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Abstract

Previous studies demonstrated that fear of negative evaluation (FNE) moderates responses to exclusion in late-stage social outcomes (e.g., social judgments and behaviors). People with low levels of FNE show affiliative responses, feeling compelled to recover their sense of belonging, whereas people with high levels of FNE do not. This study examined whether FNE also moderates responses to exclusion in early-stage interpersonal perception, manifested in selective attention. The experiment using a dot-probe task revealed that exclusion led participants with low levels of FNE to increase attention to signs of social acceptance (i.e., smiling faces). It also revealed that exclusion led those with high levels of FNE to pay more attention to signs of social threat (i.e., angry faces) relative to those of social acceptance. Thus, exclusion makes the motivation to protect oneself from social threats dominant over the motivation to reestablish social bonds among those who fear negative evaluation.

Keywords: social exclusion, fear of negative evaluation, selective attention

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The Social Reconnection Hypothesis

Human beings have a fundamental need to form and maintain interpersonal relationships, so called a need to belong (Baumeister & Leary, 1995), and satisfaction of this need is thwarted by social exclusion. Maner, DeWall, Baumeister, and Schaller (2007) proposed the social reconnection hypothesis that excluded people show an affiliative response that is motivated to reestablish social bonds and restore their sense of belonging. However, this tendency has been shown to be moderated by the levels of fear of negative evaluation (FNE) of excluded people. The perceived likelihood of negative evaluation by others causes social anxiety and avoidant behaviours, and FNE is regarded as a core cognitive feature of social phobia (Rapee & Heimberg, 1997). Previous studies examined whether exclusion prompted people to perceive others as friendly and to behave favorably to others and suggested that people with low levels of FNE (or social anxiousness) have optimistic view of a new social connection and prioritize the motivation to reconnect with others (reconnection motive) after excluded, whereas people with high levels of them perceive the likelihood of negative evaluation by others to be high and prioritize the motivation to protect themselves from further social threat (self-protection motive) over the reconnection motive (Mallott, Maner, DeWall, & Schmidt, 2009; Maner et al., 2007)

The early stage processes of person perception

DeWall, Maner, and Rouby (2009) argued that social exclusion affects not only the late-stage processes of cognition and action, such as judgments and prosocial behavior, but also the early-stage perceptual processes, such as attention. Attention is automatically oriented to stimuli that are relevant to motivation, which is activated within an individual, and it is viewed as a mechanism to select important information from the environment and a foundation of the late-stage processes (e.g., DeWall et al., 2009). They found that excluded participants pay more attention to smiling faces, which signal a high potential for social acceptance.

Buckner, DeWall, Schmidt, and Maner (2010) examined the moderating effect of FNE on attention allocation after social exclusion. After exclusion manipulation, they used eye-tracking methods to measure attention allocation to four types of facial stimuli (smiling, angry, sad, and neutral), which were presented simultaneously in an array for 30 s. Participants high in FNE maintained their attention longer for smiling faces and shorter for angry faces when they were given the threat of social exclusion than when they were given the non-exclusion threat, while participants low in FNE did not show such an attentional bias.

These results contradict the findings of Maner et al. (2007) probably because of the methods used to measure attentional bias. Mogg, Philippot, and Bradley (2004) suggested that people with social phobia pay attention to threatening stimuli at first but subsequently avert attention from them so that they could reduce the anxiety elicited by them. They assessed attentional bias using the dot-probe task and observed that individuals with social phobia paid more attention to angry faces relative to smiling faces 500 ms after the presentation of facial stimuli, although participants with no psychological disorder did not show such a tendency. These two groups did not differ in attentional bias 1250ms after the presentation of them. Bradley, Mogg, and Millar (2000) suggested that responses at the stimulus duration of 500 ms were assumed to reflect the initial orienting of attention. Besides, Garner, Mogg, and Bradley (2006) measured eye movements by eye tracking while participants performed the dot-probe task and showed that the initial fixation occurred about 350 ms after the presentation of facial stimuli, and the gaze remained at the initial point of fixation for about 350 ms. From these, it is inferred that participants high in FNE in Buckner et al. (2010) paid attention to angry faces immediately after the presentation of facial stimuli, but they shifted attention to smiling faces to avoid the threatening stimuli.

Present Research

The present study examined whether FNE moderates responses to social exclusion in the early-stage processes by assessing attentional bias during initial orienting of attention after social exclusion. We measured attentional bias toward smiling and angry faces during initial orientation of attention, using the dot-probe task with stimulus duration of 500 ms.

We employed Cyberball (Williams, Cheung, & Choi, 2000) to manipulate the status of exclusion or inclusion. Previous studies employed various kinds of exclusion manipulations including Cyberball and revealed converging evidence (e.g., Bastian & Haslam, 2010). Therefore, it is assumed that these paradigms had equivalent levels of effectiveness at thwarting participants' inclusionary status and their ability to satisfy the need to belong.

It is presumed that exclusion leads people high in FNE to prioritize the self-protection motive over the reconnection motive, while it leads people low in FNE to the opposite priority. Besides, it is also presumed that attention is given to stimuli that are relevant to a currently activated motivation and that the early-stage perceptual processes underlie the late-stage processes (DeWall et al., 2009). Based on these premises, the following hypotheses were constructed.

Hypothesis 1: Participants low in FNE in the exclusion condition allocate more attention to smiling faces than those in the control condition.

Hypothesis 2: Participants high in FNE in the exclusion condition allocate more attention to angry faces than those in the control condition.

Hypothesis 3: Participants low in FNE allocate equal amount of attention to smiling and angry faces in the control condition, but they pay more attention to smiling faces than to angry faces in the exclusion condition.

Hypothesis 4: Participants high in FNE allocate more attention to angry faces relative to smiling faces in both the control and the exclusion condition.

We attempted to assess participants' levels of depression and control its effects because depressive disorder tends to accompany social phobia (Brown, Campbell, Lehman, Grisham, & Mancill, 2001) and may correlate with FNE, and dysphoric individuals have a tendency to avoid positive social information (Shane & Peterson, 2007).

Method

Participants

Fifty-seven university students (28 men and 29 women; M_{age} = 19.00 years, *SD* = 0.82) participated in the experiment.

Procedure

Pretest. We asked participants completed the Short Fear of Negative Evaluation Scale for Japanese (SFNE; Sasagawa et al., 2004) a few weeks before the experiment.[1] This scale is composed of 12 items that are rated on a 5-point scale (1 to 5), with higher scores indicating higher levels of fear of a negative evaluation. On arrival at the experimental room, participants were informed that they could decide whether to participate in the experiment at their own free will and that they were free to stop the experiment at any time. Then, we measured their visual acuity with a Landolt ring chart at 3 m, to assess whether it was 6/12 or better. We asked participants to complete the Japanese version of the BDI-II (Beck, Steer, & Brown, 1996, Kojima & Furukawa, Trans., 2003). This scale is composed of 21 items that are rated on a 4-point scale (0 to 3), with higher scores indicating severer levels of depression.

Exclusion manipulation. We employed Cyberball (Williams et al., 2000), which is a computer game in which participants toss a ball with other participants. In a practice session, participants were informed that they would practice tossing a ball with computer-controlled characters. They played with three computer-controlled characters and received passes with the same frequency as the other players. The practice session involved 12 tosses. In an experimental session, participants were informed that they would toss a ball with three other participants through the Internet (who were in fact computer-controlled characters). Participants in the exclusion condition received two tosses at the beginning of the session but did not receive any toss afterward. Participants in the control condition received tosses with the same frequency as other players throughout the session. The experimental session involved 40 tosses. The manipulation was conducted with CyberBall 2 (Empirisoft).

Previous studies gave special consideration to participants with moderate depression, whose average score on the BDI-II exceeded 0.95 (i.e., a total score of 20), by removing them from stressful situations (e.g., Mansell, Clark, Ehlers, & Chen, 1999). In consideration of the ethical treatment of participants, we assigned them to the control condition and removed their data from the analysis.

Manipulation check. After the exclusion manipulation, participants reported their levels of satisfaction for a variety of fundamental needs and their mood during the Cyberball game. According to Williams (2009), social exclusion induces negative mood and thwarts satisfaction for four fundamental needs: need to belong, to maintain self-esteem, to control one's social environment, and to view one's existence as meaningful. We employed three items which were described by Williams (2009), translated into Japanese, to measure levels of satisfaction of each need and mood. The questionnaire was composed of 15 items (12 for satisfaction of fundamental needs and 3 for mood states) that were rated on a 7-point scale (1 to 7) with higher scores indicating higher levels of need satisfaction and a more positive mood. Participants also reported the percentage of total passes they received during the game (Williams, 2009).

Dot-probe task. After the manipulation check, participants performed the dot-probe task. The size of the stimuli and the stimulus duration were set to make them the same as those used by Garner et al. (2006). In each trial, a cross (20 × 20 mm) was first presented as a fixation point in the middle of the screen for 500 ms. Afterwards, two faces of the same person (a smiling or angry face was paired with a neutral expression) were presented for 500 ms, one on the left side and the other on the right. Then, a small black dot (5 mm in diameter) appeared at the same location as the emotional face (congruent trials) or at the same location as the neutral face (incongruent trials). Participants were instructed to indicate on which side of the screen the dot appeared by pressing one of two keys, and their RTs to detect the dot were recorded. If participants paid attention to an emotional face, their RT would be shorter in congruent trials because the emotional face attracted their attention, and it would be longer in incongruent trials because they had to disengage their attention from the emotional face. The intervals between the trials were 1,000 ms.

The pictures of faces displaying smiling, angry, and neutral expressions of eight persons (4 men and 4 women) were selected from the ATR Facial Expression Image Database DB99 (ATR-Promotions, 2006) and used as stimuli.[2] The size of the pictures was 72 × 110 mm, and the distance between the centers of the two pictures was 186 mm. The stimuli were presented on a 17-inch color monitor, and participants sat 1.1 m away from the monitor with their chin on a chin rest. The task was conducted with SuperLab 4 (Cedrus).

We conducted 64 experimental trials for each participant, counterbalancing the location of the emotional face and dot and randomizing the order of trials. Practice trials were given in order to familiarize participants with the task. In practice trials, pictures of cups and pens were presented instead of facial stimuli. Eight practice trials were conducted.

After completing the dot-probe task, participants were checked to ascertain whether they knew the true purpose of the experiment. Then, participants were thoroughly debriefed, and thanked for their participation.

Results

Data preparation

Five participants whose average score on the BDI-II exceeded 0.95 and one participant whose corrected visual acuity did not reach 6/12 were excluded from the analysis. Another participant was excluded because of a computer error during the dot-probe task.

RTs from trials with errors were removed, and those that fell outside of 2.5 *SD* from each participant's mean were excluded as outliers. The rate of trials with errors and outliers for one participant was extremely high (21.9%), and the mean RT for another participant was beyond 2.5 *SD* from the mean RT for all participants. Thus, data from these two participants were excluded.

For remaining 48 participants (25 participants in the control condition, 23 in the exclusion condition), the mean scores on the SFNE ($\alpha = .93$) and the BDI-II ($\alpha = .78$) in the control condition were 3.36 (*SD* = 0.89) and 0.37 (*SD* = 0.23), and those in the exclusion condition were 3.28 (*SD* = 0.74) and 0.40 (*SD* = 0.25), respectively. Participants in the control and exclusion conditions did not differ in these scores, t (46) = 0.31, $p = .756$, d = 0.09; t (46) = 0.37, $p = .715$, $d = 0.11$, in order. These scores correlated significantly ($r = .36$, $p = .012$). The mean RT of the dot-probe task was 360.4 ms (*SD* = 36.7). The mean percentage of errors was 0.4%, and that of outliers was 2.2%.

Manipulation check

Scores for need satisfaction (12 items; $\alpha = .88$) and mood (3 items; $\alpha = .86$) and the percentage of passes were examined with hierarchical regression analysis.[3] Main effects of the exclusion manipulation (control = −0.5, exclusion = 0.5) and SFNE scores (centered) were entered in the model in Step 1, and the interaction of them were added in Step 2. The analysis revealed significant main effects of the exclusion manipulation in Step 1 for need satisfaction, $B = -1.59$, $SE = 0.22$, t (45) = 7.34, $p < .001$, $R^2 = 0.57$; for mood, $B = -1.41$, $SE = 0.21$, t (45) = 6.76, $p < .001$, $R^2 = 0.51$; and for the percentage of passes, $B = -17.03$, SE = 1.08, t (45) = 15.75, $p < .001$, $R^2 = 0.85$. None of interaction terms were significant in Step 2.

The excluded participants reported a lower level of need satisfaction and less positive mood and a smaller percentage of total passes they received than participants in the control condition.

Attentional bias

We calculated attentional bias scores (e.g., Mogg et al., 2004) for each participant and emotional face type by subtracting the mean RT of congruent trials from the mean of incongruent trials. Positive values indicated vigilance for emotional faces, and negative values indicated avoidance of them. These scores were examined using a hierarchical linear model (see Footnote 3). The within-participants level was described as level 1 (N = 96) and the between-participants level was described as level 2 (N = 48). The level-1 predictor was face type (smiling = 0.5, angry = −0.5), and the level-2 predictors were the exclusion manipulation (exclusion = 0.5, control = −0.5) and SFNE scores (centered). We conducted the analysis with HLM 7 (Scientific Software International), using the restricted maximum likelihood estimation.

As a result, a significant interaction of face type × exclusion × SFNE was observed in Model 1 (see Table 1).[4] Figure 1 depicts the attentional bias scores estimated by the regression equation of Model 1. To interpret this interaction, the simple slopes of the independent variables were tested. The simple slope of exclusion for the smiling faces condition was found to be significant at a relatively low level of SFNE score (−1 *SD*), B = 15.62, SE = 5.68, t (44) = 2.75, p = .009, indicating that participants with relatively low levels of FNE in the exclusion condition paid more attention to smiling faces than those in the control condition. On the other hand, the simple slope of exclusion for the angry faces condition was not significant at a high level of SFNE score (+1 *SD*), B = 4.98, SE = 5.75, t (44) = 0.87, p = .391, indicating that participants with relatively high levels of FNE in the exclusion condition did not pay more attention to angry faces than those in the control condition.

Participants with low SFNE scores (−1 *SD*) tended to pay more attention to angry faces than to smiling faces in the control condition, $B = -9.04$, $SE = 5.16$, $t(44) = 1.75$, $p = .087$. However, this tendency was reversed in the exclusion condition; they paid more attention to smiling faces than to angry faces when excluded, $B = 11.89$, $SE = 5.66$, $t(44) = 2.10$, $p = .042$. Participants with high SFNE scores (+1 *SD*) showed a tendency to pay more attention to angry faces in the control condition, $B = -8.64$, $SE = 4.95$, $t(44) = 1.74$, $p = .088$. This tendency became more obvious in the exclusion condition, $B = -18.62$, $SE = 5.97$, $t(44) = 3.12$, $p = .003$.

When scores for BDI-II and mood (both were centered) were added to the model (Model 2, 3), the interaction of face type × exclusion × SFNE remained significant. Neither the main effects of BDI-II and mood scores nor the interaction term of face type and those scores was significant.

Discussion

We examined whether FNE moderates responses to social exclusion in early-stage interpersonal perception. The results supported hypothesis 1 and the latter parts of hypothesis 3 and 4. However, hypothesis 2 was not supported probably because people with social anxiousness tend to pay attention to angry faces even when they are not excluded (Mogg et al., 2004) and this might make it difficult to detect a statistical difference between the two conditions. Contrary to hypothesis 3, participants with relatively low levels of FNE paid more attention to angry faces than to smiling faces in the control condition, though this effect was marginally significant. This may be because they showed negativity bias (Rozin & Royzman, 2001), but the fact that this effect was marginally significant hinders assertive conclusion. Participants with relatively high levels of FNE in the control condition showed a tendency of attentional bias which in principle aligned with hypothesis 4, though the effect was marginally significant. Thus we may say that hypothesis 4 was weakly supported.

The observed effects remained significant when the effects of mood and depression were controlled. This suggests that the attentional bias found in the current study were not attributable to a mere increase in negative mood, but were attributable to the experience of being excluded. It also suggests that FNE affected the attentional bias independently from severity of depression.

The literature on the relationship between attention and motivation claims that attentional resources are given to stimuli related to an activated motivation (e.g., DeWall et al., 2009). The current results suggest that exclusion leads people high in FNE to prioritize their self-protection motive over their reconnection motive in early-stage cognition, while it leads people low in FNE to the opposite priority. These implications are consistent with those of previous studies which examined higher-order cognition and behaviors, and the present study provides more direct evidence of them than previous studies by examining the early-stage cognitive processes that is closely associated with activated motivation.

Although attentional bias in initial orienting may reflect an activated motivation within an individual, attentional bias observed in tasks with a long stimulus duration employed by Buckner et al. (2010) may be contaminated by other factors related to conscious processing, rather than by factors related to motivations evoked by social exclusion.

The present study has some limitations. First, manual RT data in the dot-probe task may be affected by covert attention as well as overt attention (Bradley et al. 2000), and future studies should employ paradigms that can assess overt and covert attention separately. Second, we could not clarify what types of psychological mechanisms affect attentional bias in tasks with long stimulus durations, which was employed by Buckner et al. (2010). Third, the levels of need satisfaction and mood were assessed only posterior to the exclusion manipulation. To strictly confirm the effectiveness of the manipulation, it is desirable to assess them prior to the manipulation as well.

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Footnotes

[1]Participants were not preselected intentionally based on scores for SFNE.

[2]ATR-Promotions (2006) had 27 university students rate each picture of ATR Facial Expression Image Database DB99 according to how happy and angry it was on 7-point scales (1 = *not at all*, 7 = *extremely*). The mean scores on happiness and anger for each emotional type were as follows; 6.16 and 1.22 for smiling faces; 1.16 and 5.67 for angry faces; and 1.91 and 1.55 for neutral faces, respectively.

[3]We employed regression analysis or hierarchical linear model instead of ANOVA because ANOVA can not deal with a continuous independent variable (SFNE scores).

[4]The random slope of face type was not added because it did not improve the model.

Table 1

Estimated Parameters of a Hierarchical Linear Model Predicting Attentional Bias Scores

	Model 1			Model 2			Model 3		
	B		*SE*	*B*		*SE*	*B*		*SE*
Intercept	3.18	*	1.46	3.16	*	1.47	3.16	*	1.48
Level-1 predictor									
Face type	−6.10	*	2.67	−6.07	*	2.68	−6.07	*	2.71
Level-2 predictor									
Exclusion	2.57		2.93	2.39		2.95	1.68		4.21
SFNE	−0.31		1.87	−0.95		2.06	−0.41		1.92
Exclusion × SFNE	−3.19		3.74	−3.91		3.87	−3.29		3.80
BDI-II				5.38		6.95			
Mood							−0.63		2.12
Cross-level interaction									
Exclusion × Face type	5.47		5.35	5.87		5.38	7.12		7.70
SFNE × Face type	−9.28	**	3.42	−7.90	*	3.75	−9.09	*	3.52
Exclusion × SFNE × Face type	−19.07	**	6.84	−17.52	*	7.07	−18.89	**	6.94
BDI-II × Face type				−11.54		12.68			
Mood × Face type							1.17		3.89
Residual variance									
Level-2 Intercept	16.84			17.23			17.06		
Level-1 Intercept	171.02			171.87			174.75		
Deviance	733.65			719.59			725.59		

Note. $**p < .01$, $*p < .05$.

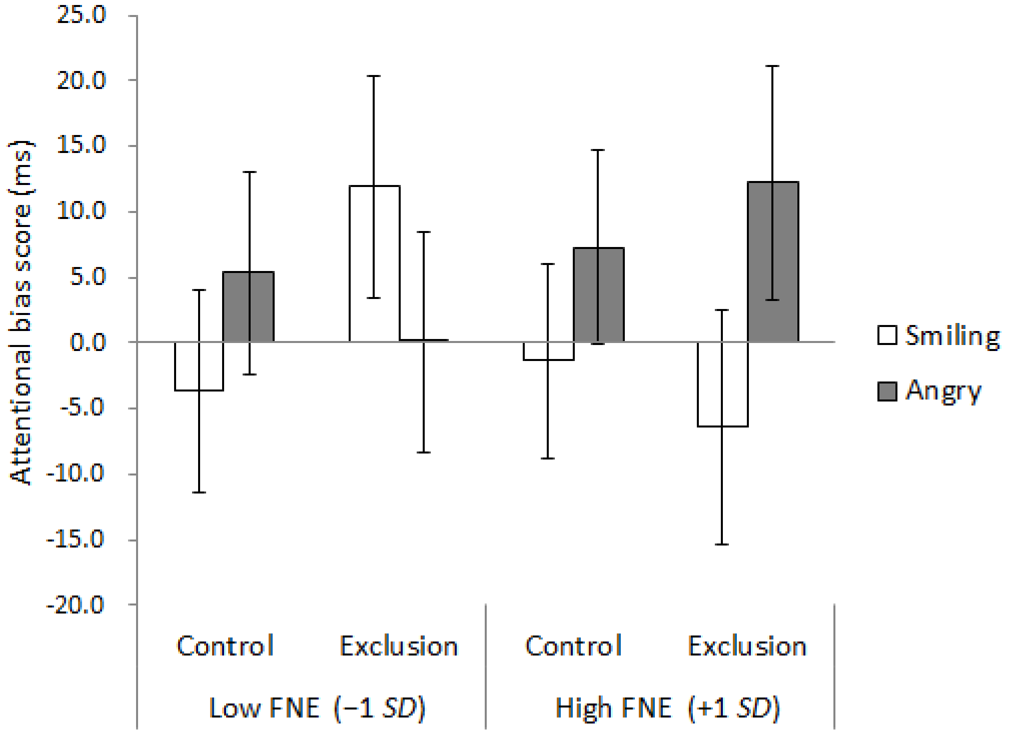

Figure 1.

Estimated attentional bias scores in each condition. Error bars indicate 95% confidence intervals for the estimated scores.