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# When a look is not enough – No evidence for direct gaze facilitating recovery after social exclusion

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## Abstract

Direct gaze has been suggested to convey inclusion. We hypothesized that receiving direct gaze could alleviate distress caused by social exclusion. In two experiments, participants were first either included or excluded, and then shown a video of a person portraying either direct or downward gaze. Basic need satisfaction was measured immediately after the exclusion manipulation and after viewing the eye gaze stimuli. In Experiment 1, after watching the one-minute eye gaze video and "mentally visualizing" an interaction with the person, basic need satisfaction of excluded participants had recovered completely, regardless of the gaze direction. In Experiment 2, participants were shown shorter eye gaze videos in which the person gave task-instructions. Participants recovered partially by the delayed measurement, but gaze direction did not moderate this recovery. These results indicate that seeing direct gaze has little or no effect on recovery after social exclusion.


Keywords: Ostracism; Eye gaze; Eye contact

Social exclusion is a common phenomenon that threatens the fundamental human need to belong (see Baumeister & Leary, 1995; Williams, 2007). Social exclusion can take many forms, such as ostracism (Williams, 2007), rejection (e.g. Maner, DeWall, Baumeister, & Schaller, 2007), and discrimination (e.g. Smart Richman, Martin, & Guadagno, 2016)[1]. Even short-term exclusion is distressing, as it lowers mood (Gerber & Wheeler, 2009), thwarts satisfaction of basic social needs of belonging, control, meaningful existence and self-esteem (Hartgerink, van Beest, Wicherts, & Williams, 2015), and can even be painful (e.g. Eisenberger, Lieberman, & Williams, 2003). According to the temporal need-threat model (e.g. Williams, 2007), this immediate, reflexive reaction to exclusion is followed by a delayed reflective reaction, during which excluded individuals attempt to fortify thwarted basic needs, usually by seeking reconnection with others. This idea is supported by findings that excluded participants, compared to controls, are more interested in forming new relationships and working with others, and rate others as nicer, friendlier, and more attractive (Maner et al., 2007). To promote their relational status, excluded individuals may work harder (Williams & Sommer, 1997), and in order to fit in, they may comply (Riva, Williams, Torstrick, & Montali, 2014), conform (Williams, Cheung, & Choi, 2000), imitate others' body movements (Lakin, Chartrand, & Arkin, 2008) and buy specific products (Mead, Baumeister, Stillman, Rawn, & Vohs, 2011).

A few studies have examined how affiliation with others moderates the affective impact of social exclusion. Being accompanied by a close other (Teng & Chen, 2012) or even a dog (Aydin et al., 2012) during exclusion can attenuate distress in the immediate, reflexive stage. Recovery from exclusion can also be moderated by successful reaffiliation. In one study, a friendly interaction with an experimenter after exclusion reduced aggression more than a neutral interaction (Twenge et al., 2007). In another study, excluded participants showed greater recovery of self-esteem and affect after chatting with a peer online than after playing a solitary game of Tetris

(Gross, 2009). Zwolinski (2014) found that an inclusive interaction alleviated affective distress after exclusion more than the passing of time.

As affiliation can ameliorate aversive outcomes of exclusion, excluded individuals could be highly attentive to affiliative cues (see also Shilling & Brown, 2016). Indeed, attention to smiling faces is increased in participants expecting exclusion (DeWall, Maner, & Rouby, 2009), as well as in participants excluded from a virtual ball-tossing game (Xu et al., 2015). In one study, excluded participants were more accurate than included participants at distinguishing between happy and angry faces (Sacco, Wirth, Hugenberg, Chen, & Williams, 2011). In another study, reflecting on exclusion made participants more accurate at distinguishing genuine smiles from smiles that were not genuine (Bernstein, Young, Brown, Sacco, & Claypool, 2008).

Not only facial expressions of positive affect, but also direct gaze could be an affiliative cue for excluded individuals. Several authors have suggested that direct gaze signals inclusion (Wesselmann, Cardoso, Slater, & Williams, 2012; Wirth, Sacco, Hugenberg, & Williams, 2010). It has been reported that a brief eye contact with a passerby can increase feelings of connectedness (Wesselmann et al., 2012), and being in eye contact (vs. seeing averted gaze) increases the perceived value of the relationship (Wirth et al., 2010). Seeing another person portraying direct gaze has also been shown to elicit positive affective reactions in the observer (Chen, Helminen, & Hietanen, 2016; Chen, Peltola, Ranta, & Hietanen, 2016), and activate brain mechanisms related to approach motivation (Hietanen, Leppänen, Peltola, Linna-aho, & Ruuhiala, 2008). Because direct gaze communicates that one is being attended to (see Conty, George, & Hietanen, 2016), it could be an especially significant cue for excluded individuals. Excluded participants, compared to included participants, have been shown to look more in the eyes of their interaction partners, suggesting that they attempt to make eye contact in order to get reintegrated in the interaction (Böckler, Hömke, & Sebanz, 2014). In a recent study, excluded participants, compared to included participants, accepted a wider range of gaze directions as being direct, possibly because seeing direct gaze could make them feel reconnected (Lyyra, Wirth, & Hietanen, 2017). It seems, thus, that excluded individuals seek direct gaze, possibly as a coping strategy that could make them feel reconnected. If direct gaze can convey inclusion, it would be expected to alleviate the aversive effects of exclusion as well.

Even though direct gaze can signal inclusion and elicit various positive reactions, it should be noted that it can also be perceived as threatening (see Kleinke, 1986). This is especially true when direct gaze is accompanied with an angry facial expression (see Adams & Kleck, 2005). Seeing angry faces portraying direct gaze can lower self-esteem (Lamer, Reeves, & Weisbuch, 2015), and thus seeing threatening faces could further bolster the adverse effects of social exclusion. On the other hand, recent research indicates that even negative feedback can alleviate distress caused by social exclusion (Rudert, Hales, Greifeneder, & Williams, 2017). An excluded individual may prefer even negative attention to being ignored altogether (see also O'Reilly, Robinson, Berdahl, & Banki, 2014). Thus, even if direct gaze were interpreted as a sign of threat, it could be expected to alleviate the adverse effects of exclusion.

The purpose of the current study was to find if receiving direct gaze could alleviate distress caused by social exclusion. In two experiments, participants' feelings of exclusion were manipulated using Cyberball (Williams & Jarvis, 2006), a virtual ball-tossing game in which participants are either included or ostracized (i.e., ignored and excluded). After the exclusion manipulation, the participants were shown a video of a person portraying either direct or downward gaze. Participants' basic need satisfaction was measured immediately after the manipulation (reflexive stage) and after viewing the eye gaze stimuli (reflective stage). We hypothesized that after the exclusion manipulation, in the reflexive stage, excluded participants would report lower basic need satisfaction than included participants, indicative of affective distress (see Gerber & Wheeler, 2009). Based on the temporal need-threat model (Williams, 2007), and earlier research on recovery of basic needs after exclusion (e.g. Wirth & Williams, 2009), we hypothesized that excluded participants would show recovery by the delayed, reflective stage measurement, but would still report more distress than included participants. Our main hypothesis was that excluded participants shown a video with direct gaze would report less distress in the reflective stage than excluded participants shown a video with downward gaze.

## Experiment 1

In Experiment 1, participants were included or socially excluded in a four-player game of Cyberball, a ball-tossing game used as a social exclusion manipulation (see Williams & Jarvis, 2006). After Cyberball, participants were shown a one-minute video of a person portraying either direct or downward gaze.

### Method

**Participants.** The participants were 80 adults (21 males, $M_{\text{age}}$ = 25.6, $SD_{\text{age}}$ = 6.0) with no diagnosed psychiatric or neurological disorders. They were rewarded with course credit or a movie ticket. Participants signed a form of informed consent. An ethical statement for the study was obtained from the Ethics Committee of the Tampere Region.

Participants were randomly assigned to be either included or excluded in Cyberball, and to be shown a video with either direct or downward gaze. The sample size of 80 participants was determined before data collection based on the suggestion of 20 participants per cell (see Simmons, Nelson, & Simonsohn, 2011). To find if this sample size has sufficient power to detect the interaction of interest, a power analysis was conducted using G*Power 3.1 software (Faul, Erdfelder, Lang, & Buchner, 2007). We were interested in how the gaze direction manipulation modulates recovery of excluded participants, and thus we simplified the analysis by focusing on this most important interaction (however, see Muller, LaVange, Ramey, & Ramey, 1992 for caveats for such an approach). We estimated the required sample size for a 2 (Gaze Direction, between-subjects factor) × 2 (Recovery Stage, within-subjects factor) design with only the exclusion group. Using very similar experimental designs as the present study, but with different manipulations, previous research has found the comparable interaction of interest to yield effect sizes ranging from $\eta^2_p = .1$ (Hales, Wesselmann, & Williams, 2016) to $\eta^2_p = .29$ (Molet, Macquet, Lefebvre, & Williams, 2013). Anticipating an effect size of $\eta^2_p = .1$, power of .80, and $p = .05$ (Cohen, 1992), and a correlation coefficient of .13 between the two measurements (Hales et al., 2016), the power analysis suggested 34 participants in the exclusion group (17 participants per cell), and thus a total sample size of 68.

**Apparatus and stimuli.** All materials were presented on a 19-inch LCD monitor with a resolution of 1280 × 1024 and a refresh rate of 60 Hz. E-Prime® 2.0 software was used to control the stimulus presentation and to acquire data. Cyberball was presented on Firefox 17.0.5. Internet browser. Participants wore acoustic earmuffs to prevent distracting noises.

For the eye gaze manipulation, we filmed one-minute video clips portraying eight different individuals (four females) with direct and downward gaze. The models had a neutral facial expression, but were instructed to maintain a slight muscle tonus in the lower part of their faces to avoid a sullen face. Minor head movements and eye blinks were allowed. The resolution of the videos was 1024 × 768. The faces were approximately 13.5 cm (11°) × 18.5 cm (15°) in size. The genders and identities of the models were counterbalanced across all conditions and genders of the participants.

**Procedure.** Participants arrived in the laboratory in groups of four. Participants were told that the purpose of the experiment was to study “mental visualization”, and that they would do mental visualization tasks. To enhance the cover story, participants completed a bogus mental visualization questionnaire. After this, they played a game of Cyberball 4.0 (Williams & Jarvis,

2006) that lasted for 45 throws. They were told to mentally visualize the interaction in detail. Participants were led to believe that the game was played with the other participants through a local area network. In reality, the course of the game was predetermined. Participants were randomly assigned to inclusion and exclusion 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.

Immediately after Cyberball (reflexive stage), participants completed a questionnaire measuring the four basic social needs (belonging, self-esteem, meaningful existence and control), mood and pain (e.g., Wirth & Williams, 2009). The questionnaire was on a 1-5 Likert scale. For the sake of brevity, results of the mood and pain measurements are presented in Supplementary materials[2]. The basic need items were reverse-scored where necessary, combined and averaged to create an index of basic need satisfaction ($\alpha$ = .97). As a manipulation check, participants were asked to assess the percentage of all ball tosses they received. Participants were also asked to indicate whether they were ignored and excluded during the game.

After the questionnaire, participants were shown the one-minute eye gaze video. In both the inclusion and exclusion groups, half of the participants saw the video portraying a model with direct gaze, and half were shown the video with downward gaze. To preserve the cover story, participants were asked to mentally visualize an interaction with the person in the video. The manipulation was followed by the reflective stage questionnaire. The questionnaire was the same as in the reflexive stage, but instead of asking participants to rate their feelings during the game, they were asked to answer based on what they felt *right now* ($\alpha_{\text{basic needs}}$ = .94). As a manipulation check, participants were asked to assess the percentage of the time the person in the video was looking directly at them. Participants were also asked to indicate whether they were ignored and excluded during the video.

After all participants were finished with the experiment, they were given an opportunity to express doubts about the experiment, and to ask questions. After this, they were thoroughly debriefed. At the end of the experiment, we measured participants' situational self-awareness, personality traits, and trait self-esteem. These measurements and their results are presented in Supplementary materials.

**Data analysis.** Four participants (two males) were excluded from the analyses, one for withdrawing the consent and three for expressing suspicion concerning the Cyberball manipulation before debriefing. The analyses yielded similar results with or without these data exclusions. The final sample consisted of 76 participants ($n_{\text{included,direct}} = 20$, $n_{\text{included,downward}} = 20$, $n_{\text{excluded,direct}} = 18$, $n_{\text{excluded,downward}} = 18$).

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. Significant interactions were broken down with t-tests. When a Levene's test for equality of variances revealed unequal variances between groups, Welch's t-test was used (for similar analytic strategies, see Hales et al., 2016; Wirth & Williams, 2009).

## Results and discussion

**Manipulation checks.** After the reflexive stage measurements, excluded participants reported receiving less of the total number of tosses (*M* = 9.6%, *SD* = 8.5) than included participants (*M* = 28.2%, *SD* = 13.0; $t(74) = 7.30$, $p < .001$, $d = 1.69$, 95% CI [13.49, 23.63]) in the Cyberball game. Excluded participants also indicated being more ignored ($M_{\text{excluded}} = 4.11$, $SD_{\text{excluded}} = 0.78$, $M_{\text{included}} = 1.55$, $SD_{\text{included}} = 0.92$, $t(74) = 13.12$, $p < .001$, $d = 3.00$, 95% CI [-2.95, -2.17]) and excluded ($M_{\text{excluded}} = 4.17$, $SD_{\text{excluded}} = 0.81$, $M_{\text{included}} = 1.33$, $SD_{\text{included}} = 0.66$, $t(74) =$

16.87, $p < .001$, $d = 3.85$, 95% CI [-3.18, -2.51]) than included participants. After the reflective stage measurements, participants in the direct gaze group reported that the person in the video was portraying more direct gaze ($M = 85.5\%$, $SD = 21.6$) than participants in the downward gaze group ($M = 5.6\%$, $SD = 17.6$; $t(74) = 17.70$, $p < .001$, $d = 4.06$, 95% CI [70.97, 88.98]). Compared to the direct gaze group, participants in the downward gaze group indicated being more ignored ($M_{downward} = 3.42$, $SD_{downward} = 1.43$, $M_{direct} = 2.45$, $SD_{direct} = 1.47$, $t(74) = 2.94$, $p = .004$, $d = 0.67$, 95% CI [-1.64, -0.31]) and excluded ($M_{downward} = 2.82$, $SD_{downward} = 1.37$, $t(74) = 2.73$, $p = .008$, $d = 0.63$, 95% CI [-1.41, -0.22]).

**Basic need satisfaction.** For basic need scores in each experimental group, see Table 1.

**TABLE 1.** Basic need scores for each experimental group in both recovery stages (Experiment 1)

| | Direct gaze *M* (*SD*) | Downward gaze *M* (*SD*) | Overall mean *M* (*SD*) |
|---|---|---|---|
| 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

A three-way mixed design ANOVA revealed a main effect of Inclusionary Status on basic need satisfaction ($F(1, 72) = 44.48$, $p < .001$, $\eta^2_p = .38$, 95% CI [0.58, 1.07]). Excluded participants reported 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 ($F(1, 72) = 22.79$, $p < .001$, $\eta^2_p = .24$, 95% CI [-0.71, -0.16]). Basic need satisfaction was higher in the delayed, reflective stage ($M = 3.40$, $SD = 0.73$) than in the immediate, reflexive stage ($M = 2.97$, $SD = 1.04$). The main effect of Gaze Direction was not significant ($F(1, 72) = 1.57$, $p = .214$, $\eta^2_p = .02$, 95% CI [-1.54, 0.46]).

The main effects were qualified by an Inclusionary Status × Recovery Stage interaction ($F(1, 72) = 69.30$, $p < .001$, $\eta^2_p = .49$). Immediately after the exclusion manipulation, in the reflexive stage, excluded participants reported significantly lower basic need satisfaction than included participants ($t(74) = 11.34$, $p < .001$, $d = 2.60$, 95% CI [1.36, 1.94]), showing that they felt excluded as expected. Excluded participants reported higher basic need satisfaction in the reflective stage than in the reflexive stage ($t(35) = 9.58$, $p < .001$, $d = 1.91$, 95% CI [-1.59, -1.03]), indicating significant recovery, whereas included participants reported lower basic need satisfaction in the reflective stage than in the reflexive stage ($t(39) = 2.51$, $p = .016$, $d = 0.51$, 95% CI [0.07, 0.64]).

Importantly, however, in the reflective stage, the two groups did not differ in basic need satisfaction ($t(74) = 0.07$, $p = .948$, $d = 0.01$, 95% CI [-0.35, 0.32]), suggesting the effect of the exclusion manipulation had dissipated by the second measurement in the exclusion group. There were no other interactions (largest $F$ was for Inclusionary Status × Gaze Direction × Recovery Stage interaction, $F(1, 72) = 0.20$, $p = .654$, $\eta^2_p = .00$). Most importantly, excluded participants shown direct vs. downward gaze videos reported similar levels of basic need satisfaction in the delayed, reflective stage ($t(34) = 0.99$, $p = .328$, $d = 0.33$, 95% CI [-0.25, 0.72]).

We did not find support for our hypothesis that seeing direct gaze could alleviate distress caused by social exclusion, but we could not refute it, either. The complete recovery of excluded participants can possibly be attributed to the distraction caused by the video viewing task, and the concurrent mental visualization task. A one-minute break after exclusion in Cyberball is enough to allow for some, but not complete, recovery of basic needs and mood (Wirth & Williams, 2009). However, previous research has also shown that when excluded participants are distracted with a task in which they are asked to observe changes in video clips, they can completely recover in less than two minutes (Wesselmann, Ren, Swim, & Williams, 2013). The eye gaze manipulation, and the concurrent mental visualization task, may have distracted the participants in our experiment, allowing for complete recovery of basic needs. Alternatively, excluded participants may have completely recovered because the mentally visualized interaction was sufficient to make them feel reconnected.

## Experiment 2

In Experiment 2, participants were, again, included or excluded in Cyberball. To ensure participants would not recover completely by the delayed, reflective stage, we designed a different eye gaze manipulation. During the experiment, the participants were given instructions in video format by a model. After the reflexive stage measurements completed immediately after the exclusion manipulation, the model gave instructions while portraying either direct or downward gaze. Unlike in Experiment 1, there was no concurrent mental visualization task, to render the gaze direction manipulation less distracting.

## Method

**Participants.** The participants were 82 adults (20 males, $M_{\text{age}}$ = 24.8, $SD_{\text{age}}$ = 6.3) with no diagnosed psychiatric or neurological disorders. They were rewarded with course credit or a movie ticket. Participants signed a form of informed consent.

Participants were, again, randomly assigned to be either included or excluded in Cyberball, and to be shown a video with either direct or downward gaze. One participant (included in Cyberball, shown a video with downward gaze) was excluded from the analyses for being familiar with Cyberball. The analyses yielded similar results with or without this data exclusion. The final sample consisted of 81 participants ($n_{\text{included,direct}}$ = 20, $n_{\text{included,downward}}$ = 18, $n_{\text{excluded,direct}}$ = 21, $n_{\text{excluded,downward}}$ = 22).

**Apparatus and stimuli.** The apparatus was identical to Experiment 1, except participants wore acoustic earmuffs with integrated audio instead of standard acoustic earmuffs.

We filmed short video clips portraying faces of two different models (female and male). The first video, which lasted for 23 seconds, was shown before Cyberball to familiarize participants with the model. The model repeated the instructions for Cyberball in a neutral tone, and also reminded participants to mentally visualize the interaction. The model alternated between looking at the camera (direct gaze; 50% of the time) and looking down (50% of the time). For the eye gaze manipulation video, shown between the reflexive and reflective stage measurements, two clips for each model were filmed. The models were instructed to act identically in each video, except for the gaze direction: they looked directly at the camera in one video, and down in the other[3]. The model gave instructions for the following reflective stage questionnaire in a neutral tone. The videos were between 25-28 seconds in length.

**Procedure.** Participants arrived in the laboratory in groups of three. The experimenter was blind to the condition of each participant. The same mental visualization cover story was used as in Experiment 1. After instructions and the first video, participants played Cyberball. The manipulation was otherwise identical to Experiment 1, except the game included three characters instead of four, and the game lasted for 30 throws in total. Participants in the inclusion condition received approximately 33% of the throws, and participants in the exclusion condition received it once from each character in the beginning of the game.

The reflexive stage measurements were administered identically to Experiment 1 ($\alpha_{\text{basic needs}}$ = .98). After the questionnaire, participants were shown one of the eye gaze videos, described above. This was followed by the reflective stage measurement. The basic need ($\alpha$ = .91), mood and pain measurements were identical to Experiment 1. Results for mood and pain measurements are presented in Supplementary materials. As a manipulation check, participants assessed the percentage of the time the model was looking at them. We also probed participants' suspicion[4], asked them to complete a self-awareness questionnaire, and to rate a few characteristics of the model. Details and results of these measurements are presented in Supplementary materials. Finally, participants were thoroughly debriefed.

## Results and discussion

**Manipulation checks.** After the reflexive stage measurements, excluded participants reported receiving less of the total number of tosses (*M* = 10.1%, *SD* = 8.6) than included participants (*M* = 31.8%, *SD* = 7.4, $t(79) = 12.08$, $p < .001$, $d = 2.70$, 95% CI [18.14, 25.29]) in the

Cyberball game. Compared to included participants, excluded participants also indicated being more ignored ($M_{excluded}$ = 4.30, $SD_{excluded}$ = 0.89, $M_{included}$ = 1.58, $SD_{included}$ = 0.83, $t(79) = 14.24$, $p < .001$, $d$ = 3.17, 95% CI [-3.10, -2.34]) and excluded ($M_{excluded}$ = 4.35, $SD_{excluded}$ = 0.97, $M_{included}$ = 1.40, $SD_{included}$ = 0.64, $t(79) = 15.92$, $p < .001$, $d$ = 3.60, 95% CI [-3.32, -2.59]). After the reflective stage measurements, participants in the direct gaze group reported that the model was portraying more direct gaze (*M* = 86.6%, *SD* = 19.4) than participants in the downward gaze group (*M* = 29.5%, *SD* = 28.9, Welch's $t(68.0) = 10.40$, $p < .001$, $d$ = 2.32, 95% CI [46.09, 67.98]).

**Basic need satisfaction.** For basic need scores in each experimental group, see Table 2.

**TABLE 2.** Basic need scores for each experimental group in both recovery stages (Experiment 2)

| | Direct gaze *M* (*SD*) | Downward gaze *M* (*SD*) | Overall mean *M* (*SD*) |
|---|---|---|---|
| Reflexive stage | | | |
| Included | 4.04 (0.53) | 3.78 (0.61) | 3.92 (0.57) |
| Excluded | 1.96 (0.66) | 1.94 (0.54) | 1.95 (0.60) |
| Overall mean | 2.97 (1.21) | 2.77 (1.09) | 2.87 (1.15) |
| Reflective stage | | | |
| Included | 3.96 (0.40) | 3.58 (0.57) | 3.78 (0.51) |
| Excluded | 3.50 (0.80) | 3.49 (0.47) | 3.49 (0.64) |
| Overall mean | 3.72 (0.67) | 3.53 (0.51) | 3.63 (0.60) |

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

A three-way mixed design ANOVA revealed a main effect of Inclusionary Status on basic need scores ($F(1, 77) = 104.40$, $p < .001$, $\eta^2_p = .58$, 95% CI [0.90, 1.34]). Excluded participants reported lower basic need satisfaction ($M = 2.72$, $SD = 0.50$) than included participants ($M = 3.85$, $SD = 0.49$). A main effect of Recovery Stage was also found ($F(1, 77) = 99.21$, $p < .001$, $\eta^2_p = .56$, 95% CI [-0.99, -0.52]). Basic need satisfaction was higher in the reflective stage ($M = 3.63$, $SD = 0.60$) than in the reflexive stage ($M = 2.87$, $SD = 1.15$), indicating recovery between the measurements. The main effect of Gaze Direction was not significant ($F(1, 77) = 2.21$, $p = .141$, $\eta^2_p = .03$, 95% CI [-0.14, 0.53]).

The main effects were qualified by an Inclusionary Status × Recovery Stage interaction ($F(1, 77) = 143.34$, $p < .001$, $\eta^2_p = .65$). Immediately after the exclusion manipulation, in the reflexive stage, excluded participants reported lower basic need satisfaction than included participants ($t(79) = 15.06$, $p < .001$, $d = 3.37$, 95% CI [1.70, 2.22]), showing that they felt excluded as expected. Excluded participants reported higher basic need satisfaction in the delayed, reflective stage than in the reflexive stage ($t(42) = 13.93$, $p < .001$, $d = 2.48$, 95% CI [-1.77, -1.32]), indicating significant recovery, consistent with the temporal need-threat model of ostracism (e.g. Williams, 2007). Included participants' basic need satisfaction was marginally lower in the reflective stage, compared to the immediate, reflexive stage ($t(37) = 1.76$, $p = .087$, $d = 0.26$, 95% CI [-0.02, 0.30]). In the delayed, reflective stage, excluded participants reported lower basic need satisfaction than included participants ($t(79) = 2.17$, $p = .033$, $d = 0.50$, 95% CI [0.02, 0.54]), indicating that, in this experiment, excluded participants had not completely recovered by the second measurement. This suggests that, unlike in Experiment 1, the delay between measurements did not allow for complete recovery of basic needs among excluded participants. There were no other interactions (largest $F$ was for Inclusionary Status × Gaze Direction interaction, $F(1, 77) = 1.97$, $p = .164$, $\eta^2_p = .03$). Most importantly, the Inclusionary Status × Gaze Direction × Recovery Stage interaction was not significant ($F(1, 77) = 0.26$, $p = .614$, $\eta^2_p = .00$). Comparison of basic need scores of excluded participants in the direct and downward gaze groups in the delayed, reflective stage clearly demonstrates that the gaze directions did not differently moderate recovery from exclusion (Welch's $t(31.9) = 0.01$, $p = .992$, $d = 0.00$, 95% CI [-0.41, 0.41]).

We designed the second experiment to address the possibility that the complete recovery of excluded participants in the first experiment was due to a distracting eye gaze manipulation. In the first experiment, excluded participants reported thwarted basic need satisfaction in the immediate, reflexive stage, but did not differ from the inclusion group in the reflective stage, possibly because the eye gaze manipulation with a mental visualization task distracted them. In Experiment 2, we administered the eye gaze stimuli in a way that was less distracting than in the first experiment, and would not allow for complete recovery of the effects of social exclusion. We succeeded in this goal, as excluded participants still reported lower basic need satisfaction than included participants in the reflective stage[5]. However, excluded participants shown videos with different gaze directions reported similar levels of basic need satisfaction in the reflective stage, suggesting that direct eye gaze did not facilitate recovery of affective distress after exclusion.

## Meta-analyses

In two experiments, we did not find evidence that seeing direct gaze could facilitate basic need recovery after social exclusion. However, the true effect may be weaker than we had anticipated, and thus our experiments may have lacked statistical power to detect it. Following the suggestion by Cumming (2014), we conducted a meta-analysis of our two experiments to estimate confidence intervals for the effect size. The analysis was conducted using Comprehensive Meta-Analysis software. We were interested in the standardized mean difference (Cohen's *d*) between excluded participants in the direct and downward gaze groups. The effect size for both experiments was calculated using means and standard deviations of reflexive and reflective stage basic need scores (i.e. pre- and post-scores, respectively) in the two groups, and the correlation between these scores (Borenstein, Hedges, Higgins, & Rothstein, 2014). A random effects model suggested an effect size of $d = 0.08$, $p = .724$, 95% CI [-0.36, 0.52]. Thus, we found no evidence that seeing direct gaze, compared to seeing downward gaze, moderates recovery of basic needs after exclusion. However, this possibility cannot be conclusively ruled out, either, as the confidence interval for the effect of gaze on basic need recovery includes relatively large effect sizes.

We originally suggested that excluded individuals may seek direct gaze as a coping strategy that can make them feel reconnected. If this is the case, it would seem likely that the effect of direct gaze on basic need recovery would be no smaller than that of simple, low-effort coping strategies such as distraction. A search of the literature revealed that a few studies have found that directing attention away from exclusion by distraction (Wesselmann et al., 2013), self-affirmation, prayer (Hales et al., 2016), or focused attention (Molet et al., 2013), facilitates recovery of basic needs after social exclusion. These studies have used very similar experimental designs and dependent variables as our experiments. We subjected these studies to a small-scale meta-analysis to find if the effect of these manipulations was different from that of seeing direct gaze. We used the same analytic strategy as in the analysis of the results of our own experiments. All manipulations were pooled into one group, and this group was compared to the control group in which participants' attention was not directed away from exclusion. Study 2 by Hales and colleagues (2016) was excluded because there was no control group. When the correlation between pre- and post-scores was not available, the effect size was calculated using the mean basic need scores in the reflexive and reflective stages and the $F$-statistic of the respective interaction. The meta-analysis suggested a large effect size of $d = 0.85$, $p < .001$, 95% CI [0.61, 1.10], showing that directing attention to another task is highly effective in facilitating basic need recovery. Remarkably, the confidence intervals of our two meta-analyses do not overlap (see Figure 1 for forest plots). This clearly shows that, even if seeing direct gaze would have some effect on basic need recovery after exclusion, this effect is smaller than that of directing attention to another task.

## General discussion

The main aim of the current study was to investigate if receiving direct gaze alleviates affective distress caused by social exclusion. In two experiments, participants excluded in Cyberball, compared to included participants, reported lower basic need satisfaction immediately after the manipulation, consistent with previous research (Hartgerink et al., 2015). In the first experiment, both excluded and included participants reported similar levels of basic need satisfaction in the delayed measurement, suggesting that excluded participants had recovered completely. This was possibly due to distraction caused by the eye gaze video and the concurrent mental visualization task. In our second experiment, we used an eye gaze manipulation that was designed to be less distracting than the one used in the first experiment. Excluded participants recovered significantly, but not completely by the delayed, reflective stage, offering support for Williams's temporal need-threat model (e.g. Williams, 2007). Importantly, our main hypothesis was not supported, as the eye gaze manipulation did not moderate recovery of basic needs among excluded participants in either experiment.

It was surprising that seeing direct gaze did not alleviate the effects of exclusion in the present study, as previous research has demonstrated that even minimal acknowledgment can facilitate recovery after exclusion (Rudert et al., 2017). However, there is one important distinction between the current study and previous research examining how acknowledgment or inclusion moderates the effects of exclusion (Gross, 2009; Rudert et al., 2017; Twenge et al., 2007; Zwolinski, 2014). In the previous studies, participants either interacted with other people, or believed that they did. In our experiments, participants were shown a cue of acknowledgment, but participants were well aware that they were not in a genuine eye contact with another person. A growing body of evidence shows that live faces and pictures of faces do not always elicit similar physiological, behavioral, and experiential responses in the observer (see e.g. Hietanen et al., 2008; Hietanen & Hietanen, 2017; Pönkänen, Alhoniemi, Leppänen, & Hietanen, 2011; Risko, Richardson, & Kingstone, 2016), possibly because the person is aware that a pictorial face does not actually look back (see Myllyneva & Hietanen, 2015). Seeing visual cues of acknowledgment may not be sufficient to alleviate the effects of exclusion if the cues do not genuinely indicate that one is being attended to by another individual. Future research could examine if seeing direct gaze portrayed by a live person would facilitate recovery from exclusion, even if direct gaze by a pictorial face does not.

While a picture of another person cannot be a source of genuine acknowledgment, these stimuli still seem to be of particular significance for excluded individuals. A number of studies show that excluded participants, compared to controls, tend to allocate more attention to pictures of faces showing positive facial expressions (Buckner, DeWall, Schmidt, & Maner, 2010;

DeWall et al., 2009; Tanaka & Ikegami, 2015; Xu et al., 2015; but see Tuscherer et al., 2015). Not only do excluded individuals tend to look at pictures of smiling faces, but they may also fixate more on the eyes than included participants (Böckler et al., 2014), and be more likely to consider that pictures are portraying direct gaze (Lyyra et al., 2017). We originally proposed that this tendency to seek direct gaze would be a coping strategy that could make excluded individuals feel reconnected. However, the current study suggests that seeing a face portraying direct gaze is not sufficient to moderate recovery from exclusion. Our results show that merely focusing attention to another task has more effect on recovery of basic needs than perceiving direct gaze. Perhaps excluded individuals seek direct gaze, not to regulate their own affective state, but to obtain information about potential for social interaction. Receiving direct gaze might increase affiliative behavior, and help the excluded individual attain reinclusion, even though the perception of this cue, as such, has little or no effect on basic need recovery.

While people often respond to exclusion by trying to reaffiliate, they can also sometimes aggress or withdraw from interactions (see Smart Richman & Leary, 2009). A tendency to seek eye contact may be related to the affiliation motivation, but other motivational responses to exclusion might be associated with different types of gaze behavior. As well as affiliative tendencies, displays of aggression tend to be accompanied with direct gaze (see Kleinke, 1986), and therefore an aggressive response to exclusion may also be associated with increased fixations to the eye region. However, when individuals respond to exclusion by seeking solitude (Ren, Wesselmann, & Williams, 2016), they might avoid eye contact. These hypotheses could be examined in future studies.

**Limitations.** One limitation of our experiments is the lack of a non-social control condition in the eye gaze manipulation. We cannot determine if the video viewing task as such had an effect on participants' basic need satisfaction, regardless of the model's gaze direction. All participants were shown a video of a person, and in Experiment 1, they imagined an interaction with the individual. Because of the quasi-social nature of this task, it may have been a mildly exclusionary or inclusionary experience, and could have influenced participants' affect more than a comparable non-social task or passing of time would have.

## Conclusion

Previous research has suggested that excluded individuals seek eye contact, presumably because direct gaze signals inclusion. We hypothesized that receiving direct gaze would alleviate affective distress caused by exclusion. However, this hypothesis was not supported. In two experiments, receiving direct gaze had no effect on recovery of basic needs after social exclusion. Perhaps excluded individuals seek direct gaze, not because it makes them feel reconnected as such, but as a means to an end – to facilitate reconnection.

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## Notes

[1] While ostracism, rejection, discrimination, and other related concepts have their own distinct definitions, they have a lot in common (see e.g., Smart Richman & Leary, 2009). There may be important distinctions between these phenomena, but because the psychological outcomes are relatively similar, the terms are often used interchangeably (see e.g., Williams, 2007). Discussing

differences between these concepts is beyond the scope of the current article, and thus we will simply use the umbrella term social exclusion to refer to all related phenomena.

[2] Supplementary materials can be obtained from http://www.uta.fi/yky/en/research/hip/publications/When_a_look_is_not_enough_Supplementary_Materials.pdf

[3] Before conducting the experiment, we ensured that the models acted similarly in the direct and downward gaze videos. We covered the eyes of the models with a black rectangle, and asked raters, blind to the purpose of the study, to rate a few characteristics of the model on a 1-5 scale. Only one video was rated by each person. The videos of the male model were rated by 102 raters, and the videos of the female model by 43 raters. Between-subject t-tests found no statistically significant differences between ratings of direct and downward gaze videos. For comparisons of each individual characteristic, the *p*-values were as follows: friendly: $p_{male} = .279$, $p_{female} = .896$; approachable: $p_{male} = .495$, $p_{female} = .826$; threatening: $p_{male} = .610$, $p_{female} = .603$; attractive: $p_{male} = .539$, $p_{female} = .209$; happy: $p_{male} = .551$, $p_{female} = .056$; inspiring: $p_{male} = .169$, $p_{female} = .685$; angry: $p_{male} = .877$, $p_{female} = .106$; dominating: $p_{male} = .746$, $p_{female} = .244$; trustworthy: $p_{male} = .226$, $p_{female} = .305$; scary: $p_{male} = .540$, $p_{female} = .305$; fluent in speech: $p_{male} = .167$, $p_{female} = .336$; convincing: $p_{male} = .966$, $p_{female} = .351$; understandable: $p_{male} = .076$, $p_{female} = .382$.

[4] We measured participants' suspicions concerning the Cyberball manipulation with a funnel-type questionnaire with open-ended questions. Although we did find that many participants, especially in the exclusion group, were suspicious, we did not find evidence that the level of suspicion was correlated with self-reported basic need satisfaction in either the reflexive or the reflective stage. Thus, we found no evidence that suspicion buffered against feelings of exclusion, or that demand

characteristics drove the effect of the exclusion manipulation. Therefore, we did not exclude suspicious participants from the analyses. See supplementary materials for details and results of these measurements.

[5] It is also possible that the different outcome between the experiments was not due to different eye gaze manipulations, but rather because the delay between reflexive and reflective stage measurements was not identical. Excluded participants may have recovered less in Experiment 2 than in Experiment 1, simply because less time passed between the exclusion manipulation and the reflective stage questionnaire.

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**Figures:**

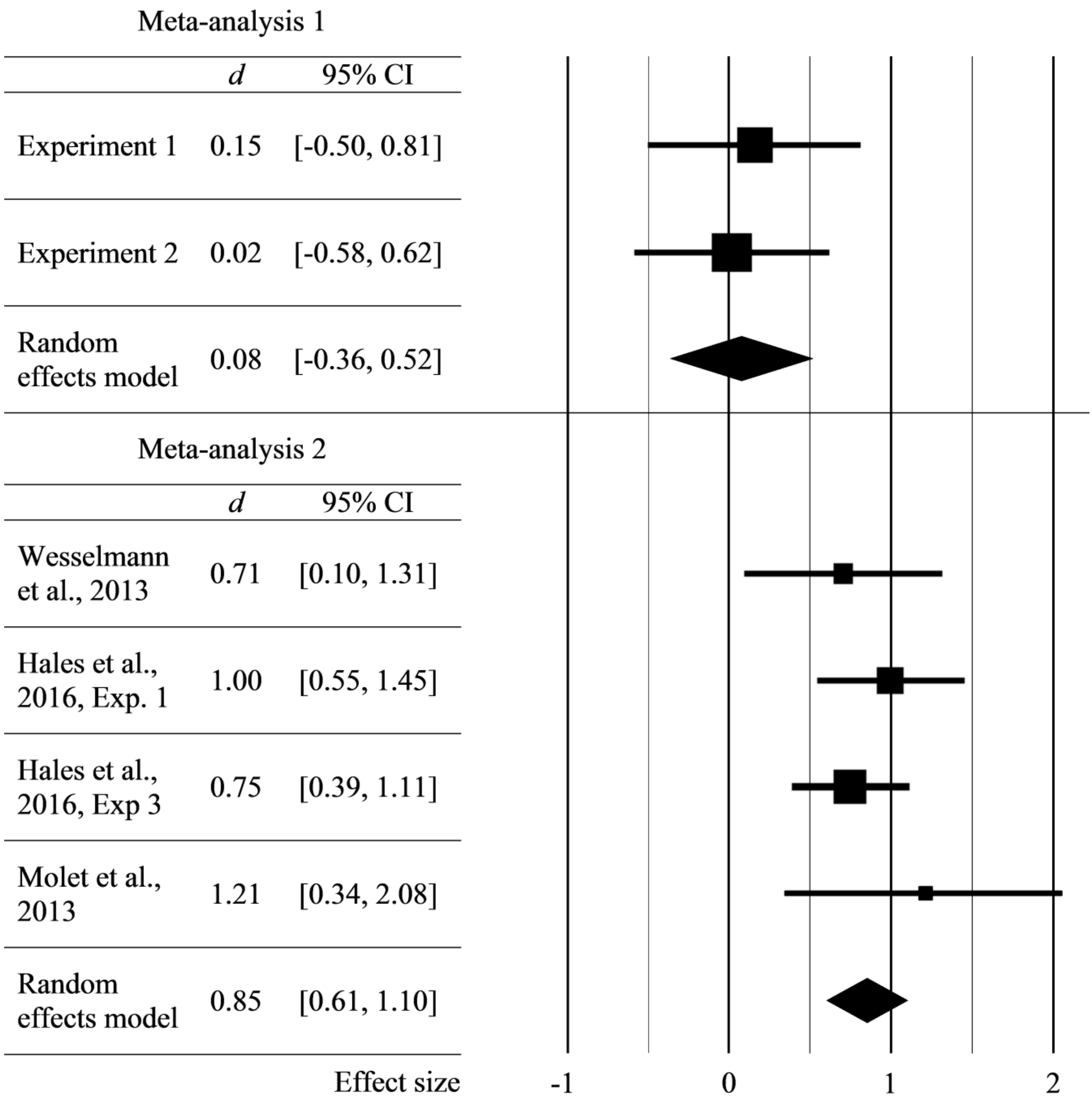


**FIGURE 1.** Effect sizes suggested by the two meta-analyses. The analyses examined the effectiveness of seeing direct gaze (Meta-analysis 1), and directing attention away from exclusion (Meta-analysis 2) at facilitating recovery of basic needs after exclusion in Cyberball. Sizes of the squares represent the proportional weight of the study in the meta-analysis. The different

manipulations in the experiments by Hales et al. (2016) were combined into one group for the purposes of this analysis.