THE EFFECT OF CYBERBALL EXCLUSION ON AUTOMATIC APPROACH BEHAVIOR

by

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Abstract

The social reconnection hypothesis claims that people who feel socially excluded feel a strong desire to form bonds with other people, likely with people who have not yet made them feel excluded. Prior studies have shown that people who feel excluded aim to form social connections. The purpose of the present study was to test if the desire to reconnect is shown automatically and reflexively. We hypothesized that participants excluded by Cyberball would approach happy faces faster than neutral faces during the Approach-Avoidance Task (AAT) compared to included participants. The participants in this study consisted of thirty-three adults recruited on the Prolific platform. They played a game of Cyberball where they were either included or excluded. Those in the included condition were tossed the ball throughout the whole game. Those in the excluded condition received only two tosses at the beginning of the game and then were never tossed the ball again. After playing Cyberball, the participants completed the Approach Avoidance Task (AAT), which instructs the participant to either approach or avoid a face on the screen. The participants completed the AAT twice. For the first AAT, they approached happy faces and avoided neutral faces. For the second AAT, they approached neutral faces and avoided happy faces. The results show that the excluded group almost approached happy faces faster than neutral faces compared to the included group. This effect approached statistical significance. However, a power analysis showed that if the effect size is maintained, only four more participants in each group are needed to attain significance. Thus, these results may show that the desire to reconnect after exclusion is shown automatically.

Introduction

Social exclusion is an experience that many people are exposed to in all sorts of social situations. Experiencing social exclusion repeatedly may result in the person who feels excluded not developing enough social connections. According to the social reconnection hypothesis (Maner, DeWall, Baumeister, Schaller 2007), people who feel socially excluded feel a strong desire to form bonds with other people, likely with people who have not yet made them feel excluded. Excluded individuals also tend to conform to the opinions of other people. This act of conformity is interpreted as an attempt to make friends through the idea of like-mindedness. In some cases, however, exclusion may also cause emotional or mental withdrawal rather than reconnection.

In the present study, we test the social reconnection hypothesis using Cyberball, the most widely used technique to study the effects of social exclusion. Cyberball is an online video game where the participant plays a game of catch with two other characters. What the participant doesn't know is that the other two characters are not real people, but they are computer automated. When participating in research studies, the participants are assigned to one of two conditions: included or excluded. Those in the excluded condition get the ball tossed to them once or twice in the beginning of the game, but do not receive any more tosses the rest of the game. Those in the included condition receive tosses from the other players throughout the whole game. Prior studies involving Cyberball have found that participants in the excluded condition feel a significant desire to reconnect with others (Hartgerink, et al 2015; Williamson, et al. 2018; Mohr, et al 2017; Heuer et al 2007).

The present study builds on prior research by testing if social reconnection is automatically expressed by seeing if rejected participants will automatically move physically closer to human faces. We used the Approach- Avoidance Task (AAT) to test the hypothesis that reconnection is automatically and reflexively shown in approach behavior. In the AAT, approach behavior is measured as rapid motor responses that occur within 50-100 milliseconds. Thus, we will see if the desire to reconnect is shown reflexively in physical behavior.

Classic Studies of the Social Reconnection Hypothesis

Maner et al. (2007) conducted a series of studies to determine the effects of social exclusion on the desire to reconnect. The purpose of the first study was a manipulation in which the participants were randomly assigned to one of three writing assignments: exclusion, social acceptance, or neutral. The participants were fifty-six undergraduate students. The exclusion condition was assigned to write about a time in their lives when they felt excluded. The social acceptance condition wrote about a time they felt accepted. The neutral condition wrote about something simple such as the activities they did the day before. Once they were finished writing, the participants filled out a questionnaire asking how they would feel about a fictitious student service designed to help them make friendships for an added $75 in student fees. The results showed that participants in the exclusion condition were significantly more interested in the fictitious service to help them make friends than participants in the other two conditions. Participants in the neutral condition were the least interested of all. This result tells us that participants' desire to connect with new friends increases when reliving an event of social exclusion, thus supporting the social reconnection hypothesis.

The purpose of the second study of Maner et al. (2007) was to show that social exclusion stimulates a desire for affiliation in the form of bogus feedback. Participants in the exclusion condition should be more likely than those in the control groups to prefer working together with others. The participants were thirty-four undergraduate students who were randomly assigned to one of three conditions: imagining a future alone, future belonging, or misfortune. Participants filled out a personality questionnaire, then received bogus feedback according to their condition. People in the future alone condition were told that they would have trouble developing long lasting relationships and would end up alone. People in the future belonging condition were told they were likely to have successful relationships and friendships throughout their life. People in the misfortune condition were told they were likely to get into accidents and have many broken bones. After receiving these results, participants were then asked if they would prefer doing the experimental task in a group or by themselves. The results showed that those in the future alone condition were more willing to work with other people than those in the other conditions. This result shows us that the threat of social exclusion received through bogus feedback involving a lonely future leads people to increase their preference for working with others rather than working alone.

If social exclusion stimulates a desire to reconnect with others, then excluded individuals may see new individuals as especially sociable and attractive. In study three of Maner et al. (2007), the goal was to test the hypothesis that rejected people would be motivated to view other people as especially welcoming and friendly, which is a perception that would facilitate efforts to affiliate with them. The participants were eighteen undergraduate students that were randomly assigned to one of two conditions:

being told that nobody wanted to work with them, or being told that everyone wanted to work with them. Participants first met in small groups to get to know each other a little bit. While they were talking, they wrote down which participants from the group they would be willing to work with individually to determine who will be working together in the second activity. Then, according to their assigned conditions, the researchers told the participants that either nobody, or everyone, wanted to work with them. After receiving the news, participants filled out a questionnaire asking them to describe their mood at that moment. After filling out the questionnaire, participants were presented with eight new target individuals and were asked to rate them based on physical attractiveness, sociability, and hostility. The results show that excluded participants rated the new target individuals higher in attractiveness and sociability than the accepted participants did. These results show us that exclusion did not lead participants to view others as angrier or more hostile. Instead, they viewed them as friendly and inviting, which is consistent with a motive aimed at restoring social bonds when a person has been socially rejected.

The fourth study by Maner et al (2007) was based on the idea that it may be implausible to conclude that every rejected person aspires to connect with every available person. Thus, the experiment was designed to test two boundary conditions for the affiliative responses of rejected people. The first boundary condition measured the attitude towards the novel partner compared to the person who rejected them. The second boundary condition examined potential influencing effects of fear of negative evaluation. The participants for this experiment included thirty-four undergraduate students. Participants were randomly assigned to one of two conditions: irrelevant

departure, or personal rejection. The participant exchanged video messages with a partner. Then according to the condition they were assigned to, they were told that their partner would not continue exchanging video messages. Those in the irrelevant departure condition were told that their partner forgot they had a prior engagement and had to leave early. Those in the personal rejection condition were told that their partner would not continue because they did not like them and would not like to continue working with them. Participants in both conditions then completed a questionnaire asking them about their mood. They also completed personality ratings of the original partner. After completing the questionnaires, participants were assigned a new partner. The participants viewed a photo of the new partner, and then completed the same personality ratings they filled out for the original partner. The results of this study showed that rejection can lead to both positive and negative perceptions about other people. All rejected participants rated the partner that rejected them negatively. However, some participants rated their new partner as significantly more friendly than the original partner, while some rated their new partners as poorly as the original partner. Those who rated their new partners poorly were determined to be high in fear of negative evaluation. These findings suggest that participants were not interested in any interaction with a new person due to fear of further negative evaluation.

The final study from Maner et al. (2007) was designed to provide further confirmation that socially favorable responses to rejection are based on a desire to reconnect with others. This was done by manipulating whether a future social interaction is anticipated. The researchers hypothesized that if rejected individuals' responses are motivated by a desire to enhance future social interactions, then they

should be observed primarily when a future interaction is anticipated but not when there is no expectation of future interaction. If positive treatment of a new partner is motivated by a desire to prepare for a pleasant interaction and possibly a potential friendship, then it should occur only when one expects to meet that person. The participants of the study were fifty-three undergraduate students. The participants exchanged video messages with a partner to get to know each other a bit. Similar to the fourth study by Maner et al (2007), participants were randomly assigned to one of two conditions: irrelevant-departure, or personal rejection. Those in the irrelevant departure condition were told that their partner forgot they had a prior engagement and had to leave early. Those in the personal rejection condition were told that their partner would not continue because they did not like them and would not like to continue working with them. The participants then completed an assessment describing their mood at the moment. For the next part of the experiment, the participant played the role of manager, while another participant played the role of a worker. The participants who played the role of the manager were randomly assigned to one of two conditions: face to face meeting condition, or the no meeting condition. Those in the face-to-face meeting condition were told they would be meeting live with their new partner. Those in the no meeting condition were told they would not actually meet their new partner. The worker drew a picture, and the manager rated the drawing. The manager deposited a quarter in a cup labeled “creativity rating” for every point the partner earned. The results show that rejected participants gave more money to the worker than those in the control group when there was an anticipated interaction. When no meeting was anticipated, excluded participants gave less money to the worker than those in the control group. This showed that rejection

increased the personal obligation of the participant to provide the worker with more money only when they anticipated meeting with them face to face. It can be concluded that those who are rejected feel like they are more likely to be viewed positively for the opportunity to reconnect if they portray themselves as generous.

Cyberball: The Most Widely Used Technique to Study Social Exclusion

Cyberball is a virtual ball-tossing game that researchers use to manipulate the degree of social exclusion in social psychological experiments. In this game, the participant plays with two participants who are not real people, but are actually part of the computer program. The program varies the degree to which the participant is passed the ball. Excluded players are not passed the ball after the first two tosses, receiving fewer ball tosses than the other players. Included players are repeatedly passed the ball and receive the same amount of ball tosses as the other players.

Hartgerink et al (2015) conducted a meta-analysis of one hundred and twenty Cyberball studies, including 11,869 participants, to determine the effect size of exclusion. The meta-analysis tested two hypotheses. The first hypothesis was that the ostracism effect size would decrease from the first variable measured to the last variable measured. Thus, first measures would be less affected by cross-cutting variables than last measures. The second hypothesis was Williams's (2009) proposition that the immediate impact of exclusion is resistant to influence, but that influence is more likely to be observed in delayed measures. The results confirmed the hypothesis that the ostracism effect decreased from the first to the last measure. The analyses of this study showed that the average exclusion effect is large ($d>1.4$). The effect of being

excluded by Cyberball generalizes across different versions of the game and across different sexes, ages, and countries. However, the results did not fully confirm the hypothesis that last measures are more strongly moderated than first measures. The researchers found that time passed since being ostracized does not predict effect sizes of the last measure. These results show that social exclusion by Cyberball doesn't tend to be influenced by other variables. People differ in how excluded they will feel and thus react differently to negative evaluation.

Williamson et al. (2018) conducted a study to investigate the effects of social exclusion by Cyberball on cardiovascular response. More specifically, they tested whether experimental manipulations of social exclusion influenced cardiovascular and affective reactivity to socially evaluative stress. Findings from previous studies indicate that higher social support is associated with lower blood pressure and better cardiovascular regulation to stress. Experimental research has demonstrated that giving support, the presence of a supportive person, and receiving support reduces physiological stress responses. The participants of this study involved eighty-one college students. The researchers placed a blood pressure cuff on the participants' arm. While wearing the blood pressure cuff, the participants filled out a questionnaire about their psychosocial characteristics such as their loneliness and their social anxiety symptoms. After filling out the questionnaire, the participants were randomly assigned to play Cyberball being either included or excluded. After playing Cyberball, the participants completed a socially evaluative stressor which consisted of having the participants say their positive and negative characteristics out loud, and a verbal arithmetic exercise that consisted of counting backwards from 1022 in intervals of

thirteen. After completing this task, the participants sat quietly for a recovery period of fifteen minutes. The results show that excluded participants experienced a significant increase in cardiovascular responses during the socially evaluative stressor. The included participants experienced some increases in anxiety, but did not experience a significant change in blood pressure. These results show us that when the participants experienced exclusion by Cyberball, they experience higher physiological arousal in their bodies during a socially stressful task.

Other Cyberball studies have tested if the desire to reconnect occurs automatically. Mohr et al (2017) conducted a study to determine if slow, affective touch may reduce the negative feelings of being excluded caused by the social exclusion manipulations of the Cyberball task. This study involved eighty-four female college students. First, all the participants played a game of Cyberball where they were included. Then, all the participants played a game of Cyberball where they were excluded. The researchers had everyone play a round of Cyberball in both conditions to avoid the participants' from developing suspicions of the exclusion manipulation. After playing both rounds of Cyberball, the participants were randomly assigned to one of two conditions: slow, affective touch or fast, neutral touch. Participants were blindfolded then touched on the wrist with a soft makeup brush either slowly or quickly according to their condition. At baseline and after the touch task, the participants then filled out a questionnaire assessing various feelings. The results supported the hypothesis that slow, affective touch compared to fast, neutral touch led to a decrease of feelings of social exclusion among the participants in the slow, affective touch condition. These results support that distress caused by social exclusion was significantly lessened when

followed by slow affective touch, compared to fast neutral touch. Slow touch is received as more pleasant.

Lyyra et al (2016) conducted a study about the effects of cone of gaze on social exclusion. Cone of gaze, also known as mutual gaze, is the angle within which deviations from direct ray-like gaze are still accepted as looking at oneself. Prior research shows that when individuals were not looked at in an interaction, excluded individuals looked more often than included individuals at the eyes of the person who could include them. This suggests that being looked at may have special importance for excluded individuals. In other words, excluded individuals might view eye contact as especially inviting. Stress-related widening of the cone of gaze has been viewed as a by-product of an increased need to seek another persons' company. The purpose of this study was to test whether exclusion widens or narrows the cone of gaze. The researchers hypothesized if excluded individuals seek reinclusion, they might evaluate slight deviations from direct gaze as still looking at them more often than included participants. They also hypothesized if excluded individuals responded by refraining from interaction, they might indicate being looked at less. The study involved forty undergraduate students completing the being-looked-at judgment task. They were randomly assigned to either the included or excluded conditions. During the judgment task, the participant was presented with a series of pictures of a character. All of the pictures were the same, except the direction of her gaze differed slightly in each picture. After each picture, the participant was presented with two response windows. The first response window asked them if the character was looking at them or not, and the second response window asked participants to evaluate the strength of the feeling of

either being looked at or not being looked at on a three-point scale: strong, intermediate, or weak. The results demonstrate that the excluded participants had a wider cone of gaze and reported stronger feelings of being looked at. Even when the gaze of the character on the screen was clearly averted, the excluded participants still reported a strong gaze. This means that excluded people feel the need to try harder to be seen.

The Approach-Avoidance Task

Heuer et al (2007) conducted a study using the Approach-Avoidance Task (AAT) to examine avoidance reactions to potential social threats of people with high anxiety. The purpose of this study is to compare the automatic approach and avoidance responses of socially anxious and nonanxious participants using AAT. The researchers of this study examined whether or not the AAT is a valid measure of very fast social approach and avoidance. The participants of this study involved eighty-six undergrad students: forty-three highly socially anxious individuals (HSAs), and forty-three non-anxious controls (NACs). During the experiment, the participants were presented with either an angry face, a smiling face, or a neutral face. With a joystick, the participants either pushed the face away to simulate avoidance or pulled the face closer to them to simulate approach. The participants were instructed to approach or avoid each face as quickly as possible. After completing the AAT, the participants rated how positive or negative each face was. The results show that the highly socially anxious individuals (HSAs) show stronger avoidance tendencies. They avoided angry faces faster than those in the control group, and also avoided smiling faces faster than the control group. There was no difference in reaction towards the neutral faces. Also, the groups did not

differ in ratings. Both groups rated the angry faces negatively, and the smiling faces positively. These results mean that socially anxious people more quickly read emotion. They likely evaluate quickly because they think they are always being evaluated and are constantly on the lookout for any sign of social threat.

The current study is also testing if the motive to reconnect after social exclusion is shown automatically. We tested if excluded individuals experience an immediate desire to reconnect after being excluded as shown in very quick approach responses. The AAT measures approach and avoidance behavior as split-second motor responses in the range of milliseconds. Using the AAT allows us to test if the desire to reconnect is demonstrated reflexively and thus unconsciously. Excluded people are likely unaware of how quickly they are responding on the AAT. I expect participants excluded by Cyberball to approach happy faces faster than neutral faces during the AAT task compared to included participants.

Method

Participants

The participants in this study were recruited from the internet platform Prolific by posting a study announcement. The study involved thirty-three participants ranging in age from eighteen to fifty-five (mean=28.3, SD=2.5). Fifty-eight percent of participants identified as female, and forty-two percent identified as male. 59% of participants identified as Caucasian, 15% as Hispanic, 11% as African American, 3% as Asian, 10% as mixed, and 2% as other. The participants completed the Fear of Negative Evaluation Scale (FNES; Leary, 1983) in order to identify participants that are not socially anxious.

The participants who scored in the top thirty percent of the distribution on the FNES were excluded. The participants provided electronic informed consent. They received $5 in exchange for participating in the study.

Experimental Design and Overview

The participants were randomly assigned to the Cyberball inclusion and exclusion groups. Cyberball inclusion meant that the participants would be involved throughout the whole game. Cyberball exclusion meant that the participants would not be thrown the ball for most of the game. After playing Cyberball, the participants did two different versions of the AAT. In one version, they moved a stick figure towards happy faces, and moved the figure away from neutral faces. In the other version, they moved the stick figure towards neutral faces, and moved the figure away from happy faces. The two AATs were counterbalanced across participants and the faces were presented in the same random order on each AAT to all participants.

The participants were presented with thirty-six happy faces and thirty-six neutral faces on each AAT. There was a total of seventy-two trials on each AAT. Overall, this experiment followed a 2 x 2 x 2, Group (Cyberball excluded or included) x Face (happy and neutral, within-subjects) x Response (approach and avoid, within-subjects), mixed design.

Measures, Materials, Equipment

The Fear of Negative Evaluation Scale (FNES; Leary, 1983) is a twelve-item questionnaire consisting of statements regarding various social fears of negative criticism. The participant rates each item on a five-point Likert scale. For example, two

of the items in the assessment are, “I am frequently afraid of other people noticing my shortcomings” and “I am afraid that people will find fault with me.”

The Approach-Avoidance Task (AAT; Heuer et al. 2007) is used to examine avoidance reactions to potential social threats of people with high anxiety. The AAT has been used in a previous to study compare the automatic approach and avoidance responses of socially anxious and nonanxious participants. We used the AAT to test the hypothesis that reconnection is automatically and reflexively shown in approach behavior. In the AAT, approach and avoidance behavior are measured as rapid motor responses that occur within fifty to one hundred milliseconds. Thus, we will see if the desire to reconnect is shown reflexively in physical behavior.

The happy and neutral faces were taken from the Chicago Face Database (CFD, Ma, Correll, & Wittenbrink, 2015). The faces were seventy-two high-resolution photographs of thirty-six male and thirty-six female individuals between the ages of seventeen and sixty-five. Half of the faces were Caucasian and half were Black in order to test a separate set of hypotheses about implicit racism. Each photo was 500 x 600 pixels, 32-bit color. The happy and neutral faces were of the same person, so they did not differ in any visual features that could confound the results.

Procedure

The participants began the experiment by downloading Inquisit, which is the software used to run the study. Then they read a brief passage describing the study. After reading the passage, they must provide informed consent in order to continue participating in the study. Next, they fill out the FNES. They are also asked some

demographic questions such as age, gender, ethnicity, race, and sexual orientation. They are asked about sexual orientation to make sure that they are approaching or avoiding the faces according to the instructions and not according to how attracted they are to the face. A heterosexual man would see male faces, a heterosexual woman would see female faces. A bisexual person would see both male and female faces. Then they play a three-minute game of Cyberball where they are randomly assigned to either the included or excluded condition. Those in the included condition received tosses throughout the whole game. Those in the exclusion condition received two tosses in the beginning of the game and then never again. After playing Cyberball, they are asked questions about how Cyberball made them feel. Some of the questions were "How ANGRY did you feel?" or "How ELATED did you feel?" These questions were asked as a manipulation check. If the participants were paying attention throughout the whole study, then those in the exclusion condition should report being in a more negative mood than the included participants. To further confirm that the participants were paying attention, they were asked how many other players were in the game, and what percentage of the time they received passes. Those in the excluded condition should report a relatively low number of passes. After answering the questions about Cyberball, the participants did the two AATs described above. During the AAT, the participants pressed the "y" key to move the stick figure up, and the "b" key to move the stick figure down. Half the time the stick figure appeared below the faces, and the other half of the time, it appeared above the faces. The participant then moved the stick figure up or down depending on whether they were instructed to approach or avoid the two types of faces. Once the AAT was complete, the participants read a debriefing passage

and were given a code to enter into Prolific so they could be reimbursed for participating in the study.

Results

Figure 1 shows the reaction times for approaching and avoiding happy and neutral faces in the excluded and included groups by the millisecond. A 2 x 2 x 2, Group (Excluded or Included) x Face (Happy & Neutral, within-subjects) x Response (Approach and Avoid, within-subjects), mixed ANOVA was used to test the hypotheses. The main effect of Group was not significant, $F(1,31)=.321$, $p=.575$, indicating that excluded participants did not respond faster to faces generally. The main effect of Face was not significant, $F(1,31)=.567$, $p=.457$, indicating that the groups did not respond more quickly to a type of face. The main effect of Response was significant, $F(1,31)=6.04$, $p=.02$, showing that across the groups, participants approached the faces faster than they avoided them. The two way interaction of Face and Response was significant, $F(1,31)=8.05$, $p=.008$, showing that across the groups, the participants approached the happy faces faster than the neutral faces. The three-way interaction of all three factors was not significant, $F(1,31)= 2.37$, $p=.13$. However, the lower p-value is showing that the two-way interaction of Face and Response is more apparent in one of the two groups.

To test our specific hypothesis, a two-way ANOVA of Group and Face for approaching faces only was conducted. The two-way interaction of Group and Face for approaching faces approached significance, $F(1,31)=2.89$, $p=.09$, showing that the excluded group nearly approached happy faces faster than neutral faces, whereas the

included group did not. While not significant, the size of this interaction effect was eta-squared=.089, which is a moderate sized effect. The same two-way interaction of Group and Face for avoiding faces was not significant, $F<1$, showing that this two-way interaction effect was specific to approaching faces.

Because the two-way interaction of Group and Face for approaching faces approached significance with a relatively small sample (N=33), a G-3 power analysis was conducted to determine how many more participants are needed to attain statistical significance, given the moderate effect size of eta-squared=.089. This power analysis showed that given this effect size, an additional eight participants, four in each group (excluded and included), would be needed to attain statistical significance at $p=.05$.

Discussion

The purpose of this study was to test the social reconnection hypothesis with respect to automatically exhibited approach behavior: if the desire to reconnect is shown automatically. We hypothesized that there would be a two-way interaction of Group and Face, in which excluded participants would approach happy faces faster than neutral faces, whereas included participants would not.

Although the excluded group nearly approached happy faces faster than neutral faces, the hypothesis was not confirmed. The two-way interaction of Group and Face for approach responses approached, but did not achieve, statistical significance. However, the effect size of this statistical trend was moderate, Eta-squared=.089. The corresponding interaction for avoiding faces was far from significant. This means that if the Cyberball exclusion had an effect on reacting to the faces, it specifically affected

approach behavior, not avoidance. This shows that exclusion may have only affected the need to reconnect. We ran a G-3 power analysis that showed that with a larger sample, the two-way interaction effect of Group and Face would likely attain statistical significance, and therefore our hypothesis would be confirmed. These results suggest that Cyberball exclusion may have caused the participants to approach happy faces faster than neutral faces.

If the observed trend attains statistical significance with a larger sample, it would suggest that excluded people would approach happy faces faster than neutral faces compared to included people. The desire to connect with others following social exclusion would be seen automatically, reflexively, and nonconsciously. This is an important finding as it would take research on social connection in a new direction. Theoretically, it would demonstrate the nonconscious dimension of the need to reconnect. These findings may speak to our fundamental social nature as human beings by illustrating that we need each other after being excluded.

These results are quite consistent with the studies reviewed earlier herein that support the need for participants to reconnect after experiencing social exclusion. Not only are the present results consistent with prior research, but they also build on prior studies. Those prior studies did not test specifically if the need to reconnect after exclusion is shown reflexively. Even though the current results did not meet statistical significance, the observed statistical trend may demonstrate that being excluded hurts. People may feel an automatic need to approach potential new partners in an effort to mend the hurt. The reason the hypothesis was not clearly confirmed was most likely that we had a smaller sample than anticipated compared to prior studies.

The biggest limitation of this study was the sample size. The two-way interaction of Group and Face did not meet statistical significance, likely because there were not enough participants. The G-3 power analysis indicated that only four more participants in each group are needed to attain significance, if the effects size is maintained. Therefore, a future study should be conducted with a minimum of forty-one participants. Another important limitation is the fact that this study was done remotely. With a remote study, we have no way of knowing that the participants were actually following the instructions. They could have easily pressed any button without actually paying attention to which faces were happy and which faces were neutral. If possible, a future study should be conducted in person and have a researcher present whose sole purpose is to monitor the participants to make sure they understand the instructions and follow them accordingly. Another reason why the study should be done in person is so the participant has good internet connection while completing the study. We want to make sure the participants' experience completing the study is as smooth as possible.

Another limitation of this study is that both Cyberball and the AAT lack ecological validity. Since these are computerized measures, it may not be an accurate depiction of how the participant would behave in real life. Approaching a picture by pressing letters on a keyboard is much different than approaching a real person. Cyberball exclusion from a game of virtual catch with cartoon characters is not like the experience of actual ostracism by real people in real life. A future study could address this by doing something similar to a prior study. For example, instead of playing Cyberball, they could write about a time they felt excluded, as in the first study by Maner et al (2007). This way, the person experiences the feelings of exclusion without going through a live,

potentially traumatic experience. The AAT is ideal for measuring automatic approach behavior. However, unlike prior studies, the AAT does not measure the desire to actually connect with potential new social partners. A future study could measure approach behavior by having the participants approach and interact with real people, rather than pictures on a screen. The problem here is that researchers might have a hard time developing a way to measure automatic approach behavior on a split-second basis in a more natural way.

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Figure

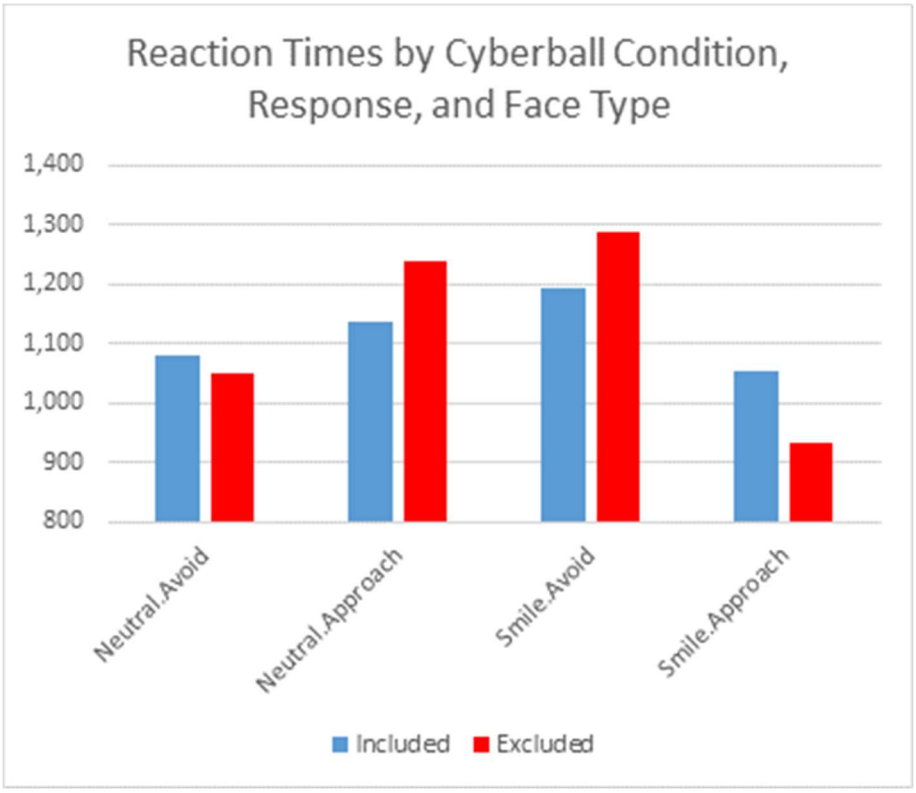

Figure 1. The reaction times for approaching and avoiding happy and neutral faces in the excluded and included groups in milliseconds.