

THE EFFECT OF CYBERBALL EXCLUSION ON AUTOMATIC
APPROACH BEHAVIOR

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Abstract

The social reconnection hypothesis posits that individuals experiencing social exclusion have a strong desire to form new connections. Past research has indicated that those who feel excluded by others actively seek new social bonds. This study aimed to assess whether the inclination to reconnect occurs automatically and reflexively. Our hypothesis was that participants excluded via Cyberball would demonstrate a faster approach toward happy faces compared to neutral faces during the Approach-Avoidance Task (AAT) in contrast to included participants. Thirty-four adults were recruited from an online participant pool. They engaged in a Cyberball game where they were either included or excluded from the game. Participants in the included condition consistently received ball tosses throughout the game, while those in the excluded condition received only three tosses initially and none thereafter. Following the Cyberball game, participants completed the Approach-Avoidance Task (AAT), based on the instruction to approach or avoid faces displayed on the screen. Each participant completed the AAT twice. In one AAT, they approached happy faces and avoided neutral ones; then they avoided happy faces and approached neutral faces in the second round. Results indicated that the excluded group nearly approached happy faces more rapidly than neutral faces compared to the included group, an effect that nearly reached statistical significance. Nonetheless, a power analysis indicated that maintaining the effect size would require additional participants to achieve significance. Therefore, these findings suggest a potential demonstration of the automatic inclination to reconnect after experiencing exclusion.

The Effect of Cyberball Exclusion on Automatic Approach Behavior

Prior research had shown that humans have a fundamental need to belong or a desire to be socially connected to others. The Social Reconnection Hypothesis (SRH) proposes that ostracism, or social rejection, enhances the desire to forge new connections. After experiencing social exclusion, individuals have a heightened motivation to reconnect with others and to restore their sense of belonging (Maner et al., 2007). According to the SRH, social exclusion creates a need to belong, which in turn motivates individuals to seek out social connections and to engage in behaviors that promote social inclusion. People who have experienced social exclusion may be more motivated to engage in behaviors that promote social inclusion, according to studies based on the SRH. They may be more likely to seek social support from friends and family, participate in prosocial activities, or form new social interactions. These actions may help to mitigate the negative effects of social exclusion and restore individuals' senses of belonging and well-being.

Cyberball is a computer-based ball-tossing game used in psychological research to study the impact of social exclusion and ostracism on human behavior and emotions (Williams et al., 2000). A variety of research studies have used Cyberball to explore the impacts of social exclusion on diverse demographics, including children, adolescents, and adults. The current research attempted to use the Cyberball game to investigate its effect of social exclusion on automatic reconnection behavior. Specifically, will the need to reconnect be expressed as automatic approach behavior right after the participant is rejected or ostracized? Before further stating the specific hypothesis and how the study was conducted, I will present relevant research that provides the background to the current study.

Initial Studies Testing the SRH: The Research of Maner and Colleagues

The first studies of the SRH were conducted by Maner, DeWall, and Baumeister (2007).

They conducted a total of 6 studies that investigated the effect of social exclusion on interpersonal reconnection. The purpose of the first study was to test the social reconnection hypothesis by testing if memories of rejection will make the participants want to make new friends. The researchers of the study recruited 56 undergraduate students. In this between-subjects experiment, the participants were randomly assigned to one of the three conditions: social exclusion, social acceptance, or neutral control. The exclusion group was asked to write an essay about a time when they felt rejected or excluded by others. The social acceptance group was asked to write about a time when they felt accepted by others, and the neutral-control group wrote about their activities the previous day. The participants were blind to the purpose of the study. After writing an essay corresponding to their condition, participants then completed a questionnaire regarding spurious student events which would be organized by Florida State University to meet new people if they show the desire to make new friends/forged new connections. Participants showed a higher interest in forging new connections and making new friends after recalling memories of social rejection. The results showed that participants that recalled the time they were socially rejected or excluded showcased an increased desire to meet/make new friends.

The second study of Maner et al. (2007) tested the social reconnection hypothesis by assessing whether social exclusion stimulates the desire for social connection as shown by testing whether being told that they would be lonely in the future would increase their preference to work with other people. The researchers recruited 34 undergraduate students. The participants were blind to the purpose of this between-subjects experiment. They were told that the study was to understand different aspects of personality. To make the study more believable, they were asked to take a questionnaire at the end of which they will get fake feedback based on their

personality and their future social relationships. Participants were randomly assigned to one of the three social feedback conditions: future alone, future belonging, and a misfortune control condition. Each of the conditions were presented with corresponding feedback based on their responses to the questionnaire. Participants in the future alone group were told the following: “You’re the type who will end up alone later in life... odds are you’ll end up being alone more and more.”. Participants in the future-belonging group were told the following: “You’re the type who has rewarding relationships throughout life... odds are that you’ll always have friends and people who care about you.” Finally, the participants in misfortune control group were told the following: “You’re likely to be accident prone later in life... the odds are you will have a lot of accidents.” After receiving the personality feedback, participants took a questionnaire assessing their mood. Then they were told that they could finish the task either with a partner or alone. Participants were asked on a scale of 0-11 (0=not at all, 11=extremely) to what extent they would prefer working with a few other social partners. Participants that received the feedback that they would be lonely in the future caused them to increase their preference to work with other people. Results show that people who are threatened with being excluded or alone in the future will lead them to prefer to work with other people.

The third study of Maner et al. (2007) investigated the cognitive changes that accompany the motivation of wanting to make new friends shown in studies 1 and 2. To be specific it was hypothesized that rejected people would be motivated to perceive other people as especially welcoming and friendly. The researchers recruited 18 undergraduate students who underwent a couple of activities. In the first activity they were asked to split into groups of 2-3. They were asked to get to know each other and then perform a task with a participant of their choice whom they like. There were 2 conditions in this study: the accepted condition and the rejected

condition. In the accepted condition, the participant was told that a group cannot be formed because multiple people chose the participant to be in their group. Participants in the rejected condition were told that a group cannot be formed because nobody chose the participant to be in their group. After completing a manipulation check to measure their mood before the actual experiment, participants performed a person perception task. Participants were asked to rate several target people as to their level of sociability and attractiveness as well as their level of hostility. The excluded group viewed the target persons as nicer, friendlier, and more desirable. Exclusion did not lead participants to view others as angrier and more hostile. Results show that excluded/rejected people are more prone to view other people as friendly and inviting, which is consistent with a motive aimed at restoring social bonds.

Study four of Maner et al. (2007) tested whether rejection can lead to both positive and negative social perceptions. Specifically, researchers hypothesized that even though rejected individuals may seek reconnection with new partners, and perceive such potential partners more positively, they may still be inclined to hold negative attitudes toward the specific persons who rejected them. The researchers recruited 34 undergraduate students. In order to test these hypotheses, participants evaluated two different individuals: (a) certain people with whom they have recently interacted (and those who have rejected them previously); and (b) entirely new partners not previously known to them. Upon arrival, participants were told that they would be interacting with a partner, first by sending videotaped messages and then by meeting face-to-face to complete a task. Later, participants were told that their partner would record one last reply video before meeting face-to-face. When the experimenter returned, they delivered the exclusion manipulation. Participants assigned to the irrelevant-departure condition were told that after watching the participants last recorded video, their partner had to leave suddenly because he or

she had forgotten to do something. By contrast, participants assigned to the personal rejection condition were told that after watching the video, their partner left suddenly because he or she did not want to meet the participant. Therefore, the participants were left to perform a task alone. The experimenter then told participants that although their partner had left, another participant had just arrived and that they would be partnered with this new person. Before seeing their new partner, participants completed measures assessing perceptions of their original partner. The experimenter then asked the participant to try and form an impression of the new partner's photo. Participants then completed measures assessing perceptions of the new partner. The rejected participants viewed a new interaction partner as especially nice and friendly. However, rejected participants were also inclined to view their original partner in a particularly negative and hostile light. Thus, the results showed that rejection can lead to both positive and negative social perceptions. Specifically, people who were rejected by a familiar individual will perceive them more negatively. At the same time, they view the new partners more positively.

Finally, in their sixth study Maner and his colleagues (2007) tried to provide further confirmation that socially favorable responses to rejection are based on a desire to reconnect with others. Specifically, if rejected participants truly desire to create new bonds and reconnect, then this should happen only when future interactions are expected. The researchers recruited 53 undergraduate students. Similar to studies 4 and 5, participants were told that they would be sending video messages back and forth to a same-sex partner and that their partner would send the first video message. After the video exchanges they will meet their partner face-to-face. For participants assigned to the irrelevant-departure condition, the experimenter explained that their original partner had forgotten to do something and would need to leave the experiment early. Participants assigned to the personal rejection condition were told that after watching their video

response, their partner did not want to meet them. After completing a mood scale, participants were then told that one participant will be playing the role of the manager and another participant will be playing the role of the worker. All participants were led to believe that they would complete this task with another participant. For participants assigned to the meeting condition, the experimenter explained that they would complete this task before meeting and interacting face-to-face with their new partner. Participants in the no-meeting condition, however, were told that they would not actually meet their new partner. A rigged drawing was used to assign participants to the manager role. After receiving their assignment, participants were told that they would judge the performance of their partner on a creativity task and assign rewards on the basis of that performance. When the experimenter returned with a drawing completed by the partner, managers were instructed to rate the drawing from 0 (not at all creative) to 20 (very creative) and to deposit one quarter in the cup labeled “creativity rating” for every point the partner earned and the rest of the money into a cup labeled “manager money”. The experimenter explained that money put in the “manager money” cup would be divided equally among participants who played the manager role in the study. Thus, any amount of money the participant gave to his or her partner would directly take away from the money he or she would earn. Rejected participants were more generous towards their new partner when there was a future interaction anticipated. The results showed that rejection increased the tendency to reward a new partner more generously, but only when there was an expectation for future interaction. In contrast, when there was no anticipation of future interaction, rejection failed to increase people’s level of socially favorable responding.

Exploring the Impact of Cyberball on Social Exclusion

Maner, DeWall, and Baumeister (2007) presented six studies supporting the idea that social exclusion enhances the desire to forge new connections and affiliate with people. However, the studies do not quite measure the impact of the exclusion on other aspects of human behavior and emotions. Cyberball is a computer-based simulation game that is frequently used in social psychology research to investigate the impact of social rejection and exclusion on individuals' emotions, behavior, and cognition (Williams et al., 2000). In order to understand whether ostracism induced by Cyberball changes automatic approach behavior, Ruggieri et al. (2013) examined the effects of ostracism or the exclusion from a group in adolescents using the Cyberball paradigm. The participants of the study included 91 students from fifth-to-eighth grade. In this between-subjects experiment, the participants were randomly assigned to either an ostracism condition or inclusion condition. Before playing the Cyberball game on a computer, participants were asked to report their mood. They were led to believe that they would play an "Internet ball-tossing game" with two other peers participating in the experiment. In reality, these "other children" were computer-generated confederates, who were represented by a photo of a child's face and an avatar. Participants had to use the mouse to indicate which of the two co-players they wanted to throw the ball to. For the first 6 ball exchanges, all participants experienced inclusion. The inclusion condition consisted of ball exchanges between the three "children" in which the participant continued to be included. In the ostracism condition, participants did not receive the ball at all after the first 6 exchanges.

Right after playing the game, the participants completed a questionnaire to report their mood. These were manipulation checks to check whether the manipulation had the intended effects on the included and excluded participants. To make the ostracized students feel better, before leaving they were invited to play Cyberball in the inclusion condition. The results showed

that participants in the ostracism condition reported a significant decrease in mood from pretest to posttest compared to participants in the inclusion condition. The ostracized participants also reported a lower sense of belonging to the group, lower self-esteem, lower sense of meaningful existence, and lower control at posttest as compared to the inclusion group. Thus, the researchers concluded that even a brief period of ostracism by unknown peers can lead to a significant decrease in well-being in early adolescents.

To determine the effect size of ostracism and conditions that might influence this effect, Hartgerink, Beest, Wicherts, and Williams (2015) conducted a meta-analysis of a total of 120 Cyberball studies with 11,869 participants investigated. The analysis found that: (1) the effect of ostracism on feeling excluded is large (it has a large effect size); (2) this effect of ostracism generalizes across multiple structural aspects such as number of players, how many times a ball was thrown to a participant, and the duration of ostracism, sampling aspects such as gender, age, and country of origin. This latter result shows that the effect of Cyberball is persistent. However, the researchers measured rejection through very generalized aspects of the effect because they did a meta-analysis. The researchers did not consider other possible conditions that might also influence the effects of Cyberball ostracism, such as one's race or ethnicity, the way participants were raised or brought up in life, and their overall desire to reconnect, or a personality trait that does not require them to have the need to reconnect as a result of ostracism.

Studies of Automatic Approach Behavior After Ostracism

Several studies have explored how ostracism impacts automatic approach behavior, which refers to the unconscious or instinctive inclination to move toward or away from social cues. These studies investigate how people who have been excluded or rejected from a social group react to cues of potential inclusion or exclusion. This first study was conducted by Lakin,

Chartrand, and Arkin (2008) to test the hypothesis that excluded people would automatically or subconsciously mimic others' behaviors more than included people. The participants of the study included 40 undergraduate students. Participants completed two tasks. First, they played on-line Cyberball. Participants in the included condition received balls throughout the entire game, whereas participants in the excluded group only received the ball couple of times in the beginning. When the game ended, participants rated their enjoyment of Cyberball and how friendly, sociable, and likeable the other players were on 9-point scales. Participants also rated the extent to which they were experiencing each of five positive (e.g., happy) and five negative (e.g., sad) emotions, using 5-point scales. The participant's task was to describe photographs to a partner who did not view them. Participants were informed that the partner had not played Cyberball previously. While researchers were retrieving the partner, they secretly recorded the participants foot movement to then compare it to the foot movement recorded while with the partner. After the researchers returned with a partner the interaction between the participant and the partner were also recorded (the partner was moving their foot steadily during the interaction). The results showed that excluded participants mimicked their partner's mannerism more than included participants, which suggests that participants tried to relate to others by imitating a person's mannerism, subconsciously. The researchers concluded that being excluded by strangers increases subconscious behavioral mimicry.

Another study investigated whether ostracism widens or narrows the cone of gaze, or how open an individual's pupils are to widen the visual field. To be exact, researchers studied whether ostracized individuals perceive an averted gaze as still being directed at them after seeing a friendly face. Lyyra, Wirth, and Hietanen (2016) recruited 40 undergraduate students. Participants played the Cyberball game where they experienced either exclusion or inclusion

from having the ball tossed to them. After the manipulation check assessments, the participants performed a “being-looked-at” judgment task to measure cone of gaze. Participants were briefly shown a face stimulus, after which they had to respond to two statements: (1) Whether they felt that the face was looking at them; and (2) How strong the feeling of either being looked at vs. not looked at was experienced. These results were that ostracized participants had a wider gaze cone and reported stronger feelings of being looked at specifically by happy faces. The results showed that ostracized individuals demonstrated a wider gaze cone than included individuals due to the need to relate or be accepted by others. This means they perceived friendly faces as more welcoming. One major limitation of the study, however, is the fact that the results were based on participants’ self-reports about cone of gaze. Therefore, the results may not be fully accurate, because the results are measured subjectively, which does not accurately capture the participants actual cone of gaze. Therefore, it is not possible to determine whether the ostracism manipulation had an impact on the measure of the cone of gaze or on higher levels associated with evaluative decisions about whether or not to be looked at.

Mohr, Kirsch, and Fotopoulou (2017) tested whether the administration of slow, affective touch may reduce the negative feelings of ostracism induced by social exclusion. The researchers recruited 84 female undergraduate students. Participants played the Cyberball inclusion game where they received the ball an equal number of times as other players. Participants played another Cyberball exclusion game where they received the ball 2 initial times, after which they were excluded in the remaining ball-tosses. After completing the Cyberball game, they completed a manipulation check to make sure that the participants experienced both inclusion and exclusion. Following the second Cyberball game, the participants were blindfolded. Immediately after the experimenter stroked the participant’s marked skin areas for 70 seconds

with a soft brush using either controlled touch (CT)-optimal speed (3 cm/sec; slow touch group) or non-CT-optimal speed (18 cm/sec; fast touch group). At the end of the experiment, researchers collected pleasantness ratings of CT-optimal touch and non-CT-optimal touch to make sure that participants actually perceived slow touch as more pleasant than the fast touch. These results revealed that exclusion distress was significantly lessened for the group that received a slow, affective touch following the ostracism manipulation, compared to the group that received a fast, 'neutral' touch. The results showed that slow, affective touch may reduce the negative feelings of ostracism induced by social exclusion.

The social reconnection hypothesis (SRH) indicates that rejection or social rejection increases the desire to form new bonds. After experiencing social exclusion, people have increased motivation to connect with others and regain a sense of belonging (Maner et al., 2007). According to SRH, social exclusion creates a need to be accepted, which in turn motivates people to seek social connections and engage in behaviors that promote social inclusion. Though prior research showed extensive proof that exclusion evokes the desire to reconnect with other people and make new connections, there is not much research on whether that said desire is shown reflexively. In the current study, we used the Approach-Avoidance Task (AAT), which measures approach and avoidance behavior as split-second motor responses in the range of milliseconds. The AAT specifically measures the desire to reconnect as a *reflex*. The purpose of this study was to test the effect of social exclusion on automatic reconnection behavior, and to test if the motive to reconnect after exclusion is shown not just automatically, but also reflexively and thus *unconsciously*. It was hypothesized that participants excluded by Cyberball will automatically approach happy faces versus neutral faces on the AAT faster than included

participants. We did not expect there to be a difference between the excluded/included groups for approaching neutral faces, however.

Methods

Participants

The participants of the study were recruited through an announcement posted on the internet platform Prolific. A total of 34 participants took part in the study, ages ranging from 18-45 ($M=25.4$ $SD=1.03$), 13 males, 19 females, and 2 non-binary. 27 of the subjects were Caucasian, 5 of the participants were Hispanic, and 2 were African American. The study only included the participants who were *not* socially anxious by using the Fear of Negative Evaluation Scale (FNES). Participants who scored higher than the 30th percentile on the FNES were excluded from the study (Molen et al., 2014). These participants were excluded because highly socially anxious people could confound the results; people who are high in social anxiety may not be inclined to reconnect with others after social rejection, but instead they may cope by avoiding others. Prior to beginning the experiment, participants provided electronic informed consent, and after the experiment, they were paid \$4.33 for the 25-minute study as compensation for their time.

Experimental Design

In this experiment, the Internet game Cyberball developed by the researchers Williams, Cheung, and Choi (2000) was used to manipulate ostracism. Participants were randomly assigned to either the included or ostracized condition. In the ostracized condition, the virtual players threw the ball to the participant twice at the start of the game, but did not throw it to them again for the rest of the game. In the inclusion condition, the participant received one-third of the balls thrown during the game.

We used the Approach-Avoidance Task (AAT; Heuer et al., 2007) to measure the approach and avoidance behavior as split-second motor responses. The AAT is a task in which participants are shown individual stimuli, which in this study were happy faces and neutral faces presented on a computer screen. A total of 72 facial expressions were presented to the participants, 36 happy faces and 36 neutral faces. The participants' task was to respond to each face as quickly as feasible by moving a stick figure towards or away from the presented face. The participants completed two different AATs. In one of the AATs, they moved the stick figure to approach the happy faces and avoid the neutral faces. In the other AAT, they avoided the happy faces and approached the neutral faces. The order of these tasks was counterbalanced across participants. Thus, this experiment followed a 2 x 2 x 2, Group (excluded or included) x Face (happy and neutral, within-subjects) x Response (approach and avoid, within-subjects), mixed design.

Other Measures and Materials

To exclude highly socially anxious participants, the Fear of Negative Evaluation Scale (FNES; Van der Molen et al., 2013) was used. FNES is a 12-item scale consisting of statements regarding various social fears. The participant rated each item on a 5-point Likert scale. One being *“Not at all characteristic of me”* and five being *“Extremely characteristic of me.”* Some statements included: *“Others will not approve of me”* or *“If I know someone is judging me, it has little effect on me”*.

The study used happy and neutral faces that were taken from the Chicago Face Database (CFD). The faces were 72 high-resolution photographs of 36 male and 36 female individuals between the ages of 17 through 65 years. Half of the faces were Caucasian and half were African-American 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

Participants were recruited through the online platform Prolific. In order to gain access to the experiment, they were first instructed to download an app called Inquisit. Once participants opened the study with Inquisit, the first thing they did was give electronic informed consent. After obtaining consent, participants completed the Fear of Negative Evaluation Scale (FNES). Then participants answered demographic questions, such as their age, gender, ethnicity, sexual orientation, and who they feel more romantically attracted to; this was asked to ensure that the physical attractiveness of the faces could not confound approach or avoidance responses. Prior to starting the first task, participants were presented with a brief description of the experiment. They were informed that they would be playing a ball-tossing game with other players (Cyberball, 2000), and when the ball was tossed to them, they were instructed to click on one of the three other “players” to throw the ball to. The other “players” were, in fact, computer-generated. The game consisted of four players, including the participant, throwing a ball to each other. The three cartoon characters, being the three players, were having a game of catch; once the participant got the ball, they passed the ball to the selected player. Prior to the start of the game, the participants were informed that they would be playing an Internet game with three other participants who were also taking part in the experiment. In reality, the movements of the other “participants” in the game were controlled by the computer, making them virtual players.

After completing the Cyberball game, participants moved on to the second part of the study, which was the Avoidance-Approach Task (AAT). Participants were informed that they would see smiling and neutral faces in the center of the screen, and a small stick figure that

would appear above or below each face. Participants were either presented with all-male or all-female faces based on their sexual orientation. For example, heterosexual males completed AATs with male faces only. Participants were instructed to press either the Y or the B key to move the stick figure towards or away from the face. The Y key always moved the stick figure up (toward the top of the screen), and the B key always moved the stick figure down (towards the bottom of the screen). They were instructed to move the stick figure toward or away from it, depending on whether the face was smiling or not. The participants completed a total of two AATs, and each presented 72 faces in total (neutral and smiling). In the first AAT, participants were instructed to *approach* the smiling faces and *avoid* the neutral faces by pressing the Y and B keys, and in the second AAT, they were instructed to *avoid* smiling faces and *approach* neutral faces. After completing the AATs, participants were presented with questions to see how well they were paying attention during the Cyberball game. These questions consisted of: “*About what percent of the throws tossed in the game would you say received during the game?*”; “*Have you ever heard of, or played, Cyberball before today?*”; and “*How many other players were playing with the participant in the game?*”. After these manipulation check questions, participants were asked to report how they felt during the Cyberball game. Some of these questions were: “*How sad did you feel during the Cyberball game?*”, or “*How rejected did you feel during the Cyberball game?*” They answered seven such questions on a 7-point Likert scale, 1 meaning “*Not at all*” and 7 meaning “*Very much so*”.

Lastly, after completing the AAT, participants read a debriefing form stating the study's purpose and its hypothesis. Finally, all participants received a code to receive the payment of \$4.33 for completing the study.

Results

Table 1 shows the reaction times in milliseconds for approaching and avoiding happy and neutral faces, in both the included and excluded groups. A mixed 2x2x2 ANOVA was used to test the hypotheses. The 2x2x2 design represents the Group (Excluded vs. Included), Face (Happy vs. Neutral faces, within-subject), and Response (Approach vs. Avoid, within-subject) variables. The main effect of Group was not significant, $F(1,32) = .029, p = .865$. Likewise, the main effect of Face was not significant, $F(1,32) = .61, p = .44$. The main effect of Response, on the other hand, did reach significance, with $F(1,32) = 6.45, p = .016$, demonstrating that between the groups, participants approached the faces faster than they avoided them. The two-way interaction between Face and Response was significant, $F(1,32) = 7.61, p = .01$, indicating that regardless of the group, participants approached happy faces vs. neutral faces faster than they avoided them. In contrast, the three-way interaction involving all three factors was not statistically significant, $F(1,32) = 2.05, p = .162$. Nevertheless, the lower p-value suggests that the two-way interaction between Face and Response is more pronounced in one of the two groups.

To test our specific hypothesis, we performed a two-way ANOVA focusing solely on Group and Face in the context of approaching faces. The two-way interaction between Group and Face for approaching faces approached significance, $F(1,32) = 2.58, p = .10$. This suggests that in comparison to the included group, the excluded group exhibited a tendency to approach happy faces more rapidly than neutral faces, although this difference did not attain statistical significance. Nonetheless, the effect size for this interaction was $\eta^2 = .075$, indicating a moderately sized effect. On the other hand, the same two-way interaction between Group and Face for avoiding faces was not close to statistically significant, with $F(1,32) = 1.21, p = .28$.

Discussion

The aim of this study was to examine the social reconnection hypothesis in the context of automatically displayed approach behavior, specifically by measuring the need to reconnect as it is expressed in a split second. It was hypothesized that the excluded participants would reflexively approach happy vs. neutral faces faster than the included participants.

Even though the group that was excluded showed a tendency to approach happy faces more quickly than neutral ones, the hypothesis was not confirmed. The two-way interaction of Group and Face on approach reactions approached significance, but did not fully reach statistical significance. However, this interaction neared significance, aligning with our hypothesis: participants who were excluded tended to approach happy faces more rapidly than neutral ones, unlike the included participants. Additionally, the effect size of this statistical pattern was moderate, with $\eta^2 = .075$. In contrast, the interaction concerning avoiding faces lacked significance by a wide margin. Therefore, if the Cyberball exclusion did in fact impact on reactions to the happy faces, it specifically influenced *approach* behavior rather than *avoidance*, possibly suggesting an influence on the desire to reconnect. A G-3 power analysis based on the observed effect size was conducted and indicated that a larger sample size (3 more participants per group) would result in the Group by Face interaction reaching statistical significance, which would confirm our hypothesis. Therefore, the findings imply that the Cyberball exclusion might have led participants to approach happy faces more swiftly than neutral faces.

Should the current trend become statistically significant with a larger sample, it would indicate that excluded individuals tend to approach happy faces more rapidly than neutral faces compared to included individuals. The innate urge to reconnect after social exclusion would be apparent as an automatic, reflexive, and nonconscious response. This discovery would be important as it would steer social connection research into uncharted territory. Theoretically, it

would showcase the nonconscious aspect of the urge to re-establish connections. These results could shed light on our intrinsic social essence as humans by emphasizing our automatic need for one another after social exclusion.

Our findings align closely with the studies reviewed earlier that emphasize the necessity for individuals to re-establish connections following social exclusion. Not only do these current results support previous research, but they also expand upon it. Previous studies did not specifically examine whether the urge to reconnect after exclusion happens reflexively. Despite the current results not reaching statistical significance, the observed statistical pattern could indicate the emotional pain experienced following exclusion. Individuals might instinctively feel compelled to approach potential new connections as a way to alleviate this pain. The lack of clear confirmation for the hypothesis was likely due to a smaller sample size than what was initially expected compared to previous studies.

The main limitation of this study was the sample size. The two-way interaction of Group and Face failed to reach statistical significance, presumably due to not having enough participants. Future studies should be conducted with a larger sample size. Another significant limitation lies in the remote nature of this study. Conducting the research remotely means there is no certainty that participants adhered to the instructions; for example, some might have pressed buttons without truly distinguishing between happy and neutral faces. A future study should be carried out in person in the lab with a researcher overseeing participants to ensure their comprehension of instructions and strict adherence to them.

Another limitation in this study pertains to the lack of ecological validity associated with both Cyberball and the AAT. Since both are completed using a computer, they might not authentically represent how participants would act in real-life social exclusion situations. The act

of approaching a picture via keyboard inputs differs greatly from real-life interpersonal interactions. Furthermore, being excluded from a virtual game like Cyberball does not mirror the experience of real ostracism by genuine individuals in real-world settings. To address this limitation, a future study could adopt a methodology akin to a previous research approach. For example, instead of playing a Cyberball game, researchers could tell the participants that the partner they were supposed to work with, whom they had never met before, chose not to have them in their group, as in the third study done by Maner et al (2007). Although the AAT serves as an effective tool for assessing automatic approach tendencies, unlike prior studies it does not measure the desire to actually connect with new people. To address this, future studies could measure approach behavior by creating a situation where the participant interacts with real individuals instead of images on a screen.

References

- Hartgerink, C. H. J., van Beest, I., Wicherts, J. M., & Williams, K. D. (2015). The ordinal effects of ostracism: A meta-analysis of 120 cyberball studies. *PLoS ONE*, 10(5).
<https://doi.org/10.1371/journal.pone.0127002>
- Hietanen, J. K., Myllyneva, A., Helminen, T. M., & Lyyra, P. (2016). The effects of genuine eye contact on visuospatial and selective attention. *Journal of Experimental Psychology: General*, 145(9), 1102–1106. <https://doi.org/10.1037/xge0000199>
- Lakin, J. L., Chartrand, T. L., & Arkin, R. M. (2008). I Am Too Just Like You: Nonconscious Mimicry as an Automatic Behavioral Response to Social Exclusion. *Psychological Science*, 19(8), 816–822. <https://doi.org/10.1111/j.1467-9280.2008.02162.x>
- Lyyra, P., Wirth, J. H., & Hietanen, J. K. (2017). Are you looking my way? ostracism widens the cone of gaze. *Quarterly Journal of Experimental Psychology*, 70(8), 1713– 1721.
- Maner, J., DeWall, C., Baumeister, R., & Schaller, M. (2007). Does Social Exclusion Motivate Interpersonal Reconnection? Resolving the Porcupine Problem. *Journal of Personality and Social Psychology*, 92, 42–55. <https://doi.org/10.1037/0022-3514.92.1.42>
- Ruggieri, S., Bendixen, M., Gabriel, U., & Alsaker, F. (2013). Cyberball: The impact of ostracism on the well-being of early adolescents. *Swiss Journal of Psychology*, 72(2), 103–109. <https://doi.org/10.1024/1421-0185/a000103>

Von Mohr, M., Kirsch, L. P., & Fotopoulou, A. (2017). The soothing function of touch:

Affective touch reduces feelings of social exclusion. *Scientific Reports*, 7(1), 13516.

<https://doi.org/10.1038/s41598-017-13355-7>

Williams, K. D., Cheung, C. K., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology*, 79(5), 748–762.

<https://doi.org/10.1037//0022-3514.79.5.748>

Table 1. *Effects of Cyberball on Approaching and Avoiding Happy Versus Neutral Faces in Excluded and Included Groups*

Group	Response	Happy Faces	Neutral Faces
<i>Included</i>	Approach	1.046 (81)	1.133 (77)
	Avoid	1.181 (84)	1.097 (76)
<i>Excluded</i>	Approach	.935 (81)	1.240 (77)
	Avoid	1.288 (84)	1.052 (76)

Note. Mean reaction times for the Cyberball groups approaching and avoiding facial expressions in milliseconds.