Journal of Abnormal Psychology
2009, Vol. 118, No. 1, 223–228

0021-843X/09/$12.00 DOI: 10.1037/a0014658

BRIEF REPORTS

Judging the Intensity of Facial Expressions of Emotion: Depression-Related Biases in the Processing of Positive Affect

K. Lira Yoon and Jutta Joormann
University of Miami

Ian H. Gotlib
Stanford University

A forced-choice intensity judgment task was used to investigate biases in the processing of subtle expressions of emotion in participants with major depressive disorder (MDD). Participants were presented with 2 pictures of the same actor side by side, either depicting a neutral and a subtle emotional expression or depicting a subtle positive and a subtle negative expression. Participants were asked to indicate which of the 2 pictures showed the stronger emotion. Compared with participants with social anxiety disorder (SAD) and with never-disordered controls (CTLs), participants with MDD were less likely to judge subtle happy expressions as more intense than neutral expressions. In addition, compared with the CTL participants, participants who had MDD and participants who had SAD were less likely to judge subtle happy expressions to be more intense than negative expressions. Biases in the judgment of the intensity of subtle expressions of positive affect could play an important role in the interpersonal difficulties that are associated with depression.

Keywords: depression, facial expression, bias

Cognitive theories of depression implicate biases in the processing of emotional stimuli in the onset, maintenance, and recurrence of depressive episodes (Beck, 1976; Ingram, 1984). Within this broad category of stimuli, facial expressions of emotion are particularly powerful; indeed, examining biased processing of facial cues is likely to contribute significantly to the understanding of depression (Gotlib & Hammen, 1992). Facial expressions of emotion convey people's emotional states as well as their attitudes, needs, intentions, and evaluations of situations. Given the importance of emotional expressions in guiding behavior in everyday life, failure to process facial expressions accurately is likely to have significant adverse consequences (e.g., Persad & Polivy, 1993). More specifically, depressed individuals' difficulties in detecting positive affect may lead them to perceive a lack of reinforcement and to reduce their approach behavior; similarly, their readiness to perceive and attend to negative aspects of their social surroundings may contribute to their decreased experience of social support (Gotlib & Hammen, 1992). Thus, biases in depression in judging facial expressions may lead to interpersonal problems that, in turn, can contribute to the maintenance of this disorder.

It is thus not surprising that previous studies have examined biases in the processing of facial expressions in depression. The majority of these studies used categorization tasks in which participants were presented with pictures of either schematic or real faces and were asked to label the emotional expressions. Although some studies reported a general depression-associated deficit in the accuracy of emotion recognition (e.g., Persad & Polivy, 1993), other studies failed to obtain evidence for such deficits (e.g., Ridout, Astell, Reid, Glen, & O'Carroll, 2003). Still other investigators reported that depression was related not to a general deficit in emotion processing but instead with deficits in the processing of specific types of emotional faces (Persad & Polivy, 1993). Gur, Erwin, Gur, and Zwil (1992), for example, found that although participants with depression were not impaired in their overall performance on an emotion identification task, they tended to interpret neutral faces as sad and happy faces as neutral.

Arguably, the most significant limitation of previous investigations is the fact that in everyday life, people process a wide range of emotional stimuli, including signals that are far less intense than the prototypical facial expressions contained in standardized picture sets. It is likely, therefore, that responses concerning the identification of the emotions portrayed in these prototypical faces provide only a limited understanding of the processing of social cues in depression.

To address these limitations, researchers have begun to use picture sets that convey varying degrees of emotional intensity. Surguladze et al. (2004), for example, presented participants with faces that were morphed to express 50% emotional intensity in addition to happy and sad faces at full intensity to examine the ability of individuals with major depressive disorder (MDD) to identify subtle emotional expressions. Compared with controls, participants with MDD were less likely to label the 50% happy faces as happy, suggesting that individuals with depression have difficulty identifying mildly happy expressions. Joormann and

K. Lira Yoon and Jutta Joormann, Department of Psychology, University of Miami; Ian H. Gotlib, Department of Psychology, Stanford University.

This research was supported by National Institute of Mental Health Grant MH080683 awarded to Ian H. Gotlib.

Correspondence concerning this article should be addressed to K. Lira Yoon, Department of Psychology, University of Miami, Coral Gables, FL 33124. E-mail: klira@psy.miami.edu

Gotlib (2006) presented participants with pictures of faces that changed slowly from a neutral expression to a full emotional expression. These investigators found that individuals with MDD required significantly higher intensity to correctly identify happy faces than did both participants diagnosed with social anxiety disorder (SAD) and control participants. Both of these tasks, however, require participants not only to detect the emotional expression but also to label it correctly. Consequently, these tasks cannot differentiate whether participants with depression differ from their nondepressed counterparts in their perception of the intensity of the expression or in their likelihood of labeling subtle expressions in a specific manner.

Our primary goal in the present study, therefore, was to examine whether biases in the processing of emotional facial expressions are evident not only in emotion categorization and labeling tasks but also in intensity judgment tasks in which participants are not asked to attend to the valence of the facial expression. Focusing on intensity instead of valence judgments allows us to examine emotion detection independent of the labeling of the emotional expression and makes our task less susceptible to response biases and demand characteristics (MacLeod & Cohen, 1993). In this study, we administered a forced-choice intensity judgment task to three groups of participants: those diagnosed with MDD, those diagnosed with SAD, and never-disordered controls. Participants were presented with two pictures of the same actor, side by side on the computer screen, depicting different emotional expressions. On some trials, participants were presented with one picture showing a neutral expression and one picture showing a low-intensity emotional expression. On other trials, participants were presented with one picture showing a subtle happy expression and one showing a subtle negative (sad, fear, anger) emotional expression. Participants were asked to indicate which of the two faces presented on each trial exhibited the stronger emotional expression.

We included participants with SAD to examine the specificity to depression of biases in the processing of facial expressions. Investigators have found that individuals who report high levels of social anxiety tend to perceive faces as negative on both explicit (e.g., Winton, Clark, & Edelmann, 1995) and implicit tasks (e.g., Yoon & Zinbarg, 2008). Given the high comorbidity rate between MDD and SAD (e.g., Kessler, Chiu, Demler, & Walters, 2005), it is critical to investigate the diagnostic specificity of depression-related biases in participants diagnosed with MDD but not SAD and in participants diagnosed with SAD but not MDD.

Previous studies using subtle expressions of emotions have demonstrated that individuals with MDD have difficulties identifying happy faces (Joormann & Gotlib, 2006; Surguladze et al., 2004). Therefore, we hypothesized that, compared with the participants with SAD and control participants, participants with MDD would be less likely to select the subtle happy expressions as showing the stronger emotion.

Method

Participants

Participants were recruited from the community. All participants completed an initial telephone interview to establish that participants were fluent in English and between 18 and 60 years of age. Participants were excluded for severe head trauma, color blindness, and learning disabilities, as well as for current panic disorder, psychotic symptoms, bipolar disorder, and alcohol or substance abuse within the past 6 months. Trained interviewers administered the Structured Clinical Interview for the *DSM–IV* (SCID; First, Spitzer, Gibbon, & Williams, 1996) to eligible individuals during their first session in the study. The kappa coefficients were .93 for the MDD diagnosis, .92 for the SAD diagnosis, and .92 for the nonpsychiatric control diagnosis (i.e., the absence of current or lifetime psychiatric diagnoses, according to the *DSM–IV* criteria).

Participants were included in the MDD group if they met the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM–IV*; American Psychiatric Association, 1994) criteria for MDD but did not meet current or lifetime criteria for SAD. Participants were included in the SAD group if they met *DSM–IV* criteria for SAD but did not meet criteria for current or lifetime MDD. The CTL group consisted of individuals with no current diagnosis and no history of any Axis I disorder. Participants completed the Beck Depression Inventory—II (BDI; Beck, Steer, & Brown, 1996) and the trait version of the State–Trait Anxiety Inventory (STAI–T; Spielberger, 1983) immediately after participating in the forced-choice intensity judgment task.

Sixty-five individuals participated in this study. Data from 1 CTL participant were excluded because in over half of the trials, this participant did not respond until 3,000 ms had passed, which was well beyond 2 standard deviations of the full sample. Thus, for the purposes of data analysis, the final sample consisted of 64 participants: 21 with MDD (14 women), 23 with SAD (16 women), and 20 CTL (16 women).

Materials

We selected a male and a female face from the widely used morphed series *Facial Expressions of Emotions: Stimuli and Tests* (FEEST; Young, Perrett, Calder, Sprengelmeyer, & Ekman, 2002), in which faces from Ekman and Friesen's (1976) *Pictures of Facial Affect* have been morphed from a neutral expression to a fully emotive expression in 10% intervals. In addition to neutral faces (i.e., 0% emotion), we included the sad, angry, happy, and fearful versions of each of these faces at 40% intensity. We decided to use faces at 40% intensity on the basis of pilot testing.[1]

Forced-Choice Intensity Judgment Task

Participants were presented with two pictures of the same actor, side by side, on the computer screen. For the neutral trials, one picture with a neutral expression and one picture with a slightly emotional expression (40% intensity happy, sad, angry, or fearful face) were presented. For the happy trials, a face with a slightly (40%) happy expression and a face with a slightly (40%) negative emotional expression (i.e., sadness, anger, or fear) were presented. Participants were asked to indicate, by pressing assigned keys on the computer keyboard, which face expressed the stronger emotion (forced choice). The order of the trials, the pictures used in a trial, and the side on which the anchor face (i.e., a neutral face for the neutral trials and a happy face for the happy trials) was presented

[1] Details of the results of the pilot testing and examples of the images used in this study are available on request from K. Lira Yoon.

in a given trial were randomized for every participant. The computer recorded both the keypress (left or right) and the reaction times.

Procedure

Participants were tested individually within 2 weeks after their initial diagnostic interview. Participants completed 48 neutral trials and 36 happy trials of the forced-choice intensity judgment task. In addition, we presented practice trials and an additional 36 trials with combinations of all negative facial expressions (sad–fear, fear–angry, sad–angry) to hide the critical trials.

Results

Participant Characteristics

The three groups of participants did not differ significantly in age (for the MDD group, $M = 36.63$ years, $SD = 12.11$; for the SAD group, $M = 30.70$ years, $SD = 9.38$; for the CTL group, $M = 30.35$, $SD = 8.39$), $F(2, 56) = 2.39$, *ns*, or education (86% of the MDD, 61% of the SAD, and 80% of the CTL groups' participants were college graduates), $\chi^2(2, N = 64) = 4$, *ns*. The final sample included 1 participant with past panic disorder and 1 participant with current generalized anxiety disorder in the MDD group. One participant with past panic disorder, 1 participant with past specific phobia, 1 participant with past posttraumatic stress disorder (PTSD), and 1 participant with current PTSD were included in the SAD group. As expected, the three groups of participants differed significantly in their BDI scores, $F(2, 61)=32.72$, $p < .001$. The MDD group ($M = 28.05$, $SD = 13.67$) had significantly higher BDI scores than did both the SAD ($M = 12.13$, $SD=10$), $t(42) = 4.44$, $p < .001$, and CTL ($M = 2.7$, $SD = 4.43$), $t(39) = 7.91$, $p < .001$, groups; the SAD group, in turn, had higher BDI scores than did the CTL group, $t(41) = 3.89$, $p < .001$.[2]

Forced-Choice Intensity Judgment

Neutral versus emotional expressions. First, we examined whether the groups differed in their decision latencies. Only the main effect for valence was significant, $F(2, 183) = 11.09$, $p < .001$. Follow-up analyses indicated that the decision latencies for the sad–neutral pairs ($M = 2{,}250.86$ ms, $SD = 502.31$) were longer than were the latencies for the angry–neutral pairs ($M = 1{,}995.92$ ms, $SD = 408.54$), $t(63) = 5.26$, $p < .001$; the fearful–neutral pairs ($M = 2{,}011.45$ ms, $SD = 405.52$), $t(63) = 4.80$, $p < .001$; and the happy–neutral pairs ($M = 2{,}026.12$, $SD = 521.26$), $t(63) = 4.39$, $p < .001$. No other comparisons yielded significant results.

Next, we analyzed the percentage of neutral–emotion trials on which participants selected the face expressing the 40% intensity emotion as the more intense face (see Figure 1). A Group (MDD, SAD, CTL) × Expression Type (happy, angry, fear, sad) repeated-measures analysis of variance (ANOVA) conducted on these percentages yielded a significant main effect for expression type, $F(3, 183) = 10.54$, $p < .001$, which was qualified by a significant interaction of group and expression type, $F(6, 183) = 4.86$, $p < .001$; the main effect for group was not significant, $F(1, 61) < 1$. Follow-up univariate ANOVAs revealed that the groups did not differ in their choices when sad, fearful, or angry faces were paired with neutral expressions: For angry faces, $F(2, 61) = 1.91$, *ns*; *F*s for both sad and fearful faces <1. The groups differed significantly in their choices, however, when happy faces were paired with neutral expressions, $F(2, 61) = 8.75$, $p < .001$, $\eta^2 = .22$. As shown in Figure 1, whereas both CTL participants and participants with SAD chose happy faces (vs. neutral faces) as the more intense face in over 80% of the trials, participants with MDD did so in only 67% of the trials. Not surprisingly, therefore, the MDD group differed significantly from both the CTL, $t(39) = 2.96$, $p < .01$, $\eta^2 = .18$, and the SAD groups, $t(42) = 3.27$, $p < .01$, $\eta^2 = .20$, in their tendency to endorse happy faces as the more intense expression in happy–neutral trials. No significant difference emerged for happy–neutral comparisons between the SAD and CTL groups, $t(42) < 1$, *ns*. These results suggest that individuals with MDD differ from both participants with SAD and CTL participants in their judgments of the intensity of positive facial expressions.

Happy versus negative expressions. We also examined participants' tendencies to select the face expressing subtle degrees of happiness as exhibiting the more intense emotion compared with the face expressing a low-intensity negative emotion. The ANOVA conducted on the decision latencies yielded significant main effects for expression type, $F(2, 122) = 4.84$, $p < .01$, and group, $F(2, 61) = 3.78$, $p < .03$. The Group × Expression Type interaction was not significant, $F(4, 122) = 1.03$, *ns*. Follow-up analyses indicated that the decision latencies for the fear–happy pairs ($M = 2{,}086$ ms, $SD = 587$) were significantly longer than were decision latencies for the angry–happy pairs ($M = 1{,}958$ ms, $SD = 480$), $t(63) = 3.23$, $p < .01$, and the sad–happy pairs ($M = 1{,}976$ ms, $SD = 527$), $t(63) = 2.24$, $p < .05$. The SAD group ($M = 2{,}197$ ms, $SD = 473$) took significantly longer to make their choices than did the CTL group ($M = 1{,}800$ ms, $SD = 473$), $F(1, 41) = 6.61$, $p < .02$. No other comparisons were significant.

Next, we analyzed the percentage of trials on which participants chose the face expressing the negative emotion (vs. the happy face) as the more intense face (see Figure 2). A Group (MDD, SAD, CTL) × Expression Type (angry, fear, sad) ANOVA conducted on these percentages yielded a significant main effect for expression type, $F(2, 122) = 27.64$, $p < .001$. Follow-up analyses indicated that in negative expression–happy pairs, participants chose the angry, $t(63) = 5.89$, $p < .001$, or fearful faces, $t(63) = 4.53$, $p < .001$, as the more intense expression significantly more frequently than they did the sad faces. Participants also chose the angry face as the more intense face more often than they did the fearful face, $t(63) = 2.53$, $p < .05$. More interesting, there was a significant main effect for group, $F(2, 61) = 8.00$, $p < .002$. Post hoc analyses indicated that the CTL group chose happy faces (vs. negative faces) as the more intense expression significantly more frequently than did the MDD, $F(1, 39) = 16.26$, $p < .001$, $\eta^2 = .29$, and the SAD, $F(1, 41) = 4.79$, $p < .05$, $\eta^2 = .10$, groups. Indeed, whereas

[2] In addition, group differences in STAI–T scores approached significance, $F(2, 59) = 2.99$, $p < .06$. The MDD ($M = 45.42$, $SD = 4.18$) and the SAD ($M = 44.65$, $SD = 4.40$) groups had higher STAI–T scores than did the CTL group ($M = 42.25$, $SD = 3.80$). We reanalyzed the data controlling for level of anxiety and found that none of the results changed. The analysis of covariance results are available on request from K. Lira Yoon.

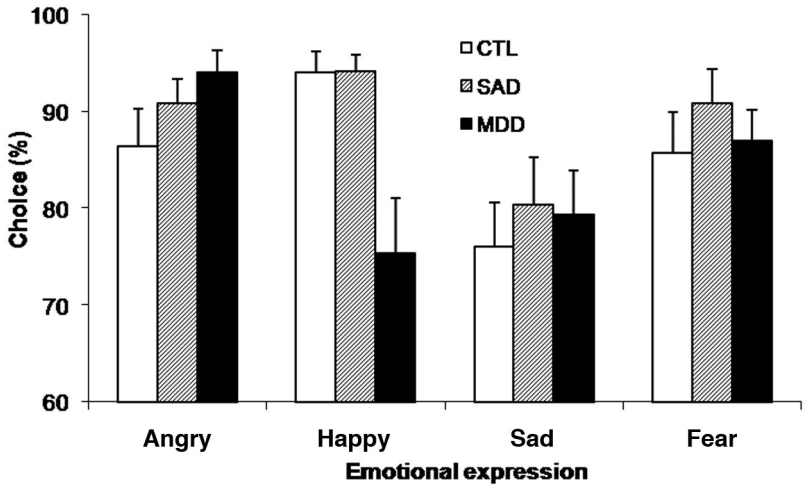

Figure 1. Forced-choice intensity judgment: neutral versus emotional expressions. Mean proportion of trials on which emotional expressions were rated as more intense than neutral expressions in the forced-choice task by participants with major depressive disorder (MDD), participants with social anxiety disorder (SAD), and control participants (CTL) as a function of valence of facial expression. Error bars represent one standard error.

CTL participants selected the sad faces as more intense than the happy faces in less than 30% of the sad–happy trials, participants with MDD picked the sad faces in almost 50% of the trials. In contrast, whereas CTL participants picked the angry faces when paired with happy faces in about 50% of all trials, participants with MDD picked the angry faces in almost 80% of all trials. The difference between the SAD and the MDD groups regarding their tendency to choose happy faces (vs. negative faces) as the more intense expression approached significance, $F(1, 42) = 3.58$, $p < .07$, $\eta^2 = .08$, with the SAD group choosing happy faces more frequently than the MDD group. No other effects were significant. These results suggest that CTL participants tend to see happy faces as more intense than faces depicting negative expressions (i.e., positivity bias) and that this pattern was most prominent when happy faces were pitted against sad faces. It is important to note that neither participants with MDD nor participants with SAD exhibited this positivity bias.

Discussion

Biased processing of social cues may underlie the interpersonal difficulties frequently reported in people with MDD (Hammen, 1997; Joiner, 2002). In the present study, we examined depression-related biases in the judgment of the intensity of facial expressions

Figure 2. Forced-choice intensity judgment: happy versus negative expressions. Mean proportion of trials on which negative emotional expressions were rated as more intense than happy expressions in the forced-choice task by participants with major depressive disorder (MDD), participants with social anxiety disorder (SAD), and control participants (CTL) as a function of negative facial expression. The dotted line indicates the chance level (50%). Error bars represent one standard error.

of emotion. In a forced-choice task in which participants were asked to choose which of two presented faces expressed the stronger emotion, participants with MDD were significantly less likely than were participants with SAD and CTL participants to judge subtle happy expressions as more intense than neutral expressions. It is important to note that this bias for happy versus neutral faces was specific to depression. When the happy faces were pitted against negative expressions (i.e., anger, fear, or sadness), participants with either MDD or SAD, compared with the CTL participants, were significantly less likely to choose the happy face as the more intense expression. The difference between the participants with MDD and SAD approached significance, suggesting that the effect was slightly stronger among the participants with MDD.

It is interesting that individuals with MDD did not differ from the other groups in their intensity judgments for any of the negative facial expressions when they were paired with neutral faces. This finding implies that the MDD group did not judge neutral expressions as more negative or negative expressions as more intense than did the CTL or SAD groups; rather, they judged positive facial expressions as less intense. Indeed, our results indicate that participants with MDD were less likely than were participants in the other groups to choose happy over neutral faces. Considered collectively, the present results suggest that individuals with MDD tend to underidentify positive affect in subtle facial expressions.

The current results are consistent with previous studies that demonstrated that, compared with individuals with SAD and CTL participants, participants with MDD require more intensity in observed faces to correctly identify happy faces (Joormann & Gotlib, 2006; Surguladze et al., 2004). These findings are also consistent with previous studies using full-intensity facial expressions that reported that participants with depression tended to interpret happy faces as neutral (Gur et al., 1992; Suslow, Junghanns, & Arolt, 2001). The present results thus add to a growing literature indicating that depression is characterized primarily by difficulties in the processing of positive affect, perhaps even more so than by biases in the processing of negative affect (e.g., Surguladze et al., 2004). Investigators have demonstrated, for example, that depression is associated with decreased memory for (e.g., Gilboa-Schechtman, Erhard-Weiss, & Jeczemien, 2002; Ridout et al., 2003) and diminished reaction to happy facial expressions (Sloan, Bradley, Dimoulas, & Lang, 2002). Researchers using fMRI have also found individuals with MDD to exhibit low activation in subcortical and limbic regions in response to happy faces (Fu et al., 2007; Lawrence et al., 2004). The current findings extend the previous work by suggesting that participants with MDD differ from CTL participants not only in their categorization and labeling of facial expressions but also in their judgment of the intensity of subtle expressions of happiness.

In addition to the depression-specific bias in the judgment of happy expressions when paired with neutral expressions, we also observed a bias when happy expressions were paired with negative expressions. Both the MDD and SAD groups were significantly less likely than the CTL group to pick happy faces as the more intense expression when paired with sad, fearful, or angry expressions. The data we obtained in these happy–negative comparisons suggest that the intensity judgments were a function of the level of arousal associated with the different facial expressions. Thus, the finding that faces expressing anger or fear were more likely to be chosen as portraying greater intensity than were faces expressing sadness may be due to the fact that sad faces are less arousing than are faces expressing other emotions (e.g., Frijda, 1994). In a series of studies, for example, Russell and Bullock (1985) demonstrated that both preschoolers and adults rated faces expressing sadness as less arousing than faces expressing other emotions (e.g., anger and happiness). Other investigators have demonstrated that sad faces are judged to be less intense than faces expressing other emotions (e.g., Ekman et al., 1987). In this context, it is interesting to note that in the present study, CTL participants demonstrated a clear preference to select happy faces when happy faces were pitted against faces expressing negative emotions (with the exception of angry faces). Our finding that participants with SAD and MDD did not exhibit this positivity bias suggests that these two groups of participants perceived happy expressions as less arousing or negative expressions as more arousing than did the CTL participants. These findings are consistent with previous reports of blunted responses to positive stimuli in depression (e.g., Henriques & Davidson, 2000).

Although this pattern of findings is important, we should note three limitations of the current study. First, the difficulty in recruiting an MDD sample without SAD and an SAD sample without MDD led to a relatively low number of participants in these two groups. Nevertheless, given the high comorbidity rates of SAD and MDD, it is important to continue to recruit these noncomorbid groups to understand the diagnostic specificity of cognitive biases. It is also important to note the highly significant interaction and main effects even in the face of the small sample size, underscoring the strength of the obtained group differences. Second, we did not address mechanisms that might underlie the group differences in intensity judgments. Recent studies have suggested, for example, that differences in eye-gaze patterns are related to difficulties in emotion perception (Wong, Cronin-Golomb, & Neargarder, 2005). Other studies suggest that attentional control might be associated with biases in the processing of emotional material (e.g., Ridout et al., 2007). Future research should include measures of attentional control and eye tracking to further investigate possible mechanisms underlying depression-related biases in the processing of positive facial expressions. Finally, we selected our stimuli from a widely used stimulus set that originated from Ekman and Friesen's (1976) *Pictures of Facial Affect*. Although using a well-validated set of stimuli has merit, researchers conducting future studies should use different stimuli to increase external validity. We also used static pictures. Considering that the decoding of other's emotional expressions in actual social interactions is likely to be based on dynamic cues (e.g., Joormann & Gotlib, 2006; Niedenthal, Halberstadt, Margolin, & Innes-Ker, 2000), in future studies, researchers should investigate whether depression-related deficits in intensity judgments extend to dynamic stimuli.

In conclusion, our results are consistent with findings of previous research demonstrating that depression is related to biases in the processing of positive stimuli (e.g., Joormann & Gotlib, 2006). This impairment may underlie one of the hallmark features of depression: anhedonia. It may also have important consequences for the understanding of interpersonal difficulties that are associated with this disorder (Joiner, 2002). Individuals use facial expressions as important cues to regulate their own behavior and to

assess the attitudes of others. If individuals with depression judge subtle positive facial expressions to be less intense than do nondepressed persons, it is likely that they will also judge social interactions and social situations to be less positive (e.g., Fisher-Beckfield & McFall, 1982). Biases in the processing of subtle facial expressions of positive affect may thus contribute to the interpersonal difficulties that maintain this disorder (e.g., Gotlib & Hammen, 1992).

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Beck, A. T. (1976). *Cognitive therapy and the emotional disorders.* New York: International Universities Press.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory—II.* San Antonio, TX: Psychological Corporation.

Ekman, P., & Friesen, W. V. (1976). *Pictures of facial affect.* Palo Alto, CA: Consulting Psychologists Press.

Ekman, P., Friesen, W. V., O'Sullivan, M., Chan, A., Diacoyanni-Tarlatzis, I., Heider, K., et al. (1987). Universal and cultural differences in the judgments of facial expressions of emotion. *Journal of Personality and Social Psychology, 53,* 712–717.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1996). *Structured Clinical Interview for DSM–IV* (Patient ed.). Washington, DC: American Psychiatric Association.

Fisher-Beckfield, D., & McFall, R. M. (1982). Development of competence inventory for college men and evaluation of relationships between competence and depression. *Journal of Consulting and Clinical Psychology, 50,* 697–705.

Frijda, N. H. (1994). Emotions are functional, most of the time. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 112–122). New York: Oxford University Press.

Fu, C. H. Y., Williams, S. C. R., Brammer, M. J., Suckling, J., Kim, J., Cleare, A. J., et al. (2007). Neural responses to happy facial expressions in major depression following antidepressant treatment. *American Journal of Psychiatry, 164,* 599–607.

Gilboa-Schechtman, E., Erhard-Weiss, D., & Jeczemien, P. (2002). Interpersonal deficits meet cognitive biases: Memory for facial expressions in depressed and anxious men and women. *Psychiatry Research, 113,* 279–293.

Gotlib, I. H., & Hammen, C. L. (1992). *Psychological aspects of depression: Toward a cognitive–interpersonal integration.* Oxford, England: Wiley.

Gur, R. C., Erwin, R. J., Gur, R. E., & Zwil, A. S. (1992). Facial emotion discrimination: II. Behavioral findings in depression. *Psychiatry Research, 42,* 241–251.

Hammen, C. (1997). *Depression.* Hove, England: Psychology Press.

Henriques, J. B., & Davidson, R. J. (2000). Decreased responsiveness to reward in depression. *Cognition & Emotion, 14,* 711–724.

Ingram, R. E. (1984). Information processing and feedback: Effects of mood and information favorability on the cognitive processing of personally relevant information. *Cognitive Therapy and Research, 8,* 371–386.

Joiner, T. E. J. (2002). Depression in its interpersonal context. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (pp. 295–313). New York: Guilford Press.

Joormann, J., & Gotlib, I. H. (2006). Is this happiness I see? Biases in the identification of emotional facial expressions in depression and social phobia. *Journal of Abnormal Psychology, 115,* 705–714.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM–IV* disorders in the National Comorbidity Survey replication. *Archives of General Psychiatry, 62,* 617–627.

Lawrence, N. S., Williams, A. M., Surguladze, S., Giampietro, V., Brammer, M. J., Andrew, C., et al. (2004). Subcortical and ventral prefrontal cortical neural responses to facial expressions distinguish patients with bipolar disorder and major depression. *Biological Psychiatry, 55,* 578–587.

MacLeod, A., & Cohen, I. L. (1993). Anxiety and the interpretation of ambiguity: A text comprehension study. *Journal of Abnormal Psychology, 102,* 238–247.

Niedenthal, P. M., Halberstadt, J. B., Margolin, J., & Innes-Ker, Å. H. (2000). Emotional state and the detection of change in facial expression of emotion. *European Journal of Social Psychology, 30,* 211–222.

Persad, S. M., & Polivy, J. (1993). Differences between depressed and nondepressed individuals in the recognition of and response to facial emotional cues. *Journal of Abnormal Psychology, 102,* 358–368.

Ridout, N., Astell, A. J., Reid, I. C., Glen, T., & O'Carroll, R. E. (2003). Memory bias for emotional facial expressions in major depression. *Cognition & Emotion, 17,* 101–122.

Ridout, N., O'Carroll, R. E., Dritschel, B., Christmas, D., Eljamel, M., & Matthews, K. (2007). Emotion recognition from dynamic emotional displays following anterior cingulotomy and anterior capsulotomy for chronic depression. *Neuropsychologia, 45,* 1735–1743.

Russell, J. A., & Bullock, M. (1985). Multidimensional scaling of emotional facial expressions: Similarity from preschoolers to adults. *Journal of Personality and Social Psychology, 48,* 1290–1298.

Sloan, D. M., Bradley, M. M., Dimoulas, E., & Lang, P. J. (2002). Looking at facial expressions: Dysphoria and facial EMG. *Biological Psychiatry, 60,* 79–90.

Spielberger, C. D. (1983). *Manual for the State–Trait Anxiety Inventory (STAI).* Palo Alto, CA: Consulting Psychologists Press.

Surguladze, S. A., Young, A. W., Senior, C., Brébion, G., Travis, M. J., & Phillips, M. L. (2004). Recognition accuracy and response bias to happy and sad facial expressions in patients with major depression. *Neuropsychology, 18,* 212–218.

Suslow, T., Junghanns, K., & Arolt, V. (2001). Detection of facial expressions of emotions in depression. *Perceptual & Motor Skills, 92,* 857–868.

Winton, E. C., Clark, D. M., & Edelmann, R. J. (1995). Social anxiety, fear of negative evaluation and the detection of negative emotion in others. *Behaviour Research and Therapy, 33,* 193–196.

Wong, B., Cronin-Golomb, A., & Neargarder, S. (2005). Patterns of visual scanning as predictors of emotion identification in normal aging. *Neuropsychology, 19,* 739–749.

Yoon, K. L., & Zinbarg, R. E. (2008). Interpreting neutral faces as threatening is a default mode for socially anxious individuals. *Journal of Abnormal Psychology, 117,* 680–685.

Young, A., Perrett, D., Calder, A., Sprengelmeyer, R., & Ekman, P. (2002). *Facial Expressions of Emotion: Stimuli and Tests (FEEST).* Bury St. Edmunds, UK: Thames Valley Test.

Received June 19, 2008
Revision received October 6, 2008
Accepted October 8, 2008 ■