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A Tale of Two Threats: Social Anxiety and Attention to Social Threat as a Function of Social Exclusion and Non-Exclusion Threats

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Abstract

To attain and maintain social acceptance, people may attend to cues of possible social rejection or exclusion. Attention to such cues can be influenced by social anxiety. Two competing theories address social anxiety and attention: hypervigilance to versus avoidance of negative social cues. We propose a synthesis of these models such that, in the absence of social exclusion, socially anxious people may be hypervigilant to negative social cues. However, after experiencing social exclusion, they may avoid negative cues in favor of cues signaling social acceptance. Eyetracking was used to examine attention to negative, happy, and neutral faces after social exclusion threat or a non-exclusion threat ($N = 27$, 69.2% female). Fear of negative evaluation, a core component of social anxiety, was assessed using the *Brief Fear of Negative Evaluation (BFNE) scale* (Leary 1983). Among individuals with high BFNE, non-exclusion threat elicited greater attention toward negative faces than did social exclusion threat. However, social exclusion threat relative to non-exclusion threat was related to greater attention to positive faces among those with high BFNE. These effects were not observed among those with low BFNE. Thus, data provide preliminary support for a synthesized model.

Keywords

Shyness; Social anxiety; Exclusion; Belongingness; Attention; Individual differences

The benefits of social connectedness are substantial. People who have a life marked by social connectedness demonstrate better physical and emotional health than people who experience social exclusion (Berkman et al. 1992; Cacioppo et al. 2006). The rewards of social inclusion highlight the importance of thinking, feeling, and behaving in ways that reduce one's chances of experiencing social exclusion. Vigilance to cues that signal social exclusion may prove beneficial because early detection that certain behaviors cause others to show signs of social disapproval (e.g., through negative facial expressions) could allow people to change how they behave to increase their chances of gaining social acceptance (e.g., Ohman et al. 2001). This

ability to change the self to remain in agreement with standards for socially desirable behavior is linked to having rewarding relationships with others (Finkel and Campbell 2001). Thus, people who exert some vigilance to social exclusion cues may have an easier time establishing and maintaining harmonious social relationships.

However, the benefits of vigilance to cues signaling social exclusion appear to be dose dependent and particular personality traits may be associated with potentially harmful attentional biases regarding these cues. In fact, attentional biases related to signs of social disapproval are thought to play etiological and/or maintaining roles in social anxiety, the upper end of the continuum of the personality trait shyness (Rapee and Heimberg 1997; Schmidt et al. 2009). There is some disagreement, however, regarding how attentional biases influence the ways in which socially anxious people process information. Some theoretical models assert that social anxiety is associated with attentional bias *toward* social threat cues in an effort to rapidly detect signs of negative evaluation (Rapee and Heimberg 1997) and some data support this contention (Asmundson and Stein 1994; Buckner et al. 2009; Hope et al. 1990; Mattia et al. 1993; Mogg and Bradley 2002; Pishyar et al. 2004). Other models suggest that socially anxious people *avoid* social cues that may signal negative evaluation in an effort to manage anxiety and reduce the likelihood of experiencing adverse social interactions (Hope et al. 2000) and some data support this view (Chen et al. 2002; Horley et al. 2003).

These two perspectives seem in opposition, but it is possible that both can be accurate—albeit under different circumstances. Social anxiety may diminish or enhance attention to social threat as a function of whether the threat is directly related to or unrelated to social exclusion. Socially anxious individuals are thought to attend to social threats so as to detect signs of possible negative evaluation; in this way they can then adjust their behaviors to be more acceptable, thereby preventing social exclusion (Rapee and Heimberg 1997). Thus, until they receive information signaling social exclusion, they may be hypervigilant for social threat cues (e.g., negative facial expressions). However, if socially anxious people perceive that they have been socially excluded, they may no longer need to allocate their attention toward socially threatening stimuli; indeed, they may attend away from social threat cues and may even begin to attend preferentially to stimuli that increase their chances of gaining social acceptance. In fact, social exclusion has been found to increase desire for compensatory social interaction, and a smiling facial expression is often an unambiguous sign that one is willing to engage in a positive interpersonal interaction (Maner et al. 2007).

To date, there are no data ascertaining whether receiving feedback signaling social exclusion influences attention to social cues among individuals with high trait social anxiety. There is some evidence suggesting the context in which attention is examined affects attentional processes among socially anxious people. Several studies have shown that *anticipation* of social evaluation might affect attention to social threat cues among those with high social anxiety. Amir et al. (1996) examined attentional processing among patients with DSM-III-R social phobia (also known as social anxiety disorder or SAD) and non-clinical controls before and after participants were informed they would engage in an evaluative task. They found that when not anticipating evaluation, patients with SAD demonstrated attentional bias toward social threat (compared to physical threat words). But in anticipation of the evaluative task, patients with SAD did not demonstrate this bias, suggesting that anticipation of evaluation may actually attenuate bias toward social threat cues. However, Garner et al. (2006) found that when participants were not under threat of evaluation, those with high social anxiety (scores greater than 39 on the brief Fear of Negative Evaluation (BFNE) questionnaire; Leary 1983) did not differ from those with low social anxiety (BFNE scores less than 30) on attention to faces. But in anticipation of a socially evaluative task, individuals with low social anxiety fixated longer on emotional faces (positive and negative) relative to neutral ones, whereas people with high social anxiety did not demonstrate this bias. Mansell et al. (1999) found, however, that relative

to low socially anxious people, high socially anxious people demonstrated a bias away from faces (regardless of emotional valence) when under threat of having to perform an evaluative task. However, attempts to replicate this pattern were unsuccessful (Sposari and Rapee 2007).

The present study set out to extend prior work in three ways. First, this is the only known study to test whether social anxiety influences attention to negative social stimuli (faces exhibiting negative emotions) as a function of experiencing the threat of social exclusion versus feedback that is negative but unrelated to social exclusion. Second, tests were conducted to examine whether threat of social exclusion, relative to a non-exclusion threat, affected attention to positive and neutral faces. Third, eyetracking was used to provide a direct measure of attentional bias. It was hypothesized that in response to a non-exclusion threat, higher social anxiety would be associated with greater attention toward negative faces. It was also hypothesized that after experiencing the threat of social exclusion, people with higher social anxiety would exhibit less attention to negative faces and greater attention to positive faces. No differences were expected for neutral faces.

Method

Participants

The sample was comprised of 26 undergraduates participating in exchange for research credit. Participants were primarily female (69.2%) and Caucasian (84.6%). Ages ranged from 18 to 22 ($M = 18.9$, $SD = 1.0$).

Stimulus Photos

Each participant viewed four arrays, each of which contained four faces (two male, two female) that contained one happy, one sad, one angry, and one neutral face. Nine different individuals were used from the Ekman pictures of facial affect (Ekman and Friesen 1976). Each combination of target sex and facial expression was presented. Locations of the emotional expressions were counterbalanced across trials.

Measures

Visual Fixations—Regions of interest were defined by creating area of interest (AOI) files for each target photo within each visual array. Each AOI covered the top left corner surrounding the face to the bottom right corner. This criterion was used specifically to include an area that would include the photo's face within one degree of visual angle, which is the precision rate for this eyetracking system. The proportion of time spent fixating on each AOI was recorded, providing a direct measure of eye gaze direction. An eye fixation was recorded whenever the participant attended to a photograph for at least 100 ms. Summary measures were created by calculating the proportion of total fixation time on a particular type of face averaged across the four arrays. Negative facial expressions generally are thought to be perceived by those with high social anxiety as social threats, as they signal disappointment, anger, sadness, disgust, etc. with the socially anxious individual (Rapee and Heimberg 1997). Thus, we averaged the proportion of time spent fixating on negative facial expressions (sad and angry faces), a practice consistent with prior studies of social anxiety and attention (e.g., Mansell et al. 1999; Sposari and Rapee 2007).

Brief Fear of Negative Evaluation (BFNE) Scale—The BFNE measured social anxiety (Leary 1983) using the straightforward wording suggested in prior reports (Carleton et al. 2006; Taylor 1993). Although fear of negative evaluation does not comprehensively measure social anxiety, the BFNE has been shown to have good discriminant, convergent, and construct validity (Weeks et al. 2005). The current sample's mean was 28.96 ($SD = 9.70$). The social

exclusion threat condition ($M = 31.92$, $SD = 10.48$) and the non-exclusion threat condition ($M = 26.43$, $SD = 8.55$) did not significantly differ on this measure, $F(1, 25) = 2.16$, $p = .15$. These means are consistent with those found in other undergraduate samples (Weeks et al. 2005). Cronbach's alpha was .93 and the average inter-item correlation was .72 (range from .30 to .87).

Experimental Manipulation

Eysenck Personality Questionnaire (Eysenck and Eysenck 1975)—The EPQ was used to provide participants with information regarding their level of extraversion to be used for the experimental manipulation. Although the EPQ includes items related to extraversion, emotional stability, and psychoticism, the present study only used the 12 items related to extraversion. Participants completed an additional 24 items to mask that the reason for the EPQ was to assess extraversion.

Social Exclusion and Non-Exclusion Threat Manipulation—Participants received evaluative feedback that either concerned threat of social exclusion or a non-exclusion threat. Feedback was said to be based on EPQ scores. To bolster credibility, participants received accurate feedback regarding their EPQ extroversion score. Participants in the social exclusion threat condition were told that, because of their EPQ extroversion score, they would likely end up alone in the future. Participants in the non-exclusion condition, in contrast, were told that their EPQ results suggest they would become increasingly accident prone in future years, with many injuries and hospital stays. This manipulation has been used successfully in previous studies (e.g. Maner et al. 2007).

Apparatus

An Applied Science Laboratory series 5000 eyetracker was used. This eyetracker samples eye saccades at 60 Hz (i.e., 60 samples per second) and is accurate to within 1–2 degrees visual angle (approximately half an inch of monitor space). The eyetracker sat atop a small lightweight headband placed on the participant's head. Equipped with a magnetic head tracker, the eyetracker allows for natural head movement throughout stimulus presentation. The Eyenal program (Applied Science Laboratories; Bedford, MA) was used to extract the eyetracking data.

Procedure

Participants arrived individually for a study ostensibly concerned with personality and color perception. After giving informed consent, participants completed the BFNE and the EPQ. Eligible participants were randomly assigned to study condition through the use of a computerized random number generator. The experimenter then delivered the social exclusion threat or non-exclusion personality feedback.

After receiving their personality feedback, participants were told that the next part of the study investigated color perception—how the eye processes color—and that the eyetracker was a color-optics recording device that would record information from the retina while viewing color stimuli. This cover story has been used successfully in prior work (e.g., Maner et al. 2007). The participant was fitted with the eyetracker and the experimenter closed a room divider so that the participant was alone in his/her half of the room (although the participant could still hear the experimenter's voice for instructions). Similar to prior eyetracking studies (e.g., Buckner et al. 2009; Maner et al. (2003), participants were told to “look naturally at the screen” throughout the experiment.

After the experimenter calibrated the eyetracker, the participant viewed a set of filler stimuli, allowing the experimenter to check the accuracy of the eye calibration. Next, the participant

viewed the stimulus arrays. The arrays were viewed for 30 s each with 5 s breaks between each array. Upon completion of the eyetracking task, all participants were thoroughly debriefed. During debriefing, participants were given the opportunity to ask any questions they had about any aspect of the study and to indicate what they believed was the true purpose of the study. No participant expressed any suspicion regarding the true purpose of the study. Participants also were provided rationale for the use of deception in the experiment.

Results

To test whether experimental condition affected attention to particular faces, a 2 (Experimental Condition) $\times$ 3 (Face Valence: Positive, Negative, Neutral) mixed model analysis of variance (ANOVA) was conducted. Continuous BFNE total score was included as a predictor variable. The three-way interaction between BFNE $\times$ Condition $\times$ Face Valence approached significance, $F(2, 44) = 2.42, p = .10$.

Failure to find a significant three-way interaction does not preclude the possibility that predicted differences exist for each face type (Maxwell and Delaney 2004). Therefore, separate hierarchical linear regressions were conducted for each face type with continuous BFNE total score included as a predictor variable. For the first model, attention to negative faces served as the dependent variable. The dependent variables for the second and third models were attention to positive faces and neutral faces, respectively. In each model, attention was regressed on continuous BFNE total score, experimental condition, and their centered interaction.

Was Non-Exclusion Threat Associated With Greater Attention Toward Negative Faces Among Socially Anxious Participants?

Results revealed the expected interaction between BFNE and experimental condition on attention to negative faces (Table 1). The form of the interaction was examined by substituting values one standard deviation above (i.e., high BFNE) and below (i.e., low BFNE) the mean into the regression equation (Aiken and West 1991; Holmbeck 2002) (Fig. 1). The BFNE mean for the high BFNE group is in the range found in pretreatment SAD patient samples (Weeks et al. 2005). As predicted, simple effect tests revealed that among individuals with high BFNE, non-exclusion threat elicited greater attention toward negative faces than did social exclusion threat, $t(17) = 3.38, p < .01$. Among participants with low BFNE, there were no differences between conditions on attention to negative faces, $t(17) = 1.06, p = .31$.

To examine whether high and low BFNE individuals differed on attention to negative faces in each condition, the slopes of the interaction were tested. Results revealed that among participants in the non-exclusion condition, there was a trend for those with high BFNE scores to attend to negative faces more so than did those with low BFNE scores, $t(25) = 1.94, p = .065$. Participants in the social exclusion threat condition did not differ in their attention to negative faces as function of BFNE scores, $t(25) = -1.02, p = .32$.

Did Social-Exclusion Threat Enhance Attention Toward Positive Faces Among Socially Anxious Participants?

Consistent with expectation (Fig. 2), the BFNE $\times$ condition interaction was significant for attention to positive faces (Table 1). Among those with high BFNE scores, social exclusion threat relative to non-exclusion threat was related to greater attention to positive faces, $t(17) = 3.47, p < .01$. No such effect was observed among those with low BFNE scores, $t(17) = -.59, p = .56$. In the social exclusion threat condition, participants with high BFNE scores attended to positive faces more so than did those with low BFNE scores, $t(25) = 1.84, p = .08$. Among

participants in the non-exclusion threat condition, attention did not differ according to level of BFNE scores, $t(25) = 1.11, p = .28$.

Did Attention to Neutral Faces Differ as a Function of Condition and Social Anxiety?

Consistent with expectation, the BFNE $\times$ condition interaction was not significant for neutral faces (Table 1).

Discussion

The current study sought to resolve mixed findings in the literature on the relations between social anxiety and attention by proposing a conceptual framework in which seemingly disparate viewpoints regarding the nature of social anxiety on attention can complement each other. Specifically, this study proposed that attention to social threat functions to prevent social exclusion. In the absence of a social exclusion threat, socially anxious people may allocate large amounts of cognitive resources to socially threatening stimuli in order to anticipate and prevent social exclusion. However, upon receipt of feedback signaling social exclusion, socially anxious individuals may divert their attention away from threat, and instead attend toward potential sources of social acceptance.

Results from the present eyetracking experiment yielded evidence that appears to support this conceptual framework. Participants with high fear of negative evaluation (a core feature of social anxiety) who received feedback that was unrelated to social exclusion attended preferentially to negative faces (compared to those who experienced social exclusion feedback). In contrast, among those with high fear of negative evaluation, social exclusion threat relative to non-exclusion threat was related to greater attention to happy faces. These effects were not observed among those with low fear of negative evaluation. Comparing those with high and low fear of negative evaluation under conditions of non-exclusion threat, there was a trend for those with high fear of negative evaluation to attend more to *negative faces* than those with low fear of negative evaluation. However, in the social exclusion threat condition, there was a trend for participants with high fear of negative evaluation attended more to *positive faces* than those with low fear of negative evaluation.

Taken together, these data suggest that socially anxious people may vigilantly scan the environment for cues that signal possible social exclusion, but once socially anxious people experience feedback signaling social exclusion they no longer preferentially attend to social threat. Instead, they allocate their attention to potential sources of social acceptance. This is consistent with previous evidence that social exclusion can lead people to turn toward positive social cues as a means toward compensatory social affiliation (Maner et al. 2007).

The current study included limitations that indicate directions for future research. First, we did not explore the implications of observed attentional processes for judgments and behaviors. Although socially anxious participants attended preferentially to positive faces in the wake of the threat of social exclusion, this does not necessarily mean that they will engage in behaviors meant to gain new friends. Indeed, recent evidence suggests that socially anxious people, compared to those low in social anxiety, do not behave pro-socially toward sources of affiliation after experiencing the threat of social exclusion, possibly because they perceive the risk of further exclusion as too great (Maner et al. 2007). This potential disconnect between attention and behavior may be explored in future research. Second, although the use of photographic faces serves as a proxy for actual social stimulation, future research should determine the responses of socially anxious individuals while engaging in actual social situations. Third, social anxiety was assessed using a measure of fear of negative evaluation, a core component of social anxiety. Future work could benefit for a more comprehensive examination of all facets of social anxiety (e.g., interaction fears, performance fears). Future work would also benefit

from examination of larger samples comprised of participants of more diverse age ranges and racial/ethnic backgrounds.

Vigilance to social threat enables people to adjust their behavior so as to get along well with others and avoid social exclusion. However, hypervigilance to social threat is linked with elevated social anxiety. Blending perspectives from cognitive, clinical, and social psychology, the current work serves as a first step in understanding the roles of social exclusion and non-exclusion threats in guiding basic attentional processing of emotional stimuli among socially anxious people. Given that social anxiety is linked to a host of negative psychological and social consequences (Buckner et al. 2008a, b; Davidson et al. 1993; Grant et al. 2005; Stein and Kean 2000), understanding biases associated with the processing of emotional stimuli among socially anxious individuals could have important implications for the prevention and treatment of this prevalent and impairing condition.

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Fig. 1.
Experimental condition interacted with level of social anxiety to affect attention to negative emotions

Fig. 2.
Experimental condition interacted with level of social anxiety to affect attention to positive emotions

Table 1
Summary of hierarchical regression analyses for attention to face by face type ($N = 27$)

	ΔR^2	df	ΔF	t	β	sr	p
<i>Attention to negative faces</i>							
Step 1	.20	2,23	2.91				.075
BFNE				.49	.10	.09	.627
Condition				2.40	.47	.45	.025
Step 2	.14		4.52				.045
BFNE $\times$ condition		1,22		2.13	.49	.41	.045
<i>Attention to happy faces</i>							
Step 1	.25	2,23	3.75				.039
BFNE				-.36	-.07	-.07	.720
Condition				-2.70	-.51	-.49	.013
Step 2	.13	1,22	4.49				.046
BFNE $\times$ condition				-2.12	-.48	-.36	.046
<i>Attention to neutral faces</i>							
Step 1	.00	2,23	.04				.966
BFNE				-.12	-.03	-.03	.907
Condition				.19	.04	.04	.850
Step 2	.00	1,22	.00				.960
BFNE $\times$ condition				-.05	-.01	-.01	.960

BFNE brief fear of negative evaluation (Leary 1983); β standardized β weight, sr semipartial (i.e., part) correlation