THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF BIOBEHAVIORAL HEALTH

SEX DIFFERENCES IN POSITIVE AFFECT AND SELF-ESTEEM IN RESPONSE TO
SOCIAL EXCLUSION

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SPRING 2019

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree
in Biobehavioral Health
with honors in Biobehavioral Health

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ABSTRACT

Aspects of personality have the potential to significantly affect health outcomes. Protective factors categorize such characteristics that may buffer an individual's risk of experience negative health outcomes in adverse situations, such as social exclusion. Positive affect and self-esteem are two protective factors that have additional implications for overall health and well-being. Positive affect refers to an individual's pleasant emotions (e.g., joy, excitement, happiness) in response to the environment. Self-esteem relates to an individual's perception and understandings of his/her value and worth. Both positive affect and self-esteem can be influenced by social exclusion and this relationship may be further influenced by sex. Research suggests that females are more emotionally reactive to their environments, especially in regard to highly valued social connections. Additionally, previous studies have determined that females typically have lower self-esteem, relative to men. To investigate sex differences in positive affect and self-esteem in response to social exclusion, the present study utilized data from the Social Interactions and Health (SIH) Study, a two-group, randomized controlled experiment. SIH used "Cyberball" to simulate social exclusion, which was the experimental condition. 120 college students, 80 in the exclusion condition and 40 in the inclusion (control) condition, participated in the study. It was hypothesized that females would exhibit greater decreases in both positive affect and self-esteem in response to social exclusion, relative to males. Although there were differences by sex and Cyberball condition in changes in positive affect and self-esteem levels, analyses indicated that no significant relationships were observed.

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ACKNOWLEDGEMENTS

I would like to extend my sincere thanks and gratitude to all of the staff in the Stress, Health, and Daily Experiences Laboratory. Thank you to Dr. Smyth who provided me with the opportunity to gain research experience in his lab. I greatly appreciate his willingness to share his extensive knowledge and to support me during the thesis process, and the past couple of years. I would like to express my appreciation to Dr. Sulamunn Coleman who allowed me to aid in his research project and use the resulting data for this thesis. I also want to thank Sully for his contributions to the initial development of my thesis, in addition to taking the time to teach me about proper research and experimental procedures. Special thanks to my fellow SHADE Lab research assistants, past and present. Working and growing during and outside of lab hours with them has been a privilege, and I cannot think of a better group with which to have learned and laughed. Thank you to Dr. Gyekis for so willingly offering his advice and knowledge about SPSS as I worked through data analyses. Thank you to Dr. Kamens, my honors advisor, for her guidance, help, and expertise in obtaining my Honors degree in Biobehavioral Health. Thank you to the Schreyer Honors College for allowing me to experience Penn State to the fullest extent and leading me to extremely rewarding opportunities that have helped shape who I am as a person. Finally, I am grateful to my family, especially my parents, and friends who believed in, supported, and motivated me throughout not only the thesis process, but also the entirety of my Penn State career.

Chapter 1

Introduction

Social interactions have the potential to impact health in various ways, including producing beneficial and negative effects. Many social experiences can promote psychological changes and either impact or interact with differences in personality traits that can affect personal health (Martin, Friedman, & Schwartz, 2007). There is an understanding that personality traits can construct the social environment, suggesting that individuals have the capability to alter relationships between their surroundings and health (Cohen, 2004). Specific personality traits, such as agreeableness and conscientiousness, have been linked to mortality and disease (Friedman, 2008). For example, conscientiousness has been found to predict lifetime mortality risk (Martin et al., 2007). Additionally, positive affect and self-esteem are characteristics that contribute to overall health (Lyubomirsky, King, & Diener, 2005; Mayol & Scott, 2014).

The work described herein focused on understanding how sex may influence positive affect and self-esteem in response to social exclusion. The present study uses a portion of the data that was collected during the IRB approved Social Interactions and Health (SIH) Study through the Stress, Health, and Daily Experiences (SHADE) Laboratory. The results can provide insight into implications of the connections between individual responses to the environment and health.

Protective Factors

Protective factors refer to traits that decrease an individual's risk of encountering negative risk factors or subsequent harmful outcomes (O'Connell, Boat, & Warner, 2009). Protective factors can vary in type, such as biological (e.g., cortisol levels, genetics; O'Connell et al., 2009), psychological (e.g., autonomy; Garmezy, 1992), social (e.g., access to support systems; Garmezy, 1992), or community-based (e.g., school; O'Connell et al., 2009). Other protective factors related to psychological features, more specifically personality, are positive affect and self-esteem (Layous, Chancellor, & Lyubormirsky, 2014; Kumari & Sharma, 2016).

Protective factors act through various mechanisms in order to provide preventive effects against adverse health outcomes. For example, protective factors are active in promoting mental health well-being in the form of positive activities (Layous et al., 2014). Positive activities may entail prosocial behavior, grateful thinking, and reflective meditation and engaging in such actions may provide those with genetic predispositions for unhappiness assistance in achieving happiness (Layous et al., 2014). Research in adolescent health behavior suggested that increases in personal protective factors are associated with health-enhancing behaviors (e.g., seatbelt use, exercise) (Jessor, Turbin, & Costa, 1998). In acting as psychological buffers against the development of negative mental health outcomes, protective factors can result in lower values of hopelessness and suicidal ideation (Chioqueta & Stiles, 2007). In a study of university students that supported the buffering effect of positive affect, increased protective factors including self-esteem and perceived social support, were significantly correlated with decreased levels of hopelessness and suicidal ideation (Chioqueta & Stiles, 2007). Protective factors also have the ability to cultivate resiliency, although sex differences exist in the types of specific factors utilized (Hartman, Turner, Daigle, Exum, & Cullen, 2009). For example, among a group of

adolescents, females' main protective factors were religiosity and positive school environment which contributed significantly more to resiliency than males' protective factors (Hartman et al., 2009). Additionally, research showed that increased resiliency was associated with more protective factors (Hartman, et al., 2009).

Protective factors have the capability to decrease one's potential of experiencing negative risks or outcomes (O'Connell et al., 2009). Actively engaging protective factors may result in happiness (Layous et al., 2014) or health promoting behaviors (Jessor et al., 1998). There have been previously observed sex differences in use of types of protective when comparing males to females (Hartman et al., 2009). In relation to this current study, protective factors may influence how participants respond psychologically and physically to social exclusion.

Positive Affect

Positive affect, a protective factor, typically refers to an individual's level of pleasant emotions in response to the environment (Clark, Watson, & Leeka, 1989). Typically, positive affective states involve joy, enthusiasm, excitement and can vary in duration, thus they can be long-lasting, stable feelings, or short-lived transient states (Cohen & Pressman, 2006). Positive affect often encourages individuals to become or remain active in their environment (Fredrickson, 2001). Negative affect contrasts with positive affect in that it relates to negative affective states, such as anger, guilt, and fear (Clark et al., 1989). It's important to distinguish that low positive affect does not correlate to high negative affect (Cohen & Pressman, 2006). Both factors mostly function independently of each other, thus absence of one is not presence of the other (Clark et al., 1989). In the present study, affect was measured using the Positive and

Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Two ten-item scales measure positive and negative affect with reportedly high internal consistency, validity, and reliability (Watson et al., 1988).

Positive affect is associated with overall health as its relative levels can support helpful health outcomes. Positive psychological states which includes positive affect are associated with increased well-being in addition to decreased risk of illness (Steptoe, Dockray, & Wardle, 2009). In prospective mortality studies, during which participants are tracked for a set number of years and then those still alive at the end of the study are identified, increased positive affect at baseline was related to an increase in longevity when compared to those who had lower baseline positive affect (Pressman & Cohen, 2005). Another study of older adults who rated happiness and emotional status and were then followed up after 3 years identified a relationship between increased positive affect and decreased mortality (Pressman & Cohen, 2005). In regard to cardiovascular and inflammatory processes, a research study explored connections between biological mechanisms and measures of positive affect (Steptoe, Wardle, & Marmot, 2005). Blood pressure, heart rate monitoring, salivary cortisol levels, positive affect, and psychological distress were measured. Results established associations between positive affect and decreased inflammatory and cardiovascular activity consistent with the protective effects of positive states (Steptoe et al., 2005). For example, lower cortisol and plasma fibrinogen, both inflammatory markers, were associated with positive affect. The study also identified decreased psychological distress in correlation with positive affect (Steptoe et al., 2005). In reference to the specific relationship between cardiovascular function and positive affect, individuals have been found to experience a decrease in heart rate following acute feelings of positive affect (Dockray & Steptoe, 2010).

Additionally, positive affect is often linked to meaning in life (Machell, Kashdan, Short, & Nezlek, 2015; King, Hicks, Krull, & Gaiso, 2006). Meaning in life corresponds to individuals' perceptions of their lives in regards to having significance, purpose, mission (Machell et al., 2015). Various associations between positive affect and meaning in life were observed in ways beneficial to health (King et al., 2006). A study with 162 college students that measured daily experiences and affective reactivity highlighted that positive affect significantly contributes to daily meaning (Machell et al., 2015). In relevance to the current research, this study on meaning in life recognizes the impact that positive affect may have on health.

As discussed above, positive affect describes one's level of pleasing emotional states (e.g., joy, enthusiasm, excitement) (Clark et al., 1989; Cohen & Pressman, 2006). Positive affect has been previously associated with beneficial health outcomes, including decreased mortality rates (Pressman & Cohen, 2005), and general levels of inflammation in the body (Steptoe et al., 2005). Additionally, meaning in life is another marker of positive affect, including the understanding that increased positive affect can lead to increased meaning in life (Machell et al., 2015). In relation to the present study, positive affect is involved as a psychological measure that may be influenced by social exclusion.

Self-Esteem

Self-esteem, a protective factor, refers to individuals' perceptions and understandings of their value and worth (McMullin & Cairney, 2004). Self-esteem can be a positive or negative view of oneself and encompasses subtypes which include global self-esteem (e.g., overall self-worth) and specific self-esteem (e.g., value in certain areas of life) (Friedlander, Reid, Shupak, &

Cribbie, 2007). Typically, the self-evaluative process occurs through comparison to others and reflection on interactions with others (McMullin & Cairney, 2004). Although individuals' self-esteem may be affected by their close friends and family, acquaintances often have greater ability to alter our self-esteem (Neff, 2011). Compared to positive affect, self-esteem has been more widely researched (Bleidorn et al., 2016). In the present study, self-esteem was measured using the Fundamental Basic Needs Questionnaire (FBNQ; Zadro, Williams, & Richardson, 2004).

Similar to positive affect, self-esteem has implications on health. Self-esteem is often related to measures of subjective well-being and life satisfaction (Moksnes & Espnes, 2013). Subjective well-being refers to psychological health and involves various other that promote its development (Moksnes & Espnes, 2013). Regarding subjective well-being, a study of adolescents in middle school and high school examined correlations between self-esteem and life satisfaction, and determined that a positive correlation exists (Moksnes & Espnes, 2013). Lower levels of self-esteem can be viewed as predictors for adverse health outcomes. In a cross-sectional study of nursing students, researchers explored the relationship between self-esteem and academic stress (Pandey & Chalise, 2015). Results indicated that a majority of the students had low self-esteem which translated to higher levels of perceived stress (Pandey & Chalise, 2015). It is also possible that there was a bidirectional causal relationship as stress can lead to changes in self-esteem (Pandey & Chalise, 2015). Self-esteem has additionally been linked to depression (Armstrong & Oomen-Early, 2009) and alcohol use in college students (Luhtanen & Crocker, 2005). Additionally, it has been previously established that there was a positive association between self-esteem and social connectedness (Armstrong & Oomen-Early, 2009). Assessing personal academic performance among college students was also studied in relation to

self-esteem, and results suggested that higher self-esteem corresponded to greater self-awareness and learning (Weisskirch, 2018).

Self-esteem involves self-evaluation of personal worth and value (McMullin & Cairney, 2004). Levels of self-esteem can be dependent on how individuals think others perceive them (Neff, 2011). Previous research has established relationships between self-esteem and adverse health outcomes, including depression (Armstrong & Oomen-Early, 2009) and alcohol use (Luhtanen & Crocker, 2005). In the current study, self-esteem is a measured outcome variable in participants that may be affected by social exclusion.

Responses to Social Exclusion

Cyberball is a paradigm that provides the opportunity to elicit a sense of social exclusion in an experimental setting (Williams & Jarvis, 2006). In the SIH study, in order to convince participants that they were in fact playing with real people, manipulation procedures were utilized to enhance the feeling of social exclusion (Coleman, 2018). Social exclusion entails being ignored after expecting to be involved in social settings and can be harmful (e.g., increased social anxiety, loneliness, depression) (Leary, 1990). Experiencing social exclusion also has the potential to result in altered physiological and psychological states in participants (Seidel et al., 2013). Physiological states involve changes in cortisol in addition to increases in progesterone in females and decreases in testosterone both in males and females (Seidel et al., 2013). These alterations in hormones may represent sensitivity to a decrease in social status in men and female's interest in rejoining a group after rejection (Seidel et al., 2013). Social exclusion can threaten individuals' perceptions on their belongingness in addition to evoking increases in

retaliatory responses such as decreased empathy and increased aggression (Batara, 2014).

Regarding positive affect, an outcome variable for this current research, social exclusion may

evoke increased affective reactivity, including greater mood changes (Seidel et al., 2013).

Greater reductions in positive affect may represent a large emotional reaction to social exclusion

(Seidel et al., 2013). Regarding self-esteem, the other outcome variable for the present study,

increased social exclusion is correlated with lower self-esteem (Leary, 1990). Individuals'

perceived exclusion from social situations can prompt them to feel lonely or anxious both of

which can contribute to alterations in self-esteem (Leary, 1990).

Although shared general responses to social exclusion exist among all demographic

groups (Seidel et al., 2013), sex differences can emerge in certain measures. There are various

sex differences in personality without the presence of social exclusion (Feingold, 1994). For

example, males typically exhibit higher self-esteem and are more assertive whereas females tend

to have higher levels of empathy and anxiety (Feingold, 1994). Furthermore, on measures of

self-esteem in college students, one study established males had higher self-esteem than females,

and females had greater levels of depression (Armstrong & Oomen-Early, 2010). When

examining social relationships, females generally value social connectedness more than males

(Rose & Rudolph, 2006). Placement of greater value on interpersonal connections may lead

females to have increased negative reactions to social exclusion, relative to males (Rose &

Rudolph, 2006). There are many explanations related to these sex differences, including

ideologies regarding personality that focus on biological (e.g., hormones, physiological

measures, chromosomal differences) and sociocultural (e.g., gender roles and stereotypes)

origins (Feingold, 1994). Biological theories largely entail gonadal hormonal and chemical

differences (e.g., testosterone and progesterone) and chromosomal distinctions (e.g., two X chromosomes in females versus one X chromosome in males) (Feingold, 1994).

Social exclusion involves being ignored in social settings (Leary, 1990) and has the potential to induce unpleasant psychological and physiological alterations in individuals (Seidel et al., 2013). Previous research has indicated that social exclusion can decrease positive affect (Seidel et al., 2013) and self-esteem (Leary, 1990). There are sex differences in positive affect and self-esteem as females generally have greater changes in positive affect and lower overall self-esteem (Feingold, 1994) relative to men. In the present study, social exclusion was utilized as the experimental condition and certain changes in psychological responses were measured in response to social exclusion.

Objectives

The primary purpose of the current study is to identify sex differences in response to social exclusion, explicitly examining effects on changes in positive affect and self-esteem. In order to achieve this goal, data from the SIH study was gathered and investigated using bivariate correlations and linear regression analyses. It is hypothesized that (1) females will exhibit greater decreases in positive affect relative to males in response to social exclusion. It is also hypothesized that (2) females will exhibit greater decreases in self-esteem relative to males in response to social exclusion.

Chapter 2

Methods

Participants and Recruitment

Data from a total of 120 eligible individuals were gathered between August of 2017 and April of 2018. Study participants were recruited using flyer advertisements throughout The Pennsylvania State University's campus and downtown State College in addition to in-class announcements. Individuals were eligible to participate if they were current Penn State students, between the ages of 18-24, not involved in previous studies using a ball-toss game, not diagnosed with a pervasive developmental disorder or an endocrine disorder, and not visually impaired. Eligible participants also needed to be able and willing to avoid consumption of alcohol for 12 hours, caffeine and nicotine for 2 hours, exercise for 2 hours, and food for 60 minutes prior to the study. Once participants were determined to be eligible after answering the required screening questions and were scheduled for a visit to the SHADE Laboratory to participate in the study. Participants were randomly assigned to either the inclusion condition (n=40) or exclusion condition (n=80) for Cyberball. The mean age of the final sample was 20.12 years (SD=1.33) and 67.5% of participants were female (32.5% male).

Procedures

During a participant's visit to complete the study, a trained research assistant (RA) initially greeted him/her in the hallway. Throughout the study, the RAs completed steps in order to maintain the experimental manipulation that there were actual people playing Cyberball (e.g., checking a list to find the participant's "assigned room", explaining that the secondary RA was waiting on one more participant). Once the participant was in the study room, the primary RA began with "day-of-screening" questions to determine further eligibility. These included asking about the participant's current well-being, recent alcohol, caffeine, and food consumption, and exercise activity. Informed consent followed this process if the participant was eligible to participate in the study.

Once consent was acquired, set-up of the heart rate monitor began. The RA first demonstrated the proper method to use the heart rate monitor, and then left the room to allow the participant to attach the monitor to him/herself in order to gather physiological data. After the heart monitor had been successfully connected, the participant answered baseline questionnaires (demographics, baseline affect, covariates, etc.) then sat quietly for five minutes once they were complete. After five minutes, a saliva sample was collected.

In order to support the story that other participants were involved in the experiment, the primary RA announced that he/she needed to leave the room ensure that they were ready to begin Cyberball. The secondary RA was then alerted to knock on the study room door in three minutes to inform the primary RA that the other participants were ready to begin Cyberball. The primary RA returned to the study room, explained Cyberball to the participant, and then waited for the knock from the secondary RA. After the secondary RA had updated the primary RA, Cyberball

began. During the game, the participant viewed a screen with what appeared to be two other study participants.

After the completion of Cyberball (after about 5 minutes), the participant answered final questionnaires (assessment of needs threat, manipulation check, word-completion task etc.) before the collection of the second saliva sample after 25 minutes. Once the time had expired, the participant removed the heart rate monitor as the RA waited outside the room. The study completed with a debriefing statement about the experimental manipulation and distribution of compensation. The participant was then instructed not to reveal the nature of the study, specifically the manipulation, to other individuals because the study would be continuing for several months.

Measures

Demographics and individual psychological traits questionnaires assessed the variables in the present study. Participant's biological sex was measured using a question in the initial screening form. Participants' gender was measured through a demographics question that included the options "Male", "Female", and "Transgender/Non-binary". No participants identified as "Transgender/Non-binary", so it was assumed that all participants' biological sex matched their gender; thus, participants were referred to by sex. Cyberball condition, randomly assigned during the screening process, was used as a predictor variable with the participants in the exclusion condition being the primary interest in data analyses.

Positive affect. Positive affect was evaluated through the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) which consists of two sets of ten adjectives relating to

positive (e.g., excited, strong, proud) and negative (e.g., distressed, upset, guilty) emotions (see Appendix A). Participants were able to rank how much they currently identified with the emotion through Likert scale responses from 1 (very slightly or not at all) to 5 (extremely). Overall positive affect totals based on the average of the ten items were quantified at baseline and post-Cyberball. The change in positive affect variable represents the value of the difference between the two scores.

Self-esteem. Measurement of self-esteem was incorporated into the needs threat and manipulation checks section of the post-Cyberball questionnaires (see Appendix B). A version of the Fundamental Basic Needs Questionnaire (FBNQ; Zadro, Williams, & Richardson, 2004), which was created for research involving Cyberball, contained questions (e.g., "I felt good about myself", "my self-esteem was high") with Likert scale responses from 1 (strongly disagree) to 5 (strongly agree) regarding self-esteem. Higher values determined by an average of items contributing to the specific variable corresponded to increased self-esteem.

Data Analysis

The subset of data used during analysis included the participant's biological sex, Cyberball condition (with a focus on exclusion), self-esteem, and change in positive affect, as detailed in the previous section. In coding for the categorical variable of participants' Cyberball conditions, inclusion and exclusion were identified as 0 and 1, respectively. In coding the categorical variable of participant's biological sex, male and female were identified as 1 and 2, respectively. SPSS version 25.0 was used to conduct all statistical analyses.

Descriptive statistics and bivariate correlations were run and evaluated for each of the variables. Univariate general linear model analyses were utilized to investigate the relationships proposed in the hypotheses. The predictor variables included participant sex, Cyberball condition, and an interaction between participant sex and Cyberball condition. The outcome variables were self-esteem and change in positive affect.

Chapter 3

Results

Demographic Information

The sample consisted of a total of 120 participants with 80 in the exclusion condition and 40 in the inclusion condition. There were 81 female participants of which 53 were in the exclusion condition and 28 were in the inclusion condition (Table 1). There were 39 male participants of which 27 were in the exclusion condition and 12 were in the inclusion condition. The average age of the sample was 20.12 years (SD=1.33). 67.50% of participants were white, 17.50% were Asian, 12.50% were Black or African American, and 2.50% were American Indian or Alaskan Native. 5.83% of the sample identified as Hispanic or Latinx.

Table 1. *Sample Characteristics*

	Frequency	%
Gender/Sex		
Man/Male	39	32.50
Woman/Female	81	67.50
Transgender/Non-binary	0	0
Race		
American Indian or Alaskan Native	2	1.67
Asian	27	22.50
Black or African American	12	10
White	75	62.50
Other	4	3.33
Ethnicity		
Hispanic or Latinx	7	5.83
Not Hispanic or Latinx	113	94.17

Bivariate Correlations and Descriptive Statistics

Table 2 displays the bivariate correlations and descriptive statistics for the outcome variables. There was a statistically significant positive linear relationship indicated between change in positive affect and self-esteem, $p<.01$, r=0.34. The mean for change in positive affect was -0.69 (SD=0.75) and the mean for self-esteem was 2.71 (SD=0.98).

Table 2. *Bivariate Correlations and Descriptive Statistics for Outcome Variables*

Variable	1	2
1. Change in Positive Affect	-	-
2. Self-Esteem	0.34*	-
Mean	-0.69	2.71
Standard Deviation	0.75	0.98

Note: $N = 120$, *$p<.01$

Table 3 contains descriptive statistics for the outcomes categorized by sex of the participant and Cyberball condition. All participants, regardless of sex, in the exclusion condition exhibited greater decreases in positive affect and lower self-esteem than participants in the inclusion condition. These differences alone were not further explored as the main hypotheses focused on the interaction of sex and Cyberball condition as a predictor of changes in positive affect and self-esteem.

Table 3. *Descriptive Statistics by Cyberball Condition and Sex of Participant*

| | Inclusion | | Exclusion | |
| | Male | Female | Male | Female |
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Outcome				
Change in Positive Affect	-0.18(0.49)	-0.29(0.71)	-0.94(0.71)	-0.88(0.71)
Self-Esteem	3.50(0.75)	3.56(0.85)	2.44(0.76)	2.22(0.77)

General Linear Model Analyses

Positive Affect

Univariate general linear model analysis was conducted to examine whether Cyberball condition, the sex of the participant, and the interaction of sex and experimental condition could predict change in positive affect in response to social exclusion (Table 4). Cyberball condition as a predictor variable significantly contributed to the model, F=22.23, $p<.001$, with (as noted) excluded participants exhibiting greater decreases in positive affect (Table 3; Figure 1). Sex of the participant as a predictor variable did not significantly predict change in positive affect, $F=0.05$, $p=0.82$. The interaction between participant sex and Cyberball condition interaction was not significantly related to change in positive affect, $F=0.35$, $p=0.56$ (see Figure 1).

Table 4. *Univariate General Linear Model for Change in Positive Affect as the Outcome*

Predictor	F	p
Cyberball Condition	22.23	0.00*
Sex of Participant	0.05	0.82
Sex of Participant*Cyberball Condition	0.35	0.56

Note: $N = 120$; Sex of Participant coded as male=1, female=2; Cyberball Condition coded as inclusion condition=0, exclusion condition=1; * $p < .05$

Figure 1. *Group Mean Differences by Sex on Changes in Positive Affect in Response to Cyberball*

Self-Esteem

Univariate general linear model analysis was conducted to examine whether participant sex and Cyberball condition could predict self-esteem in response to social exclusion (Table 5; Figure 2). Cyberball condition significantly predicted self-esteem (with lower self-esteem in excluded participants), $F=53.51$, $p<.05$. Sex of the participant as a predictor variable did not significantly contribute to the model, $F=0.25$, $p=0.62$. The results indicated that the interaction of participant sex and Cyberball condition was not significant, $F=0.80$, $p=0.37$ (see Figure 2).

Table 5. *Univariate General Linear Model for Self-Esteem as the Outcome*

Predictor	F	p
Cyberball Condition	53.51	0.00*
Sex of Participant	0.25	0.62
Sex of Participant*Cyberball Condition	0.80	0.37

Note: $N = 120$; Sex of Participant coded as male=1, female=2; Cyberball Condition coded as inclusion condition=0, exclusion condition=1; * $p < .05$
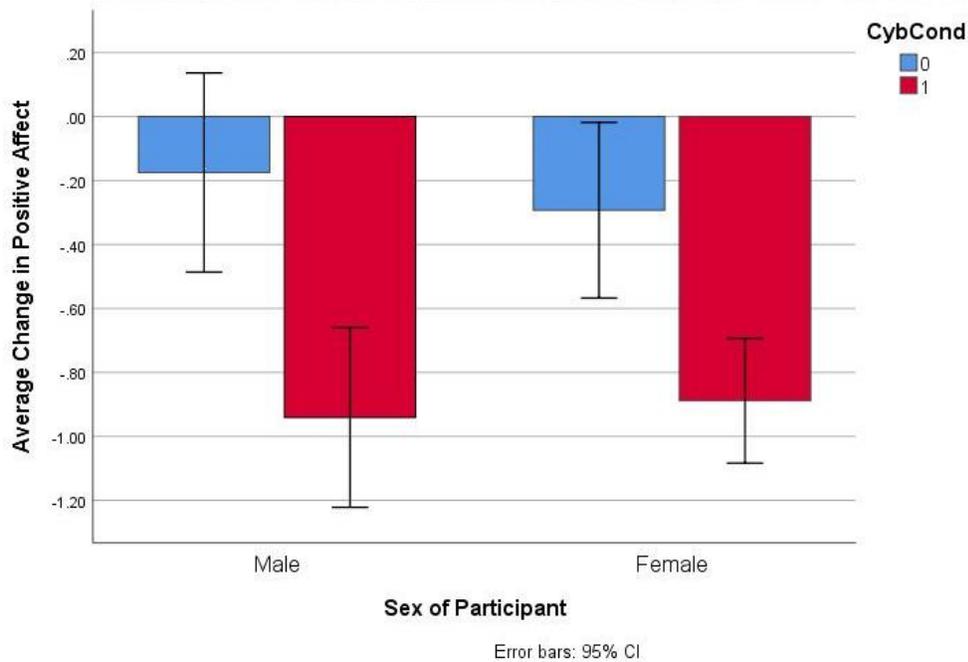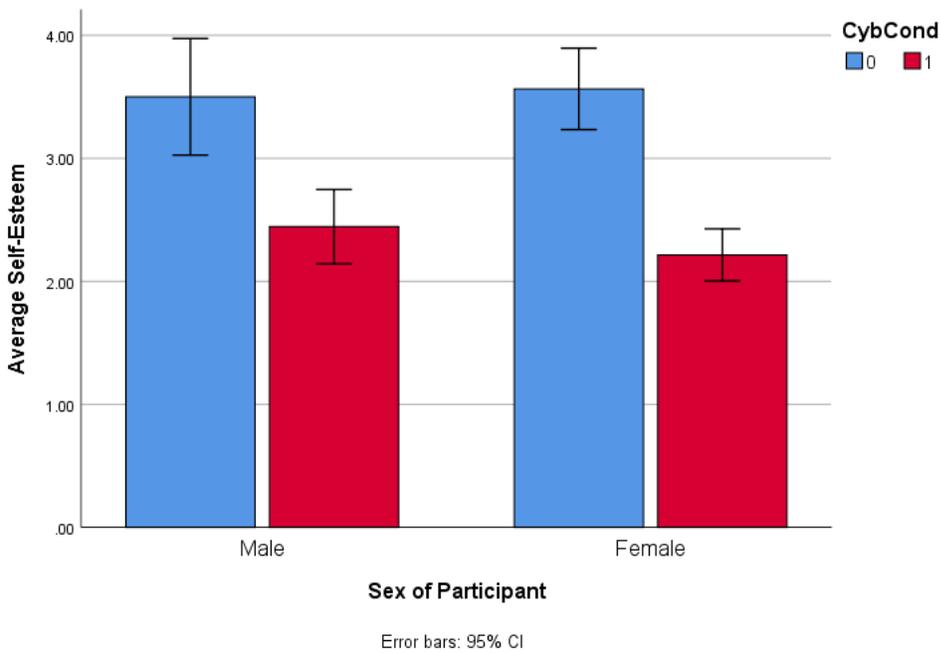

Figure 2. *Group Mean Differences by Sex on Self-Esteem in Response to Cyberball*

Chapter 4

Discussion

This study investigated sex differences in females and males in positive affect and self-esteem in response to social exclusion. Regarding positive affect, it was hypothesized that females would have greater decreases in positive affect after being socially excluded, relative to men. Regarding self-esteem it was hypothesized that females would have lower self-esteem after social exclusion, relative to men.

Bivariate correlations demonstrated that there was a significant positive relationship between change in positive affect and self-esteem. These results indicated that participants who had greater decreases in positive affect also had lower self-esteem after the manipulation. Based on previous research, these trends in positive affect and self-esteem were expected. For example, a previous study including a sample of undergraduate students determined that self-esteem impacts regulation of positive affect, such that lower self-esteem hinders levels of positive affect (Wood, Heimpel, & Michela, 2003). Additionally, past studies have found that when positive affect increased, levels of self-esteem increased (Greenberg et al., 1992).

In the inclusion condition, females had a (non-significantly) greater decrease in positive affect and (non-significantly) higher self-esteem than did males. Although not statistically different, this pattern was still somewhat unexpected. Females were expected to have lower self-esteem, regardless of condition, a prediction founded on findings from previous studies that males tend to have higher levels of self-esteem (Armstrong & Oomen-Early, 2010; Bleidorn et al., 2016; Kling, Hyde, Showers, & Buswell, 1999). However, this pattern was closer to what was observed in the exclusion condition, as discussed below.

It may be meaningful to note that when comparing the overall outcome levels in both conditions, regardless of sex, there were greater decreases in positive affect and self-esteem when participants were socially excluded. As discussed previously, these results were expected. Social exclusion has been identified as a predictor of greater decreases in positive affect (Seidel et al., 2013) and lower self-esteem (Leary, 1990).

In relation to the original hypotheses, females exhibited slightly lower self-esteem compared to males in the exclusion condition, although this relationship was not determined to be significant in the univariate general linear model analysis. This pattern of means is broadly consistent with previous studies that found that males reported higher self-esteem than females although the same research also determined this difference to not be significant (Armstrong & Oomen-Early, 2010; Bleidorn et al., 2016; Kling, Hyde, Showers, & Buswell, 1999). There are explanations identifying the reasoning underlying sex differences in self-esteem. Many of the perspectives focus on gender roles, differences in peer interactions between males and females, and cultural expectations of males versus females (Kling, Hyde, Showers, & Buswell, 1999). It is possible that these processes played a role in the measured self-esteem values in participants of the current study.

Evaluation of the results of the univariate general linear model analyses of both positive affect and self-esteem revealed no statistically significant relationships between the interaction of sex of the participant and Cyberball condition. Although females did have lower self-esteem relative to males in response to social exclusion, the difference was not significant. The hypothesis related to self-esteem did predict that this difference would be significant; however, previous research did not, as mentioned above.

Because of the inconsistency between self-esteem by sex in the inclusion and exclusion conditions, it is impossible to draw conclusions that there are any reliable differences in self-esteem between males and females. Furthermore, the univariate general linear model analyses with the interaction variable of sex of participant and Cyberball condition did not reach statistical significance for either outcome; this suggests that the responses (in positive affect and self-esteem) to social exclusion via Cyberball did not reliably differ as a function of participant sex.

The pattern of means relative to the results for change in positive affect were inconsistent with the initial predictions; although there were not reliable sex differences, the means suggested that males had (non-significantly) greater decreases in positive affect. When comparing to previous research, this output was not consistent with those findings. Because of their emphasis on social connectedness (Rose & Rudolph, 2006), females were expected to have greater emotional reactivity to being excluded. However, there may be a theory that could potentially support the lower decrease in positive affect in females compared to males in the exclusion condition. 'Tend-and-befriend' refers to a female-typical pattern of engaging with potential aggressors in a placid manner in order to try to negotiate through any conflict (Taylor et al., 2000). This construct contrasts with 'flight or fight' which is commonly seen among males as the immediate response to stress (Taylor et al., 2000). 'Tend-and-befriend' commonly involves females expressing empathy and prosocial behavior toward a possible threat, which may include a decrease in social support or experiences of social exclusion (Nickels, Kubicki, & Maestripieri, 2017). Additionally, there may be biological mechanisms that contribute to the process of 'tend-and-befriend', such as oxytocin and sex hormone release (Taylor et al., 2000). For example, oxytocin is associated with the parasympathetic system resulting in increased relaxation during exclusion. Oxytocin effects on the body may also be moderated by estrogen (Taylor et al., 2000).

In relation to the present study in which participants experienced social exclusion, it is plausible that females stress response included 'tend-and-befriend' to a greater degree than occurred in males. This mechanism could have acted as a protective factor in buffering change in positive affect. Protective factors can include biological, social, and psychological effects (O'Connell et al., 2009), which 'tend-and-befriend' encompasses. The 'tend-and-befriend' theory notes that when exposed to a stressful situation, females will participate in increased positive engagement with others and greater trust, generosity, and cooperativity (Nickels et al., 2017). In the Cyberball game, it is possible that, instead of the predicted decrease in positive affect, females unconsciously employed the 'tend-and-befriend' method to maintain positive affect. In a similar study, it was found that males responded to stress with more selfish attitudes, including decreased willingness to take risks (Taylor et al., 2000). These results were consistent with the male 'flight or fight' mechanism (Taylor et al., 2000) possibly suggesting that the greater decrease in positive affect in males in the current study was a consequence of the 'flight or fight' stress response.

In addition to the 'tend-and-befriend' hypothesis, sex differences in the use of protective factors as aspects of resiliency may have contributed to the observed differences in change in positive affect among the exclusion group. It is important to consider that protective factors can buffer individuals' negative response to adverse situations (O'Connell et al., 2009), including social exclusion. Previous research noted that there were significant sex differences in type of protective factors utilized in cultivating resiliency (Hartman et al., 2009). Acknowledging these sex differences in protective factors may provide greater insight into potential sex differences in future work. For example, if females are engaging in different protective factors than males (Hartman et al., 2009), there may be differences in how significantly those protective factors will

buffer the negative responses to social exclusion. This concept may explain why the predicted hypothesis regarding positive affect was not observed in the study.

Limitations

There were several limitations that are worth discussing in this study. The sample lacked diversity in regard to sex and race (e.g., a majority of the sample was female and white). Thus, it may be difficult to generalize to other college populations. There were limitations regarding previous research in relation to formulation of the study's hypotheses. Many studies focused on samples that were not always representative of the typical university population. For example, one study, although focused on a sample of college students, was really examining a subgroup of that population in college athletes (Armstrong & Oomen-Early, 2009). Additionally, another study focused on undergraduate nursing students' experiences with self-esteem (Pandey & Chalise, 2015). Although the data did reveal some important aspects that were related to this study, such as the relationship between self-esteem and stress, it may be possible that undergraduate students in other majors have different experiences with those two outcomes, thus making the data complicated to generalize. Another issue with the previous research included a wide variance in the age of the samples. A significant portion of data on self-esteem and positive affect focused on general adult populations. Although some college students may fall into this category, a majority would not, including the sample of the current study. Self-esteem and positive affect have been noted to develop and change across the life-span indicating that individuals stress responses in relation to these two variables may vary throughout their lives (McMullin & Cairney, 2004).

Future Research

The results of this study may warrant the need for future research into positive affect and self-esteem in college students. Previous studies discussed above made it evident that personality can greatly influence health in either negative or positive ways. Because personalities can significantly vary among individuals, it would be beneficial to learn about certain characteristics that may alter health outcomes. Understanding the implications of how females and males may differ in responses to stress, specifically in relation to positive affect and self-esteem, could be helpful to overall well-being and health.

Appendix A

Measures of Affective Reactivity

PANAS: Using the scale below, indicate from 1 to 5 how intensely you are feeling the listed emotions right now				
Very Slightly or Not At All	**A Little**	**Moderately**	**Quite a Bit**	**Extremely**
1	2	3	4	5

1. Interested _____

2. Distressed _____

3. Excited _____

4. Upset _____

5. Strong _____

6. Guilty _____

7. Scared _____

8. Hostile _____

9. Enthusiastic _____

10. Proud _____

11. Irritable _____

12. Alert _____

13. Ashamed _____

14. Inspired _____

15. Nervous _____

16. Determined _____

17. Attentive _____

18. Jittery _____

19. Active _____

20. Afraid _____

Appendix B

Measures of needs threat, manipulation checks and enhancement, and aggressive cognition

FBNQ: For each question, please select the response that best represents the feelings you were experiencing DURING THE GAME.	Not at all 1	2	3	4	Extremely 5
I felt "disconnected"	○	○	○	○	○
I felt rejected	○	○	○	○	○
I felt like an outsider	○	○	○	○	○
I felt I belonged to the group	○	○	○	○	○
I felt other players interacted with me a lot	○	○	○	○	○
I felt good about myself	○	○	○	○	○
My self-esteem was high	○	○	○	○	○
I felt liked	○	○	○	○	○
I felt insecure	○	○	○	○	○
I felt satisfied	○	○	○	○	○
I felt powerful	○	○	○	○	○
I felt I had control over the course of the game	○	○	○	○	○
I felt I had the ability to significantly alter events	○	○	○	○	○
I felt I was unable to influence the action of others	○	○	○	○	○
I felt the other players decided everything	○	○	○	○	○
I felt invisible	○	○	○	○	○
I felt meaningless	○	○	○	○	○
I felt non-existent	○	○	○	○	○
I felt important	○	○	○	○	○
I felt useful	○	○	○	○	○
I was ignored	○	○	○	○	○
I was excluded	○	○	○	○	○

BIBLIOGRAPHY

Armstrong, S., & Oomen-Early, J. (2009). Social connectedness, self-esteem, and depression symptomatology among collegiate athletes versus nonathletes. *Journal of American College Health*, *57*(5), 521-526.

Batara, J. B. L. (2014). The Desire to Be With Others: Exploring Social Rejection and Gender. *Southeast Asia Psychology Journal*, *2*.

Bleidorn, W., Arslan, R. C., Denissen, J. J., Rentfrow, P. J., Gebauer, J. E., Potter, J., & Gosling, S. D. (2016). Age and gender differences in self-esteem—A cross-cultural window. *Journal of personality and social psychology*, *111*(3), 396.

Chioqueta, A. P., & Stiles, T. C. (2007). The relationship between psychological buffers, hopelessness, and suicidal ideation: identification of protective factors. *Crisis*, *28*(2), 67-73.

Clark, L. A., Watson, D., & Leeka, J. (1989). Diurnal variation in the positive affects. *Motivation and Emotion*, *13*(3), 205-234.

Cohen, S. (2004). Social relationships and health. *American psychologist*, *59*(8), 676.

Cohen, S., & Pressman, S. D. (2006). Positive affect and health. *Current Directions in Psychological Science*, *15*(3), 122-125.

Coleman, S.R. (2018). The effects of narcissism on stress-reactivity to social exclusion. (Unpublished dissertation). The Pennsylvania State University, University Park, PA.

Dockray, S., & Steptoe, A. (2010). Positive affect and psychobiological processes. *Neuroscience & Biobehavioral Reviews*, *35*(1), 69-75.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological bulletin*, *116*(3), 429.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American psychologist*, *56*(3), 218.

Friedlander, L. J., Reid, G. J., Shupak, N., & Cribbie, R. (2007). Social support, self-esteem, and stress as predictors of adjustment to university among first-year undergraduates. *Journal of college student development*, *48*(3), 259-274.

Friedman, H. S. (2008). The multiple linkages of personality and disease. *Brain, behavior, and immunity*, *22*(5), 668-675.

Garmezy, N. (1992). *Risk and protective factors in the development of psychopathology*. Cambridge University Press.

Greenberg, J., Solomon, S., Pyszczynski, T., Rosenblatt, A., Burling, J., Lyon, D., ... & Pinel, E. (1992). Why do people need self-esteem? Converging evidence that self-esteem serves an anxiety-buffering function. *Journal of personality and social psychology*, *63*(6), 913.

Hartman, J. L., Turner, M. G., Daigle, L. E., Exum, M. L., & Cullen, F. T. (2009). Exploring the gender differences in protective factors: Implications for understanding resiliency. *International Journal of Offender Therapy and Comparative Criminology*, *53*(3), 249-277.

Jessor, R., Turbin, M. S., & Costa, F. M. (1998). Protective factors in adolescent health behavior. *Journal of personality and social psychology*, *75*(3), 788.

King, L. A., Hicks, J. A., Krull, J. L., & Del Gaiso, A. K. (2006). Positive affect and the experience of meaning in life. *Journal of personality and social psychology*, *90*(1), 179.

Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: a meta-analysis. *Psychological bulletin*, *125*(4), 470.

Kumari, B., & Sharma, R. (2016). Self-Esteem and Personality Traits as Predictors of Mental Well Being. *The International Journal of Indian Psychology*, *3*(3), 52-57.

Layous, K., Chancellor, J., & Lyubomirsky, S. (2014). Positive activities as protective factors against mental health conditions. *Journal of Abnormal Psychology*, *123*(1), 3.

Leary, M. R. (1990). Responses to social exclusion: Social anxiety, jealousy, loneliness, depression, and low self-esteem. *Journal of Social and Clinical Psychology*, *9*(2), 221-229.

Luhtanen, R. K., & Crocker, J. (2005). Alcohol use in college students: effects of level of self-esteem, narcissism, and contingencies of self-worth. *Psychology of Addictive Behaviors*, *19*(1), 99.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success?. *Psychological bulletin*, *131*(6), 803.

Machell, K. A., Kashdan, T. B., Short, J. L., & Nezlek, J. B. (2015). Relationships between meaning in life, social and achievement events, and positive and negative affect in daily life. *Journal of Personality*, *83*(3), 287-298.

Martin, L. R., Friedman, H. S., & Schwartz, J. E. (2007). Personality and mortality risk across the life span: the importance of conscientiousness as a biopsychosocial attribute. *Health Psychology*, *26*(4), 428.

Mayol, M. H., & Scott, B. M. (2014). The Relationship Between Multidimensional Wellness and Self-Esteem in College Students. *Research Quarterly for Exercise and Sport*, *85*(S1), A30.

McMullin, J. A., & Cairney, J. (2004). Self-esteem and the intersection of age, class, and

        gender. *Journal of aging studies*, *18*(1), 75-90.

Moksnes, U. K., & Espnes, G. A. (2013). Self-esteem and life satisfaction in adolescents—

        gender and age as potential moderators. *Quality of Life Research*, *22*(10), 2921-2928.

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and personality*

        psychology compass, *5*(1), 1-12.

Nickels, N., Kubicki, K., & Maestripieri, D. (2017). Sex Differences in the Effects of

        Psychosocial Stress on Cooperative and Prosocial Behavior: Evidence for 'Flight or

        Fight' in Males and 'Tend and Befriend' in Females. *Adaptive Human Behavior and*

        Physiology, *3*(2), 171-183.

O'Connell, M. E., Boat, T., & Warner, K. E. (2009). *Preventing mental, emotional, and*

        behavioral disorders among young people: Progress and possibilities (Vol. 7).

        Washington, DC: National Academies Press.

Pandey, R. A., & Chalise, H. N. (2015). Self-esteem and academic stress among nursing

        students. *Kathmandu University Medical Journal*, *13*(4), 298-302.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health?. *Psychological*

        bulletin, *131*(6), 925.

Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes:

        potential trade-offs for the emotional and behavioral development of girls and

        boys. *Psychological bulletin*, *132*(1), 98.

Seidel, E. M., Silani, G., Metzler, H., Thaler, H., Lamm, C., Gur, R. C., & Derntl, B. (2013). The

        impact of social exclusion vs. inclusion on subjective and hormonal reactions in females

        and males. *Psychoneuroendocrinology*, *38*(12), 2925-2932.

Steptoe, A., Dockray, S., & Wardle, J. (2009). Positive affect and psychobiological processes relevant to health. *Journal of personality*, *77*(6), 1747-1776.

Steptoe, A., Wardle, J., & Marmot, M. (2005). Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *Proceedings of the National Academy of Sciences*, *102*(18), 6508-6512.

Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychological review*, *107*(3), 411.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, *54*(6), 1063.

Weisskirch, R. S. (2018). Grit, self-esteem, learning strategies and attitudes and estimated and achieved course grades among college students. *Current Psychology*, *37*(1), 21-27.

Williams, K. D., & Jarvis, B. (2006). Cyberball: A program for use in research on interpersonal ostracism and acceptance. *Behavior Research Methods*, *38*(1), 174-180.

Wood, J. V., Heimpel, S. A., & Michela, J. L. (2003). Savoring versus dampening: self-esteem differences in regulating positive affect. *Journal of personality and social psychology*, *85*(3), 566.

Zadro, L., Williams, K. D., & Richardson, R. (2004). How low can you go? Ostracism by a computer is sufficient to lower self-reported levels of belonging, control, self-esteem, and meaningful existence. *Journal of Experimental Social Psychology*, *40*(4), 560-567.

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Resident Assistant in Honors College Residence Hall   Penn State University |August 2017 – present
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