

Can eye contact alleviate distress caused by ostracism?

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Being ostracized by others is distressing and painful. Previous research suggests that ostracism creates a need to re-affiliate with new potential interaction partners, and that successful re-affiliation can alleviate distress caused by being ostracized. As eye contact is an important cue indicating willingness for social interaction, it could reduce the adverse effects of ostracism. In this study, participants were randomly assigned to be either included or excluded in a virtual ball-tossing game Cyberball, after which they were shown a one-minute video of a person with either direct or downward gaze. Participants' mood, pain and satisfaction of basic social needs were measured right after the game (reflexive stage) and after the video (reflective stage). The main hypothesis was that, among participants ostracized in the game, seeing a video portraying a person with direct gaze would facilitate recovery of basic needs, mood, and social pain more than seeing a video of a person with downward gaze. However, while ostracized participants showed recovery in the reflective stage, the recovery was not differently moderated by the gaze direction in the video. In fact, ostracized participants had completely recovered by the reflective stage. Thus, the hypothesis was not supported. However, because the complete recovery of ostracized participants may have been due to distraction caused by the video viewing task, the hypothesis could not be refuted either. These results may have implications on how ostracism and recovery from ostracism should be studied in the future. The results also showed that ostracism and eye gaze together may influence public self-awareness. Personal characteristics did not have an impact on the outcomes of ostracism, except global self-esteem, which buffered against social pain.

Keywords: ostracism, social exclusion, eye gaze, eye contact, recovery, distraction

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1. INTRODUCTION

1.1. Ostracism

Social connection is a fundamental human need. Undoubtedly most people regard their relationships – with their families, loved ones, friends – as some of the most important things in their lives. An adequate level of social interaction is beneficial in many ways: quality and quantity of social relationships predict subjective well-being (Hotard, McFatter, McWhirter, & Stegall, 1989) and lower mortality rate (see House, Landis, & Umberson, 1988 for a review). Self-reported loneliness has been found to be associated with a number of negative outcomes, such as depression, poor physical health (see Luanaigh & Lawlor, 2008 for a review), problematic drinking behavior (Bonin, McCreary, & Sadava, 2000), and higher mortality rate (Luo, Hawkey, Waite, & Cacioppo, 2012).

Ostracism – being ignored and excluded from relationships – is harmful and even life-threatening to social animals such as humans (Gruter & Masters, 1986). People who have been ostracized for a long time report a wide variety of problems, such as depression, eating disorders and suicide attempts (see Williams, 2007), but even a brief episode of ostracism is distressing (e.g. Williams, Cheung, & Choi, 2000).

To study ostracism in controlled settings, several procedures have been developed to induce feelings of ostracism in a laboratory. Probably the most common of these procedures is a game called Cyberball (Williams & Jarvis, 2006). In this procedure, participants are playing a simple ball-tossing game on a computer, ostensibly with other participants, but in reality, with computer-controlled characters. Participants are either included in the game, receiving the ball as many times as the other players, or excluded from it, receiving the ball only a few times throughout the game. Exclusion from such a simple game may seem like a trivial matter, but it is, in fact, highly distressing (see Williams, 2007), demonstrating how powerful an experience ostracism is. Being ostracized in Cyberball has been shown to cause a number of adverse effects, such as worsened mood, thwarted satisfaction of the four basic needs of belonging, control, meaningful existence and self-esteem (e.g. Williams, Cheung, & Choi, 2000), increased aggression (DeWall, Twenge, Bushman, Im, & Williams, 2010) and lowered physical activity in children (Barkley, Salvy, & Roemmich, 2012). Other effects of ostracism include impaired cognitive performance (Baumeister, Twenge, & Nuss, 2002) and self-regulation (Baumeister, DeWall, Ciarocco, & Twenge, 2005) and

decreased prosocial behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007).

The reaction to ostracism has been called social pain (MacDonald & Leary, 2005). The authors suggest that physical and social pain serve a similar purpose: physical pain warns about tissue damage and similarly social pain warns about exclusion. Interestingly, social pain and physical pain even operate via overlapping neural systems: ostracism has been found to activate dorsal anterior cingulate cortex (dACC), a region of the brain associated with experience of physical pain, indicating that being ostracized can be literally painful (Eisenberger, Lieberman, & Williams, 2003). Supporting this finding, another study found that people taking acetaminophen, a widely used analgesic, reported less social pain in their daily lives and showed less activity in the dACC while being ostracized in Cyberball than participants taking placebo (DeWall et al., 2010).

1.2. Reflexive and reflective reactions to ostracism

Williams (2007) proposes that people detect ostracism quickly in a very rudimentary way. The early, reflexive reaction to ostracism is pain, and the purpose of this reaction is to warn of exclusion as quickly as possible, so that the situation can be given the attention it needs. This reaction is robust in that it is modulated by few if any situational factors. Ostracism hurts, even when being ostracized by members of a despised outgroup (Gonsalkorale & Williams, 2007) or by computers (Zadro, Williams, & Richardson, 2004). Even financial incentive does not seem to weaken the impact of ostracism: in one study, participants were charged money for each throw received in a game of Cyberball, but even that did not make exclusion from the game any less distressing (Van Beest & Williams, 2006).

Not only situational factors, but also personality and other traits seem to have little impact on the reflexive reaction to ostracism. In a review published in 2007, Williams notes that no studies had found introversion, extraversion, agreeableness, self-esteem, secure attachment, individualism, loneliness or social anxiety moderating the reflexive reaction to ostracism. A more recent study with a large sample size supports this notion (McDonald & Donnellan, 2012). There are, however, a few studies suggesting that some traits may moderate the distress caused by ostracism. In one study, Cluster A personality disorder traits (characterized by, for example, severe interpersonal distrust and discomfort with social interactions) were found to buffer against the effect of ostracism on social pain and basic need satisfaction (Wirth, Lynam, & Williams, 2010), indicating that some extreme traits may moderate the reflexive reaction to ostracism. Another study suggests that previous

experience with being ostracized may also moderate the reflexive reaction (Wesselmann, Wirth, Mroczek, & Williams, 2012). In the study, affect was measured second-by-second during the ostracism episode, and it was found that lonely participants, compared to less lonely participants, showed slower decline of affect during ostracism, but ended up feeling worse. In a study by Onoda et al. (2010), self-esteem reduced social pain caused by ostracism. Still, as most studies have not found personality or other traits moderating the reflexive reaction to ostracism, it seems that few traits have more than a negligible impact. The reflexive reaction to ostracism is very similar for all people.

While the immediate reflexive reaction is modulated by few if any situational factors and personal traits, studies have found factors moderating the speed of recovery. The delayed, reflective reaction is moderated by, for example, attributions made of the ostracism episode. In a study by Wirth and Williams (2009), participants were ostracized in a game of Cyberball by either different-gender characters or characters assigned a different arbitrary color (green or blue). Just minutes after the ostracism episode, participants ostracized by different-color characters, compared to participants ostracized by different-gender characters, showed greater recovery of basic needs and mood. This could indicate that attributing ostracism to one's permanent trait, such as gender, may hinder recovery. Rumination can also hinder recovery (Wesselmann, Ren, Swim, & Williams, 2013). In the study, participants were either distracted or not distracted after a game of Cyberball. Ostracized participants who were distracted showed greater recovery of affect compared to ostracized participants who were not distracted. According to the authors, this may have been because the short break caused the participants not distracted to ruminate after the ostracism episode. Socially anxious people tend to ruminate after socially anxious situations (Kocovski, Endler, Rector, & Flett, 2005), so high social anxiety would be expected to hinder recovery from ostracism. This is, indeed, the case: individuals high in social anxiety (but not those low in social anxiety) show thwarted basic need satisfaction (Zadro, Boland, & Richardson, 2006) and impaired self-regulation (Oaten, Williams, Jones, & Zadro) as long as 45 minutes after being ostracized in Cyberball.

1.3. Ostracism and Reconnection Hypothesis

It has been proposed that ostracism creates a need to re-affiliate with new potential relationship partners (Maner, DeWall, Baumeister, & Schaller, 2007). The authors provided evidence for this

Reconnection Hypothesis in several different experiments: they found that rejection increases interest in forming new relationships and willingness to work in a group, rather than alone. They also found that ostracized people, compared to included people, rate other people not associated with the ostracism as nicer, friendlier, and more attractive. Another study found that ostracism increases unconscious mimicry of other people, which could indicate that ostracized people try to regain their social status by mimicking the behavior of others (Lakin, Chartrand, & Arkin, 2008). Ostracism has also been found to increase the likelihood of conforming with incorrect judgments of a group (Williams, Cheung, & Choi, 2000) and, among women, to increase effort in group tasks (Williams & Sommer, 1997), suggesting that ostracized people may try to please the group in order to gain their acceptance.

Being ostracized not only increases motivation in forming new relationships, but may also enhance abilities at determining whether a person is willing for social interaction or not. In one study, ostracized participants, compared to included and control participants, were more accurate at determining whether a smile is genuine or not (Bernstein, Young, Brown, Sacco, & Claypool, 2008). Need to belong has been found to be associated with higher accuracy at identifying facial emotions and vocal tone (Pickett, Gardner, & Knowles, 2004). Ostracism has also been found to increase attention to cues of acceptance (DeWall, Maner, & Rouby, 2009). The researchers found that participants expecting exclusion, compared to control participants, were faster at spotting a smiling face (but not an angry or a sad face) from a crowd of faces, fixated more on a smiling face and were slower at disengaging from a smiling face. Ostracism has also been found to increase acuity at perceiving whether a face shows a happy or an angry expression, and whether a person belongs to a racial in-group or not, suggesting that ostracism increases abilities at identifying interaction partners most likely to offer social acceptance (Sacco, Wirth, Hugenberg, Chen, & Williams, 2011). Findings suggesting that ostracism enhances abilities at spotting potential interaction partners also support the notion that being ostracized creates a need to re-affiliate.

If being ostracized engenders a need to re-affiliate with other people, it seems reasonable to think that a successful re-affiliation could mitigate the adverse effects of ostracism. Having some social connection while being ostracized by others can buffer against the adverse effects of ostracism (DeWall, Twenge, Bushman, Im, & Williams, 2010). Participants played Cyberball with three other players and the number of players ignoring the participant was varied. It was found that the more ostracizing players there were in the game, the more aggressive the participants were after the game. Being accompanied by a close other during ostracism, as opposed to being accompanied by a stranger, has also been found to buffer against feelings of ostracism (Teng & Chen, 2012), possibly because a friend is more likely to offer social support than a stranger, increasing the feeling

of belonging. Interestingly, even the presence of a dog can be enough to make ostracism less distressing (Aydin et al., 2012). In these studies, the need for re-affiliation, proposed by Maner et al.'s (2007) Reconnection Hypothesis, may have not been engendered in the first place, because the need to belong was fulfilled by having an adequate amount of social connection. If a person is completely ignored, the need to belong should not be fulfilled, creating a need for re-affiliation. It may be that successful re-affiliation after such an ostracism episode would alleviate the negative feelings caused by the exclusion. There are some studies suggesting that this is the case. In a study by Twenge et al. (2007), a friendly contact with an experimenter after being rejected reduced aggression more than a similar neutral social contact. In another study by Gross (2009), ostracized adolescents and young adults showed greater recovery of self-esteem after chatting with a peer online than after playing a solitary game of Tetris. Chatting also facilitated recovery of affect among adolescents, but not among young adults. Perhaps other cues indicating successful re-affiliation, such as receiving eye contact, could also facilitate recovery from ostracism.

1.4. Gaze and ostracism

Gaze is one of the most important forms of nonverbal communication, and it also plays a major role in ostracism. Gaze is used in a myriad of ways in human communication: to exercise social control, regulate interactions, express intimacy, provide information and facilitate task goals (see Kleinke, 1986 for a review). Gaze avoidance has been described as the most common cue to indicate ostracism (Williams, Shore, & Grahe, 1998). Gaze avoidance is interesting in that it can be more ambiguous than most forms of ostracism. If someone will not respond to your speech or refuses to pass you the ball in a game, it is usually clear that the person is ostracizing you. Not making eye contact could, on the other hand, be due to a number of different reasons: the person might be shy or there could be something else demanding his or her attention. Despite this potential ambiguity, gaze avoidance can engender feelings of ostracism just like more explicit forms of social exclusion. Simply seeing a video of a face with an averted gaze has been shown to lower basic need satisfaction and mood (Wirth, Sacco, Hugenberg, & Williams, 2010).

While gaze avoidance is used to indicate ostracism, eye contact is used to signal willingness for social contact. People look more at others they like rather than dislike (see Kleinke, 1986). People also gaze at others more when willing to engage in social interaction with them. Approach- and avoidance-oriented emotions tend to be expressed with direct and averted gaze, respectively,

and perception of these emotions is enhanced when accompanied by a corresponding gaze direction (Adams & Kleck, 2005). We automatically infer others' motivational tendencies based on their gaze behavior: when we see someone looking at us, we see him or her as interested in interacting with us. Seeing a person making eye contact or looking away has even been shown to cause brain responses indicative of a tendency to approach or avoid, respectively (Hietanen, Leppänen, Peltola, Linna-Aho, & Ruuhiala, 2008). Receiving a very brief eye contact with an unknown passerby has been found to increase feelings of connectedness (Wesselmann, Cardoso, Slater, & Williams, 2012). For someone deprived of social interaction, i.e., a person who has been ostracized, eye contact could signal successful reconnection, which would be expected to reduce the distress caused by the ostracism episode. As we have seen, there is some evidence suggesting that re-affiliation can alleviate the adverse effects of ostracism, but no studies have been done on whether eye contact specifically has an ameliorative effect.

1.5. Current study

The aim of the current study is to find if receiving eye contact after being ostracized could facilitate recovery of basic need satisfaction, mood and social pain. The Cyberball paradigm (Williams & Jarvis, 2006) will be used to induce feelings of ostracism. After being either included or excluded in a game of Cyberball, the participants will be shown a one-minute video of a person looking either directly at the participant (camera) or down. Participants' basic need satisfaction and mood will be measured both right after the Cyberball game (reflexive stage) and after the video (reflective stage). Thus, a 2 (inclusionary status: included/excluded) \times 2 (gaze direction: direct/down) \times 2 (recovery stage: reflexive/reflective) mixed design will be used. Because successful re-affiliation after ostracism can alleviate the adverse effects of ostracism, and eye contact could be a cue indicating such re-affiliation, it is hypothesized that ostracized participants shown a video of a person making eye contact will show greater recovery of basic need satisfaction and mood at the reflective stage than ostracized participants shown a video of a person looking down.

Participants' situational self-awareness will also be measured to find if the ostracism manipulation and eye gaze modulate self-awareness. Previously it has been found that eye contact can increase public self-awareness (Pönkänen, Peltola, & Hietanen, 2011; Hietanen, Leppänen, Peltola, Linna-Aho, & Ruuhiala, 2008). In addition, personality traits, self-esteem and social anxiety will be measured to explore the possibility that they could moderate the level of distress

experienced at either the reflexive or reflective stage. It is expected that, consistent with the mass of studies conducted thus far, these traits will not moderate the reflexive reaction to ostracism. No a priori hypotheses will be set on the potential moderating effects of the traits on the reflective reaction to ostracism.

2. METHOD

2.1. Participants

The participants were 80 adults (59 females) with no diagnosed psychiatric or neurological disorders. Four participants (two females) were excluded from the analyses, one for withdrawing the consent and three because they expressed suspicion concerning the Cyberball manipulation. Thus, the final sample consisted of 76 participants (57 females). The mean age of the final sample was 25.6 years (minimum 18 years, maximum 47 years). Participants were rewarded with either a movie ticket or partial course credit.

2.2. Procedure and materials

Participants arrived to the laboratory in groups of four. The participants were seated in cubicles with a computer. All materials were presented on a standard 19-inch LCD monitor with a resolution of 1280×1024. Participants were told that the purpose of the experiment is to study mental visualization and that they would do a mental visualization task, after which they would do a few tests. They were also told that before this task, they would do two short exercises of mental visualization. Participants were led to believe that the two exercises were merely practice before the actual task. In reality, there was no task after the two exercises. After being given the instructions, participants signed a form of informed consent. After this they filled a bogus questionnaire ostensibly measuring their tendency to mentally visualize. The purpose of the questionnaire was to enhance the mental visualization cover story.

In the first exercise, participants played a game of Cyberball (Williams, Cheung, & Choi,

2000; Williams & Jarvis, 2006), a virtual ball tossing game used to induce feelings of ostracism. In the game, four simple animated characters are throwing a ball at each other. Participants were told to mentally visualize the interaction in detail as if they were playing the game in real life. To ensure effectiveness of the manipulation, participants were led to believe that they were playing the game with each other through a local network. In reality, the other characters in the game were controlled by the computer. Participants were randomly assigned to two groups. Participants in the inclusion group received approximately 25 % of the throws and participants in the exclusion group only received the ball three times, once from each character, in the beginning of the game and then never again. The game lasted for 45 throws in total.

Right after the Cyberball game, participants filled a questionnaire measuring four basic needs of self-esteem (e.g. "I felt good about myself"), belonging (e.g. "I felt like an outsider"), meaningful existence (e.g. "I felt important") and control (e.g. "I felt powerful"). The questionnaire also contained measurements of positive mood (e.g. "I felt happy") and negative mood (e.g. "I felt angry"). See Appendix 1 for a complete list of items. Participants were instructed to rate on a 1 (not at all) to 5 (extremely) scale how they felt during the game. The items were reverse-scored where necessary, combined and averaged to create an index of basic need satisfaction ($\alpha = .97$) and both positive ($\alpha = .89$) and negative mood ($\alpha = .79$). Participants were also asked to rate how much pain they experienced during the game on a 100-point scale. Three manipulation check items were also included to confirm that the participants correctly perceived their inclusionary status. They were asked to rate on a 5-point scale if they were ignored and excluded during the game. They were also asked to assess the percentage of all ball tosses they received. These measurements have been used in a number of previous ostracism studies (e.g. Wirth & Williams, 2009; Zadro, Boland, & Richardson, 2006).

After the questionnaire, participants were shown a one-minute video portraying a face with a neutral facial expression. To avoid a sullen face, the models maintained a slight muscle tonus in the lower part of their faces. The person in the video was either looking directly at the participant (camera) or down. Laterally averted gaze was not used in the control condition because it has been shown to lower basic need satisfaction and mood (Wirth, Sacco, Hugenberg, & Williams, 2010). The models stayed relatively motionless, but minor head movements and eye blinks were allowed. The background was black. The video was shown full screen in a resolution of 1024×768. The size (horizontal × vertical) of the face was approximately 13.5 cm (11°) × 18.5 cm (15°), though there was slight variation due to differing facial characteristics of the models and distance of the participants from the monitor. The videos were of eight different models, four male and four female. The genders and identities of the models were counterbalanced across all conditions and genders of

the participants. To preserve the cover story, participants were told to mentally visualize an interaction with the person shown in the video.

After the video, participants were asked to fill another questionnaire. Basic need, mood and pain items in the questionnaire were the same as after the Cyberball game, but instead of asking participants to rate their feelings during the game, they were asked to answer based on what they felt *right now*. Cronbach's alpha coefficients for basic need satisfaction, positive mood and negative mood scales were .94, .83, and .77, respectively. Again, three manipulation check items were included. Participants were asked to rate on a 5-point scale whether they were ignored and excluded during the video. They were also asked to assess the percentage of the time the person in the video was looking directly at them.

After this, participants were told that they would be shown another video of the same person, during which they would fill another questionnaire. The questionnaire was Situational Self-Awareness Scale¹(SSAS; Govern & Marsch, 2001), a 9-item questionnaire measuring private (e.g. “Right now, I am conscious of my inner feelings”) and public (e.g. “Right now I am self-conscious about the way I look”) self-awareness and awareness of one’s surroundings (e.g. “Right now, I am keenly aware of everything in my environment”). Participants were shown a smaller video of the same person with the same gaze direction. The video was in a resolution of 640×480. It was cropped in a way that the face appeared only slightly smaller than during the first video viewing task. The video was shown in the upper part of the screen. The questions were presented on the lower part of the screen. The video was shown for 15 seconds before presenting the first question and it kept playing for as long as it took for the participants to answer the questions.

After all the participants were finished with the tasks, they were given a chance to express doubts about the experiment. After this, they were thoroughly debriefed. They were told the purpose of the study, and that the other characters in the Cyberball game were actually controlled by the computer. After the debriefing, they were asked to fill Short Five (Konstabel, Lönnqvist, Walkowitz, Konstabel, & Verkasalo, 2012), a 60-item personality questionnaire based on the Big Five model of personality, SPAI-23 (Roberson-Nay, Strong, Nay, Beidel, & Turner, 2007), an abbreviated version of the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989) and Rosenberg Self-Esteem Scale (Rosenberg, 1965). After filling all the questionnaires, participants were asked to provide their age and whether they were acquainted with any of the other participants (11 participants were acquainted with one other participant and one was acquainted with two) or the model in the video (none were). Finally, participants were thanked for their participation and rewarded with either a movie ticket or partial course credit. In total, the

1 SSAS data was not received from two participants (one female) due to a computer error.

experiment took approximately one hour.

3. RESULTS

3.1. Manipulation checks

Participants correctly perceived whether they were excluded or included in the Cyberball game. Excluded participants reported feeling more ignored ($M=4.11$, $SD=0.92$) than included participants ($M=1.55$, $SD=0.78$; $t(74)=13.1$, $p<.001$). Excluded participants also reported feeling more excluded ($M=4.17$, $SD=0.81$) than included participants ($M=1.33$, $SD=0.66$; $t(74)=16.9$, $p<.001$). Excluded participants reported receiving less of the total tosses (9.6%) than included participants (28.2%; $t(74)=7.3$, $p<.001$). Manipulation checks in the eye gaze manipulation were also successful. Participants in the downward gaze group reported feeling more ignored ($M=3.42$, $SD=1.43$) than participants in the direct gaze group ($M=2.45$, $SD=1.47$; $t(74)=2.9$, $p<.01$). Participants in the downward gaze group also reported feeling more excluded ($M=2.82$, $SD=1.37$) than participants in the direct gaze group ($M=2.00$, $SD=1.23$; $t(74)=2.7$, $p<.01$). Participants in the direct gaze group reported receiving more direct gaze (85.5% of the time) than participants in the downward gaze group (5.6% of the time; $t(74)=17.7$, $p<.001$).

3.2. Basic need satisfaction

Basic need scores were subjected to a three-way mixed design ANOVA, with Inclusionary Status (Included/Excluded) and Gaze Direction (Direct/Downward) as between-subject factors and Recovery Stage (Reflexive/Reflective) as a within-subject factor. The main effect of Inclusionary Status was significant ($F(1,72)=44.48$, $p<.001$). Excluded participants had lower basic need satisfaction ($M=2.75$, $SD=0.55$) than included participants ($M=3.58$, $SD=0.52$). A main effect of Recovery Stage was also found ($F(1,72)=22.79$, $p<.001$). Basic need satisfaction was higher in the reflective stage ($M=3.40$, $SD=0.73$) than in the reflexive stage ($M=2.97$, $SD=1.04$). The main effect of Gaze Direction was not significant ($F(1,72)=1.57$, $p=.21$).

An Inclusionary Status \times Recovery Stage interaction was found ($F(1,72)=69.30, p<.001$). There were no other interactions (highest F was for Inclusionary Status \times Gaze Direction \times Recovery Stage interaction, $F(1,72)=0.20, p=.65$). To break down the Inclusionary Status \times Recovery Stage interaction, a series of t-tests were conducted. In the reflexive stage, included participants had significantly higher basic need satisfaction than excluded participants ($t(74)=11.34, p<.001$). In the reflective stage, the two groups did not differ in basic need satisfaction ($t(74)=0.07, p=.95$). In the reflective stage, compared to the reflexive stage, excluded participants reported higher basic need satisfaction ($t(35)=9.58, p<.001$), while included participants reported decreased basic need satisfaction ($t(39)=2.51, p=.016$). For means and standard deviations of basic need scores, see Table 1.

Table 1. Means and standard deviations for basic need satisfaction in the reflexive and reflective stage

Condition	Direct gaze	Downward gaze	Overall mean
Reflexive stage			
Included	3.84 (0.57)	3.67 (0.66)	3.75 (0.61)
Excluded	2.16 (0.63)	2.04 (0.69)	2.10 (0.66)
Overall mean	3.04 (1.04)	2.90 (1.06)	2.97 (1.04)
Reflective stage			
Included	3.45 (0.72)	3.35 (0.79)	3.40 (0.75)
Excluded	3.53 (0.71)	3.29 (0.72)	3.41 (0.71)
Overall mean	3.49 (0.71)	3.32 (0.75)	3.40 (0.73)

Note: The measurements were made on a 1 (not at all) to 5 (extremely) scale

3.3. Positive mood

A similar three-way mixed design ANOVA was conducted for positive mood scores as for basic need scores. Again, a main effect of Inclusionary Status was found ($F(1,72)=13.47, p<.001$). Excluded participants reported lower positive mood ($M=2.89, SD=0.63$) than included participants ($M=3.42, SD=0.65$). A main effect of Gaze Direction was also found ($F(1,72)=4.54, p=.04$). Participants shown a video of a person with direct gaze reported higher positive mood ($M=3.33,$

$SD=0.63$) than participants shown a video of a person looking down ($M=3.02$, $SD=0.72$). The main effect of Recovery Stage was not significant ($F(1,72)=1.10$, $p=.30$).

An Inclusionary Status \times Recovery Stage interaction was found ($F(1,72)=40.93$, $p<.001$). There were no other interactions (highest F was for Inclusionary Status \times Gaze Direction interaction, $F(1,72)=0.06$, $p=.80$). T-tests were conducted to get a more detailed view of the Inclusionary Status \times Recovery Stage interaction. In the reflexive stage, included participants reported more positive mood than excluded participants ($t(74)=6.92$, $p<.001$). In the reflective stage, the two groups reported similar amounts of positive mood ($t(68.9)=0.67$, $p=.51$). In the reflective stage, compared to the reflexive stage, excluded participants reported more positive mood ($t(35)=6.44$, $p<.001$), while included participants reported less positive mood ($t(39)=3.44$, $p=.001$). For means and standard deviations of positive mood scores, see Table 2.

Table 2. Means and standard deviations for positive mood in the reflexive and reflective stage

Condition	Direct gaze	Downward gaze	Overall mean
Reflexive stage			
Included	3.88 (0.57)	3.51 (0.76)	3.69 (0.69)
Excluded	2.64 (0.72)	2.39 (0.87)	2.51 (0.80)
Overall mean	3.29 (0.89)	2.98 (0.98)	3.13 (0.95)
Reflective stage			
Included	3.31 (0.92)	2.99 (0.94)	3.15 (0.93)
Excluded	3.42 (0.63)	3.13 (0.61)	3.27 (0.63)
Overall mean	3.36 (0.79)	3.05 (0.80)	3.21 (0.80)

Note: The measurements were made on a 1 (not at all) to 5 (extremely) scale

3.4. Negative mood

Negative mood scores were also subjected to an Inclusionary Status \times Gaze Direction \times Recovery Stage three-way mixed design ANOVA. A main effect of Inclusionary Status was found ($F(1,72)=19.32$, $p<.001$). Excluded participants reported more negative mood ($M=2.20$, $SD=0.64$) than included participants ($M=1.62$, $SD=0.56$). A main effect of Gaze Direction was also found ($F(1,72)=6.25$, $p=.02$). Participants in the direct gaze group reported less negative mood ($M=1.73$,

$SD=0.65$) than participants in the downward gaze group ($M=2.07$, $SD=0.64$). The main effect of Recovery Stage was approaching statistical significance ($F(1,72)=3.64$, $p=.06$). The mean negative mood scores in the reflexive and the reflective stage were 1.98 ($SD=0.87$) and 1.82 ($SD=0.79$), respectively.

An Inclusionary Status \times Recovery Stage interaction was found ($F(1,72)=32.07$, $p<.001$). No other interactions were found (highest F was for Inclusionary Status \times Gaze Direction \times Recovery Stage interaction, $F(1,72)=0.72$, $p=.40$). To break down the Inclusionary Status \times Recovery Stage interaction, t-tests were conducted. In the reflexive stage, excluded participants reported more negative mood than included participants ($t(58.7)=7.34$, $p<.001$). In the reflective stage, the two groups reported similar amounts of negative mood ($t(74)=0.15$, $p=.88$). In the reflective stage, compared to the reflexive stage, excluded participants reported decreased negative mood ($t(35)=5.48$, $p<.001$), while included participants reported increased negative mood ($t(39)=2.65$, $p=.011$). For means and standard deviations of negative mood scores, see Table 3.

Table 3. Means and standard deviations for negative mood in the reflexive and reflective stage

Condition	Direct gaze	Downward gaze	Overall mean
Reflexive stage			
Included	1.30 (0.32)	1.58 (0.63)	1.44 (0.51)
Excluded	2.43 (0.86)	2.72 (0.72)	2.58 (0.79)
Overall mean	1.84 (0.85)	2.12 (0.88)	1.98 (0.87)
Reflective stage			
Included	1.54 (0.79)	2.08 (0.87)	1.81 (0.86)
Excluded	1.72 (0.69)	1.94 (0.74)	1.83 (0.71)
Overall mean	1.63 (0.74)	2.01 (0.80)	1.82 (0.79)

Note: The measurements were made on a 1 (not at all) to 5 (extremely) scale

3.5. Social pain

A similar three-way repeated measures ANOVA was conducted for pain scores as for basic need and mood scores. No main effects were found (highest F was for Inclusionary Status, $F(1,72)=2.49$, $p=.12$).

An Inclusionary Status \times Recovery Stage interaction was significant ($F(1,72)=11.62$, $p=.001$). No other interactions were found (highest F was for Gaze Direction \times Recovery Stage interaction, $F(1,72)=1.99$, $p=.16$). T-tests were conducted to break down the Inclusionary Status \times Recovery Stage interaction. In the reflexive stage, excluded participants reported more pain than included participants ($t(41.6)=2.95$, $p=.005$). In the reflective stage, the two groups reported similar amounts of pain ($t(74)=0.26$, $p=.79$). In the reflective stage, compared to the reflexive stage, excluded participants reported less pain ($t(35)=2.66$, $p=.012$), while included participants reported more pain ($t(39)=2.11$, $p=.041$). For means and standard deviations of social pain scores, see Table 4.

Table 4. Means and standard deviations for social pain in the reflexive and reflective stage

Condition	Direct gaze	Downward gaze	Overall mean
Reflexive stage			
Included	5.20 (6.29)	4.05 (8.00)	3.63 (7.13)
Excluded	14.94 (22.37)	16.89 (22.19)	15.92 (21.98)
Overall mean	9.82 (16.57)	10.13 (17.36)	9.97 (16.86)
Reflective stage			
Included	6.90 (15.81)	12.40 (19.31)	9.65 (17.64)
Excluded	5.94 (11.04)	11.39 (17.53)	8.67 (14.70)
Overall mean	6.45 (13.59)	11.92 (18.25)	9.18 (16.21)

Note: The scale is from 0 to 100

3.6. Situational self-awareness

Situational Self-Awareness Scale (SSAS) was administered after the reflective stage questionnaire to measure the effect of Cyberball and the video on participants' private and public self-awareness and awareness of surroundings. A 2 (Inclusionary Status: Included/Excluded) \times 2 (Gaze Direction: Direct/Downward) ANOVA was conducted for each factor measured by SSAS. There were no significant main effects or interactions on awareness of surroundings (all $ps>.3$). For private self-awareness, there was a marginally significant main effect of both Inclusionary Status ($F(1,70)=3.33$, $p=.072$) and Gaze Direction ($F(1,70)=3.28$, $p=.075$), but no interaction of the two ($F(1,70)=1.09$,

$p=.30$). There was an Inclusionary Status \times Gaze Direction interaction on public self-awareness ($F(1,70)=4.23, p=.042$), but no main effects of either Inclusionary Status or Gaze Direction (both $ps>.2$). For means and standard deviations of SSAS scores, see Table 5. A series of t-tests were conducted to break down the Inclusionary Status \times Gaze Direction interaction. Excluded participants who watched a video portraying a face looking down reported higher public self-awareness ($M=9.6$) than excluded participants watching a video with a person looking straight ($M=6.5; t(28.0)=2.3, p<.05$). No other significant differences were found (all $ps>.1$).

Table 5. Mean scores and standard deviations for private self-awareness, public self-awareness and awareness of surroundings on Situational Self-Awareness Scale as a function of Inclusionary Status and Gaze Direction

Condition	Direct gaze	Downward gaze	Overall mean
Private			
Included	10.0 (3.5)	12.4 (3.4)	11.2 (3.6)
Excluded	12.4 (4.1)	13.1 (3.5)	12.7 (3.8)
Overall mean	11.1 (3.9)	12.7 (3.4)	12.0 (3.7)
Public			
Included	8.7 (4.9)	7.9 (3.2)	8.3 (4.1)
Excluded	6.5 (3.0)	9.6 (4.9)	8.1 (4.3)
Overall mean	7.6 (4.2)	8.7 (4.2)	8.2 (4.2)
Surroundings			
Included	10.7 (4.0)	9.4 (3.9)	10.0 (4.0)
Excluded	10.1 (4.1)	9.9 (3.5)	10.0 (3.8)
Overall mean	10.4 (4.0)	9.6 (3.7)	10.0 (3.9)

3.7. Moderators of basic need satisfaction, social pain and mood

Big Five personality traits, social anxiety and global self-esteem were measured to investigate if they would moderate the effects of ostracism or eye gaze manipulations in the reflexive or reflective stage, respectively. Because the manipulations were not found to affect basic need satisfaction, social pain or mood in the reflective stage, moderation analyses were only conducted for the

measurements in the reflexive stage.

Regression analyses were conducted for basic need satisfaction, social pain and mood measurements. All analyses investigated exclusionary status (inclusion = 0, exclusion = 1), an individual difference (centered), and an interaction between the two. When a significant interaction was found, separate analyses were conducted for included and excluded participants. A similar analytic strategy has been used in previous studies (McDonald & Donnellan, 2012; Wirth, Lynam, & Williams, 2010).

Higher social anxiety was associated with lower basic need satisfaction ($B=-.19, p<.05$) and nearly significantly with lower positive affect ($B=-.24, p=.051$). The moderating effect of extraversion on basic need satisfaction ($B=.18, p<.1$) and positive affect ($B=.21, p<.1$) was approaching significance. No other main effects were found. See Table 6 for an overview of the results.

A significant interaction between global self-esteem and exclusionary status on social pain was found ($B=-.31, p=.01$). When the two groups were analyzed separately, it was found that higher global self-esteem was associated with lower social pain in the exclusion group ($B=-.336, t=-2.08, p<.05$), but not in the inclusion group ($B=.046, t=0.28, p=.78$).

Table 6. Statistics for the moderation analyses.

	Basic need satisfaction			Social pain			Positive affect			Negative affect		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
<i>Openness</i>												
Exclusionary status	-.80	-11.09	<.001	.34	3.05	.003	-.63	-6.81	<.001	.66	7.34	<.001
Openness	-.03	-0.26	.80	.04	2.6	.80	-.02	-0.17	.86	-.02	-.11	.91
Exclusionary status × Openness	.04	0.35	.73	-.01	-0.07	.95	-.01	-0.08	.94	.03	0.24	.81
<i>Conscientiousness</i>												
Exclusionary status	-.81	-11.36	<.001	.34	3.01	.004	-.63	-6.80	<.001	.65	7.27	<.001
Conscientiousness	-.10	1.05	.30	.002	.002	.99	.51	0.41	.68	-.002	-0.01	.99
Exclusionary status × Conscientiousness	-.02	-0.17	.87	-.01	-0.08	.93	-.02	-.18	.86	.04	0.32	.75
<i>Extraversion</i>												
Exclusionary status	-.78	-10.86	<.001	.38	3.35	<.001	.60	-6.49	<.001	.63	6.96	<.001
Extraversion	.18	1.87	.07	.08	0.51	.61	.21	1.67	.099	-.13	-1.05	.30
Exclusionary status × Extraversion	-.13	-1.34	.19	.12	0.78	.44	.13	-1.07	.29	.01	0.12	.91
<i>Agreeableness</i>												
Exclusionary status	-.80	-11.34	<.001	.33	3.01	.004	-.63	-6.93	<.001	.66	7.50	<.001
Agreeableness	.13	1.30	.20	-.02	-0.14	.89	.16	1.23	.22	-.12	-.93	.36
Exclusionary status × Agreeableness	-.11	-1.15	.25	.08	0.53	.60	-.12	-0.98	.33	.04	0.36	.72
<i>Neuroticism</i>												
Exclusionary status	-.78	-11.24	<.001	.33	2.99	.004	-4.61	-6.74	<.001	.64	7.33	<.001
Neuroticism	-.14	-1.64	.11	.004	0.03	.98	-.05	-1.32	.19	.13	1.17	.25
Exclusionary status × Neuroticism	-.01	-0.06	.95	.03	0.24	.81	.01	0.11	.92	.05	0.44	.66
<i>Social anxiety</i>												
Exclusionary status	-.78	-11.13	<.001	.33	2.92	.005	-.61	-6.69	<.001	.65	7.25	<.001
Social anxiety	-.19	-2.03	.046	.04	0.27	.79	-.24	-1.99	.051	.12	0.97	.33
Exclusionary status × Social anxiety	.14	1.48	.14	.01	0.05	.96	.16	1.37	.18	-.09	-.76	.45
<i>Global self-esteem</i>												
Exclusionary status	-.80	-11.36	<.001	.35	3.29	.002	-.62	-6.87	<.001	.66	7.50	<.001
Global self-esteem	.11	1.38	.71	.02	0.13	.90	.06	0.55	.58	-.11	-1.05	.30
Exclusionary status × Global self-esteem	-.05	-0.64	.52	-.31	-2.51	.01	-.13	-1.24	.22	.16	1.54	.13

Note: The analyses investigated exclusionary status (inclusion = 0, exclusion = 1), individual difference (centered) and the interaction between the two.

4. DISCUSSION

4.1. Recovery of basic needs, mood, and social pain

The aim of the current study was to find if receiving direct gaze could facilitate recovery of basic social needs, mood and social pain after ostracism. Participants were assigned to one of four groups. They were first either included or ostracized in a virtual ball tossing game, Cyberball (Williams & Jarvis, 2006). After the game, participants were shown a one-minute video of a person with either direct or downward gaze. Basic need satisfaction, mood and pain were measured right after the Cyberball game (reflexive stage) and after the video (reflective stage). The main hypothesis of the study was that ostracized participants shown a video with direct gaze would report higher basic need satisfaction, mood and less social pain in the reflective stage than ostracized participants shown a video with downward gaze. As predicted, and consistent with previous research, exclusion from a game of Cyberball was found to be distressing. Participants ostracized from the game, compared to participants included in the game, reported lower satisfaction of basic needs, lower mood, and more pain in the reflexive stage. Ostracized participants reported significant improvement on all of these measurements in the reflective stage. However, contrary to the main hypothesis of the study, different gaze directions did not differently moderate recovery among ostracized participants. In fact, in the reflective stage, participants reported similar levels of basic need satisfaction, mood and social pain regardless of whether they were ostracized or included in the Cyberball game, and whether they were shown a video with direct or downward gaze.

What could have caused the complete recovery among ostracized participants? In a study by Wirth and Williams (2009), a one-minute break after ostracism in a game of Cyberball was enough to allow for some recovery of basic needs and mood, but not to completely eliminate the effect of the manipulation. The delay between the reflexive and the reflective stage was exactly as long in the current study as in the study by Wirth and Williams. Thus it seems unlikely that the recovery found in this study could be attributed to the passing of time alone. The recovery was most likely caused by the video viewing task. Perhaps this was due to the social nature of the stimulus. Participants did not only view a video of a person, but were also instructed to mentally visualize an interaction with the person. It has been shown that a friendly interaction can reduce aggression after an ostracism episode (Twenge et al., 2007). Online chatting after experiencing ostracism can also facilitate recovery of self-esteem more than a solitary activity (Gross, 2009). It may be that in the current

study, the imagined interaction could have completely alleviated any distress caused by the ostracism. However, because there was no control condition in which the participants were shown a non-social stimulus, it is not possible to conclude whether this was the case or not. The most surprising finding was that ostracized participants seemed to have completely recovered from the ostracism in a very short period of time. Even if the video viewing task did alleviate distress caused by the ostracism, it would seem likely that the ostracized participants would have still reported slightly lower basic need satisfaction, mood and more social pain than included participants. This raises a question whether there could be another explanation as to why none of the groups differed in basic need satisfaction or mood in the reflective stage.

The quick recovery of basic needs, mood and social pain among ostracized participants may have been due to a distraction caused by the video viewing task. A distraction may cause recovery of affect after ostracism (Wesselmann, Ren, Swim, & Williams, 2013). In that study, participants were first either excluded or included in a game of Cyberball. Then participants were given one of two treatments that took 1.5 minutes. The first group was instructed to write what they were thinking at the moment. The participants in the second group were distracted with a task in which they were told to observe changes in short video clips, after which they were instructed to write about their thoughts. Like in the current study, basic needs were measured right after the Cyberball game (reflexive stage) and after the second manipulation (reflective stage). In the reflective stage, ostracized participants who were distracted reported higher basic need satisfaction than ostracized participants who were not distracted. The distraction may have taken the participants' minds off the unpleasant experience, relieving distress caused by it. This may also be what happened in the current study: the video viewing task may have distracted the participants, causing the effect of the manipulation to vanish.

Tang and Richardson (2013) conducted several experiments in which participants played two consecutive games of Cyberball. They were either ostracized in both games, included in both, or ostracized in one of the two games. Each experiment yielded similar results: after the second game, the level of basic need satisfaction and mood of the participants only depended on whether they were excluded or included in the latter game. The first game did not have any impact at that point. The authors proposed that the subsequent inclusion alleviated the distress caused by the formerly experienced ostracism. Another possibility is that the second game just distracted the participants so that only the effect of the second game persisted. Perhaps the effect of Cyberball (and possibly other laboratory based ostracism manipulations) is so transient that a major distraction is enough to eliminate it. Perhaps it is not that the subsequent task was necessarily ameliorative in and of itself – perhaps simply having something else to think about may have been enough to

change the mental state of the participants. This may have also happened in the current study. It is worth noting, however, that this was not necessarily due to a weakness in the ostracism manipulation. Distraction can be an effective coping strategy even when facing ostracism in real-life situations. Several studies have found that instructing dysphoric people to distract their thoughts from their problems can decrease their depressive mood (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Laboratory-based ostracism manipulations are obviously not designed to be as upsetting as exclusion people face in their daily lives. Thus it seems likely that the effects of the manipulations are more susceptible to distraction than effects of real-life ostracism. When recovery from ostracism is studied, it is vital to understand how distractions affect outcomes of the ostracism manipulations. Different kinds of distractions do not necessarily have the same impact. Studies conducted so far leave a lot unanswered. First, it may be that only cognitively demanding tasks are distracting enough to alleviate effects of ostracism manipulations. In both the current study and in the study by Tang and Richardson (2013), the participants were instructed to mentally visualize an interaction in the latter task. This made the tasks cognitively rather demanding. Wesselmann et al. (2013) distracted participants with a task in which they were told to observe changes in short video clips. While cognitively less demanding than the tasks in the other two studies, it still required some attention. It may also be that a cognitively less demanding distraction, such as passively viewing emotionally neutral stimuli, would distract ostracized participants, eliminating any effect of earlier ostracism manipulations. When designing future studies about recovery from ostracism, it would be important to understand what kinds of tasks can be administered without distracting the participants.

The main hypothesis of the study was that eye contact can facilitate recovery of affect after ostracism. Because participants reported similar levels of distress in the reflective stage, regardless of whether they were included or ostracized, and whether they were shown a video with direct or downward gaze, the hypothesis was not supported. However, because the recovery of ostracized participants may have been due to a distraction caused by the subsequent task, the hypothesis can not be refuted either. A new study should be designed to rule out the possibility that observed recovery is due to distraction. The eye gaze stimulus could be administered in a more subtle way that is not as distracting as the task in the current study. Simply instructing the participants to watch the video, and not give them any other instructions, such as to mentally visualize an interaction, or explaining the purpose of the video, could reduce the distractiveness.

As well as studying whether eye contact can facilitate recovery from ostracism, it would be interesting to study whether eye contact could also buffer against the effects of ostracism. The eye contact and the ostracism manipulation could be administered simultaneously. It is worth noting,

however, that one study has been described in which an eye contact manipulation did not buffer against the effects of ostracism (Kassner, Wesselmann, Law, & Williams, 2012). In the experiment, participants played a game of ball toss similar to Cyberball in an immersive virtual environment. The other players in the game were programmed to either make eye contact with the participant or not. The eye contact manipulation did not produce any significant main effects or interactions. However, it is worth noting that the person whose eye gaze was manipulated was involved in the ostracism. It seems unlikely that a person ostracizing you in a ball game could be seen as a source of social support even when making eye contact. A similar experiment could be conducted in which a person not involved in the ostracism would either make eye contact or not. Receiving eye contact could signal successful social connection with that person, which could reduce the impact ostracism from another source would have. This would also support the idea that eye contact could facilitate recovery from ostracism.

4.2. Ostracism and self-awareness

After the ostracism and eye gaze manipulations, participants' private and public self-awareness and awareness of surroundings were measured using Situational Self-Awareness Scale (SSAS). At the same time, a video of a person with the same gaze direction as in the eye gaze manipulation was shown on the screen. Ostracized participants viewing a video of a person looking down reported higher public self-awareness than ostracized participants viewing a video of a person with direct gaze. This was surprising because it has previously been shown that receiving eye contact, compared to seeing a face with an averted gaze, increases public self-awareness (Pönkänen, Peltola, & Hietanen, 2011).

Perhaps the most interesting finding was that the ostracism manipulation and the eye gaze task had an interaction on public self-awareness. The two gaze directions differently affected public self-awareness only among participants who were first ostracized in Cyberball. Because very little is known about how ostracism and eye gaze affect self-awareness, it is only possible to speculate on why the ostracism and eye gaze manipulations had this interaction. One possible explanation is that the attributions made about the interactions increased participants' public self-awareness. A person ostracized by strangers could attribute the exclusion to one's appearance. Seeing another stranger avoid eye contact could be seen as further confirmation that this notion was correct, which could increase public self-awareness. However, this kind of attribution would be expected to be associated

with lowered mood and self-esteem. Ostracized participants shown different kinds of videos did not differ in any of these measurements, suggesting that the explanation might not be correct. It is also possible that the interaction reflects a Type-I error. Further research would be needed to confirm the finding.

Ostracized participants reported slightly higher private self-awareness than included participants. The difference was only marginally significant, possibly because there was a long delay between the ostracism manipulation and the self-awareness measurement. If self-awareness was measured right after the Cyberball game, the difference between ostracized and included participants might have been larger. This is, of course, speculation, and further research would be needed to properly address the issue.

Previously it has been suggested that ostracism decreases self-awareness (Hess & Picket, 2010). The authors argue that this is an adaptive reaction, because dwelling on one's shortcomings would reduce the chances of social success in the future. They conducted an experiment in which, after a game of Cyberball, participants read journal entries, which they were told to imagine were written by either themselves, a close friend, or a stranger. Participants who were ostracized in Cyberball, compared to included participants, recalled less social events related to themselves and more social events related to others. The authors argued that this reflects lowered self-awareness. Another possibility might be that the ostracized participants processed journal entries related to themselves less effectively, because they tried to avoid increases in self-awareness. It has been suggested that ostracism causes people to avoid things that increase their self-awareness (Twenge, Catanese, & Baumeister, 2003). The authors conducted an experiment in which participants were told, ostensibly based on personality tests, that they would either end up alone in life (i.e. led to expect ostracism), would face another kind of misfortune, or that they would have good, rewarding relationships, or they were given no feedback. Participants who were led to expect ostracism were less likely to sit on a chair facing a mirror than participants in the other conditions. Because a mirror is an effective technique for increasing self-awareness, this indicates that the participants expecting ostracism tried to avoid the increase in self-awareness that facing the mirror would have caused.

While it has been suggested that ostracism decreases self-awareness (Hess & Picket, 2010), it also seems plausible that it could engender thoughts that there is something wrong with the self, which might be associated with increased private self-awareness. The current study indicates that this might be the case, though the evidence is not nearly conclusive. Further research is needed.

4.3. Moderators of the effects of ostracism

At the end of the experiment, Big Five personality traits, social anxiety and global self-esteem were measured to find if they would moderate the effects of ostracism. Higher self-esteem was associated with lower social pain among ostracized participants. This is consistent with the results by Onoda et al. (2010). They found that ostracized participants with low trait self-esteem, compared to those with higher trait self-esteem, both report more pain and show more activity in dorsal anterior cingulate cortex, an area of the brain associated with pain. Other researchers have reported that they have not found self-esteem reducing the effects of ostracism on basic need satisfaction (McDonald & Donnellan, 2012). The authors interpreted this finding as a failure to replicate Onoda et al.'s results. However, the current study offers some insight into this discrepancy. While global self-esteem buffered against social pain, it did not reduce the impact ostracism had on basic need satisfaction and mood. Thus, the current study replicated the findings of both above-mentioned studies. This highlights that while basic need threat and social pain are interrelated, they are still distinct concepts. No other interactions were found. These results contribute to Williams' (2007) idea that personality and other traits have little impact on the reflexive reaction to ostracism.

There was only one significant main effect of a trait across conditions. Participants higher in social anxiety were found to report lower basic need satisfaction (and marginally significantly lower positive mood) in both inclusion and exclusion conditions. This seems plausible, as social anxiety tends to be associated with low life satisfaction (Eng, Coles, Heimberg, & Safren, 2005). No other significant main effects were found. Most importantly, McDonald and Donnellan's (2012) finding that openness is associated with higher basic need satisfaction was not replicated.

4.4. Limitations

The sample in the current study was relatively homogenous, consisting mostly of young adults, which limits the generalizability of the results. Laboratory-based ostracism manipulations have been shown to cause negative outcomes among school-aged children (Barkley, Salvy, & Roemmich, 2012), adolescents (Gross, 2009), adults (e.g. Williams, Cheung, & Choi, 2000) and the elderly (Hawley, Williams, & Cacioppo, 2011). However, there are differences in how different-aged people respond to these manipulations: In one study, female adolescents reported lower basic need

satisfaction than adult females (Sebastian, Viding, Williams, & Blakemore, 2010). In another study, ostracism threatened self-esteem more among children than adolescents or adults (Abrams, Weick, Thomas, Colbe, & Franklin, 2011). Adults between ages 53 and 60 have been found to respond more negatively to ostracism than adults over the age of 60 (Hawkley et al., 2011). In a study by Gross (2009), after ostracism, online chatting facilitated recovery of affect more than solitary activity among adolescents, but not among young adults. Because there is little other research on how different age-groups differ in recovery from ostracism, it is not possible to tell if the findings of the current study are applicable to other age-groups besides young adults. Future studies should address this issue by using more heterogeneous samples and comparing recovery from ostracism between different-aged participants.

Another limitation of the current study was that it used self-reports to measure the effects of ostracism. To increase convergent validity, future studies could use additional measurements such as fMRI (Eisenberger, Lieberman, & Williams, 2003), implicit measurements of self-esteem (Wirth, Sacco, Hugenberg, & Williams, 2010) or behavioral measurements of aggression (DeWall, Twenge, Bushman, Im, & Williams, 2010).

A third limitation of the study was that it used videos instead of live faces as stimuli. It has been found that seeing a face with direct or averted gaze elicit different brain responses and influence arousal and self-awareness differently, but only when live stimuli are used instead of pictures (Pönkänen, Alhoniemi, Leppänen, & Hietanen, 2010; Pönkänen, Peltola, & Hietanen, 2011). In a recent study, Myllyneva and Hietanen (2015) showed that the autonomic and central nervous system responses to direct gaze can be modulated by the observer's mental attributions. In the study, direct gaze caused stronger responses than averted gaze only when the observer believed the live model saw him or her, but not when the participant was led to believe the model's vision was blocked. These findings are highly relevant for ostracism studies. It seems possible that seeing a picture or a video of a face with direct gaze would not be seen as a successful social connection, while eye contact with a live person would. Perhaps eye contact with a live person could mitigate the adverse effects of ostracism more than seeing a picture of a person with direct gaze. However, it seems unlikely that the use of videos instead of live stimuli affected the results of the current study because, as argued above, the recovery from ostracism was likely due to distraction. Still, future studies should consider that seeing a picture or a video of a person may not be sufficient to mitigate the adverse effects of ostracism.

4.5. Conclusion

While the current could neither confirm nor refute its main hypothesis, it offers directions and guidelines for future ostracism studies. Feelings of ostracism induced by laboratory-based manipulations seem to be susceptible to distraction, and this needs to be taken into account in the future. When recovery from ostracism is studied, the participants should not be distracted after the ostracism manipulation to ensure any observed recovery will not be due to the distraction. How exactly distractions affect the outcomes of ostracism should also be studied further. The findings of this study also suggests that the association between ostracism and self-awareness is still not fully understood.

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6. APPENDIX

Appendix 1. Basic need and mood measurements

Variable	Item in the reflexive stage	Item in the reflective stage
Belonging	I felt I couldn't connect with others	I feel I can't connect with others
Belonging	I felt rejected	I feel rejected
Belonging	I felt like an outsider	I feel like an outsider
Belonging	I felt I belonged to the group	I feel I belong to a group
Belonging	I felt other people interacted with me a lot	I feel that others interact with me a lot
Self-esteem	I felt good about myself	I feel good about myself
Self-esteem	My self-esteem was high	My self-esteem is high
Self-esteem	I felt liked	I feel liked
Self-esteem	I felt insecure	I feel insecure
Self-esteem	I felt satisfied	I feel satisfied
Meaningful existence	I felt invisible	I feel invisible
Meaningful existence	I felt meaningless	I feel meaningless
Meaningful existence	I felt non-existent	I feel non-existent
Meaningful existence	I felt important	I feel important
Meaningful existence	I felt useful	I feel useful
Control	I felt powerful	I feel powerful
Control	I felt I had control over the course of the interaction	I feel I have control over the course of interactions
Control	I felt I had the ability to significantly alter events	I feel I have the ability to significantly alter events
Control	I felt I was unable to influence the action of the other people	I feel I am unable to influence the action of other people
Control	I felt the other people decided everything	I feel other people decide everything
Positive mood	I felt good	I feel good
Positive mood	I felt friendly	I feel friendly
Positive mood	I felt pleasant	I feel pleasant
Positive mood	I felt happy	I feel happy
Negative mood	I felt bad	I feel bad
Negative mood	I felt unfriendly	I feel unfriendly
Negative mood	I felt angry	I feel angry
Negative mood	I felt sad	I feel sad