Social Exclusion and Early-Stage Interpersonal Perception: Selective Attention to Signs of Acceptance

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Social exclusion can thwart people's powerful need for social belonging. Whereas prior studies have focused primarily on how social exclusion influences complex and cognitively downstream social outcomes (e.g., memory, overt social judgments and behavior), the current research examined basic, early-in-the-cognitive-stream consequences of exclusion. Across 4 experiments, the threat of exclusion increased selective attention to smiling faces, reflecting an attunement to signs of social acceptance. Compared with nonexcluded participants, participants who experienced the threat of exclusion were faster to identify smiling faces within a "crowd" of discrepant faces (Experiment 1), fixated more of their attention on smiling faces in eye-tracking tasks (Experiments 2 and 3), and were slower to disengage their attention from smiling faces in a visual cueing experiment (Experiment 4). These attentional attunements were specific to positive, social targets. Excluded participants did not show heightened attention to faces conveying social disapproval or to positive nonsocial images. The threat of social exclusion motivates people to connect with sources of acceptance, which is manifested not only in "downstream" choices and behaviors but also at the level of basic, early-stage perceptual processing.

Keywords: social exclusion, rejection, attention, affiliation, reconnection

The desire for positive and lasting relationships is among the most pervasive and fundamental of human needs. This need to belong is rooted deeply within our evolutionary history and has important consequences for a broad range of psychological processes (Baumeister & Leary, 1995). Failure to satisfy one's need to belong can have damaging effects on cognitive, emotional, behavioral, and health outcomes (Baumeister, DeWall, Ciarocco, & Twenge, 2005; Buckley, Winkel, & Leary, 2004; Cacioppo, Hawkley, & Berndtson, 2003; Twenge, Baumeister, Tice, & Stucke, 2001). Indeed, recent evidence suggests that the threat of social exclusion activates mechanisms designed for the detection and regulation of physical pain (DeWall & Baumeister, 2006; Eisenberger, Lieberman, & Williams, 2003; see MacDonald & Leary, 2005, for a review).

Given this fundamental need to belong, one might expect that people would respond to the threat of social exclusion by doubling their interest in restoring their sense of belonging, perhaps by forging new social bonds with promising social partners. Moreover, this interest in renewed social connection might be expected to manifest itself at various levels of cognition and action, from early-in-the-cognitive-stream perceptual processes such as attention, to downstream processes such as memory and prosocial behavior. Empirical studies in this area of research, however, have tended to focus primarily on downstream processes, such as overt social choices, memory, judgments, and behaviors aimed at restoring social connections. Researchers have left relatively unexplored the more basic—and possibly more fundamental—cognitive mechanisms presumed to underlie cognitively downstream processes displayed by individuals faced with social exclusion.

In the present work, we sought to help fill this gap in the literature by examining basic, early-stage perceptual attunements precipitated by the threat of social exclusion. Our primary hypothesis was that the threat of social exclusion would promote increased attention to people that seem to reflect promising possibilities for renewed social connection.

Previous Evidence for Renewed Social Connection

Several converging lines of research suggest that, at the level of downstream cognition and action, the experience of social exclusion can promote increased interest in attaining social acceptance. For example, social exclusion has been shown to enhance memory for events related to affiliation—both positive events related to social acceptance and negative events related to social rejection

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(Gardner, Pickett, & Brewer, 2000). This memory could reflect a desire for social acceptance, although it could also reflect increased vigilance to the possibility of further social exclusion. Similarly, recent evidence has shown that traits associated with deficits in belongingness needs (i.e., need to belong, loneliness) correlate with accurate judgments and recall of both positive and negative social cues, such as facial expressions and vocal tone (Gardner, Pickett, Jefferis, & Knowles, 2005; Pickett, Gardner, & Knowles, 2004). Williams, Cheung, and Choi (2000) demonstrated that ostracized participants were more likely than other participants to conform to the opinions of others, which could indicate a desire to be accepted by one's group, although it is possible that such conformity may also reflect increased passivity among ostracized participants. Maner, DeWall, Baumeister, and Schaller (2007) showed that exclusion led people to increase their desire to be with others, to see potential sources of friendship in a positive social light, and to behave generously toward others who represented good prospects for future friendship. Thus, several previous findings suggest that the threat of social exclusion promotes patterns of higher-order cognition and action that seem to reflect a renewed desire for social acceptance.

Few studies, however, have investigated whether the threat of social exclusion precipitates a desire for social reconnection that is observed at the level of basic, early-in-the-cognitive stream perceptual processes. An understanding of the basic cognitive mechanisms underlying the desire to reconnect with others is of paramount importance, as early-stage cognition provides the basic building blocks for adaptive higher-order cognition and behavior. Indeed, basic cognitive processes such as selective attention have been conceptualized as the mechanisms by which social perception is translated into action (Houghton & Tipper, 1994).

Pickett et al. (2004) provided some initial evidence suggesting that the threat of social exclusion might increase perceptual sensitivity to social cues. Participants high in the need to belong, for example, were distracted by vocal tones paired with oppositely valenced words in a Stroop task and were especially accurate in judging rapidly presented facial expressions, both of which seem to suggest attentiveness to social cues. However, although some of their findings indicated attentiveness to positive vocal tone (Study 2), other findings indicated attentiveness to both positive and negative vocal tone (Study 1). In addition, it was not reported whether the accurate identification of facial expressions depended on the type of expression. Moreover, individuals in that research who were made to feel excluded were less accurate—not more accurate—in an empathic accuracy task. Thus, although they are suggestive, these findings leave open the question of whether exclusion promotes perceptual sensitivity to positive signs of social acceptance.

Selective Attention to Signs of Social Acceptance

The social world is extremely complex, with myriad stimuli competing for attention. Because people's cognitive resources are limited, they must selectively attend to certain features of their social environment. Cognitive resources are frequently, and quite automatically, allocated to features in the environment that are related to specific adaptive goals (Gibson, 1979; Maner, Gailliot, & DeWall, 2007; Maner et al., 2003; McArthur & Baron, 1983). Indeed, many previous studies demonstrated that particular motivational states can bring goal-relevant stimuli to the forefront of the perceptual field (e.g., Maner, Gailliot, Rouby, & Miller, 2007; Öhman & Mineka, 2001). Given the fundamental need for social belonging and the apparent desire to fulfill that need following the threat of social exclusion, one might expect attentional processes to operate in a manner that could help satisfy that need. That is, if the threat of social exclusion promotes a desire to affiliate with others, then certain features of the social landscape—particularly those that signal potential sources of renewed social affiliation—would be expected to receive preferential processing. The primary hypothesis of this research, therefore, was that the threat of exclusion would increase attention to other people displaying cues that signal a high likelihood of social acceptance.

What specific types of social cues might capture people's attention when people have been threatened by the possibility of social exclusion? One modality through which people communicate their interpersonal intentions is through the expressions they wear on their faces. A substantial body of evidence, inspired largely by the pioneering work of Darwin (1872/1998), indicates that facial expressions serve as rich nonverbal cues that can powerfully communicate important interpersonal intentions and motives (Parkinson, 2005; cf. Ekman, 1971, 1982). Indeed, facial expressions not only reveal what emotions a person is feeling; they also serve as a rich source of interpersonal meaning, communicating to others a person's desire to make friends, be aggressive, ask for help, and so on (Fridlund, 1994). Particular facial expressions, therefore—especially those that signal social interest and a high likelihood of social acceptance—may capture attention when people have been threatened by social exclusion.

One cue that commonly signals a high likelihood of social acceptance is the presence of a smile. Displaying a smile commonly signals friendly interpersonal intentions (e.g., Horstmann & Bauland, 2006; Lundqvist & Öhman, 2005; Parkinson, 2005). In addition to expressing happiness and other positive emotions, displaying a smile communicates a high degree of social interest and benevolent interpersonal intentions (Schneider & Josephs, 1991). Indeed, even in early childhood, humans use smiles as a way of forming new social bonds (Jones & Raag, 1989). If the threat of social exclusion motivates people to seek out others who represent a high likelihood of friendliness and social acceptance, then people for whom the threat of social exclusion is salient might pay particular attention to others exhibiting a smiling facial expression.

Selective Attention to Signs of Social Threat?

Although the primary hypothesis of this research was that the threat of social exclusion would promote selective attention to smiling, welcoming faces, we also considered possible alternatives to this main hypothesis. There is some reason to expect that being threatened by exclusion could increase attention to signs of social threat (e.g., angry faces), rather than, or perhaps in addition to, signs of social acceptance. Indeed, there is an essential tension between wanting to seek social acceptance and wanting to avoid the possibility of rejection (see Maner, DeWall, et al., 2007). Exclusion conceivably could cause people to become hypervigilant to the possibility of additional exclusion or rejection, and therefore, people threatened by exclusion could become highly attentive to aspects of the social environment that denote social

threat or disapproval. On the basis of this reasoning, one might expect that the threat of social exclusion would increase attention to faces displaying expressions of anger or disgust, both of which can communicate social threat or disapproval (e.g., Rozin, Lowery, & Ebert, 1994).

Selective attention to angry faces or disgust faces following the threat of social exclusion may be consistent with other studies suggesting that excluded people display heightened processing of both positive and negative social events (Gardner et al., 2000, 2005; Pickett et al., 2004). Attention to threat faces might be consistent also with a large literature suggesting that, under baseline conditions, many people selectively attend to displays of social threat, such as angry faces (Hansen & Hansen, 1988; Horstmann & Bauland, 2006; Öhman, Lundqvist, & Esteves, 2001).

There are reasons to expect, however, that most individuals threatened by social exclusion would attend to smiling faces—signs of social acceptance—rather than angry faces or disgust faces. Maner, DeWall, et al. (2007) showed that, following exclusion, individuals viewed others to be more welcoming and inviting, consistent with a desire for social reconnection. Those same studies found no evidence that excluded individuals viewed by others as angrier or more threatening. Excluded individuals did see the specific people who excluded them as more threatening and angry, but this perception did not extend to other people who reflected new and more promising sources of friendship. This suggests that, following the threat of social exclusion, the desire for social reconnection may trump the desire to avoid further exclusion.

There may even be reason to suspect that the threat of social exclusion would lead attention to be repelled by, rather than drawn to, other people who appear to be socially threatening (e.g., Downey, Mougios, Ayduk, London, & Shoda, 2004). For example, although some studies have shown that people with social anxiety—who are particularly fearful of social exclusion—attend preferentially toward angry faces (e.g., Mogg & Bradley, 2002), other studies have suggested that such people avoid and attend away from, rather than toward, signs of social threat (Horley, Williams, Gonzalvez, & Gordon, 2003).

Thus, the clearest prediction is that the threat of social exclusion will promote selective attention to smiling faces as signs of social acceptance, rather than to anger or disgust faces as signs of social threat. To establish the specificity of this hypothesized attentional bias, and to explore the possibility of attention to social threat following exclusion, we assessed attention to angry faces in all four experiments and measured attention to disgust faces in Experiment 4.

Current Research

The primary purpose of the current work was to test the hypothesis that the threat of social exclusion increases the basic perceptual processing of social stimuli that signal potential sources of renewed social affiliation. The current investigation examined the extent to which the threat of social exclusion promotes attentional attunements to signs of social acceptance—in particular, faces exhibiting a smiling expression.

We used two methods to manipulate the threat of social exclusion. One manipulation involved giving participants a personality test and providing some participants with bogus feedback regarding their future belongingness status. As in previous studies (DeWall & Baumeister, 2006; Maner, DeWall, et al., 2007; Twenge et al., 2001), some participants were told that they would be alone later in life. The other manipulation consisted of participants expecting to interact with another person and telling some participants that the person refused to work with him or her. Whereas the first procedure manipulated the threat of possible future social exclusion, the second procedure manipulated the immediate experience of social exclusion by a peer. Both of these manipulations have been shown to increase a desire for compensatory social contact (Maner, DeWall, et al., 2007). After manipulating the threat of social exclusion, selective attention to smiling faces was measured. We used three different procedures to measure attentional biases to signs of social acceptance. In Experiment 1, participants completed a visual search task in which they searched for smiling, angry, and sad faces within a "crowd" of neutral faces. In Experiments 2 and 3, an eye tracker was used to measure participants' eye movements while they viewed arrays of faces varying in their expressions. Experiment 4 used a visual cueing task that assessed the extent to which particular emotional expressions influenced attentional engagement and disengagement processes. Across these studies, we predicted that the threat of social exclusion—whether in the form of a future diagnostic forecast or immediate peer exclusion—would increase selective attention to faces displaying a smiling expression (i.e., a cue signaling a high likelihood of positive social affiliation).

We included several methodological features aimed at demonstrating the specificity of this hypothesized effect. First, as noted above, we evaluated attention to faces denoting threat (anger and disgust faces), in addition to faces denoting social acceptance. This allowed us to assess the possibility that threat of exclusion would increase attentional vigilance to social threat.

Second, we attempted to rule out the possibility that threat of social exclusion would increase attention to positively valenced stimuli, regardless of whether those stimuli signal social acceptance. A beautiful landscape image, for example, is likely to be perceived as a very positive stimulus and might even create positive emotion in the observer, but it is unlikely that an image of a beautiful landscape could be taken to reflect social acceptance. Our main hypothesis was that attentional attunements precipitated by the threat of social exclusion would be highly specific to sources of social reconnection, rather than being related more broadly to positive stimuli. To rule out the possibility that people threatened by social exclusion are broadly attentive to any positive stimuli, in Experiment 3 we measured attention to positively valenced images that were unrelated to social acceptance.

Third, we attempted to rule out the possibility that any effects of the threat of social exclusion would be produced by mere affective changes (e.g., increase in negative affect), as opposed to the more specific desire for social acceptance. In each study, we measured participants' affective state and assessed whether effects produced by the threat of social exclusion could be accounted for by changes in participants' current emotional state.

Experiment 1

Experiment 1 provided an initial test of the hypothesis that the threat of social exclusion would increase attention to signs of social acceptance. Threat of social exclusion was manipulated by

having participants complete a personality test and leading some participants to believe that they would end up alone later in life. Participants in this *future alone* condition were therefore given reason to anticipate a lonely future devoid of meaningful social relationships. Two control groups were used. In one of the control groups, participants received feedback that they had a personality type with which they could anticipate high levels of positive and meaningful social relationships throughout their life (*future belonging*). The second control group consisted of participants who were told that they had a personality type with which they could expect frequent negative events that were unrelated to their level of social acceptance (frequent accidents and injuries; *misfortune control*). The inclusion of the misfortune control condition enabled us to test whether increased attention to signs of social acceptance was unique to the threat of social exclusion or could be explained as a result of simply receiving an unpleasant forecast about the future. This manipulation has been shown to elicit responses that are equivalent to other, more immediate forms of social exclusion (e.g., Baumeister et al., 2005; Maner, DeWall, et al., 2007; Twenge et al., 2001).

A measure of attention was obtained with a face-in-the-crowd task modeled after previous research (Hansen & Hansen, 1988; Öhman et al., 2001). Participants were given a target face to find within a "crowd" of other faces. The facial expression of the target face was manipulated and included smiling, sad, and angry expressions. The main prediction was that, compared with participants in the future belonging and misfortune control conditions, participants in the future alone condition would be quicker to identify the smiling faces within the crowd of faces, because smiling faces serve as powerful cues signaling possible social acceptance.

Method

Participants. Sixty-nine undergraduates (61 women, 8 men) participated in exchange for partial course credit. Participants were recruited from introductory psychology courses via an online announcement that posted a description of the study and the times that were available for participation.

Materials and procedure. Participants arrived at the laboratory individually for a study ostensibly concerning the relationship between personality and visual processing. After giving informed consent, participants were informed that they would be completing a visual search task later in the study and would first complete some practice trials so that they could learn how to complete the task. The experimenter informed participants that the visual search task would consist of identifying a face among a crowd as quickly as possible by clicking on the picture of the target face. The instructions emphasized the importance of making correct and fast responses. Participants then completed a set of practice trials, which included neutral objects. Before each block of trials, a target object was displayed and participants were instructed to identify that object when it appeared amid a crowd of distracters by clicking on it with the mouse. A green circle or red cross appeared after each trial, indicating whether the correct target object had been selected.

After completing the practice trials, participants completed a brief demographic questionnaire and the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975). Using a procedure adapted from Twenge et al. (2001), we randomly assigned participants to one of three feedback conditions: future alone, future belonging, and misfortune control. To bolster the credibility of the test, we gave participants accurate feedback regarding their extraversion score. In the (crucial) future alone condition, participants were told that they probably would end up alone later in life. Future belonging participants, in contrast, were told that they would have stable, rewarding relationships throughout life. Misfortune control participants were told that they would become increasingly accident prone in future years, with many injuries resulting in broken bones and hospital stays. We included this last condition to ascertain whether any effects of the manipulation would be specific to the threat of social exclusion, as opposed to being caused simply by the threat of a negative future.

After receiving their feedback, participants completed the Brief Mood Introspection Scale (BMIS; Mayer & Gaschke, 1988). The BMIS is a 16-item self-report measure of current emotional state that contains items measuring mood valence (e.g., happy, content) and arousal (e.g., active, peppy). When participants had completed the BMIS, the experimenter informed them that the next part of the study would again involve performing the visual search task. Participants then completed the task, which included facial stimuli that varied in emotional expression. Before each block of trials began, participants were presented with a face and were instructed to familiarize themselves with this face. They were further instructed that they would be searching for this target face among a crowd of faces on subsequent trials. Then, on each trial, participants were presented with a 3×3 matrix of faces that contained the target face and eight distracter faces. Stimulus faces were taken from the Ekman (1971) stimulus set. Target faces displayed either a smiling, sad, or angry facial expression. All stimulus faces displayed closed-mouth expressions.[1] The distracter faces always showed a neutral facial expression and matched the target face's gender. Participants completed 16 trials (eight containing a male target, eight containing a female target) for each target facial expression, for a total of 48 trials. When participants had completed the visual search task, they were debriefed and dismissed.

Dependent measure. The latency of correct responses to identify the target faces was recorded, which provided a measure of the extent to which attention was drawn quickly toward each type of target.[2] Summary measures were created by calculating the mean latency of correct responses to each type of facial expression (the mean latency to respond to smiling, angry, and sad faces), averaged across the 16 targets.

Results

We conducted three one-way analyses of variance (ANOVAs) using mean latency scores to smiling, angry, and sad targets as dependent measures. None of the experimental effects depended

[1] Faces displaying open-mouth expressions were not used because the whiteness of the teeth provided a sharp visual contrast by which participants might locate the face.

[2] Ninety-two percent of all trials were completed correctly, indicating that participants were able to complete the task with a high degree of accuracy.

on the gender of the target (all Fs < 1, ps $> .80$), and therefore, we collapsed analyses across target gender.

Did the threat of social exclusion increase attention to smiling faces? Compared with socially accepted and control participants, participants who experienced the threat of social exclusion were faster to identify smiling faces within a crowd of other faces. Results revealed significant variation between the three experimental conditions on latency to respond to the smiling targets, $F(2, 66) = 5.17$, $p < .01$ (see Figure 1). A 2-1-1 a priori contrast confirmed that future alone participants responded to the smiling targets more quickly than did both future belonging and misfortune control participants, $F(1, 66) = 9.84$, $p < .01$. Planned comparisons showed that future alone participants were faster than future belonging participants to identify the smiling targets, $F(1, 66) = 9.41$, $p < .01$, $d = .90$. Future alone participants were also faster than misfortune control participants at identifying the smiling targets, $F(1, 66) = 5.59$, $p < .03$, $d = .66$. Future belonging and misfortune control participants did not differ from one another ($F < 1$).

Was increased attention specific to smiling target faces? We conducted additional analyses to explore the possibility that the threat of exclusion affected attention to angry or sad faces. No significant variation was observed among the three conditions for either angry targets, $F(2, 66) = 1.07$, $p = .35$, or sad targets ($F < 1$).

Was attention to smiling faces due to differences in mood valence or arousal? To test whether the observed differences were attributable to changes in emotion, we conducted two one-way ANOVAs using scores on the mood valence and arousal subscales of the BMIS as dependent measures. Results revealed marginal variation between the three conditions in terms of their mood valence, $F(2, 66) = 2.54$, $p = .09$, and no significant variation in terms of their arousal, $F(2, 66) = 1.04$, $p = .36$. Controlling for mood valence, the effect of the threat of exclusion on attention to smiling faces remained significant, $F(2, 66) = 4.66$, $p < .02$. These results suggest that the observed effects of the threat of social exclusion were not due to differences in mood valence or arousal.

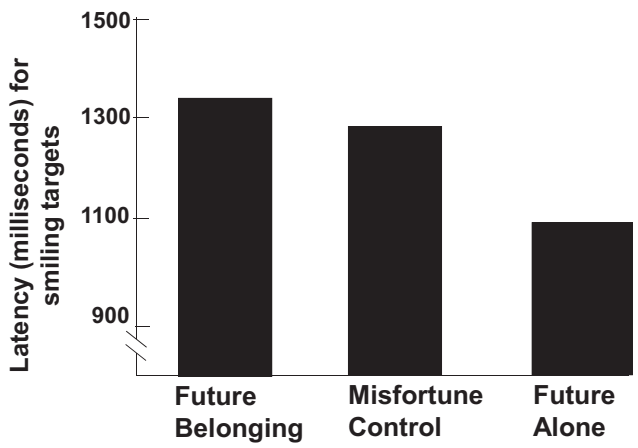

Figure 1. Mean latency (in milliseconds) to identify a smiling face amid a crowd of discrepant faces. Experiment 1.

Discussion

The results of Experiment 1 provide initial support for the hypothesis that, at the level of early-in-the-cognitive-stream processing, the threat of social exclusion increases attention to potential signs of social acceptance. Participants anticipating a lonely future were faster than others to identify smiling faces within a crowd. Smiling faces commonly signal positive interpersonal intentions (Parkinson, 2005); therefore, these findings are consistent with the view that the threat of social exclusion instills a desire to identify potential sources of social reconnection, a desire that is manifested at the level of basic social perception. This pattern was specific to smiling faces: Participants who experienced the threat of social exclusion were no quicker than other participants at identifying angry or sad faces. Thus, the threat of social exclusion facilitated the identification of signs of social acceptance (i.e., smiling faces) but not identification of other targets, including those likely to be taken as signs of social threat. It is important to note that future alone participants were faster than misfortune control participants at identifying smiling targets, suggesting that the effects were due to the threat of social exclusion, rather than merely being due to the forecast of a negatively valenced future.

Experiment 2

In Experiment 2, we sought to replicate and extend the findings of Experiment 1 using a different measure of attention. Whereas the face-in-the-crowd task used in Experiment 1 provides a measure of how quickly participants attended to various stimuli, in Experiment 2, we used an eye-tracking method to provide a direct measure of eye movements, which are a particularly useful measure of visual attention. After undergoing a manipulation that exposed some participants to the threat of social exclusion, participants viewed arrays of faces varying in facial expression, and participants' eye movements were surreptitiously recorded. We predicted that participants threatened with the possibility of exclusion, compared with socially accepted and control participants, would exhibit increased attention to smiling faces.

Method

Participants. Forty-six undergraduates participated in exchange for course credit. Data from two participants were excluded from analysis because an equipment malfunction rendered the majority of their data unusable. This resulted in a sample of 44 participants (29 women, 14 men, 1 unreported).

Materials and procedure. Participants arrived for a study ostensibly investigating the relationship between personality and visual processing. We used the same manipulation as was used in Study 1, in which participants received feedback forecasting a lonely future (future alone), a future filled with positive social relationships (future belonging), or a future filled with injurious mishaps (misfortune control). After undergoing this manipulation, participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item self-report measure of current emotional state that includes items assessing positive affect (e.g., interested, excited) and negative affect (e.g., irritable, ashamed). Participants then were informed that they would complete a task (associated with a

different study) aimed at measuring how the human eye processes visual information. As in previous research (Maner et al., 2003), participants were fit with an eye tracker, which they were told was a color-optics recording device designed to record how the retina processed color stimuli. During the task, a room divider was closed so that the participant was alone in his or her half of the room (although the participant could still hear the experimenter's voice for instructions). Participants were instructed to "look naturally at the screen" throughout the experiment.

After a short calibration procedure, participants viewed filler stimuli consisting of colored fruit and household objects, which reinforced the cover story and also allowed the experimenter to check the accuracy of the eye calibration. Participants then viewed the stimuli of interest.

Participants viewed four arrays, each containing four faces that varied in facial expression. Stimulus faces were taken from the Ekman (1971) stimulus set. Each array contained one smiling face, one angry face, one sad face, and one neutral face. Each array also contained two male and two female faces, such that each combination of target sex and facial expression was presented. Each target individual was pictured displaying each type of expression. Target photos were situated randomly in a square array for presentation on a 21-in. computer monitor. Each array was viewed for 30 s, with 5-s breaks between arrays. Throughout stimulus presentation, participants' eye movements were surreptitiously recorded.

We used an Applied Science Laboratories Series 5000 eye tracker (Bedford, MA), which samples eye saccades at 60 Hz (i.e., 60 samples per second) and is accurate to within one to two degrees visual angle (approximately half an inch of monitor space). The eye tracker sat atop a small lightweight headband placed on the participant's head and was equipped with a magnetic head tracker, which allowed for natural head movement throughout stimulus presentation. When participants had finished viewing the stimuli, they were probed for suspicion, debriefed, and dismissed.

Dependent measure. The proportion of time spent fixating on each target was recorded, which provided a measure of attention directed toward each target face. An eye fixation was recorded whenever the participant attended to a given target photograph for at least 10 ms. Summary measures were created by calculating the proportion of total fixation time spent attending to a particular type of facial expression (e.g., the proportion of total fixation time spent attending to smiling faces), averaged across the four arrays.

Results

We conducted one-way ANOVAs to assess the effects of the experimental manipulation on attention to smiling, sad, angry, and neutral faces (see Figure 2). As in Experiment 1, none of the experimental effects depended on the gender of the target (all Fs < 1, ps $> .23$), and therefore, we collapsed analyses across target gender.

Did the threat of social exclusion promote attention to smiling faces? Participants threatened with social exclusion fixated on smiling faces to a greater extent than did participants in the other conditions. Results revealed significant variation between the three experimental groups for attention to smiling faces, $F(2, 41) = 7.02$, $p = .002$. A 2-1-1 a priori contrast confirmed that the attention of future alone participants was fixated on smiling faces to a greater extent than was the attention of future belonging and misfortune control participants, $F(1, 41) = 13.28$, $p = .001$. Planned comparisons showed that future alone participants spent more time attending to smiling faces than did misfortune control participants, $F(1, 41) = 13.09$, $p = .001$, $d = 1.38$, and future belonging participants, $F(1, 41) = 8.17$, $p < .01$, $d = 1.07$. Future belonging and misfortune control participants did not differ from one another with respect to attention to smiling faces ($F < 1$). Thus, future alone partici-

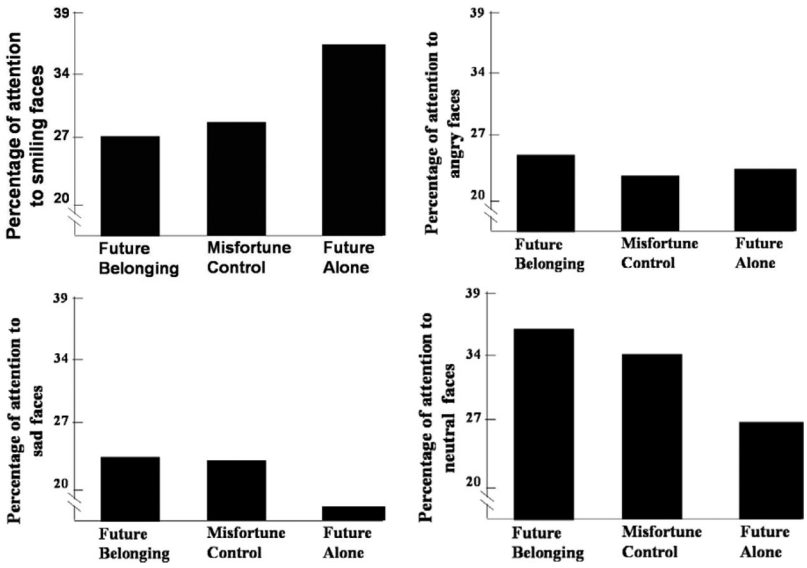

Figure 2. Average proportion of time spent attending to smiling, sad, angry, and neutral facial expressions as a function of experimental condition. Experiment 2.

pants spent more time than future belonging and misfortune control participants attending to smiling faces.

Did the threat of exclusion increase attention to nonsmiling faces? No significant effects of the manipulation were observed for attention to angry, $F(2, 41) = 1.34$, $p = .27$, or neutral faces, $F(2, 41) = 1.19$, $p = .32$. We did observe an unpredicted effect of the manipulation on attention to sad faces. Compared with future belonging and misfortune participants, future alone participants spent less time attending to sad faces. Results revealed significant variation between the three experimental groups, $F(2, 41) = 5.19$, $p = .01$. A 2-1-1 focused contrast confirmed that future belonging and misfortune control participants attended to sad faces to a greater extent than did future alone participants, $F(1, 41) = 8.80$, $p = .005$. Post hoc pairwise comparisons revealed that future alone participants had their attention captured by sad faces less than did future belonging participants, $F(1, 41) = 10.28$, $p = .003$, $d = 1.24$, or misfortune control participants, $F(1, 41) = 4.32$, $p < .05$, $d = 0.93$. Future belonging and misfortune control participants did not differ with respect to their attention to sad faces, $F(1, 41) = 1.12$, $p = .30$.

Was attention to smiling faces due to differences in positive or negative affect? To assess whether the effects resulted from fluctuations in mood, we conducted two one-way ANOVAs using scores on the Positive Affect and Negative Affect subscales of the PANAS as dependent measures. Results revealed no significant variation between the three experimental groups in terms of positive affect or negative affect (both Fs < 1, ps $> .42$). Thus, we observed no evidence to suggest that the observed effects were attributable merely to differences in positive or negative affect.

Discussion

The results from Experiment 2 provide additional evidence suggesting that, at the level of early-stage perceptual processing, the threat of exclusion promotes heightened attention to signs of renewed social acceptance. Compared with participants in the other two conditions, participants for whom threat of social exclusion was salient attended preferentially to smiling faces—a social stimulus that signals a high likelihood of social acceptance. The increased attention to signs of social acceptance was specific to people who experienced the threat of social exclusion. Participants in the misfortune control group, who received a forecast of an unpleasant future involving accidents and injuries, did not show increased attention to smiling faces or decreased attention to sad faces. The threat of exclusion, as opposed to a negatively valenced forecast, was apparently the crucial cause.

We also observed that people who experienced the threat of social exclusion were less inclined than other participants to attend to sad faces. This may, in part, reflect the inherent tradeoff in attention to different faces in this experiment: Attending to one type of face necessarily reduced attention to other faces. That attention to sad faces, in particular, was reduced among participants threatened by the possibility of exclusion could reflect the fact that these participants were less inclined to dwell on signs of further social disconnection (a possible reminder of their recent exclusionary experience) than to look toward signs of renewed social acceptance.

As in Experiment 1, there was no evidence that effects of the threat of exclusion were driven by positive or negative affect. Participants who experienced the threat of social exclusion did not report levels of positive affect or negative affect that differed from socially accepted and control participants. This is consistent with previous research suggesting that the threat of social exclusion tends to promote emotional numbness, rather than salient affective responses (DeWall & Baumeister, 2006). Overall, the results of Experiment 2 provide additional evidence that participants who were given a future diagnostic forecast of social exclusion showed increased attention to signs of social acceptance.

Experiment 3

Experiments 1 and 2 provided consistent evidence in support of the hypothesis that the threat of social exclusion increases attention to signs of social acceptance. Experiment 3 was designed to pinpoint further the specificity of this attentional attunement. Participants in Experiments 1 and 2 who were threatened by the possibility of exclusion showed heightened attention to smiling faces, but this effect, in part, could reflect attention to positively valenced stimuli in general, as opposed to stimuli specifically denoting social acceptance. To address this possible alternative explanation, we led participants in Experiment 3 to anticipate a lonely future, a future filled with social acceptance, or a future filled with frequent accidents, and they then viewed arrays of positive nonsocial images, neutral nonsocial images, and faces varying in their expression. While they viewed the arrays, participants' eye movements were surreptitiously recorded. If attention to smiling faces reflects a desire for social acceptance, then the threat of exclusion should increase attention to smiling faces but not to positive images that are unrelated to gaining social acceptance.

Method

Participants. Eighty-five undergraduates (61 women, 24 men) participated in exchange for partial course credit.

Materials and procedure. Participants arrived at the laboratory individually for a study concerning the relationship between personality and color perception. After giving informed consent, participants completed the Eysenck Personality Questionnaire and received accurate extraversion feedback. Next, participants were exposed to the same manipulation used to expose participants to the threat of social exclusion as in Experiments 1 and 2. By random assignment, participants were informed that they had a personality type in which they could anticipate a lonely future (future alone), a future filled with positive and lasting relationships (future belonging), or a future filled with frequent physical injuries (misfortune control). After receiving the feedback, participants completed the PANAS.

Participants then completed an eye-tracking task that ostensibly would measure how the eye processes color. After a short calibration procedure, participants viewed one filler array and four arrays that contained the stimuli of interest. The stimuli and procedure for this task were identical to those used in Experiment 2, with one exception. Participants viewed arrays containing six images instead of four images (one smiling face, one angry face, one sad face, and one neutral face). One of the additional images in each array was a neutral nonsocial image (e.g., a wooden stool) taken from the International Affective Picture System (Lang et al.,

2005). The additional image consisted of a positive nonsocial image (e.g., a landscape).

A sample of undergraduates ($n = 30$) rated the images used in the arrays on a 1 (*not at all positive*) to 7 (*extremely positive*) scale. Results from a paired-samples t test revealed that smiling faces ($M = 6.41$, $SD = .45$) were rated as equivalent to positive nonsocial images ($M = 6.42$, $SD = .63$) in terms of their overall positivity, $t(29) = .07$, $p < .95$. Compared with sad faces, angry faces, neutral faces, and neutral nonsocial images, the smiling faces and positive nonsocial images were rated as more positive (all ts > 16.16, ps $< .001$). Thus, two of the six images in each array were equally positive in valence, but only one of the images represented a positive social image denoting social acceptance. After participants viewed the stimuli, they were probed for suspicion, debriefed, and dismissed.

Dependent measure. As in Experiment 2, the proportion of time spent fixating on each target was recorded, providing a direct measure of attention directed toward each target face. Eye fixations were recorded whenever the participant attended to a given target image for at least 10 ms. Summary measures were created by calculating the proportion of total fixation time spent attending to a particular type of target (e.g., the proportion of total fixation time spent attending to smiling faces), averaged across the four arrays.

Results

We conducted one-way ANOVAs to assess the effects of the social-exclusion manipulation on attention to smiling faces, sad faces, angry faces, neutral faces, neutral nonsocial images, and positive nonsocial images. None of the experimental effects were qualified by the sex of the target.

Did the threat of social exclusion increase attention to signs of social acceptance? Compared with future belonging and misfortune control participants, future alone participants fixated more of their attention on smiling faces. Results revealed significant variation among the three experimental groups, $F(2, 82) = 4.06$, $p = .02$. A 2-1-1 contrast confirmed that future alone participants attended to smiling faces more so than did both future belonging and misfortune control participants, $F(1, 82) = 7.81$, $p < .01$. Planned comparisons showed that, compared with future belonging participants ($M = .17$, $SD = .07$), future alone participants ($M = .22$, $SD = .09$) spent more time attending to smiling faces, $F(1, 82) = 7.28$, $p < .01$, $d = .62$. In addition, future alone participants ($M = .22$, $SD = .09$) fixated their attention on smiling faces more than did misfortune control participants ($M = .18$, $SD = .07$), $F(1, 82) = 4.50$, $p < .04$, $d = .50$. Future belonging and misfortune control participants did not differ in terms of the amount of time spent fixating on smiling faces ($F < 1$).

Did the threat of social exclusion increase attention to positive nonsocial targets? There was no evidence that future alone participants attended to positive nonsocial targets more than did future belonging and misfortune control participants. Results revealed no significant variation among the three experimental groups ($F < 1$). These findings indicate that the threat of social exclusion did not increase attention to positive stimuli in general.

Did the threat of social exclusion increase attention to nonsmiling faces? No evidence was observed to suggest that threat of exclusion affected attention to any social targets other than smiling faces. No experimental effects emerged for angry faces, sad faces, neutral faces, or neutral nonsocial targets (all Fs < 1.75, ps $> .18$).

Was attention to smiling faces due to differences in positive or negative affect? We tested the possibility that the current effects were due to differences in mood. No differences were detected among the three experimental groups in terms of positive or negative affect (both Fs < 1). These findings suggest that increased attention to smiling faces was not due to changes in mood.

Discussion

Experiment 3 provided additional evidence consistent with the hypothesis that the threat of social exclusion influences early-stage attentional processes in a manner that is specific to signs of social acceptance. Consistent with the previous studies, participants who anticipated a lonely future fixated their attention on smiling faces more than did participants who expected a future filled with social acceptance or a future marred by frequent, serious physical injuries. In contrast, participants threatened by the possibility of exclusion did not show heightened attention to images that were positively valenced but that were nonsocial in nature. Thus, attentional attunements following a threat of social exclusion were unique to stimuli that represent potential sources of renewed affiliation.

Experiment 4

The main purpose of Experiment 4 was to provide converging evidence using a different method for manipulating the threat of social exclusion and a different measure of attention. Experiments 1–3 used a manipulation that constituted a threat of a social exclusion insofar as participants were led to believe that something about their personality would cause them to be rejected in the future. Experiment 4 used a more immediate manipulation of social exclusion. We used a procedure developed by Maner, DeWall, and colleagues (DeWall, Baumeister, & Vohs, in press; DeWall, Twenge, Gitter, & Baumeister, in press; Maner, DeWall, et al., 2007; see also Bushman, Bonacci, Van Dijk, & Baumeister, 2003). Participants viewed and sent video messages to a same-sex confederate with whom a future interaction was anticipated. Some participants were told that their partner had to leave unexpectedly and would not be able to meet them. Others were informed that their partner refused to work with them. Thus, the interaction was cut short in both conditions, but only in the social exclusion condition did participants believe it was specifically due to a negative evaluation of the participant.

In the current study, we evaluated the extent to which participants would attend to smiling, angry, or disgust expressions. By including faces displaying a disgust expression, in addition to angry faces, we were able to test more fully the possibility that social exclusion would increase attention to signs of social disapproval, as well as to signs of social acceptance.

To measure attentional bias, we used a visual cueing task—commonly referred to as a *dot-probe task* (Fox, Russo, Bowles, & Dutton, 2001). This type of task involves participants identifying the location of a probe after viewing faces showing a variety of facial expressions. This task allowed us to assess the extent to which participants initially oriented toward particular stimulus

faces (attentional engagement), as well as the extent to which participants were able to pull their attention away from particular faces once they were perceived (attentional disengagement). Previous research suggests that goal-directed attentional biases are more commonly observed when people try to disengage their attention from a particular stimulus, rather than when people first orient toward a stimulus (e.g., Fox et al., 2001; Salemink, van den Hout, & Kindt, 2007). For example, people high in anxiety (who are particularly concerned with signs of threat) are slower than other people to disengage their attention from threatening stimuli but do not show differences in how quickly they initially orient toward threatening stimuli (e.g., Fox et al., 2001; Koster, Crombez, Verschuere, & De Houwer, 2006; Salemink et al., 2007). Thus, we expected that attention to signs of social acceptance might be especially apparent at the stage of attentional disengagement. That is, we predicted that smiling faces would capture the attention of excluded participants, so that those participants would be slower than other participants when pulling their attention away from smiling faces.

Method

Participants. Sixty-six undergraduates participated in this study in exchange for partial course credit. Data from 2 participants were excluded because of equipment malfunction, leaving 64 participants (36 women, 27 men, 1 unreported) in the final sample.

Materials and procedure. Participants arrived at the laboratory individually for a study ostensibly concerning how limitations on initial meeting encounters relate to cognitive functioning. After giving informed consent, participants were instructed that they would send video messages back and forth with another same-sex participant and would then complete an interaction with the participant. The experimenter informed the participant that his or her partner had arrived at the laboratory early and would send the first video message. In reality, no partner existed. The experimenter informed the participant that, while the partner was completing the video message, the participant would complete some practice trials on a visual discrimination task (see below for procedural details about the task). The pictures used in the practice trials were neutral images (e.g., stool, clock) taken from the International Affective Picture System (Lang et al., 2005).

When participants had finished the practice trials, the experimenter returned to the participant's room with a video clip from the partner. The video clip depicted a same-sex confederate responding to a series of general questions regarding his or her personal and career goals. The experimenter left the room while the participant watched the video clip, which lasted approximately 3 min.

After the participant had watched the video clip, the experimenter returned and recorded a response video of the participant responding to the same questions the partner was asked in his or her interview. The experimenter then left with the tape, ostensibly bringing it for the partner to watch. Approximately 5 min later, the experimenter returned and delivered the social exclusion manipulation. Participants assigned to the irrelevant departure condition were told:

> I am not sure what happened, but your partner won't be able to meet you . . . I guess s/he has to leave all of a sudden to go to something s/he forgot about . . . well, hmm, I guess you won't be meeting each other.

Participants in the social exclusion condition were told:

> I am not sure what happened, but your partner doesn't want to meet you . . . Um, do you guys know each other or something? (waiting for the participant to say no) . . . well, hmm, I guess we won't be doing the task where you meet each other, because I cannot ask a participant to do something that s/he is not comfortable with.

Thus, in both cases the interaction was cut short, but only participants in the social-exclusion condition were specifically excluded because of a negative evaluation from the partner.

Participants then completed the PANAS (Watson et al., 1988). Afterward, participants completed the experimental trials of the dot-probe task. The images used in the experimental trials were selected from the MacArthur Network Face Stimuli Set[3] (http://www.macbrain.org/faces/index.htm), developed by the Research Network on Early Experience and Brain Development. The entire MacArthur facial expression stimuli set consists of color photographs of 646 different facial expression stimuli displayed by a variety of models across different genders and ethnicities. Stimuli consisted of equal numbers of male and female faces displaying a neutral, smiling, angry, or disgust expression. Half of the faces were Caucasian, whereas the other half of the faces were African American.

Participants were instructed that their job was to detect the location of a small dot as quickly as possible. The dot could appear on the left or the right side of the screen, and the participant's task was to indicate on which side of the screen the dot appeared by pressing one of two keys (*E* if the dot appeared on the left side and *I* if the dot appeared on the right side) as quickly as possible. Prior to the appearance of the dot, two faces were presented simultaneously, one on the left side of the screen and one on the right. Each of the 24 picture pairs (eight smiling, eight angry, and eight disgust expressions paired with the neutral expression of the same actor) was presented four times, for a total of 96 trials. The trials were presented in a randomized order. Each trial began with a fixation cross in the middle of the screen for 1,000 ms. After 1,000 ms, the fixation cross was replaced by one of the face pairs, which appeared for 1,000 ms. One face depicted an expression (smiling, angry, disgust), and one face displayed a neutral facial expression. Whether the expressive face appeared on the left versus right side of the screen was randomized. After 1,000 ms, the images disappeared, and a small gray dot appeared on either the left or the right side of the computer screen. Participants indicated the location of the dot as quickly and accurately as possible by pressing either the *E* or the *I* key. The location of the gray dot (left vs. right side) was randomized.

The task was designed so that on half of the trials, the probe appeared in the same location as the emotional face (*engagement trials*), whereas on the other half of the trials, the probe appeared in the location of the other, neutral face (*disengagement trials*).

[3] Development of the MacBrain Face Stimulus Set was overseen by Nim Tottenham and supported by the John D. and Catherine T. MacArthur Foundation Research Network on Early Experience and Brain Development. Please contact Nim Tottenham at tott0006@tc.umn.edu for more information concerning the stimulus set.

Response latencies on engagement trials provided an index of how quickly attention was initially captured by faces displaying particular emotional expressions. Response latencies on disengagement trials provided an index of how long it took participants to disengage their attention from the emotion face and to shift attention to the neutral face. Trials in which the participant categorized the location of the object incorrectly were excluded from analysis (less than 1% of all trials). After completing the dot-probe task, participants were debriefed and dismissed.

Results

We conducted one-way ANOVAs to assess the effects of the social-exclusion manipulation on attentional engagement and disengagement to smiling, angry, and disgust faces. Attentional bias did not differ as a function of target sex or target race (both Fs $<$ 1). Therefore, latency scores were collapsed across target sex and target race.

Did personal exclusion influence attention to smiling faces? Compared with irrelevant departure participants, personally excluded participants were slower to disengage their attention from smiling faces. When the target face displayed a smiling expression, personal-exclusion participants ($M = 1011.66$, $SD = 130.20$) had longer reaction times on disengagement trials than did irrelevant departure participants ($M = 954.07$, $SD = 96.80$), $F(1, 62) = 4.07$, $p < .05$, $d = .50$. Reaction times for engagement trials did not differ by experimental condition ($F < 1$). Thus, peer exclusion appeared to increase the amount of time it took participants to disengage their attention away from smiling faces, although it did not appear to influence the speed with which participants initially oriented their attention toward smiling faces.

Did personal exclusion influence attention to threat faces? There was no evidence to suggest that personal exclusion affected attention to faces showing an expression of disgust or anger. No experimental effects were observed for either angry or disgust targets on engagement or disengagement trials (all Fs < 2.15, ps $> .15$).

Was attention to smiling faces due to positive or negative affect? To determine whether the effects were due to differences in mood, we conducted two one-way ANOVAs using positive affect and negative affect scores of the PANAS as dependent measures. Results revealed no significant differences between conditions for either positive affect or negative affect (both Fs < 1). These findings suggest that increased attention to smiling faces was not attributable to positive affect or negative affect.

Discussion

Experiment 4 provided further evidence that social exclusion causes individuals to attend preferentially to stimuli that are linked to gaining social acceptance. The findings extend those of Experiments 1–3 and address some possible limitations of those studies. Experiment 4 demonstrated that peer exclusion produces attentional attunements to smiling faces that are similar to those found in response to a forecast of future social exclusion. Second, these findings join with the previous studies in suggesting that the threat of social exclusion did not increase attention to signs of social threat. Excluded participants did not differ from irrelevant departure participants in their attention to faces expressing anger or disgust.

In addition, results from this study help pinpoint the particular stage of attention at which smiling faces received preferential processing. Results suggest that excluded participants were relatively slower than other participants at disengaging their attention from smiling faces. In contrast, excluded participants were no faster than others when initially orienting toward smiling faces. These results are similar to previous studies using dot-probe tasks, which have shown that selective attention to goal-relevant stimuli involves attentional processes responsible for disengagement more than those responsible for engagement (e.g., Fox et al., 2001; Koster et al., 2006; Salemink et al., 2007).

General Discussion

The threat of social exclusion can have a substantial impact on psychological and interpersonal processes, and an extensive literature has documented some of the consequences of social exclusion. The vast majority of studies on the interpersonal effects of exclusion have focused on outcomes such as overt choices and behaviors (e.g., aggression, prosocial behavior). Previous studies have left relatively unexplored the more basic, early-in-the-cognitive stream processes assumed to underlie these "downstream" consequences. Indeed, basic, lower-order social perceptual processes are important, in part because they provide the building blocks for higher-order cognition and action.

Findings from the current experiments provided consistent support for the hypothesis that the threat of social exclusion increases attention to signs of social acceptance. Using a variety of tasks to assess attention (face in the crowd, eye tracking, dot probe), these studies demonstrated that participants threatened by the possibility of exclusion attended selectively and preferentially to smiling faces. Previous research has shown that smiles often serve to communicate benevolent interpersonal feelings and intentions, and therefore, attention to smiling faces is consistent with a desire for compensatory social acceptance following the threat of social exclusion.

Findings from this research also begin to delineate the specific stage of processing at which selective attention to signs of social acceptance occurs. Cognitive neuroscience research suggests that attentional processes include three subsystems responsible for disengaging attention from a particular stimulus, orienting attention to a second stimulus, and engaging that second stimulus (Posner & Peterson, 1990). The current findings (Study 4) suggest that excluded individuals were slower at pulling their attention away from smiling faces, although they were not quicker at initially orienting toward those faces. This is consistent with evidence that attentional biases occur more powerfully during disengagement than during orienting (Derryberry & Reed, 1994; Fox et al., 2001; Fox, Russo, & Dutton, 2002). Nevertheless, most methods for assessing attentional biases fail to distinguish adequately orienting from disengagement, and our methods are no exception (see Fox et al., 2001, for additional discussion). Further research is needed to pinpoint the specific stage(s) of perceptual processing at which sensitivity to signs of acceptance occurs.

The attentional biases observed in these studies were highly target specific. No evidence was observed in any of these studies that suggested that threat of exclusion affected attention to signs of

social threat (angry or disgust faces). On one level, this seems to break with previous evidence suggesting that a lack of social connectedness increases monitoring of social information denoting both acceptance and social disapproval (Gardner et al., 2000, 2005; Pickett et al., 2004). One possible explanation for the discrepant findings lies in the nature of the cognitive processes being examined. Previous studies have examined processes such as memory, for which it is possible to display heightened processing of positive and negative social cues simultaneously: Memory for one type of social stimulus does not necessarily detract from memory for other stimuli. Studies of selective attention, in contrast, allow stimuli to compete for attention. This competition reflects a common tradeoff in people's processing of the social world: attending to one stimulus necessarily detracts from one's ability to attend to other stimuli. As demonstrated in the current studies, under these conditions, attention to signs of acceptance seems to trump attention to signs of social threat, thus suggesting that the desire for compensatory social acceptance may outweigh the desire to avoid further social harm.

An unanticipated result from Experiment 2 was that, compared with other participants, participants who had experienced the threat of social exclusion attended less to sad faces. This decrease in attention to sad faces could reflect a desire to attend away from reminders of their recent threat of social exclusion; sad faces have been shown to be relevant to depression (Gotlib, Krasnoperova, Yue, & Joorman, 2004), and there is an abundance of research showing that depressed individuals are frequently rejected (e.g., Coyne, 1976; Strack & Coyne, 1983). Further research is necessary, however, to evaluate this possibility directly.

Design features of the current studies also allowed us to rule out the possibility that attention to smiling faces reflected a general affective phenomenon, as opposed to a phenomenon specific to social affiliation. First, no evidence was observed to suggest that effects of exclusion were mediated by changes in general positive or negative affect. This is consistent with previous studies indicating that the threat of exclusion initially evokes emotional numbness, rather than heightened negative emotion (DeWall & Baumeister, 2006). Second, attention was specific to positive signs of social acceptance, as opposed to positive stimuli more generally. Participants threatened by exclusion in Experiment 3 increased their attention to smiling faces, but they did not increase their attention to equally positive nonsocial stimuli.

How might results from the current studies be reconciled with previous evidence for interpersonal contempt and aggression among excluded individuals? Previous findings depict the person threatened by exclusion as eager to explore possibilities for new friendships but inclined to do so in a cautious and judicious manner (Maner, DeWall, et al., 2007). That is, the threat of social exclusion causes people to become keen to pursue social acceptance, but only from individuals who seem to represent immediate and promising prospects for social acceptance. When others appear to be less promising in terms of the potential for social connection, excluded people tend to behave in a relatively more hostile manner (e.g., Twenge et al., 2001). This depiction of the excluded person is consistent with findings from the current experiments. In all four experiments, people who experienced the threat of social exclusion attended to smiling faces, which typically serve as unambiguous and promising signs of social acceptance. It may well be that individuals threatened with the possibility of social exclusion would be less inclined to attend to others for whom likelihood of renewed affiliation was more questionable.

It is notable that we found evidence for attention to smiling faces both when participants were given a negative forecast of future social exclusion (Experiments 1–3) and when they experienced an immediate form of exclusion (Experiment 4). This suggests that, even in the absence of an immediate exclusionary experience, the threat of possible future social exclusion can activate psychological mechanisms aimed at achieving compensatory social acceptance. These findings are consistent with several previous studies suggesting that immediate peer exclusion and anticipated social exclusion have similar effects on psychological and interpersonal processes (e.g., Baumeister et al., 2005; Maner, DeWall, et al., 2007; Twenge et al., 2001).

Thus, findings from the current experiments are consistent with previous evidence suggesting a compensatory desire for renewed social affiliation among people who experience the threat of social exclusion. The specific attentional attunement to smiling faces observed in the current investigation fits with previous evidence that excluded people choose situations with opportunities for positive social interaction, judge others as friendly and welcoming, and behave in a prosocial fashion toward others who represent good prospects for future friendship (Maner, DeWall, et al., 2007). The current findings go beyond those previous findings, however, and suggest that the threat of exclusion promotes a desire for social acceptance that manifests itself not only in people's overt choices, judgments, and behavior but also in basic patterns of early-stage social cognition.

Limitations and Future Directions

The experiments reported in this article provide consistent evidence that the threat of social exclusion causes attentional attunements to signs of social acceptance. There are, however, limitations to consider, in part because they provide useful avenues for further research. One limitation pertains to the stimuli used in these studies. An ecological approach assumes that perception is adaptively tuned to pick up information in a dynamic environment (Gibson, 1979). The stimuli used in the current experiments were static photographs of individuals on a computer screen. We speculate that attention to dynamic displays (e.g., observations of people at a social gathering) would be even more likely to show attention to signs of acceptance, although this remains an empirical question.

A smiling facial expression is a rich cue that signals social interest, but other cues can modify the meaning of a smiling face and could, in turn, alter the extent to which such a face would be perceived as a sign of social acceptance. Gaze direction, for example, can dramatically alter the meaning of a facial expression (Adams, Gordon, Baird, Ambady, & Kleck, 2003). The stimuli used in the current experiments all involved facial displays with gaze directed at the participant, which generally reflects direct interaction with the perceiver (Adams & Kleck, 2003). In contrast, a smiling face with an averted gaze direction may signal a response to some other person or event in the environment. In turn, a smiling face with averted gaze may be less likely to capture the attention of a person threatened by social exclusion, because such a face would be less likely to communicate social intentions to the perceiver. Future research might profitably examine the extent to

which facial expression works in concert with other cues, such as gaze direction, to influence perceptual processes among excluded individuals. Moreover, although facial expressions serve as rich sources of social information, there are others ways to communicate positive interpersonal intentions and a desire for social interaction. Research might examine the extent to which exclusion promotes attention to signs of acceptance that are communicated through a range of modalities (e.g., body language, vocal tone, overt expressions of social interest).

Another limitation is that our measures of emotional response may have lacked sufficient conceptual and contextual specificity to demonstrate an emotional link between the threat of social exclusion and attentional attunement to signs of acceptance. The PANAS and BMIS measure general affective states instead of specific emotions that might be relevant to rejection, such as anger (Chow, Tiedens, & Govan, 2008; for a review, see Leary, Twenge, & Quinlivan, 2006). The PANAS and BMIS are also context-free in that they assess global affect instead of affect specifically related to the exclusionary experience; asking people to rate their emotion within the context of the exclusionary experience may yield results that differ from those reported in the current article. More generally, prior work has questioned the utility of retrospective measures of emotion (Ross, 1989). Consequently, future work may benefit from using physiological measures to assess emotional responses to exclusion. Recent research, for example, has used measures of cortisol reactivity to uncover stressful responses among excluded individuals (Blackhart, Eckel, & Tice, 2007).

A final limitation pertains to individual differences. Because the need to belong is a fundamental human motivation, most individuals should seem inclined to direct their attention to signs of acceptance, especially when they are threatened by the possibility of social exclusion. There are reasons to think, however, that some people may be inclined to shy away from others—even those exhibiting strong cues to acceptance—following the threat of social exclusion. People with high levels of social anxiety, for example, sometimes display exaggerated signs of social withdrawal following exclusion (Barlow, 2002; Maner, DeWall, et al., 2007; see also Brown, Silvia, Myin-Germeys, & Kwapil, 2007). To the extent that threat of social exclusion promotes social withdrawal, attention to signs of social acceptance might be attenuated among socially anxious people. Indeed, there may even be reason to suspect that highly anxious people, unlike participants in the current studies, would become hypervigilant to signs of social threat (e.g., angry faces) after experiencing the threat of social exclusion. Future research would benefit from examining this possibility.

Concluding Remarks

The current findings provide important confirmation that the need for social belonging operates like many other motivations, in the sense that when it is thwarted, people look for new ways to satisfy it. Indeed, the threat of social exclusion appears to precipitate patterns of early-stage social perception that reflect a desire for renewed social acceptance. At a broader conceptual level, the current investigation highlights the utility of integrating a focus on basic, early-stage social perceptual processes with research on social relationships. Selective attentional processes provide the building blocks for higher-order social cognition and action. Incorporating a functionalist ecological approach to early-stage social perception facilitates the development of psychological theories of social affiliation and exclusion and provides fertile ground for future empirical work.

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