HAPPY BUT NOT SO APPROACHABLE: THE SOCIAL JUDGMENTS OF INDIVIDUALS WITH GENERALIZED SOCIAL PHOBIA

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Background: We examined social approachability judgments in a psychiatric population that frequently experiences interpersonal difficulties and reduced social satisfaction, individuals with generalized social phobia (gSP). Methods: Our objective was to broaden the understanding of the social cognitive tendencies of individuals with gSP by systematically investigating their interpretation of positive facial expressions. We hypothesized that approachability ratings would be lower for positive as well as negative emotional faces in the gSP group compared to the healthy comparison group. Each participant evaluated 24 emotional faces presented on a computer screen. Participants first labeled the faces as either happy, disgust, or angry in emotional expression, and then they rated each face's approachability. Analysis of variance and post hoc analyses were used to identify group, emotion, and group by emotion rating differences. Results: Happy face approachability ratings were higher than disgust and anger in both groups. The central finding was that individuals with gSP rated happy faces as less approachable than the healthy participants and that degree of social anxiety was associated with lower approachability ratings within the gSP sample. Explicit approachability judgments of negative faces did not differ as predicted. Conclusions: Consistent with earlier indirect evidence of interpretation biases of positive social emotional information, this study reveals that individuals with gSP demonstrate explicit, subjective social interpretation biases of overtly positive social feedback. The therapeutic relevance of these results is discussed. Depression and Anxiety 0: 1–6 2009. © 2009 Wiley-Liss, Inc.

Key words: approach-withdrawal; social anxiety; emotional faces; social evaluation; interpretation bias; social cognition; subjective interpretation

INTRODUCTION

Humans are social beings and positive social relationships offer psychological satisfaction and important social support.[1] Yet, individuals with social phobia fear and avoid engaging others in social interactions.[2] Their social phobia is based on an expectation that they will be evaluated negatively and rejected socially.[2] Social phobia or social anxiety disorder is one of “the most common mental disorders on a lifetime basis”[3] and individuals with social phobia suffer with chronic interpersonal deficits,[4,5] functional impairments, and lower quality of life.[3,6] To better understand the psychological basis of this disorder, researchers have examined various social emotional behaviors.[4,5] To date, the majority of studies have focused on responses to negative social emotional information.[4,7] Yet,
emerging evidence suggests that individuals with social phobia are also biased in how they process positive social emotional information.\[^{[7-15]}\] In this study, we provide unique evidence of biased social evaluations of prototypical, happy faces\[^{[16]}\] in individuals with social phobia compared to healthy individuals.

**BIASED INTERPRETATIONS OF POSITIVE FEEDBACK: INDIRECT EVIDENCE**

Indirect evidence of atypical processing of positive social emotional information has been found in several studies using text-based ambiguous social information.\[^{[17,18]}\] Individuals high in social anxiety were (1) less likely to interpret ambiguous social vignettes as positive,\[^{[17]}\] (2) slower to respond to non-threatening (and threatening) sentence completion probes for ambiguous scenarios,\[^{[18]}\] and (3) impaired in learning non-threat or positive associations in text-based ambiguous descriptions.\[^{[7]}\] These findings were interpreted as a deficiency in the positive interpretation bias shown by non-socially anxious individuals.

Emotional faces represent a more ecological form of social signaling and feedback than text-based descriptions.\[^{[8,12,19,20]}\] Indirect evidence of social anxiety-related interpretation biases of positive facial expressions also has been found.\[^{[8-12,15,21]}\] For example, in comparison to healthy individuals, socially anxious individuals showed a slower reaction time to happy faces but a faster response to negative faces,\[^{[12]}\] remembered fewer happy faces correctly,\[^{[21]}\] did not show the healthy tendency to falsely recognize novel happy faces as previously viewed,\[^{[8]}\] were less likely to classify ambiguous, partially happy morphed faces as happy,\[^{[11]}\] or positive,\[^{[22]}\] and were faster at pushing away (avoiding) compared to pulling toward (approaching) happy faces.\[^{[10]}\]

Other studies using happy faces to prime subsequent responses have shown that individuals high in social anxiety expected fewer pleasant and more aversive outcomes\[^{[9]}\] and responded more quickly to the subsequent presentation of disgust faces, which suggests that among social/anxious individuals happy faces activate negative face processing attributes.\[^{[15]}\] Although these results suggest that positive social feedback may be interpreted as less positive or even negatively among individuals with high levels of social anxiety, none of these findings reflect a direct assessment of the subjective response to positive social feedback. Yet, subjective interpretation biases of social scenarios and social information are central to social anxiety disorder as shown in negative social information studies.\[^{[4]}\]

**POSITIVE FEEDBACK: BIASED EXPLICIT INTERPRETATIONS**

Evidence of explicit interpretation biases of positive social emotional information is mixed. In a recent study, individuals high in social anxiety revealed positive perceptions and happy reactions to positive text-based scenarios, but they were more likely to have a negative interpretation of the positive event, and assign a lower likelihood that such positive events would occur.\[^{[11]}\] The negative interpretations of positive events are similar to previous findings of experimentally manipulated, in vivo social interactions.\[^{[14,23]}\]

Social anxiety-related explicit interpretation biases of positive facial expressions are also inconsistent: some studies report exaggerated positive responses\[^{[24,25]}\] and other studies report no group differences.\[^{[10,26-28]}\] Methodological issues and the focus of the questions asked may have masked an important underlying explicit interpretation bias, such as the use of facial crowd displays\[^{[26]}\] that are open to selective attentional confounds\[^{[29,30]}\] that interpretation measures only indirectly related to the concept of social engagement (pleasantness;\[^{[10,24,25,28]}\]), or response scales mixing positive and negative social interpretations.\[^{[27]}\] Given that social rejection is a primary concern among individuals with social phobia, a positive interpretation bias may be most evident when these individuals consider engaging others in social interactions. To directly assess the judgment to engage others socially and avoid previous methodological interpretation confounds, we will use single, prototypical happy facial expressions\[^{[16]}\] and a 1-to-9 rating scale assessing participants’ willingness to approach the picture person (i.e., face) to engage in a social interaction.

**HYPOTHESIS**

Given the evidence of social anxiety-related interpretation biases described above, we predict that individuals with generalized social phobia (gSP) will interpret happy facial expressions as less approachable than healthy individuals.

**METHOD**

**PARTICIPANTS**

Forty participants provided approachability rating data from two separate functional magnetic resonance imaging studies: 12 individuals with gSP and 28 healthy comparison (HC) individuals. Psychiatric diagnoses were made using the MINI International Diagnostic Interview version 5.0\[^{[31]}\] for DSM-IV.\[^{[32]}\] This instrument has shown good reliability and validity compared to more extensive assessment instruments such as the Composite International Diagnostic Interview and the Structured Clinical Interview for the DSM\[^{[11]}\] for DSM-IV. The HC participants were free of any lifetime DSM-IV mental disorder diagnosis. All participants were physically healthy. Participants were recruited through outpatient clinic contacts and print advertisements. The study and all procedures were conducted with the approval of the University of Manitoba research ethics board. All participants provided signed, informed consent.

**Demographics:** The age, education, and gender of the participants for each group are presented in Table 1. All participants were Caucasian except one patient who was Asian. The groups did not differ from each other in age, \(F(1, 38) = 0.40, P = .68\), education,
TABLE 1. Sociodemographic and clinical characteristic means (standard deviation) for each group

<table>
<thead>
<tr>
<th>Sociodemographics</th>
<th>Social phobia (n = 12)</th>
<th>Comparisons (n = 28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: female/male</td>
<td>7/5</td>
<td>10/18</td>
</tr>
<tr>
<td>Age (years)</td>
<td>31.9 (10.7)</td>
<td>30.4 (11.0)</td>
</tr>
<tr>
<td>Education (years)</td>
<td>13.2 (2.3)</td>
<td>14.1 (2.5)</td>
</tr>
<tr>
<td>Clinical measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illness duration (years)</td>
<td>17.4 (11.6)</td>
<td>n/a</td>
</tr>
<tr>
<td>Social anxiety (LSAS)</td>
<td>90.6 (26.4)</td>
<td>11.5 (10.8)</td>
</tr>
<tr>
<td>Depression (BDI)</td>
<td>15.8 (10.6)</td>
<td>1.8 (2.5)*</td>
</tr>
<tr>
<td>State anxiety (STAI)</td>
<td>45.8 (11.4)</td>
<td>22.6 (4.3)*</td>
</tr>
</tbody>
</table>

Note: LSAS, Liebowitz Social Anxiety Scale; BDI, Beck Depression Inventory; STAI, Spielberger State Anxiety Inventory.

*aP = .92, bP = .86*

F(1, 38) = –1.05, P = .30, or female–male frequency, Pearson χ² (1, N = 40) = 1.76, P = .18.

SP clinical status: The individuals with SP had a primary diagnosis of gSP and were never on psychotropic medications. The mean duration of their illness was 17.4 years and ranged from 4 to 37 years since the first reported episode (Table 1). The information on previous psychotherapy treatment was not systematically assessed. Clinical interviews revealed that the SP deficits were present in most social arenas reflecting the generalized subtype of SP.15 We excluded gSP participants who had a lifetime comorbid diagnosis of psychotic disorder, Tourette’s syndrome, posttraumatic stress disorder, obsessive–compulsive disorder or subthreshold obsessive–compulsive disorder. Other comorbid mood and anxiety disorders were permitted if they were deemed of lower clinical priority than gSP. Among the 12 gSP subjects, five had some comorbidity: one with generalized anxiety disorder, one with panic disorder, two participants had dysthymia disorder and generalized anxiety disorder, and the fifth participant had dysthymia, generalized anxiety disorder, and alcohol abuse. For the gSP group and a subsample of the HC group, trait- and state-anxiety levels were measured as well as current depression levels using the Liebowitz Social Anxiety Scale [LSAS],13 the State version of the Spielberger State-Trait Anxiety Inventory [STAI],14 and the Beck Depression Inventory,15 respectively (Table 1). The gSP participants reported more anxiety (trait-, LSAS, t (1,24) = 10.3, P < .0001, and state-based, STAI, t (1,24) = 7.1, P < .0001) and depression, Beck Depression Inventory, t (1,24) = 4.8, P < .0001, than the HC subgroup.

FACE STIMULI

Each participant viewed 24 emotional faces from a standardized set.16 There were an equal number of male and female faces (12 each) and equal numbers of Asian and Caucasian faces (12 each). Eight faces of each of the emotional expressions were presented: happy, disgust, and anger. Using a laptop computer, the set of emotional faces was presented one face-at-a-time to each participant twice, once for emotion labeling and once for approachability ratings. Participant responses to each face were recorded using a paper-and-pencil response format. Before these assessments, participants viewed each face 4–5 times during a neuroimaging experiment. Thus, these faces were somewhat familiar to the participants before the emotion labeling and approachability ratings described below.

EMOTION LABELING

Participants were asked to label each of the 24 faces as either a happy, disgust, or angry face. Participants were given as much time as needed to respond to this relatively easy, forced-choice emotion recognition task. The outcome was mean accuracy of emotion labeling.

APPROACHABILITY RATINGS

During the second presentation of the 24 faces, participants were instructed to “rate how likely you are to approach and engage the presented person (face) in a social interaction” using a 1 (least likely) to 9 (most likely) approachability scale. The outcome was mean approachability for each emotional expression. Internal reliability estimates (Cronbach’s α) of the approachability ratings were consistent for happy (α = .92), disgust (α = .92), and angry (α = .86) faces.

DATA ANALYSIS

An analysis of variance (ANOVA) was used to test for group (between-participant factor), emotional expression (within-participant factor), and group by emotional expression differences for both labeling accuracy and approachability ratings. Tests were two-tailed and an adjusted post hoc P-value = .01 was used to identify the specific differences underlying any main or interaction effects identified. Correlations between outcomes and other measures tested for associations relevant to the interpretation of the ANOVA findings.

RESULTS

ACCURACY IN LABELING EMOTIONAL FACES

Labeling accuracy scores are presented in Figure 1. An initial look at the raw data revealed that no participant mislabeled any happy face.1 Thus, the Group by Emotion ANOVA was restricted to the angry and disgust faces. No main effect of Group, F(1, 38) = 1.6, P = .23 or Group by Emotion interaction, F(1, 38) = 0.2, P = .64 was found.2 The ANOVA identified a main effect of Emotion, F(1, 38) = 4.2, P = .047, which reflected more accurate labeling of angry than disgust faces. Although select disgust faces may have been more difficult to label than angry faces, happy faces, the primary emotion for this project, were easily labeled by all participants.

APPROACHABILITY RATINGS

Approachability rating scores are presented in Figure 2. A Group (between participant) by Emotion (within participant) ANOVA of the approachability scores revealed a main effect of Group, F(2, 76) = 188.7, P = .004, a main effect of Emotion, F(2, 76) = 188.7, P = .004, a main effect of Group, F(1, 38) = 14.7, P = .004, a main effect of Emotion, F(2, 76) = 188.7, P = .004.

1For each group, angry and disgust face labeling accuracy was significantly less than a population value of 1 used to represent happy face labeling accuracy, all P < .001.

2Using a post hoc Group by Emotion by Face-Race ANOVA for emotion labeling accuracy, no significant Group effects related to Face-Race were found, P > .55.
P < .0001, and a Group by Emotion interaction, F(2, 76) = 5.3, P = .007.

The main effect of Group reflected a lower overall approachability rating in the gSP group compared to the HC group. The main effect of Emotion reflected happy faces as more approachable than either disgust, difference = 4.67, P < .001, or angry faces, difference = 4.39, P < .001. Disgust did not differ from anger, difference = −0.28, P = .15. The Group by Emotion interaction moderated the Group main effect. As hypothesized, the gSP group rated happy faces as less approachable than the HC group, difference = −2.0, P < .001 (Fig. 2). No other group differences were significant, P > .05.

Are depressive symptoms responsible for the altered interpretation of happy faces among the gSP patients as some have suggested? The correlation between depression symptom scores and happy face approachability ratings was not significant, r = −.44, P = .15. In contrast, greater social anxiety levels (LSAS) and higher state-based anxiety levels (STAI) were associated with lower happy face approachability ratings, r = −.67, P = .02 and r = −.66, P = .02, respectively. For a subsample of healthy participants with complete data, neither LSAS nor STAI scores were correlated with the happy face approachability ratings, r = .14, P = .67 and r = −.47, P = .15, respectively.

Follow-up examination confirmed that happy faces were viewed as more approachable than each negative face for each group separately, all P < .0001.

Using a post hoc Group by Emotion by Face-Race ANOVA for approachability ratings, no significant Group effects related to Face-Race were found, P < .25. Using Levine's test of homogeneity across groups, happy face approachability ratings were more variable for the gSP group than the healthy group, P < .05. Angry and disgust face ratings did not differ in variability, P > .05. The findings for happy faces were unchanged when using adjustments for heterogeneity in the Group by Emotion ANOVA, all P < .03, or when using a non-parametric Kruskal–Wallis group test for happy faces, χ²(1, 38) = 12.9, P < .001.

### DISCUSSION

The central finding is that participants with gSP judge prototypical happy faces as less approachable than healthy participants and, that among individuals with gSP, approachability ratings of the happy faces were inversely associated with social anxiety levels, but unrelated to depression scores. This finding is consistent with previous studies, which shows indirect evidence that individuals with social anxiety lack the positive interpretation bias shown by healthy individuals.

In contrast, studies of explicit subjective interpretations of happy faces have not reported evidence of biased interpretations of positive facial expressions. Various methodological, participant sampling or measurement differences may account for this discrepancy. For example, a recent study used emotionally morphed faces, evaluated high (and low) social anxiety participants, and had participants rate the emotional cost of interacting with the pictured person. Our study used prototypical happy faces, evaluated individuals meeting criteria for social anxiety disorder, and focused on participants’ willingness to socially engage others. These methodological differences may explain why we found an impaired interpretation of positive social stimuli in both females and males compared to the female only interpretation bias found in this other recent study. Our finding is consistent with earlier in vivo laboratory studies of social anxiety interpretation deficits of positive social feedback.

Our finding has direct treatment implications. For example, a recent treatment protocol study demonstrates that facilitating benign or positive interpretations for high socially anxious individuals increased non-negative and positive recognition interpretations, decreased negative recognition interpretations, and reduced their predicted levels of anxiety about upcoming social events. Our results

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**Figure 1.** Mean labeling accuracy (+SD) for healthy control (n = 28) and social phobia (n = 12) groups across happy, disgust, and anger facial expression conditions.

**Figure 2.** Approachability ratings (+SD) for healthy control (n = 28) and social phobia (n = 12) groups across happy, disgust, and anger facial expression conditions. Note: † = P < .001, between generalized social phobia versus healthy comparison.
and these other studies highlight the need to address interpretational biases toward positive social signals as well as negative social signals in individuals with gSP.

NOT RECOGNITION DEFICITS

The underlying mechanism for this interpretation bias is not known. Poor recognition of happy faces is not likely to account for this interpretation bias. Although socially anxious participants exhibit atypical visual scanning[38,39] and altered directed attention[40,41] toward positive and negative facial expressions, they show no deficits in their recognition and differentiation of different emotional expressions in the current emotion labeling results and other systematic studies.[19,20,22] Thus, our findings likely reflect subjective interpretation biases rather than recognition deficits.[22]

WHY HAPPY BUT NOT SO APPROACHABLE?

Why may positive social signals be interpreted more negatively?[9,15,21,23]? Some researchers have suggested that happy faces may be interpreted as reflecting mockery,[9,15] an expression of social dominance by the other,[10] or a threat of raised social expectations.[14,21,23] Future studies are needed to determine the underlying cognitions that account for this more negative interpretation of distinctly positive social feedback.

STRENGTHS AND LIMITATIONS

The primary findings are consistent and significant, but a larger sample size would enhance confidence in the generalizability of the results. Although our participants had not previously received medication for their social phobia, they may have previously received psychotherapy. If any patients had previously received treatment, this would likely act to reduce interpretation biases rather than increase them, which speaks to the robustness of the identified bias. Future studies will be needed to directly test this potential influence. The gSP approachability bias was found for both Caucasian and Asian happy faces. Moreover, the faces were somewhat familiar to participants through exposure during the earlier neuroimaging experiment. This suggests that the findings are generalizable to same-race and other-race faces and are not dependent on face novelty effects. This previous exposure may also have functioned to minimize group differences in the interpretation of prototypical negative faces. Alternatively, more ambiguous negative faces may be needed to draw out the underlying group differences in explicit subjective ratings.[26] Although a neutral face condition may have provided a useful control condition, neutral faces are not always emotionally neutral among socially anxious individuals.[42] Depression scores were not associated with happy face approachability ratings among the gSP participants. However, owing to limited psychological data on the healthy group, we could not control for this variable during between-group testing. Despite potential experimental demand characteristics or social desirability effects that would function to normalize explicit social evaluations among the gSP group,[10,43] our results reveal a significant gSP-related bias in explicit subjective approachability ratings to engage others in social interactions. Future studies should test for in vivo behavioral approach biases to positive social signals.

CONCLUSION

Individuals with gSP judge happy faces to be less approachable than HC participants. Furthermore, the severity of social anxiety symptoms appears to increase the bias in these approachability ratings. Given the importance of emotional expressions to interpersonal communication,[20] these results emphasize the potential usefulness of developing treatments for biased interpretations of positive social signal among individuals with gSP.[36,37]

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Depression and Anxiety


