social Exclusion and Aggression

Evidence from previous studies on this topic indicated that males and females differ in their psychological responses to social exclusion due to differences in natural tendencies to form social networks. From childhood, females tend to develop one-on-one relationships with others, whereas males generally interact by forming relationships with larger networks of groups (Benenson et al., 2013). It has therefore been hypothesized, based on social tendencies, that males and females may respond differently to different acts of social exclusion. In addition, it has been argued that gender accounts for differences in sex hormone levels after social exclusion (Seidel et al., 2013). According to the biosocial status hypothesis, testosterone, a sex hormone that is typically higher in males than females, has been postulated as a major contributor to the desire for power, dominance, and social status (Seidel et al., 2013). In an experiment that analyzed gender differences in testosterone in response to social exclusion, it was found that testosterone decreased in both genders after exclusion and increased for included males only (Seidel et al., 2013). The increase in testosterone in included males is consistent with the biosocial status hypothesis in that increases in testosterone levels are often associated with power and dominance in social settings.

Prior research has found that ostracism impacts an individual's cognitive process of perceiving the situation as hostile, which can lead to a hostile mood and aggressive behaviors (DeWall, Twenge, Gitter, & Baumeister, 2009). Indeed, high testosterone levels have been linked to aggression (Denson, O'Dean, Blake, & Beames, 2018). Differences in testosterone levels between males and females might help to explain why they may react differently to social exclusion. Although not examining testosterone levels, this research will focus on analyzing hostility and aggressive cognition, which are psychological measures related to aggressive

behaviors. Understanding how aggressive cognitive thoughts and hostile emotions are potentially activated by social exclusion, may be beneficial towards developing biobehavioral interventions in the future. Specifically, these interventions may be aimed at helping individuals who feel they experience repeated episodes of social exclusion.

Aggressive Cognition

A negative social interaction, such as social exclusion, may lead ostracized individuals to develop aggressive thoughts about themselves and towards others who may or may not have been involved in the ostracism. Prior research has found a link between social exclusion and overall aggressive-behavior. Research suggests both that aggressive people tend to be socially excluded and also that social exclusion can lead generally non-aggressive people into developing aggressive thoughts (DeWall, Twenge, Gitter, & Baumeister, 2009). Anderson and Bushman (2002) proposed the General Aggression Model, which stated that negative social interactions can alter how one perceives information and their cognitive processes. In particular, negative social interactions, such as social exclusion, can lead to people perceiving neutral or ambiguous information as threatening (Anderson & Bushman 2002). Anderson and Huesmann (2003), argued that aggressive thoughts are the basis for the development of aggressive personality changes and behaviors.

Aggressive or hostile cognition can be measured a few different ways immediately following social exclusion. In a series of 4 experiments, researchers analyzed the role of hostile cognition leading to aggressive behavior following a social exclusion procedure developed by Vorauer, Cameron, Holmes, and Pearce (2003). One way that aggressive cognition can be

measured is by ranking the similarity between aggressive and hostile words following social exclusion (DeWall, Twenge, Gitter, & Baumeister, 2009). From this first experiment, socially excluded participants resulted in higher similarity ratings for aggressive and ambiguous words compared to participants in the social inclusion condition (DeWall, Twenge, Gitter, & Baumeister, 2009). These results were consistent with the proposed General Aggression Model from Anderson & Bushman (2002).

An additional method of measuring hostile or aggressive cognition following social exclusion includes having participants complete a word completion task (DeWall, Twenge, Gitter, & Baumeister, 2009). Participants are instructed to fill in the rest of a word stem, where completing the word fragment can lead to a potentially ambiguous or aggressive ending (DeWall, Twenge, Gitter, & Baumeister, 2009). In the second experiment within this same series of 4, researchers predicted that participants who had been socially excluded would complete more aggressive than ambiguous word stems due to their development of a short-term aggressive mindset compared those who were not ostracized (DeWall, Twenge, Gitter, & Baumeister, 2009). Results from this experiment found that excluded participants were more likely to complete word stems with aggressive words compared to the control group (DeWall, Twenge, Gitter, & Baumeister, 2009). Both of these experiments provided evidence that individuals may develop aggressive or hostile mindsets following social exclusion.

State Hostility

In addition to aggressive cognition, state hostility has been another variable studied to understand the development of aggressive behaviors. One line of development in previous

studies focused on how hot temperatures can lead to aggressive thoughts and hostile moods and found that both variables increase in response to feeling uncomfortable by hot temperatures (Anderson, Deuser, & DeNeve, 1995). Within these studies, the State Hostility Scale (SHS) was developed. The State Hostility Scale included thirty-five statements about anger and hostility (Anderson, Deuser., & DeNeve, 1995) and can be used in other research contexts.

A number of social exclusion studies have assessed participant's emotional response by specifically analyzing hostile affect. For example, researchers utilized the SHS (developed by Anderson, Deuser, and & DeNeve, 1995) to assess hostile emotions after an exclusion test. Compared to the other two groups that served as the control condition, the excluded participants reported higher hostile rating compared to the two control groups (DeWall, Twenge, Gitter, & Baumeister 2009). A significant relationship was observed in social rejection and hostile responses for predicting overall aggression towards others (DeWall, Twenge, Gitter, & Baumeister 2009). However, this experiment did not account for gender differences in hostility.

Gender Differences in Aggressive Cognition

Prior experimental studies have found that social exclusion leads socially excluded individuals into developing an aggressive or hostile mindset. However, one main limitation is that there is much less empirical examination of how males and females may differ in aggressive cognition after social exclusion. In 1 of the 4 studies conducted, researchers were determined to measure the effects of social exclusion on one's aggressive cognition (DeWall, Twenge, Gitter, & Baumeister, 2009). However, researchers did not take into account how males may differ compared to females in aggressive cognition scores following social exclusion. Participants were

instructed to a word completion task and a rating of ambiguous and aggressive words. Overall, researchers found that the social rejection group perceived information as hostile, which led to an overall hostile mindset (DeWall, Twenge, Gitter, & Baumeister, 2009). However, gender differences in aggressive cognition were not explored.

An additional study assessed the effects of social exclusion on aggressive cognition, but also did not take into account gender differences in aggressive cognition. Birk et al. (2016) developed a unique social exclusion paradigm, known as the “Operator Challenge”, to test aggressive or hostile cognition. After participants completed the social exclusion portion of the study, they filled out a word completion task. It was also concluded that participants in the excluded group wrote significantly more hostile words than included participants (Birk et al., 2016). Overall, past research has commonly explored whether social exclusion leads to increased aggressive cognition, but there is a lack of evidence regarding if and how gender differences may predict aggressive cognition following social exclusion.

Gender Differences in State Hostility

Although it has been found in prior studies that social exclusion has led people to becoming more hostile, there has been a lack of convincing evidence whether gender played a role in this association. Zvolinski (2012) conducted a study with Cyberball to analyze the short-term effects on psychological and neuroendocrine reactivity in first year college students. There was a significant change in hostility observed for males, but not females, after the completion of Cyberball (Zvolinski, 2012). It was found that males who were randomly assigned to the Cyberball exclusion condition resulted in higher scores for hostility after compared to included

males (Zwolinski, 2012); in contrast; however, this trend was not observed for females. It was concluded that there was no significant difference in hostility in excluded females compared to included females after playing Cyberball. This evidence is conflicting to prior findings in that females are more threatened by social exclusion compared to males (Benenson et al., 2013). As Cyberball has been repeatedly proved to be a significant test to analyze the psychological and behavioral effects of ostracism, results from Zwolinski (2012) are convincing, if still preliminary.

Overview of this Study's Aims

The purpose of this thesis is to examine how gender and social exclusion are associated with aggressive cognition and changes in state hostility. Prior research has found that aggressive mindset and hostile emotions may result from social exclusion, and that both of these factors may contribute to aggressive behaviors (Anderson & Bushman 2002). Therefore, the primary aim of this thesis was to determine whether social exclusion was associated with changes in hostility and aggressive cognition. Experiments analyzing the psychological effects of social exclusion have found that individuals tend to develop significant aggressive thoughts and hostility after being socially excluded. However, there has been less evidence whether gender is associated with increased aggressive thoughts and hostility. Therefore, the secondary aim of this thesis examined whether gender accounts for any changes in aggressive cognition and state hostility following social exclusion. By understanding potential short-term psychological consequences that could result from being socially excluded, this thesis may provide meaningful

information for the development of gender-tailored interventions for individuals who experience repeated exposures to social exclusion.

The following hypotheses have been proposed in order to examine the two primary aims.

1. **Primary hypothesis 1A:** social exclusion will be associated with higher scores in aggressive cognition and greater changes in state hostility (for both excluded males and females), and
2. **Primary hypothesis 1B:** excluded males will report a greater significance in changes in hostility and higher aggressive cognition scores than excluded females.

Chapter 2

Methods

Participants and Recruitment

This thesis was developed from a larger study, known as the Social Interactions and Health Study (Coleman, 2018). Within the larger study, a variety of different variables were analyzed to understand the psychological and physiological effects of social exclusion. However, this thesis will serve as a secondary data analysis where only a subset of measures were examined. The following experimental procedures from the Social Interactions and Health Study have been approved by the Pennsylvania State University Institutional Review Board (IRB).

Figure 1 provides a flow diagram of the recruitment process and a two-group random assignment of study participants (Coleman, 2018).

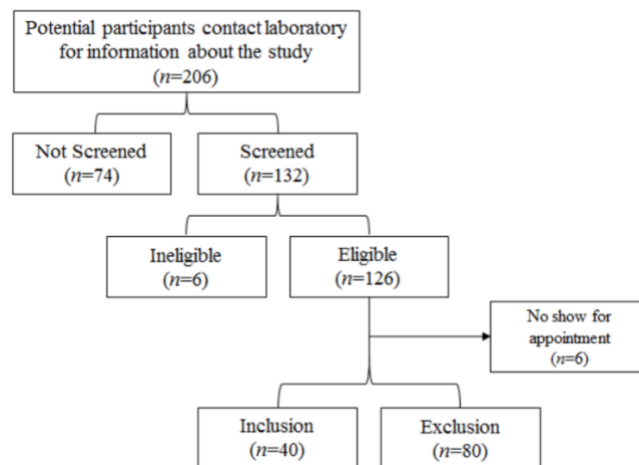


Figure 1. *Recruitment and Random Assignment of Study Participants*

Between August of 2017 and April of 2018, the Social Interactions and Health Study was conducted. The process began with recruiting individuals 18-24 years old to participate. The recruitment process included posting flyers throughout various buildings on the campus of The Pennsylvania State University. In addition, short announcements were made in lectures to invite undergraduate students to participate in a research study. Potential study participants were informed that this study was interested in analyzing certain physiological and psychological effects after playing a short computer game.

Those interested in participating in the study were asked to email or call the Stress, Health, and Daily Experiences (SHADE) laboratory in the Biobehavioral Health Department at the Pennsylvania State University. Individuals ($n=206$) contacted the SHADE lab with interests in participating. A research assistant informed each individual of more details about the study's aspects and proceeded through a series of screening questions if the individual was interested in participating ($n=132$).

A set of questions was included in the screening form to determine the individual's eligibility. Participants were ineligible for the study if: (1) they were not enrolled as a current Penn State student, (2) were younger than 18 or older than 24 years old, (3) participated in a research study that included the computerized game of ball toss, (4) diagnosed with Addison's or Cushing's Disease, (5) had visual impairments that could affect their ability to distinguish between simple shapes on a computer screen, (6) diagnosed with a pervasive developmental disorder or cognitive impairment, (7) were unwilling to abstain from alcohol 12 hours prior to participating in the study, (8) unwilling to refrain from exercise and coffee 2 hours prior to participating in the study, or (9) unwilling to refrain from eating 60 minutes prior to the start of the study. If participants were eligible ($n=126$), a research assistant scheduled a time for the

participants to come to the Biobehavioral Health building to complete the study. All participants were run after 12:00 pm in order to not interfere with cortisol patterns (due to the strong diurnal cycle of this hormone).

After assessing inclusion criteria, individuals eligible to participate were randomly assigned to either the social inclusion ($n=40$) or exclusion condition ($n=80$). A total of 6 participants did not show up for their assigned appointment time. A total of 120 participants completed the Social Interactions and Health Study, with the sample comprised of 67.5% females. **Appendix A** includes the Recruitment and Screening Materials.

Procedure

The following experimental procedure was implemented in the Social Interactions and Health Study (Coleman, 2018). The study protocol script and the experiment checklist are included in **Appendix E**. In order to enhance the believability that participants would be interacting with two real people, a research assistant told a participant during the screening process to arrive on time to the study and refrain from conversation with other people waiting near room 024 in the Biobehavioral Health Building. This information was also sent in a reminder email 24 hours prior to the participant's scheduled appointment time.

Once the scheduled participant arrived outside of room 024 in the Biobehavioral Health Building, a secondary research assistant (RA) enhanced the manipulation even further. The secondary RA opened the door and asked the participant their name and if they were there to participate in the Social Interactions Study. After the participant said "yes", the experimenter

welcomed the individual into room 024, while the secondary RA mentioned that they would wait for their “participant” in the hallway.

Once the participant entered the room, the experimenter introduced him or herself, directed the participant to have a seat, and then asked the participant how they were doing. Then, the experimenter informed the participant that they were still waiting on one other participant, but they should be there shortly, so it was okay to get started with general screening questions. The “Eligibility Screening Form of Day of Study” was used to assess whether the participant was still eligible to participate in the study. The experimenter asked if the participant was (1) feeling healthy, well, and alert, (2) abstained from the consumption of alcohol for at least the past 12 hours, (3) coffee, nicotine, and exercise for the last 2 hours, and (4) food within the last 1 hour prior to arriving to the study. All 120 participants were eligible and able to proceed with the remainder of the study.

Next, the experimenter gave 2 blank copies of the “Informed Consent Form” to the participant and proceeded to explain the study more thoroughly. The main points of the informed consent form included the study’s purpose, procedures, risks and possible discomforts, benefits, voluntary participation, other options available, privacy and confidentiality rights, compensation information, and the right to ask questions to the principal investigator or his faculty advisor. After asking the participant if he or she had any questions or concerns, a signature of consent was obtained.

The next portion of the study included instructing participants on how to properly wear a Polar® RS800CX heart rate monitor (HRM). All participants were directed to power off cellphones and fitness tracking smartwatches that could potentially interfere with a signal from the Polar® RS800CX HRM. After the experimenter demonstrated how to properly wear the

Polar® RS800CX HRM, participants were directed to practice over their clothing. After the experimenter confirmed the participant understood how to properly wear the Polar® RS800CX HRM, the experimenter left the room to allow for the participant to attach the HRM in contact with their skin. When the participant indicated that the experimenter could re-enter the room, the experimenter recorded one minute of data to ensure that the HRM was working properly. A participant was directed to sit a laptop to complete baseline questionnaires prior to the start of Cyberball.

After completion of the baseline questionnaires, participants were directed to sit quietly and relax for 5 minutes. A first saliva sample was collected after 5 minutes was complete. The experimenter directed the participants on how to properly remove, place, and return the white gauze in the saliva collection tube. After the participant placed the gauze in their mouth for approximately 2 minutes, the experimenter recorded the time and that the first saliva sample was taken.

The experimenter informed the study participant that they should just be about ready to begin the computer game and that they had to check with the other research assistants to make sure their participants were ready to start. The experimenter left room 024 and notified a secondary research assistant in a different room to start a timer for approximately 4 minutes. The experimenter returned to room 024 and told the participant that one of the other participants had a little bit longer to wait before taking their first saliva sample. In the meantime, the experimenter explained the game to the participant. After explaining the game, the experimenter told the participant that they would begin the game once the other research assistant confirmed that their participant was ready. The secondary research assistant knocked on the door of room 024 to inform the experimenter that their “participant” was ready to begin the game. The purpose

of this was to enhance the manipulation even further that the study participant was interacting with 2 other, real people.

The experimenter instructed the participant to read the directions and click “start playing” to log onto the game. The time that the participant clicked “start playing” was immediately recorded. After 5-7 minutes when Cyberball ended, the experimenter started a stopwatch for 25 minutes until the collection of the final saliva sample. During the 25-minute period, participants completed a series of post-Cyberball questionnaires. If participants completed the survey before 25 minutes, they were directed to sit quietly and relax. Once the stopwatch marked 25 minutes, a final saliva sample was collected, and the time was recorded.

Participants were told that the study was completed, and the experimenter left the room in order to give a participant privacy to take off the HRM. Once the participant told the experimenter they could return to the room, the experimenter went over final concerns and the compensation of the study. Participants signed compensation forms and received \$15 for completing the study. The experimenter then proceeded to ask the participant about what they thought the study was about. After recording the participants thoughts, the experimenter debriefed the participant by telling them the true purpose of the study. The following experimental protocol is summarized by a flow chart in **Figure 2.** (Coleman, 2018).

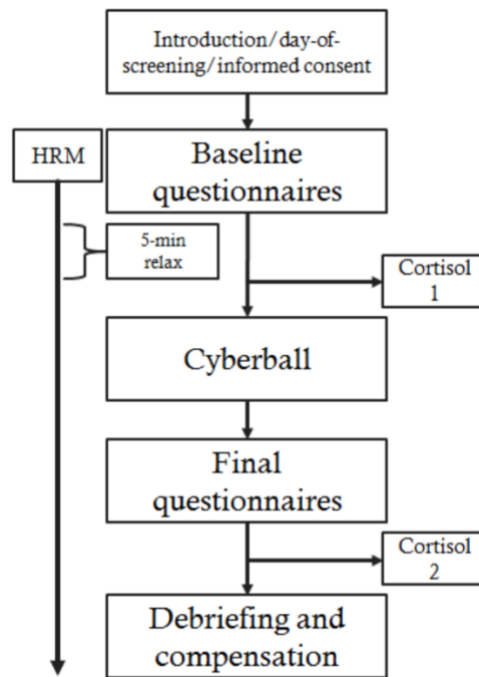


Figure 2. *Experimental Protocol Flow Diagram*

Measures

Demographic Information. Demographic variables were analyzed to understand any individual differences within the sample. Gender was the only demographic variable used in this secondary analysis. The five demographic variables assessed were: (1) gender, (2) age, (3) ethnicity, (4) race, (5) family income, and (5) existing health conditions. For reporting gender, participants had the options to identify themselves as Male, Female, or Transgender/Non-binary. Every participant identified their gender as the same as their biological sex. Therefore, sex instead of gender is the more appropriate term when referring to study participants throughout the remainder of this thesis. The demographic questionnaire is included in **Appendix B**.

Aggressive cognition. The word completion task utilized in this study used to measure one's level of aggressive cognition was developed by Anderson and colleagues (1999). After completing Cyberball, participants were instructed to complete a survey, which included Anderson and colleagues (1999) word completion task. The list includes 98-word fragments for participants to complete. From the list, half of the words could be completed as neutral, and the other half could be completed to spell neutral, ambiguous, or aggressive words. Participants were instructed to complete as many words on the list as possible. The number of completed words was recorded. The sum of aggressive words and ambiguous words were individually divided by the total number of words completed on the list to determine one's level of aggressive cognition. Each participant received an overall aggression cognition score, which was recorded as a percentage. Participants with higher percent scores were reported to have higher levels of aggressive cognition. The word completion task is included in **Appendix C**.

State Hostility. The State Hostility Scale (SHS) is a 35-item scale developed by Anderson, C. A., Deuser, & DeNeve (1995). The scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*) to assess participant's hostile emotions such as feelings of unsociability/unfriendliness (e.g., "I feel unsociable"), meanness (e.g., "I feel mean"), and aggravation (e.g., "I feel aggravated"). The items on the scale were averaged together to create 2 total state hostility scores, one prior to and after social exclusion. Overall hostility change involved subtracting hostility score prior to Cyberball from the hostility score after Cyberball. Thus, participants with a positive change in hostility score experienced increases in hostility after Cyberball compared to before. Internal consistency for the SHS was excellent in this sample ($\alpha=.92$). **Appendix D** includes the SHS scale that was used to assess participant's changes in hostility.

Statistical Analysis

All statistical procedures were conducted using the statistical software IBM SPSS Statistics 22 (IBM Corp., 2013). To test hypotheses 1A and 1B, independent sample t tests and were performed. Independent samples t tests were conducted to analyze whether any statistical differences in means were evident amongst the two groups for both Cyberball condition and participant's sex. Participants in the inclusion condition (n=40) were coded as 0, and participants in the exclusion condition (n=80) were coded as 1. For participant's sex, females (n=81) were coded as 0 and males (n=39) were coded as 1. Equal variances were not assumed within the independent samples t tests. In addition, linear regression analyses were done. A new variable was created during the hypothesis testing that was a product of the two predictor variables being analyzed in order to test the statistical interaction term Participantsex*Cyberballcondition. Results from both hypothesis tests were considered statistically significant if the reported p value was less than 0.05.

Chapter 3

Results

Descriptive Statistics and Independent Samples T Test

Independent Sample T Tests were performed to determine the difference of means between the two groups within each of the two independent variables, Cyberball condition and participant's sex. Equal variances were not assumed during these analyses. For the Cyberball condition, included participants were coded as 0, while excluded participants were coded as 1. For analyzing participant's sex, males were coded as 0, while females were coded as 1. It was found that both included and excluded participants, on average, reported increases in hostility. Overall, excluded participants experienced a much greater increase in hostility after Cyberball compared to included participants; see **Table 1** for mean changes by condition.

Table 1. *Group Statistics for Cyberball Condition*

	Cyberball Condition	N	Mean	Standard Deviation
Hostility Change	0	40	.110	.298
	1	80	.634	.711
Aggressive Cognition	0	40	.355	.084
	1	80	.351	.090

Table 2 shows that there was a statistically significant difference between the mean hostility change between Cyberball conditions ($t = -5.5673$, $p = .000$). However, there were no

statistically significant differences between the mean change in aggressive cognition between the two Cyberball conditions ($t = .274$, $p = .785$).

Table 2. *Independent Samples T Test for Cyberball Condition*

		t	df	Sig. (2-tailed)
Hostility Change	Equal variances not assumed	-5.5673	115.383	.000
Aggressive Cognition	Equal variances not assumed	.274	83.122	.785

When analyzing mean differences for participant's sex, there were no statistical differences found in either change in hostility ($t = .548$, $p = .585$) or aggressive cognition ($t = 1.109$, $p = .271$). Therefore, participant's sex did not reliably predict changes in hostility or aggressive cognition. Results are shown in **Tables 3** and **4**.

Table 3. *Group Statistics for Participant Sex*

	Participant's Sex	N	Mean	Standard Deviation
Hostility Change	0	81	.481	.677
	1	39	.413	.606
Aggressive Cognition	0	81	.346	.088
	1	39	.365	.087

Table 4. *Independent Samples T Test for Participant Sex*

		t	df	Sig. (2-tailed)
Hostility Change	Equal variances not assumed	.548	83.163	.585
Aggressive Cognition	Equal variances not assumed	-1.109	76.010	.271

Tests of Primary Hypothesis 1A and 1B

Primary Hypothesis 1A

Primary hypothesis 1A predicted that males and females randomly assigned to the exclusion condition would both result in significantly higher aggressive cognition scores and would become hostile compared to participants in the inclusion condition. Two linear regression analyses were performed to determine whether there was a significant association between Cyberball condition and aggressive cognition or state hostility. Participant's sex was controlled for during the first set of analyses. When controlling for participant's sex, there was a significant, positive association between participants randomly assigned to the Cyberball condition and overall changes in hostility ($p = 0.001$). Participants assigned to the exclusion condition reported greater increases in hostility after Cyberball compared to included participants. Results are shown in Table 5.

Table 5. *Regression Analysis for Hostility Change*

Model	Coefficients SE	Standards Coefficients β	t	Sig.
(Constant)	0.115		1.319	0.190
Participant Sex	0.210	-0.101	-0.666	0.507
Cyberball Condition	0.142	0.365	3.530	0.001
ParticipantSex*Cyberballcondition	0.255	0.050	0.305	0.761

Dependent Variable: HOSTILITY CHANGE

The association between Cyberball condition and aggressive cognition was not statistically significant when sex was controlled for ($p = .694$). It was predicted that both socially excluded males and females would have greater increases in aggressive cognition compared to included males and females, but there were no significant differences between the two Cyberball conditions. Results are shown below in Table 6.

Table 6. *Regression Analysis for Aggressive Cognition*

Model	Coefficients SE	Standards Coefficients β	t	Sig.
(Constant)	0.017		20.499	0.000
Participant Sex	0.030	0.259	1.592	0.114
Cyberball Condition	0.021	0.044	0.395	0.694
<u>ParticipantSex*CyberballCondition</u>	0.037	-0.205	-1.167	0.245

Primary Hypothesis 1B

Primary Hypothesis 1B investigated differences for aggressive cognition and state hostility due to participant's sex and the Cyberball condition they were randomly assigned to. It was hypothesized that excluded males will have significantly greater hostility changes and higher aggressive cognition scores compared to excluded females. A new predictor variable was required for addressing this hypothesis, which was created as the Participantsex*Cyberballcondition interaction term. Two separate linear regression analyses were performed to predict whether Participantsex*Cyberballcondition resulted in statistically significant changes for increased hostility and higher aggressive cognition scores for excluded male participants. The results testing Hypothesis 1B are included in tables 5 and 6 previously provided. The interaction between Cyberball condition and participant sex did not predict

statistically significant increases in hostility scores ($p = .761$). In addition, it did not predict any statistically significance for higher aggressive cognition scores in excluded males than excluded females ($p = .245$). Results for hypothesis 1B are also depicted in Tables 5 and 6 previously provided. In general, participant's sex did not predict any significant associations with aggressive cognition scores ($p = .114$) or hostility changes ($p = 0.507$). Therefore, gender alone did not predict aggressive cognition or hostility change. Overall, there were no significant increases in hostility change or higher scores for aggressive cognition found for excluded males compared to included females.

Chapter 4

Discussion

Main Findings

The overall purpose of this thesis was to further analyze different psychological effects that may result from being socially excluded. A well-validated social exclusion paradigm, known as Cyberball, was utilized in a two-group, randomized controlled experiment. A secondary data analysis was performed in part of a larger study, known as Social Interactions and Health Study (Coleman, 2018). This thesis primarily focused on analyzing whether participant's biological sex or Cyberball condition they were randomly assigned had any significant effects on aggressive cognition and changes in hostility. Individuals aged 18-24 years old ($N=120$) were randomly assigned to the inclusion condition ($n=40$) and exclusion condition ($n=80$). After the completion of Cyberball, overall changes in hostility and aggressive cognition scores were tested to determine the effects of social exclusion and participant's sex on both measures. Participants who averaged high scores for both outcome measures were reported to have higher aggressive cognition and hostility changes after Cyberball.

Prior research has found that social exclusion can lead to increased levels of aggressive behaviors (Twenge, Baumeister, Tice, & Stuck, 2001). Additional studies have found that hostile thoughts and emotions have been linked to the development of aggressive behaviors (Geniole, Carré, & McCormick, 2011). This research was conducted in order to understand whether aggressive cognition and hostility, which have both been linked to the development of aggressive behaviors, were associated with social exclusion. In addition, it was investigated whether participant's biological sex moderated this potential relationship. Determining whether there are

any significant effects of social exclusion and one's biological sex on aggressive cognition and hostility in this study may be useful for future experimentation that analyzes how social factors may be linked to the development of aggressive personality thoughts and behaviors.

Primary Hypothesis 1A

One hypothesis was that participants randomly assigned to the social exclusion condition would experience greater increases in hostility and higher scores in aggressive cognition in contrast to participants in the inclusion condition. This hypothesis was formed based on prior findings analyzing psychological effects of social exclusion. Prior studies have found that social exclusion can lead to changes in aggressive thoughts and hostility (DeWall, Twenge, Gitter, & Baumeister, 2009; Zvolinski, 2012). When controlling for participant's sex, there was a significant association between Cyberball condition and changes in hostility ($p = 0.001$). It was found that participants in the exclusion condition overall had a greater increase in hostility change after Cyberball. This means that in general, excluded participants became more hostile after being excluded, regardless of their sex. However, the Cyberball condition did not result in any statistically significant increases in aggressive cognition ($p = 0.694$), which did not support part of primary hypothesis 1A. From these analyses, it was found that both males and females in the exclusion group experienced increases in hostility after Cyberball. However, there were no statistically significant differences in aggressive thoughts between excluded and included participants.

Primary Hypothesis 1B

It was also hypothesized that socially excluded males would have a significant, positive relationship with greater changes in hostility and higher aggressive cognition than excluded females. However, there were no statistically significant findings that the interaction of participant's sex and Cyberball condition predicted hostility changes ($p = 0.761$) and aggressive cognition ($p = 0.245$). Therefore, hypothesis 1B was not supported.

Past research has been limited and conflicting for analyzing the effects of social exclusion and gender differences associated with aggressive cognition and hostility. Prior research that has analyzed gender differences in response to social exclusion have particularly focused on analyzing subjective ratings such as anger, positive mood affect, and sadness (Seidel et al., 2013). In the Seidel et al., 2013 study, it was found that both genders showed strong emotional responses in those psychological responses after being excluded.

It has also been argued that females are more reactive to social exclusion compared to males. Females generally have the desire to form one-on-one relationship, while males are known to be more independent and autonomous (Cyranowski et al., 2000). It was also theorized that females often perceive exclusion as a form of non-directed aggression directed towards them, while males generally do not (Benenson, Markovits, Thompson, & Wrangham, 2011). Thus, potentially it could have been hypothesized that excluded females would have had higher aggressive cognition and hostility scores after exclusion compared to excluded males.

In a past study that did test for gender differences in outcomes after social exclusion, it was found that socially excluded males reported significantly greater hostility scores compared to included males (Zwolinski, 2012). In addition, it was concluded that there were no significant changes in hostility between included or excluded females (Zwolinski, 2012). Although this significant association is limited to only one study, it was hypothesized that this same association would be observed in excluded males in this research study measuring hostility change.

Gender differences in aggressive cognition after social exclusion have not been previously explored. Since aggressive cognition and hostility have both been found as potential links to aggressive behaviors, a hypothesis was formed that excluded males would experience significantly greater changes in hostility and higher aggressive cognition scores compared to included females.

The findings from this study extend the generally inconsistent past literature about how gender may moderate the association between social exclusion and aggressive cognition and hostility. While some research has found that gender plays a significant role in psychological responses to social exclusion, other research has not explored gender differences. Although this research found that participant's sex did not have any significance in moderating the relationship between social exclusion and both outcome variables, there are still unanswered questions regarding whether gender still may contribute to any differences in these responses. Future experimentation could focus on including mixed samples of males and females and the use of many different paradigms, such as Cyberball, and the Operator Challenge, to further investigate whether gender is a significant predictor for both psychological and physiological responses after exclusion.

Limitations and Future Directions

One major limitation of this study was that the measure for aggressive cognition, a word-stem completion task, may not have been a highly valid form of measuring aggression after social exclusion. Prior experimentation has largely focused on how violent media exposure influences aggressive cognition (Krahé et al. 2011). However, there are a limited number of studies analyzing the effects of social exclusion paradigms, such as Cyberball, on aggressive cognition. Future experimentation should include extensive experimental testing to determine the validity of how exclusion paradigms, such as Cyberball, can lead to an individual into developing aggressive thoughts.

An additional limitation is that the terms “aggressive cognition”, “aggressive thoughts”, “hostile mindset” have been used interchangeably in past experiments (DeWall, Twenge, Gitter, & Baumeister, 2009). Although past experiments utilized a word completion task to measure this variable, like in this study, the definition for aggressive cognition was not clearly described. This may have led to false expectations in this secondary analysis about the associations between aggressive cognition with both predictor variables.

Lastly, an additional limitation may have been that the Zvolinski (2012) study may not have served as the most reliable source to predict whether gender moderates the relationship between social exclusion and hostility. In the Zvolinski (2012) study, the MAACL-R State version scale was used to measure hostility, but this current thesis analyzed hostility by the State Hostility Scale (SHS), which was developed by Anderson, Deuser, & DeNeve (1995). As both scales did not ask the same questions to measure hostility, the Zvolinski (2012) study may not have served as the most valid source.

Overall Conclusions

In summary, it was hypothesized that one would develop aggressive thoughts and heightened hostility following social exclusion. Compared to females, males were predicted to have greater responses in both of outcomes after exclusion. There were no significant findings that gender moderated the relationship between social exclusion with aggressive cognition and hostility. In addition, social exclusion did not seem to alter one's aggressive thoughts. However, it was found that both excluded males and females experienced heightened hostility after being ostracized. This finding suggests that regardless of one's sex, social exclusion can elicit a hostile response in an individual. Thus, it is important to continue to explore how the role that exclusion plays in the development of hostile behaviors. Future focus on understanding physiological and psychological mechanisms related to hostility can potentially lead to the prevention and treatment of chronic maladaptive behaviors associated with heighten hostility.

Appendix A

Recruitment and Screening Materials

Class announcement script

“Hello everyone. My name is _____ and I am a research assistant in the Stress, Health, and Daily Experiences Laboratory in the Biobehavioral Health Department here at Penn State. Our lab is looking for volunteers to participate in a study that examines how individuals respond physically and psychologically to social interactions. In the study, you will play a short computer game with other participants for about 5 minutes while we monitor your heart rate and collect 2 saliva samples. Most healthy students are eligible to participate. If you are over 18 and would be interested in earning \$10 dollars per hour for roughly 1 hour of participation, please call our lab for more information. Our lab number, which is at the bottom of the slide in yellow and bold, is (814) 865-9473, and our email is ‘shade.research.lab@gmail.com’. Thanks you for your attention!”

**** Make sure to thank the professor for allowing you to make the announcement before you leave ****

Intake form, phone screening script, and screening form

FIRST

INTAKE FORM

"Hello, SHADE laboratory, this is _____ speaking, how may I help you?"

1. Is the person calling about participating in a study?

YES (continue with #2)

NO (make comments on a sticky note for designated person)

2. Which study are you calling about?

Note: If the person is calling about "National Parks and Health," inform them that the study is no longer running and recruitment has ended. Thank them and hang up. If the person is calling about "Social Interactions and Health," continue below.

2a. If you ARE trained to recruit for Social Interactions and Health, place this form in the Intake Binder under the "Completed SIH" tab and continue with the General Screening Script and Screening form for the appropriate study (**Section labeled "Second"**).

2b. If you are NOT trained to recruit for the study the person is interested in, continue below:

"Unfortunately, I am not trained to recruit people for that particular study. Would it be alright if I collected some contact information to forward to a research assistant who is?"

If yes, collect the following contact information:

Name: _____

Phone number: _____

Best day/time to reach by phone: _____

"Okay, great. Thank you for your contact information and interest in _____. A research assistant who is trained to recruit people for that study will return your call within a couple of days to describe the study in more detail and determine whether you are eligible to participate. Do you have any further questions? Have a nice day."

If no, continue below:

"Okay. Thank you for calling the SHADE Laboratory. Please feel free to call back if you have any further questions."

GENERAL SCREENING SCRIPT

This is the script for informing the participant, over the phone, about general details of the study in order to see if they are interested.

RESEARCH ASSISTANT

Do you have a few minutes for me to go over some general screening questions and to outline the study you would be participating in?

Yes: Great,

(Continue with General Screening Script and then go over Screening Form).

No: No problem. Is there a more convenient time to call back?

(Write down preferred call back time Call and Email Log under the “Calls to Return/Attempted” tab)

RESEARCH ASSISTANT

The Stress, Health, and Daily Experiences Lab, also known as SHADE lab, is affiliated with Dr. Smyth in the BBH Department at PSU. Generally speaking, the SHADE lab is interested in how daily experiences relate to health and well-being among individuals. The study that you are calling about is investigating how individual people respond to each other while interacting in a digital environment.

I will first briefly describe the study and then, if you are interested in participating, will go over a list of screening questions to determine your eligibility.

Do you have any questions so far?

Yes: (Answer accordingly and then continue with script)

No: (Continue with script)

RESEARCH ASSISTANT

Our study is called Social Interactions and Health, in which we will explore the relationship between social interactions during basic computerized gameplay and physiological reactivity. If you choose to participate in this study you will answer a series of questionnaires and play a basic computer game with two other participants for about 5 minutes while we measure your physiological reactivity. In order to measure your physiological reactivity, you will be asked to provide saliva samples and wear a heart rate monitor. We will have to ask for your height and weight in order to allow the heart rate monitor to properly record your heart rate. Upon completion of this study, you will receive monetary compensation in the amount of \$10 per hour, and this study takes about 1 hour to complete. Does this sound like something you would like to participate in?

Yes: Great, I will now ask you a series of screening questions to determine whether or not you are able to participate. Do you have any questions before we begin?

(Answer accordingly and then continue with screening)

No: Okay. Thank you for calling in. Have a nice day.

**** Go over Screening Form (Section labeled “THIRD”) ****

SCREENING FORM

THIRD

I am now going to ask a few questions to get some basic information about you.

What is your name? _____

What is your date of birth? _____ How old are you? _____ (if < 18 or >24, excluded)

What is your address? _____

What is your phone number? _____

What is your email address? _____

What is your height and weight? H _____ W _____

What is your biological sex? (Circle one) M F

Now I am going to ask you some questions that will determine if you are eligible for this study. Please answer them with a "Yes" or "No" response. (Bolded responses = participant is excluded)

1) Do you fluently speak English? YES NO

2) Have you ever participated in a research study in which YES NO
you were required to play a computer game with other participants?

**(If YES, have the caller describe the game. If Cyberball,
continue with screening then exclude)**

3) (for females only) Are you currently taking any estrogen-containing YES NO
contraceptive pills? **(If YES, make a note in comments)**

4) Do you have any endocrine disorders such as Addison's disease YES NO
or Cushing's Disease?

5) Do you have any visual impairments that would prevent you from YES NO
being able to distinguish between simple shapes on a computer screen?

6) Do you have any cardiovascular disorders that may affect a YES NO
heart rate monitor, such as irregular heartbeat, rapid heartbeat, or
abnormally slow heartbeat? **(If YES, make note in comments)**

7) Have you ever been diagnosed with a pervasive developmental YES NO
disorder or other cognitive impairment, such as autism or mental retardation?

8) Are you willing to go 12 hours without drinking alcohol prior to YES NO
the time you would come in for the study?

9) Are you willing to not exercise 2 hours prior to the time YES NO

you would come in for the study?

10) Are you willing to go without caffeine for 2 hours prior to YES NO

the time you would come in for the study?

11) Are you willing to go 60 minutes without eating food prior to the YES NO

time you would come in for the study?

12) Do you smoke? YES NO

If YES: How often do you smoke? _____

Would you be willing to refrain from smoking 2 hours prior to the study? _____

13) Where did you learn about this study? Flyer location/Class Announcement? _____

Comments:

Return to "General Screening Script" (Section labeled "FOURTH")

FOURTH

**** Check “Participant Tracker Log” tab in the “Call Log” binder for caller’s name and phone number to see if they’ve already participated. If they are a repeat, read the “Ineligible participant” script and do not schedule them. ****

If the participant is eligible: (Continue with the General Screening Script)

If the participant is NOT eligible: *Unfortunately, you are not eligible to participate in our study. We are starting studies throughout the semester and with your permission we will keep your information on file and contact you if a future study would be more suitable for you. Is it alright for us to keep your information on file?*

***Yes:** Great, we will contact you if we begin a study that you may be eligible for. Thank you for calling in. Have a nice day.*

***No:** Okay. Thank you for calling in and have a nice day.*

General Screening Script (Continued):

It looks like you are eligible to participate in our study. Do you have a few more minutes for me to go over more details and schedule a visit?

***Yes:** (Continue with script)*

***No:** Okay when would we be a more convenient time for us to call you back?*

(Write down preferred call back time in call log)

RESEARCH ASSISTANT

Okay, are you familiar with how to get to the Biobehavioral Health Building?

***Yes:** (Continue with script)*

***No:** (Give directions as needed) (Refer to Directions to Shade Lab sheet if necessary: See Section 2.02 of Screening and Scheduling Binder or 2.06 of Project Book)*

RESEARCH ASSISTANT

When you come in to the BBH building for the study you will come to room 024 which is located in the basement. You will be interacting with other participants during the study, so it is important that you arrive on time. We also ask that you refrain from conversation with anyone waiting near room 024 in order to maintain confidentiality between yourself and the other participants. As I mentioned earlier, you will be answering questionnaires, and we will also be measuring your heart rate using a heart rate monitor as well as collecting two different saliva samples. For the heart rate monitor, it is best if you wear a loose fitting shirt. (If female, also suggest wearing a sports bra). If you don’t have any questions, we can now schedule a time for you to come in for your visit.

**** Schedule the participant visit (If you don’t know how to do this, consult Section 1.01 of Screening and Scheduling or 2.01 of Project Book) ****

Alright we will see you on [DATE] at [TIME]. We will send a reminder email the day before your scheduled time. If you do not reply to the email by the end of the day, we will call and either remind you in person or leave a voicemail. Thanks for calling in and have a great day!

Appendix B

Demographic Information

Demographic Information

1. Gender: ☐ Male ☐ Female ☐ Transgender/Non-binary

2. Age _____

3. Please answer both parts of this question.

3a. Ethnicity: ☐ Hispanic or Latino ☐ Not Hispanic or Latino

3b. Race: (You may choose more than one)

☐ American Indian or Alaska Native

☐ Asian

☐ Black or African American

☐ Native Hawaiian or other Pacific Islander

☐ White

☐ Other

4. What is your average yearly income before taxes? (Including parents' income)

☐ Less than 10,000 ☐ \$10,000-\$19,999 ☐ \$20,000-\$29,999 ☐ \$30,000-\$39,999

☐ \$40,000-\$49,999 ☐ \$50,000-\$74,999 ☐ \$75,000-\$99,999

☐ \$100,000-\$149,000 ☐ \$150,000 and over

5. Please list any illnesses or medical conditions you have been diagnosed with:

Appendix C

Aggressive Cognition and Word Completion Task

Word Completion Task: Here is a list of words with letters missing. Your task is to fill in the blanks to make complete words. For example: “_rain” can be completed with the letter “T” to spell the word “Train” or the letter “G” to spell the word “Grain”. There are no right or wrong answers. If you cannot think of letters to complete a word, skip it and move on to the next.

- | | | | | |
|-----------------|----------------|---------------|--------------------|---------------|
| 1. b__h__ _ _ | 21. r__p__ _ t | 41. p__ _ ne | 61. c__e__t e | 81. m__n__g e |
| 2. in__ _ re | 22. str__ _ e | 42. ang__ _ | 62. st__r__y | 82. ins__ _ _ |
| 3. ex__e__ _ | 23. l__ _ e | 43. fl__ _ t | 63. m__tc__ | 83. s__d__ |
| 4. mu__ _ er | 24. b__rn | 44. fi__ _ t | 64. f__r__ _ | 84. b__ _ t |
| 5. pr__ _ e | 25. st__r__o | 45. p__ck | 65. t__ _ te | 85. br__ _ ze |
| 6. spea__ | 26. p__ _ son | 46. ha__e | 66. n__ _ t__ | 86. rev__ _ t |
| 7. fli__ _ er | 27. p__st__r | 47. a__t | 67. w__ _ d__w | 87. coo__ |
| 8. expl__ _ e | 28. m__ _ gle | 48. c__t | 68. w__ _ ked | 88. s__ _ y |
| 9. w__ _ m | 29. bl__nd | 49. w__n | 69. vis__ _ n | 89. d__ _ r |
| 10. ki__ _ | 30. sn__re | 50. a__e | 70. en__age | 90. sm__ck |
| 11. t__p__ | 31. b__e | 51. __ry | 71. scr__ _ n | 91. fr__ _ t |
| 12. h__r__ | 32. h__t | 52. wa__ | 72. h__tr__d | 92. __unch |
| 13. a__t__r | 33. g__ _ pe | 53. f__m__ | 73. t__l__ph__ _ _ | 93. sh__re |
| 14. cho__e | 34. sm__ck | 54. sl__p | 74. dis__ _ s__ed | 94. a__use |
| 15. s__mp__ _ | 35. sm__ _ e | 55. b__ _ k | 75. c__nt__ _ l | 95. cl__ _ r |
| 16. att__c__ | 36. kn__ _ _ | 56. r__pe | 76. prov__ _ e | 96. h__nt |
| 17. c__mp__ _ t | 37. t__ne | 57. fo__e__t | 77. p__nb__ll | 97. w__t__r |
| 18. des__ _ _ _ | 38. s__ _ b | 58. off__ _ _ | 78. out__ _ _ | 98. s__ash |
| 19. sh__l__ | 39. sh__r__ | 59. l__ _ on | 79. c__ll | |
| 20. sho__t | 40. dr__ _ n | 60. cr__ _ l | 80. r__de | |

Appendix D

State Hostility and SHS

SHS: Using the scale below, indicate from 1 to 5 how strongly you agree that you are feeling the listed emotions <u>right now</u>				
Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
1	2	3	4	5

- | | |
|---|--|
| <p>1. I feel furious. _____</p> <p>2. I feel willful. _____</p> <p>3. I feel aggravated. _____</p> <p>4. I feel tender. _____</p> <p>5. I feel stormy. _____</p> <p>6. I feel polite. _____</p> <p>7. I feel discontented. _____</p> <p>8. I feel like banging on a table. _____</p> <p>9. I feel irritated. _____</p> <p>10. I feel frustrated. _____</p> <p>11. I feel kindly. _____</p> <p>12. I feel unsociable. _____</p> <p>13. I feel outraged. _____</p> <p>14. I feel agreeable. _____</p> <p>15. I feel angry. _____</p> <p>16. I feel offended. _____</p> <p>17. I feel disgusted. _____</p> <p>18. I feel tame. _____</p> | <p>19. I feel like I'm about to explode. _____</p> <p>20. I feel friendly. _____</p> <p>21. I feel understanding. _____</p> <p>22. I feel amiable. _____</p> <p>23. I feel mad. _____</p> <p>24. I feel mean. _____</p> <p>25. I feel bitter. _____</p> <p>26. I feel burned up. _____</p> <p>27. I feel like yelling at somebody. _____</p> <p>28. I feel cooperative. _____</p> <p>29. I feel like swearing. _____</p> <p>30. I feel cruel. _____</p> <p>31. I feel good-natured. _____</p> <p>32. I feel disagreeable. _____</p> <p>33. I feel enraged. _____</p> <p>34. I feel sympathetic. _____</p> <p>35. I feel vexed. _____</p> |
|---|--|

Appendix E

Experiment Checklist and Protocol Script

EXPERIMENT CHECKLIST

This document will help you gather and organize all of the documents materials needed to run Social Interactions and Health

- _____ Obtain key for room 024. It is kept in the silver basket on top of the desk in room 032. Make sure to bring back to room 032 right after unlocking.
- _____ Determine Cyberball condition using the randomization schedule and cross off the list on the bulletin board in room 032).
- _____ On Master Sheet, fill in date, participant ID#, and RA initials.
- _____ **Circle the experimental condition: control (inclusion) or experimental (exclusion).**
- _____ Open Qualtrics surveys on laptop.
- _____ Open Cyberball program on laptop; place laptop on back table and plug in.
- _____ Make sure one-way mirror shutter is closed.
- _____ Set up the Polar Heart Rate Monitor with the participant's height, weight, age and initials (This information can be found on the Screening Form).
- _____ If phone is plugged in in room 024, turn phone off (use horizontal volume arrow – push the left arrow until the ringer is silenced).

Documents needed in the order they are used:

- _____ Mastersheet
- _____ Microscript
- _____ Eligibility Screening Form for Day of Study
- _____ 2 Informed Consent Forms
- _____ "How to Wear HRM" Guide for Participant
- _____ 2 Participant Compensation Forms
- _____ Envelope containing \$10
- _____ Contact Info

Materials needed:

- _____ Laptop
- _____ Heart Rate Monitoring System
 - _____ Strap
 - _____ Sensor
 - _____ Watch
 - _____ Buh-Bump gel
- _____ 2 sets of disposable gloves
- _____ 2 purple labeled Salivettes (On each label, circle "Baseline" or "2nd" and write in the date and Participant ID#)
- _____ Plastic bag for Salivettes (located on 3rd shelf of 1st bookcase in room 032)

Time participant arrived: _____

_____ Welcome and RA Introduction

_____ Eligibility Screening Form for Day of Study completed (**If eligible, move on to next item; if not eligible, reschedule participant**)

_____ Informed consent

_____ Explained

_____ Both Informed Consent Forms signed

_____ One copy given to participant

_____ Heart rate monitor (HRM) visibly recording heart rate Start time: _____

_____ Demographic/baseline questionnaires completed

_____ 5 min baseline HR complete Time began: _____ Time ended: _____

_____ Baseline cortisol sample collected, placed in plastic bag Time collected: _____

_____ Cyberball complete Cyberball began: _____ Cyberball ended: _____

_____ Check HRM to ensure it is still recording heart rate

_____ Post-Cyberball questionnaires completed

_____ 2nd cortisol sample collected, placed in plastic bag (25 minutes after completion of Cyberball)

Time collected: _____

_____ Heart rate monitor off participant (retrieve data, clean, store after participant is gone)

Time of HRM removal: _____

_____ Debriefing statement read to participant

_____ Compensation

_____ Both Compensation Forms signed

_____ One copy given to participant

_____ Give participant envelope containing \$10 Time participant left: _____

MICROSCRIPT AND PROCEDURE

Prior to study:

Collect the study materials listed on the pre-experiment checklist (see section 4.01 in Project Book).

Hook up the laptop to the monitor in the back of the room and make sure it is connected to the internet.

Access predetermined (via randomization sheet in room 032) Cyberball condition by accessing one of the two following sites in Firefox:

Inclusion condition: personal.psu.edu/hjc131

Exclusion condition: personal.psu.edu/src233

Access the Qualtrics surveys, have each survey open in its own separate Firefox window apart from Cyberball.

Baseline survey: https://pennstate.qualtrics.com/jfe/form/SV_ePOmBegU3Xu8Ret

Post-Cyberball survey: https://pennstate.qualtrics.com/jfe/form/SV_0CBSSrISCQ2X8kB

Finally, make browser full screen (press F11). You should have three browser windows open in the following order: (1) Baseline questionnaire, (2) Cyberball game, (3) Post-Cyberball questionnaire.

Script Key:

1. Regular Text: Notes/general instructions
2. Underlined Regular: Prompts
3. **Bold**: Actions
4. **Underlined Bold**: Section headings and physical objects
5. *Italicized*: Spoken to participant

VERIFYING THE PARTICIPANT

Note: If at any point you have to end the study early, skip to the last section labeled “FINAL PROCEDURES.”

The secondary RA will be waiting with you in room 024 before the participant arrives. The participant should be waiting outside of room 024. Holding a clipboard, the secondary RA will greet the participant and ask for their name, then check the clipboard and explain to the participant that they have been assigned to complete the study in this room (i.e., BBH 024). Finally, the secondary RA will excuse him/herself to “wait for the last participant in the hall.”

RESEARCH ASSISTANT

Hello. (offer handshake) My name is _____. I'm the research assistant who will be working with you today. Please have a seat at the table. (Have the participant sit in the chair on the right side of the table as you enter the room). How are you doing today?

Good: *Great! We appreciate you taking the time to come in for the study today.*

Bad: *I'm sorry to hear that. We appreciate you taking the time to come in for the study today.*

If participant asks how you are: *I'm doing well, thanks.*

RESEARCH ASSISTANT

We're still waiting on one of the other participants, but they should be along shortly, so we can go ahead and get started. First, I need to go through some general screening questions to make sure you are still eligible to participate.

Use the “Eligibility Screening Form for Day of Study” to screen the participant.

ELIGIBLE: *Great, It looks like you are eligible to participate today. [Continue on to next page]*

INELIGIBLE: *Unfortunately you will not be able to participate at this time.*

Explain why the participant is not able to participate. For example, “You drank coffee just before you came. In order to participate, you cannot have any caffeine for two hours prior to the study.”

RESEARCH ASSISTANT

If you would like, we can schedule another time for you to come in. Would you like to reschedule your visit?

YES: Set up a new time, reiterate day-of exclusion criteria, and let them know we will send out another email reminder 24 hours before their next visit.

NO: Thank them for their time and see them out.

INFORMED CONSENT

Give both blank copies of the “Informed Consent Form” to the participant and say the following:

RESEARCH ASSISTANT

Now I am going to go over the Informed Consent forms with you. I have to read the main points verbatim in order to give you a general overview of the study. Then, I'll ask that you sign and date both forms – one for our records, and one for you to take home with you. Please stop me at any point if you have any questions and I will be happy to explain more thoroughly.

Purpose of the study: *This research is being done to examine how people respond to basic social interactions. Prior research has found that people have different physical and psychological reactions while interacting with others, and that this may be due to differences in personality. Our research intends to further validate and expand upon these findings in hopes of better understanding how personality might influence physical and psychological reactivity in response to social interaction.*

Procedures to be followed: *In this study, heart rate data and saliva samples will be collected. You will answer several questionnaires and play a basic, old-fashioned computer game online with 2 other participants. Lastly, you will be provided debriefing and compensation information.*

Risks and possible discomforts: *Some people may find the computer game to be mildly irritating. However, this discomfort is not beyond that which is experienced in everyday life.*

Benefits: *Benefits include learning how you react to others during online, computerized gameplay.*

Voluntary participation: *Your involvement in this research is completely voluntary and you can stop at any time. Refusal to take part in this study or withdrawing from it will involve no penalty or loss of benefits you would receive otherwise.*

Other options available: *You have the option of not participating in this research.*

Privacy and confidentiality: *There is a risk of loss of confidentiality if your information or your identity is obtained by someone other than the investigators. Reasonable efforts, such as removing identifying information from your data, and storing signed documents in locked filing cabinets in our lab, will be made to keep the personal information in your research record private. However, absolute confidentiality cannot be guaranteed.*

Compensation: *You will be compensated at \$10/hour. Compensation will be settled at the end of the experiment.*

Right to ask questions: *You are allowed to present questions, concerns, or comments about this study to Sulamunn Coleman, the principal investigator, his faculty adviser, Dr. Smyth, or the Penn State Office of Research Protections. You will receive their contact information at the end of the study.*

RESEARCH ASSISTANT

If you don't have any questions, and would still like to participate, please sign and date the last pages. [Answer any questions without giving away details about the hypotheses]. Before we get started, please make sure your cellphone is turned off completely because cell phone signals can interfere with the Heart Rate monitor. I'll put it on the back table for you and you can grab it before you leave. [Take phone and put it on the back table] Are you wearing a FitBit? [If YES, take FitBit to room 32 and return after the study] Finally, if you need to use the bathroom, please do so now because once the study begins you will not be able to take a break.

HEART RATE MONITOR SET-UP

Refer to section 2.3 of the Polar RS800 Monitoring System User Guide Version 1.7

RESEARCH ASSISTANT

Now we will set you up with the heart rate monitor. This will measure your heart rate continuously throughout the study. Here is a visual aid for you to look at for reference. [Hand participant Appendix B: Heart Rate Monitor Guide] There are three parts of the monitoring system: The watch, the sensor, and the strap. I will demonstrate on myself how to properly put on and adjust the strap and then have you practice over your clothes. You will need to place the strap where your breastbone ends and make sure it is a snug but comfortable fit. So, it shouldn't be cutting off circulation, but it needs to be tight enough so that it doesn't move around when you shift in your seat. The sensor clips on to the front of the strap like this. [Clip sensor to the strap with the logo facing upwards]. Point the electrodes towards your body with the logo facing upward on the sensor so that you can hook the clasp on your left side.

Demonstrate putting the strap on yourself; point to logo on sensor; demonstrate buckle adjustment; have participant practice over their clothing, re-explain as necessary.

RESEARCH ASSISTANT

Okay great, you can take that off now. In order to boost the signal between your skin and the electrodes on the strap [Point to electrodes on strap], I need to moisten them using either a cream or water. Do you have any type of skin allergies?

If NO: *Okay, I am now going to put this electrode gel onto the strap. This is a water-based substance so it will dry without sticky residue and won't stain your clothing.*

If YES: *Okay, I am now going to moisten the electrodes with water so I'll be back in just a minute. [Go to water fountain or bathroom and moisten electrodes with water; then return]*

RESEARCH ASSISTANT

Great, now I am going to leave the room to allow you to put the heart rate monitor on underneath your shirt. The strap needs to be in contact with your skin and will not work over your shirt. I will be outside in the hallway, so just open the door when you are ready or if you have any questions. [Stand in hallway and wait for participant to open door; re-demonstrate steps as necessary]

Okay now I'm going to hold the watch up towards the sensor in order to establish a connection. [Hold watch up towards the sensor; hit red button once, wait for HR to show up and then hit red button again to start; troubleshoot as necessary; start time on watch] So, now we are going to make sure that the heart rate collection is working properly. I am going to start the watch and collect data for 1 minute. Please sit quietly during this baseline reading. [Collect 1 minute of baseline heart rate data to make sure the HRM is working properly; follow the HRM Data Collection Check procedure for ensuring the collection worked properly]

WORKING: *Okay, great. The watch is all set up and we can continue on with the study. [Start HRM to begin collecting data again. When asked to merge data, select "No," then continue on the next page]*

NOT WORKING: *Okay, it seems as though the watch isn't working properly. Please stay seated as I go to room 032 to fix the problem. [Troubleshoot or set up a new watch and repeat process until functioning properly]*

BASELINE SURVEY

RESEARCH ASSISTANT

The next segment of the study includes having you complete some questionnaires. Please have a seat at the laptop on the back counter.

Have the participant move to the seat in the back of the room facing the monitor. Bring Polar watch with you; place on back table in close proximity to the participant, but facing you so you can make sure it's working as you sit at the table. If the watch stops reading, refer to troubleshooting procedures.

Click the tab to open the Baseline survey.

RESEARCH ASSISTANT

This questionnaire is several pages long. There is a "continue" button on the bottom of each page which will advance you, and at the end of the survey there will be a "thank you" screen. Try not to spend too much time on any single item. Just fill out the items according to how you see yourself now. Do you have any questions? [Address any concerns]

After you complete the questionnaires, I'll have you sit quietly and relax for 5 minutes before I take your first saliva sample. If you have any questions as you're filling out the questionnaires, please ask me. Otherwise, just let me know when you have reached the "thank you" screen at the end of the questionnaires.

Address any of the participant's concerns as they arise. If you find that the participant is taking longer than 20 minutes to complete the questionnaires, ask if everything is alright, and address any concerns. Otherwise, allow the participant to complete all sections.

Continue on the following page when the participant has finished. DO NOT CLOSE THE BASELINE SURVEY TAB. Participant should indicate when they are finished, but keep an eye on the questionnaire to make sure you know when the participant has completed it.

RESEARCH ASSISTANT

Now we're going to rest for 5 minutes before taking the first saliva sample. Please sit quietly and try to relax.

BASELINE CORTISOL

Put on a pair of plastic gloves.

RESEARCH ASSISTANT

We will now take your first saliva sample. This is a saliva collection tube. I will now demonstrate how to properly remove the cap. You'll want to hold the tube upright and grasp the middle section. To open it, slowly twist and pull off the cap while grasping the tube. (Keep the tube upright, hold the middle section of the tube, twist, and pull the cap off slowly/ put the cap back on and hand it to the participant).

Once the cap is removed, you can carefully remove the white gauze. You will put the gauze between your teeth and cheek and hold it there for about 2 minutes. Then, you will spit the piece into the collection tube without touching it with your hands. Please do not bite or chew on it. I will let you know when one minute is over.

Record time participant began saliva sample. Wait 2 minutes to allow proper absorption of the saliva.

RESEARCH ASSISTANT

Okay, great. It has been one minute. Please spit the gauze back in the tube without touching it with your hands.

Collect salivette; write time participant gave saliva sample on the collection tube label.

Thank you. We will store your sample and analyze it later on.

Place labeled saliva sample in a plastic bag marked with the participant's ID number.

Remove and discard your gloves.

CYBERBALL

RESEARCH ASSISTANT

Okay. We should be just about ready to begin the computer game. I'm going to go check with the other research assistants to make sure we are ready to start. I'll be back momentarily.

Leave room 24, closing the door as you exit, and walk down to room 32. There will be another RA waiting in 32. Alert the RA that you are just about ready to begin playing Cyberball. This will prompt the RA to begin the timer for when to inform you that his/her "participant" is also ready to begin (i.e., 4 minutes later). Walk back to room 24, knock on the door and re-enter.

RESEARCH ASSISTANT

Hey, so one of the other participants has a bit longer to wait before taking their first saliva sample, so while we're waiting I'm going to explain the game to you. There will be some instructions on the screen before you start playing. Read through them completely, and when you're done click "start playing" to log into the game. Once in the game you will see players on your left and right. In order to maintain confidentiality, only their age and sex will be visible to you, and your age and sex will be visible to them. This is a basic, old fashioned computer game that's used to test the effects of mental visualization while interacting with others in a digital environment. To pass the ball to another player, you simply have to use the mouse to click on the player you wish to pass the ball to. The game can last anywhere from 5-10 minutes depending on how long each participant holds the ball. To keep the game moving, please don't hold onto the ball for more than a couple of seconds. When the game has finished a screen will appear that says "Thank You" and tells you to wait for further instructions. Just let me know when that screen appears. Do you have any questions? [Address any concerns] Alright; we just have to wait for the other RA to let us know when they're ready to start.

In 1-2 minutes the second RA will knock on the door to room 24. Excuse yourself by saying "That's the other research assistant." Answer the door (you only need to open it a crack). The second RA will say "We are ready to begin" clearly so the participant can hear it. Shut the door, close the baseline survey tab on the web browser, and bring up the instructions screen for Cyberball.

RESEARCH ASSISTANT

Alright, go ahead and read through the instructions then click "Start Playing" to log into the game.

Note the real time (e.g., 5:30pm) on the Mastersheet.

Questions participants may ask during gameplay:

"Is the game is working properly?" / "I don't think the game is working properly."

"Why aren't they throwing it to me?"

"Am I doing this right?" / "Am I supposed to be doing anything?"

"Why isn't my information (age/sex) showing up?"

"Do the other participants know I'm here?" / "Can the other participant's see me?"

POST-CYBERBALL SURVEY

Start the stopwatch when the game has finished.

RESEARCH ASSISTANT

Great, thanks. Now we have to wait 25 minutes before collecting the final saliva sample. In the meantime, I'd like you to complete a few more questionnaires. If you complete them before the time is up, just let me know, then I will ask you to please sit quietly for the remaining time. It's important that you stay quiet for the entire time because we have to do our best to minimize interference with the heart rate monitor. I'll be happy to answer any questions you have afterwards.

Open up post-cyberball questionnaire on the laptop.

RESEARCH ASSISTANT

Okay. Please fill these out, then just sit quietly once you've finished.

You will use the stopwatch to make sure 25 minutes elapse after Cyberball has finished because that is when you will collect the final cortisol sample. You will need to monitor the watch to make sure exactly 25 minutes have elapsed between the completion of Cyberball and the collection of the final saliva sample.

Double check the Polar Heart Rate Monitoring watch to make sure it is still collecting heart rate data correctly. If it is not, you will need to refer back to the Polar RS800 Monitoring System Researcher User Guide and troubleshoot.

When the participant indicates they have completed the questionnaires, close that specific tab on the computer. From then on, keep an eye on the Polar watch to make sure the HRM is collecting data. Troubleshoot if necessary.

After 25 minutes have elapsed:

RESEARCH ASSISTANT

Okay [Name], the 25 minutes are over. Thanks for your patience.

If the participant has not finished the word-completion task, have them scroll to the bottom of the page and click "continue" to finish

FINAL CORTISOL SAMPLE*RESEARCH ASSISTANT*

We will now collect the final saliva sample. Just as before, grasp the middle section of the tube and carefully take the cap off. Take the white gauze out and place it in your mouth, between your cheek area and your teeth. Make sure not to chew on the gauze. Just hold it in your mouth while it collects saliva.

Hand salivette to the participant and make sure they place the gauze in their mouth properly. Wait 2 minutes to allow proper absorption of saliva.

RESEARCH ASSISTANT

Okay. Now spit the gauze directly into the tube insert without touching it with your hand and close the cap securely, just like you did before.

Note the time of collection on the Mastersheet. Place the salivette in the plastic bag and set aside. Press the “Stop” button on the side of the Polar watch.

Continue on the following page.

DEBRIEFING AND COMPENSATION

RESEARCH ASSISTANT

Okay, that completes the study. I will now leave the room in order to give you some privacy so you can remove the heart rate monitor. When you're ready just open the door to let me back in. Then we'll go over final concerns.

Leave the room to allow participant to remove the HRM. Re-enter when the participant opens the door. Check to make sure all of the heart rate monitoring equipment is on the table (i.e., watch, strap, and sensor).

RESEARCH ASSISTANT

Please have a seat at the table again.

Immediately note on the Mastersheet what time the HRM was removed.

Hand the participant the research compensation forms.

RESEARCH ASSISTANT

These are the forms which are used to maintain documentation of compensation. Please print your name, sign, and date the following forms and you will then receive the payment for your participation. One of the copies is for our lab, and the other is for you to keep.

Take one of the compensation forms from the participant to keep for our records.

RESEARCH ASSISTANT

I know your time is valuable, and I really appreciate the effort you put in to give us the data we need. You've been very helpful. Before we go over the details of the study in order to fully disclose the nature of the experiment, what do YOU think that was all about?

Record responses on the mastersheet. This information will be used to determine whether the participant has any idea of the study's main hypotheses. Allow participant to ask questions before finally debriefing.

The purpose of this study is to examine the relationship between personality traits and physiological and psychological reactions following social exclusion. The computer game you played during your participation is a simulation designed to elicit a sense of either social inclusion or exclusion based on the condition to which you were randomly assigned. The other players you interacted with were a preprogrammed part of the simulation, not real people. In order to create a realistic sense of inclusion or exclusion, you were lead to believe that you would be interacting with real people during the game. All participants have a 2:1 chance of being randomly assigned to the exclusion condition. As I said at the beginning of today's experiment, we will make every effort to keep the data in your research record confidential. Since this study will continue over the next few months, we would like to enroll you as a co-scientist while we complete our study. This means we will need your cooperation in keeping the nature of the study to yourself so that the data we get from others are as representative as your data. So, as a co-scientist, it is critical that you do not share details of the study with anyone else as that could compromise our results.

*Do you have any final questions? [Address any concerns; hand **compensation envelope** and **contact information sheet** to participant] Okay. Thank you for participating in the Social Interactions and Health Project! [Show the participant the exit]*

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ACADEMIC VITA

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EDUCATION

The Pennsylvania State University, University Park, PA May 2019 (Anticipated)
Bachelor of Science in Biobehavioral Health
Schreyer Honors College Scholar
International Study: ISI – Florence, Italy (Spring 2018)

WORK EXPERIENCE

Chandler Hall Health Service, Care Partner, Newtown, PA 2017-Present

- Provide physical, social and emotional support to elderly residents suffering from Dementia
- Assist in helping residents accomplish activities of daily living such as clothing, bathing, and eating
- Lead daily aerobic and brain strengthening activities

Newtown Athletic Club, Front Desk Receptionist, Newtown, PA 2017-Present

- Help to maintain the safety of the club by regulating the entrance and exit of NAC club members

Positive Impact Program Joyce Kilmer Middle School, Part-Time Group Leader, Trenton, NJ 2016

- Led a group of 25 middle school intercity students and promoted bonding and team building activities
- Integrated respect and education into weekly group reading lessons

ACTIVITIES

International Studies Institute, Student Ambassador, Florence, Italy Present

- Communicate to future ISI students by responding to questions and inquires about the study abroad program

Penn State Biology Department, Learning Assistant, University Park, PA 2017-Present

- Serve as a resource and encourage within lecture group lecture discussions for an introductory physiology course
- Offer weekly one on one and small group tutoring sessions to facilitate student learning

Penn State Biobehavioral Health Department, Research Assistant, University Park, PA 2016-Present
Stress Health and Daily Experiences Lab, University Park, PA

- Develop an experimental protocol used for the recruitment and running of participants in a current study

Saint Mary Medical Center, Volunteer & 2017 Pre-Med Program Participant, Langhorne, PA 2016-Present

- Assist charge nurses in the Emergency Department by recording patient symptoms into a system when they first enter the ED
- Help patients by walking with them around their hospital floor to encourage mobility

Penn State Field Hockey Club, Student Coach & Game Coordinator, University Park, PA 2016-Present

- Led a group of 42 girls each week during practices, tournaments, and team events
- Coordinated with 30 other national college club field hockey teams and referees to schedule games

Penn State Dance Marathon (THON), Dancer Relations Committee, University Park, PA 2015-2017

- Organized pre-THON events with DR committee and provided physical and emotional support to a dancer who stood for 46 hours in the fight against pediatric cancer

SKILLS

American Red Cross, CPR Certification Present