The influence of dysphoria and depression on mental state decoding

Antony S. R. Manstead
School of Psychology
Cardiff University

Dina Dosmukhambetova
School of Psychology
Cardiff University

Julia Shearn
Counseling Service
Cardiff University

Amy Clifton
School of Psychology
Cardiff University

Address correspondence to: Antony S. R. Manstead, School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff CF10 3AT, UK. Email: MansteadA@Cardiff.ac.uk

Abstract

Prior research found conflicting results concerning the relationship between depression and mental state decoding ability as assessed by the ‘Eyes Test’ developed by Baron-Cohen and colleagues. In some studies the relationship is negative, suggesting that depressed persons are worse than controls in decoding mental states on the basis of information from the eye region of others’ faces. Other research points to a positive relation between depression and mental state decoding. We report a study of mental state decoding ability in two samples of university students, one a group of students attending the university’s counseling service, the other a group of normal college students. The results are consistent in showing a negative relation between depression and mental state decoding ability. Possible reasons for discrepancies in research results are discussed.

It is well established that depression is characterized by social and interpersonal difficulties (Brown & Harris, 1978; Joiner & Coyne, 1999; Weissman & Paykel, 1974). Depressed individuals are likely to induce negative affect in others (e.g., Coyne et al., 1987; Hokanson & Butler, 1992) and to be rejected by others (e.g., Joiner, Alfano, & Metalsky, 1992, 1993; Joiner & Metalsky, 1995). They also have fewer interactions with others (Gotlib & Lee, 1989) and find these encounters less rewarding than do their non-depressed counterparts (Nezleck, Hampton & Shean, 2000). A natural response to this is to withdraw socially, which may have the effect of perpetuating the depression (Rippere, 1980).

One approach to understanding the association between depression and impairments in social functioning involves focusing on possible deficits in social understanding on the part of depressed persons[1]. Considerable attention has been paid to how depressed persons respond to facial expressions, the idea being that the ability to identify accurately what another person is feeling enables one to make adaptive adjustments to one's behavior that in turn help to avoid conflict, provide assurance to another, relieve another's distress, and so on (Hess, Kappas, & Scherer, 1988; Salovey & Mayer, 1990). This should be rewarding for the interaction partner and thereby help to cement social relations. By the same token, an inability to infer another's emotional state on the basis of that person's facial displays should have negative social consequences, and there is evidence that this is so (Carton, Kessler, & Pape, 1999; Persad & Polivy, 1993).

[1] Throughout this paper we make no distinction between unipolar and bipolar depression, given that our diagnostic measures only assess severity of depression. It is worth noting that there is evidence that bipolar patients obtain lower scores than controls on measures of mentalizing (Bora, Vahip, Gonul, Akdenix, Alkan, Ogut, Eryavuz, 2005; but see also Montag, Ehrlich, Neuhaus, Dziobek, Heekeren, Heinz, & Gallinat, 2010).

A parallel approach focuses on the ability of depressed persons to ‘mentalize,’ or to read other people’s mental states. This work has been inspired by research on ‘theory of mind’ in young children (Baron-Cohen, 1995). One aspect of theory of mind is the ability to infer another person’s beliefs and desires on the basis of behavioral information, such as facial display, tone of voice, or body posture. Researchers have focused on the possibility that children and adults with autistic spectrum disorders (ASDs) may be characterized by theory of mind deficits. In this context, Baron-Cohen, Wheelwright, Hill, Raste, and Plumb (2001) developed the “Reading the mind in the eyes” task (hereafter, Eyes Test), intended to reveal subtle differences in mental state decoding ability between people with high functioning ASDs and normal controls. The task consists of 36 photographs of the eye and brow region of human faces. These are presented one at a time, along with four words describing mental states. The task of the respondent is to say which of these four states is being experienced by the person whose eyes are shown. While clearly related to facial-expression recognition tasks, the Eyes Task is qualitatively different in at least two respects. First, the Eyes Test taps a wider range of mental states (e.g., pensive, desire, confused, happy) than facial expression recognition tasks, which focus on emotional states; second, the Eyes Test gives participants less information on which to base their judgments. The Eyes Test is therefore considered to be a more sensitive measure of individuals’ ‘mentalizing’ abilities than traditional facial expression tasks.

With regard to the relationship between mental state decoding and clinical depression, the only published paper on the subject (Lee, Harkness, Sabbagh, & Jacobson, 2005) reports that depressed individuals have problems with decoding mental states. In this study women with moderate and severe depression had lower Eyes Test scores than non-depressed controls. Within the moderately and severely depressed groups (who did not differ from each other on Eyes Test performance), Eyes Test scores were predicted by severity of affective symptoms of depression, like anhedonia and guilt, rather than non-affective symptoms. Lee et al.'s overall finding fits well with other research examining emotion-decoding skills in depressed persons, which often shows that depressed participants perform worse that non-depressed participants when judging the intensity of facial expressions (Gur, Erwin, Gur, & Zwil, 1992; Surguladze et al., 2004).

Based on this research it would be reasonable to infer that dysphoric participants – an intermediate group between non-depressed and clinically depressed participants – might show a similar, negative relationship between their depression scores and mental decoding ability, especially for those facets of depression that are 'affective' in nature. However, Harkness, Sabbagh, Jacobson, Chowdrey, and Chen (2005), who studied mental state decoding ability in dysphoric college students, found a *positive* association between college students' depression scores and their Eyes Test performance. Harkness and colleagues (2005) reported two studies in which they administered the Eyes Test to college students, categorized either as non-dysphoric (BDI score ≤ 12) or as dysphoric (BDI score > 12). In a first study of 46 female students they found that dysphoric students attained a significantly *higher* Eyes Test mean score than did their non-dysphoric controls. This surprising result was followed up in a second study in which 92 students (males and females) took part. There was again a significant positive association between overall depression scores (as measured by the Beck Depression Inventory, BDI) and performance on the Eyes Test. Harkness and colleagues explained these findings by suggesting that dysphoric students might be especially vigilant processors of social information, perhaps motivated by a desire to regain control over their social environment (Weary & Edwards, 1994), giving them an advantage in decoding the relatively subtle cues in the Eyes Test stimuli.

However, the argument about increased vigilance of dysphoric individuals is not consistent with results from related lines of research, which show that dysphoric participants tend to have intermediate scores, falling between depressed and normal samples, when it comes to impairments in social functioning. For example, it is established that there is a lowered ability to generate positive facial expressions in clinically depressed participants (Schwartz, Fair, Salt, Mandel, & Klerman, 1976). A parallel pattern is found in normal controls who are categorized into dysphoric and non-dysphoric based on their BDI scores (e.g., Sloan, Bradley, Dimoulas, & Lang, 2002).

Furthermore, in contrast to previous research, which consistently finds that depressed participants do worse than controls on positive and/or neutral items (Gur et al., 1992; Surguladze et al., 2004) but not on negative items, Harkness et al. (2005) found that item valence did not interact with dysphoria; dysphoric students performed better than non-dysphoric students regardless of item valence.

The present research aims to re-examine the relationship between depression/dysphoria and mental state decoding ability. We do this by investigating two samples: a sample of moderately-to-severely depressed students who attended a counseling service (counseling group), which was intended to be broadly equivalent to Lee et al.'s (2005) depressed sample; and a sample of normal college students, who ranged in their depression scores from non-dysphoric to dysphoric (college group). This latter group was intended to be equivalent to Harkness et al.'s (2005) sample. Our data-analytic approach focuses on the correlations between depression scores (as measured by BDI-II and HADS-D, see below) and overall Eyes Test performance in the two groups. In addition to this main analysis, we explore whether participants show differential performance on the Eyes Test as a function of item valence.

Finally, we test the explanation proposed by Lee et al. (2005) for the inconsistency between the findings of Lee et al. (2005) with clinically depressed participants and those of Harkness et al. (2005) with dysphoric participants. Lee et al. (2005) noted that their participants met the DSM-IV criteria for a major depressive episode, whereas those in Harkness et al.'s (2005) study did not. Thus, they argued, the differences in the results between the two samples may have been due to the differences in qualitative aspects of their dysphoria. They supported this claim by reference to the fact that in their study it was the affective symptoms of depression rather than non-affective symptoms that were a better predictor of Eyes Test performance among depressed individuals. They suggested that affective symptoms of depression are especially likely to be associated with a lack of interest in others, and as a consequence clinically depressed individuals are likely to perform less well on mental state decoding tasks such as the Eyes Test.

This argument implies that the negative correlation between affective symptoms and Eyes Test performance will be smaller in non-depressed samples than in severely depressed samples, and that the positive correlation between Eyes Test performance and overall BDI scores in (non-depressed) dysphoric samples observed by Harkness et al. (2005) would be driven by a positive correlation between non-affective symptoms of depression and Eyes Test scores. Another goal of the present research was to examine these implications.

Method

Participants

One hundred and eighty-nine students participated in this study. One hundred and sixteen were undergraduate students studying a range of disciplines; what they had in common was that they were clients of the university's counseling service. Of these, 91 (71 females, 20 males) satisfied our selection criterion of being at least mildly depressed (BDI-II score > 14; Beck, Steer & Brown, 1996) and were therefore retained for further analysis as 'counseling group'. Their average age was 22.22 years (SD = 5.21). The other 73 (67 females, 5 males, one participant did not provide gender information) were undergraduate students of psychology at the same university who participated in partial fulfillment of a course requirement. These students comprised the college group. Their average age was 19.42 (SD = 1.34).

Materials

Eyes Test. The task consists of 36 black-and-white photographs of the eye region of human faces (revised version; Baron-Cohen et al., 2001). These are presented one at a time, along with four words describing mental states (e.g., aghast, fantasizing, impatient, alarmed). The task of the respondent is to say which of these four states is being experienced by the person whose eyes are shown. For the valence analysis, we categorized the items into positive (4 items: playful, fantasizing, thoughtful, friendly), negative (6 items: upset, worried, regretful, accusing, doubtful, and preoccupied) and neutral (8 items: desire, insisting, uneasy, despondent, preoccupied, cautious, skeptical, anticipating), following the classifications proposed by Harkness et al. (2005) and also used by Lee et al. (2005). Harkness et al. made these classifications based on a pilot study of 12 non-dysphoric women, who rated the emotional valence of the stimuli in the Eyes Test from 1 – *very negative*, to 4 – *neutral*, to 7 – *very positive*.

Depression and anxiety measures. We used two measures of depression to assess the presence and severity of depression in our samples: the Beck Depression Inventory II (BDI-II; Beck et al., 1996), a 21-item measure of depression, and the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1993), a 14-item measure of anxiety (HADS-A subscale) and depression (HADS-D subscale). Both instruments are widely used in the literature and have good psychometric properties (Bjelland, Dahl, Haug, & Neckelmann, 2002; Dozois, Dobson, & Ahnberg, 1998). The reliabilities of the depression and anxiety measures in our sample were high (BDI, $\alpha = .94$; HADS-D, $\alpha = .88$; HADS-A, $\alpha = .87$).

Procedure

Participants in both groups took part on a voluntary basis, and it was made clear on the consent form completed before any data were collected that they were free not to respond to any items and that they could withdraw at any stage of the research without incurring any penalty. Participants were asked to complete three measures (BDI-II, HADS, and Eyes Test) and to supply some demographic information. The three measures were administered in a counterbalanced order. Participants also indicated their age, gender, and whether or not English was their first language. In addition to these variables, participants in the counseling group reported their major subject of study.

The three measures were presented in paper-and-pencil form and participants worked at their own pace. Participants in the college group signed up to take part in the study at one of a designated set of times and completed the battery of questionnaires in small groups. A researcher was present to give instructions, answer any questions, and ensure that participants completed the measures individually, without discussion. Participants in the counseling group were asked at their initial counseling session whether they would be willing to take part in the research; those who agreed to do so completed the questionnaires in the presence of a researcher who gave instructions and answered any questions.

Results

Preliminary analysis and treatment of outliers

Inspection of BDI-II scores revealed one outlier in the college group with a score more than 3 standard deviations greater than the mean; it was therefore changed to the value of the next highest BDI score plus one. The same procedure was adopted for outliers in the Eyes Test total scores (2 outliers) and the Eyes Test neutral items scores (1 outlier). Participants in the counseling group were significantly more anxious and depressed (whether indexed by BDI-II or HADS depression scores) than were those in the college group. The relevant means, standard deviations, and *t* values are shown in Table 1.

Counseling group

Correlations between BDI-II, HADS, and Eyes Test performance. Correlations among the key measures for counseling group participants are shown in Table 2. The measures of depression and anxiety are significantly and strongly inter-related. As predicted, there are negative correlations between the two indices of depression and performance on the Eyes

Test. More specifically, there is a significant correlation between Eyes Test scores and HADS-D depression scores, and between Eyes Test scores and BDI-II scores. Partial correlations controlling for HADS-A scores (to check whether the relation between depression and Eyes Test scores was independent of individual differences in anxiety), showed that the correlation with BDI-II is still marginally significant, $r(87) = -.20$, $p = .056$, and the correlation with HADS-D scores remains significant, $r(87) = -.25$, $p = .016$.

Valence analysis. We correlated percent correct for each of the three valence subscales of Eyes Test (positive, neutral and negative) with measures of depression and anxiety. These correlations were not significant for the negative or positive sub-scores (*p*s $\geq .17$). For the neutral subscale, however, there were significant correlations with BDI-II scores, $r(88) = -.23$, $p = .028$, and with HADS-D scores, $r(88) = -.29$, $p = .006$, but not with HADS-A scores, $r(88) = -.11$, $p = .294$. After controlling for the HADS-A scores, the correlation becomes marginally significant for the BDI-II scores, $r(87) = -.21$, p = .054, but remains significant for the HADS-D scores, $r(87) = -.27$, p = .011. When we compared the significance of the difference between the correlations between depression scores, on the one hand, and scores on the three valence subscales, on the other, using Fisher *r*-to-*z* transformations, we did not find any significant differences.

Affective and non-affective BDI subscales. To test Lee et al.'s argument that the difference between their and Harkness et al.'s results was due to the fact that affective symptoms were negatively correlated in clinically depressed individuals but not in dysphoric individuals, we first divided the BDI-II items into affective (9 items, including guilt, anhedonia, and suicadality, $\alpha = .89$) and non-affective (the remaining 12 items, $\alpha = .89$) subscales, and then tested whether scores on these two sub-scales were differentially related to Eyes Test performance by regressing Eyes Test scores on the affective and non-affective subscales of BDI-II. We ran a stepwise regression analysis with affective and non-affective symptoms as predictor variables and Eyes Test scores as the outcome variable. The final model was significant, $R^2 = .058$, $F(1, 88) = 5.42$, $p = .022$, and contained only affective symptoms as a predictor; non-affective symptoms were excluded from the model because this variable failed to meet the threshold *p* value (.05) for inclusion. Consistent with Lee et al.'s hypothesis, Eyes Test performance was significantly negatively related to affective symptoms, standardized $\beta = -.241$, $p = .022$, but not to non-affective symptoms, standardized $\beta = -.044$, *ns*.

The results for the counseling group therefore broadly replicate the findings of Lee et al. (2005), who showed that in clinical samples affective symptoms of depression were a better predictor of Eyes Test performance than non-affective symptoms. Also consistent with Lee et al. is the absence of a differential relation between depression scores and Eyes Test scores as a function of item valence. Although we found a significant negative relationship between Eyes Test performance and depression scores for neutral items, but not for positive or negative items, the correlation for neutral items was not significantly stronger than those for positive or negative items.

College group

Correlations between BDI-II, HADS, and Eyes Test performance. Correlations among the key measures for college group participants are shown in Table 3. It can be seen that here, too, the measures of depression and anxiety are significantly and strongly inter-related. More importantly, there is a significant negative correlation between Eyes Test performance and BDI-II scores, and a negative but non-significant correlation between Eyes Test performance and HADS-D depression scores. The correlation between Eyes Test scores and BDI-II scores is marginally significant ($r(67) = -.22$ $p = .068$) after controlling for HADS-A scores.

Dysphoria and mental state decoding. We categorized our college sample into dysphoric (BDI-II score of 12 or more, M = 20.43, SD = 5.26, N = 14) and non-dysphoric (BDI-II score of less than 12, M = 5.39, SD = 3.46, N = 56)[2], and ran an independent-samples *t*-test on Eyes Test performance. Like Harkness and colleagues, we found a significant effect of dysphoria on mental state decoding, $t(68) = 2.29$, $p = .025$, $d = 0.56$, but we did not observe what Harkness et al. called a ‘dysphoric advantage’; on the contrary, it was non-dysphoric students who scored higher ($M = 28.25$, $SD = 3.21$) than dysphoric students ($M = 26.07$, $SD = 3.08$). This relationship remained significant when dysphoria was entered as a between-group factor in a one-way ANOVA with HADS-A scores as a covariate, $F(1, 67) = 4.55$, $p = .037$, $\eta^2 = .064$.

Valence analysis. For the college sample, we correlated percent correct for positive, negative and neutral items with the measures of depression and anxiety. As for the counseling group, there were no significant correlations for positive or negative item sub-scores (ps $\leq .699$). For the neutral items, however, there was a significant negative correlation with BDI-II, $r(68) = -.29$, $p = .015$, a negative but non-significant correlation with HADS-D scores, $r(68) = -.20$, $p = .101$, and a negative but non-significant correlation with HADS-A scores, $r(73) = -.14$, $p = .229$. After controlling for HADS-A scores, the correlation with BDI-II scores remained significant, $r(67) = -.29$, p = .017. As was the case with the Counseling group, the correlation between depression scores and

[2] A BDI score of 12 was used by Harkness and colleagues as a cut-off for categorizing their participants into dysphoric/non-dysphoric subgroups. For ease of comparison we adopted the same criteria.

the neutral items was not significantly stronger than the corresponding correlations with positive or negative items.

Affective and non-affective BDI subscales. As before, we ran a forward stepwise regression with affective and non-affective subscales of BDI-II as predictor variables and Eyes Test scores as the outcome variable. The final model was significant, $R^2 = .078$, $F(1, 68) = 5.76$, $p = .019$, and contained only affective symptoms as a predictor; the non-affective symptoms variable was not included in the model. As for the counseling group, and again consistent with Lee et al.'s hypothesis, Eyes Test performance was significantly negatively related to affective symptoms, standardized $\beta = -.279$, $p = .019$, but not to non-affective symptoms, standardized $\beta = .13$, *ns*.

The results for the college group, therefore, do not replicate the pattern observed by Harkness and colleagues (2005), who found that dysphoric students performed better on the test of mental state decoding. Our findings are more consistent with those of Harkness et al. when it comes to the role of item valence: although there was a tendency for the relation between dysphoria and mental state decoding to be more evident when the mental states were neutral, this relationship was not significantly stronger than the corresponding relationships with items representing positive or negative mental states. A final point is that the findings from the college group provide no support for Lee et al.'s (2005) explanation for the differences between their findings and those of Harkness et al. First, we did not observe a positive relationship between the non-affective symptoms of depression and mental state decoding ability; second, as in the counseling group, it was the affective symptoms of depression that were a better predictor of the impaired Eyes Test performance than non-affective symptoms of depression; and finally, the affective symptoms of depression were *not* a weaker predictor of Eyes Test scores in the college group (standardized β = -.401) than in the counseling group (standardized β = -.241).

Analyses across groups

To examine the relation between depression and mental state decoding in the sample as a whole, we divided BDI scores into three categories (0–12, non-dysphoric, n = 56; 13–29: moderately dysphoric, n = 73; 30 and over, severely dysphoric, n = 32) and ran a one-way ANOVA on the Eyes Test scores of all participants, collapsing across group. This analysis revealed that the overall relation between BDI and Eyes Test scores was significant, $F(2, 157) = 3.53$, $p = .032$, $\eta^2 = .043$, such that the Eyes Test scores of the non-dysphoric group (M = 28.25, SD = 3.21) were higher than those of moderately dysphoric group (M = 27.30, SD = 3.70), which were in turn higher than those of the severely dysphoric group (M = 26.20, SD = 3.62). Post hoc comparisons showed that the non-dysphoric group differed significantly (p = .028) from the severely dysphoric group.

Finally, we revisited the issue of the role of item valence by computing correlations between depression scores and Eyes Test scores separately for negative, neutral, and positive Eyes Test items. The correlations are shown in Table 4. There is tendency for depression scores to be significantly and negatively related to performance on the neutral and positive (but not the negative) Eyes Test items. The strength of this relation is marginally significantly greater for neutral items than for negative items (z = 1.88, p = .060, and z = 1.94, p = .052, respectively, for the BDI-II and HADS-D measures). The difference in strength of relation between the positive and negative Eyes Test items is not statistically significant (z = 1.62, p = .11, and z = 1.18, p = .24, respectively, for the BDI-II and HADS-D).

Discussion

We set out to examine the relationship between depression scores (as measured by BDI-II and HADS) and mental state decoding ability in two samples of students: a counseling group consisting of students who were clients of the university's counseling service and were at least moderately depressed (BDI-II > 14); and a college group consisting of students who were not attending the university's counseling service.

For the counseling group, based on Lee et al.'s (2005) results, we anticipated that there would be a negative relationship between affective symptoms of depression and mental state decoding ability. Consistent with their results, we found that Eyes Test performance was better predicted by affective symptoms of depression than by non-affective symptoms. For the college group we sought to explore whether Harkness et al.'s (2005) finding of a positive relation between depression and mental state decoding ability would be replicated. In contrast to their findings, we observed a negative correlation between mental state decoding ability and depression scores. In addition, we analyzed the sample as a whole, collapsing across counseling and college groups. This analysis also showed that depression symptoms are negatively related to mental state decoding ability, with minimally depressed participants performing significantly better than their severely depressed counterparts.

We also examined whether the relationship between mental state decoding ability and depression scores differed as a function of item valence. Lee et al. (2005) found that valence did not interact with group (non-depressed vs. moderately depressed vs. severely depressed) to affect accuracy on the Eyes Test, whereas Harkness et al. (2005) found that dysphoric participants had scored higher than non-dysphoric participants on all types of items. Both sets of findings contrast with the generally reported finding that depression is associated with a tendency to interpret positive and/or neutral stimuli, but not negative stimuli, in negative terms (e.g., Gur et al., 1992; Murphy et al., 1999; Suslow, Junghanns, & Arolt, 2001). Our findings are more compatible with this pattern. Although there was no significant difference in the strength of the relation between depression scores and Eyes Test scores as a function of items valence when the counseling and college group data were analyzed separately, there was a trend for the relation to be stronger for neutral than for negative items when the data from both groups were analyzed together. This pattern of relationships could be regarded as reflecting a selective influence of negative affective states on Eyes Test performance, with neutral states being less well recognized due to negative schemas biasing responses to such items, although such an interpretation needs to be treated with caution in view of the fact that the difference in the strength of the correlations did not exceed the conventional threshold for statistical significance.

Finally, we explored whether Lee et al.’s (2005) suggestion that the different relations between depression and mental state decoding ability observed by them and by Harkness et al. (2005) reflect qualitative differences in depression. Their argument suggests that a negative correlation between affective symptoms of depression and mental state decoding should be found for the more severely depressed individuals in the counseling group, but not in the college group; it also suggests that in the college group any non-significant correlation of affective symptoms with mental state decoding ability should be offset by a positive correlation between non-affective symptoms and Eyes Test scores. This is not what our results showed. We found that affective symptoms were a better predictor than non-affective symptoms of Eyes Test performance in both groups.

Thus our results corroborate Lee et al.'s (2005) findings regarding the differential influence of affective and non-affective symptoms on mental state decoding, but not their argument that differences in affective symptoms of depressions between severely depressed and dysphoric individuals can account for the difference between their results and the results reported by Harkness et al. (2005).

There are several ways in which the present findings are inconsistent with those reported by Harkness et al. (2005). In trying to account for these inconsistencies, it is worth considering whether sample or procedural differences might have played a role. Other than nationality (Harkness et al.'s participants were students at a Canadian university and were presumably predominantly of Canadian nationality; those in the current study were students at a British university and all but 8 of those in the college group were British) there are no salient differences between the two samples with respect to mean age, mean BDI score or mean Eyes Test score. One clear procedural difference between the two studies is that Harness et al. used a computerized administration of the Eyes Test in which participants were encouraged to respond quickly as well as accurately, and the Eyes Test items were embedded in a broader set of items in which participants had to select one of four possible adjectives to describe each of 12 pictured animals and to judge whether 12 of the Eyes Test items depicted male or female faces. By contrast, we used paper-and-pencil administration of the Eyes Test, participants were not put under any pressure to respond quickly, and there were no items other than Eyes Test items. These procedural differences are large, yet it seems unlikely that they could account for the inconsistencies between the two sets of findings, because Lee et al. (2005) used a procedure identical to that used by Harkness et al. and found results that are similar to ours. Given the degree of consistency between Lee et al.'s results and our own, it seems reasonable to conclude that Harkness et al.'s finding that depression and mental state decoding ability are positively related may be an atypical finding, as well as being one that is also less easily accommodated into the broader literature on depression.

Although there are two published studies that appear at first sight to be consistent with Harkness et al.'s (2005) findings, on closer examination they do not provide evidence for a 'dysphoric advantage' when it comes to mental state decoding. Converse, Lin, Keysar, and Epley (2008) found that induced mood (happy vs. sad) is related to performance on a theory of mind task. In particular, they found that happy participants performed less well than sad participants when asked to predict the behaviour of a person in a scenario. However, the effect Converse et al. observed was not driven by sad participants: When the authors included a third, neutral condition in a follow-up study, sad participants did not differ in theory of mind performance from participants in the neutral condition.

Harkness, Jacobson, Duong, and Sabbagh (2010) found that participants with a prior history of clinical depression who responded to a happy-mood induction with a happy mood performed worse on the Eyes Test than did counterparts who were unresponsive to the happy mood induction. However, there was no parallel effect for participants assigned to a sad mood induction condition. Thus participants who were responsive to the sad mood induction did not perform better on the Eyes Test than did participants who were unresponsive. Furthermore, for never-depressed participants, there was also no effect in the sad mood induction condition. So dysphoria as indexed by level of sad mood in the sad mood induction conditions was unrelated to Eyes Test performance.

Conclusion

We examined the relationship between dysphoria/depression and mental state decoding in a counseling sample and a college sample. The results for the counseling group broadly replicated Lee et al.'s (2005) findings, showing that more seriously depressed participants have impaired mental state decoding and that it is the affective symptoms of depression that are associated with poorer mentalizing ability. However, the results for the college group are inconsistent with Harkness et al.'s (2005) findings, in that there was no evidence that dysphoric participants were characterized by better mental state decoding. By contrast, we found that mental state decoding ability was impaired in dysphoric college students.

References

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: The MIT Press.

Baron-Cohen, S., & Wheelwright, S. (2004). The Empathy Quotient: An investigation of adults with Asperger Syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders, 34*, 163-175.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The "Reading the mind in the eyes" test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 42*, 241-251.

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

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research*, *52*(2), 69-77.

Bora, E., Vahip, S., Gonul, A.S., Akdeniz, F., Alkan, M., Ogut, M., Eryavuz, A., (2005). Evidence for theory of mind deficits in euthymic patients with bipolar disorder. *Acta Psychiatrica Scandinavica, 112*(2), 110–116.

Carton, J. S., Kessler, E. A., & Pape, C. L. (1999). Nonverbal decoding skills and relationship well-being in adults. *Journal of Nonverbal Behavior, 23*, 91-100.

Converse, B. A., Lin, S., Keysar, B., & Epley, N. (2008). In the mood to get over yourself: Mood affects theory-of-mind use. *Emotion, 8*(5), 725-730.

Coyne, J. C., Kessler, R. C., Tal, M., Turnbull, J., Wortman, C. B., & Greden, J. F. (1987). Living with a depressed person. *Journal of Consulting and Clinical Psychology, 55*, 347-352.

Dozois, D. J. A., Dobson, K. S., & Ahnberg, J. L. (1998). A psychometric evaluation of the Beck Depression Inventory-II. *Psychological Assessment, 10*(2), 83-89.

Gotlib, I. H., & Lee, C M. (1989). The social functioning of depressed patients: A longitudinal assessment. *Journal of Social and Clinical Psychology, 8,* 223-237.

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.

Harkness, K. L., Sabbagh, M. A., Jacobson, J. A., Chowdrey, N. K., & Chen, T. (2005). Enhanced accuracy of mental state decoding in dysphoric college students. *Cognition and Emotion, 19*, 999-1025.

Harkness, K. L., Jacobson, J. A., Duong, D., & Sabbagh, M. A. (2010). Mental state decoding in past major depression: Effect of sad versus happy mood induction. *Cognition & Emotion, 24*(3), 497-513.

Hess, U., Kappas, A., & Scherer, K. R. (1988). Multichannel communication of emotion: Synthetic signal production. In K. R. Scherer (Ed.), *Facets of emotion: Recent research* (pp. 161-182). Hillsdale, NJ: Erlbaum.

Hokanson, J. E., & Butler, A. C. (1992). Cluster analysis of depressed college students' social behaviors. *Journal of Personality and Social Psychology, 62*, 273-280.

Joiner Jr, T. E., Alfano, M. S., & Metalsky, G. I. (1992). When depression breeds contempt: Reassurance-seeking, self-esteem, and rejection of college students by their roommates. *Journal of Abnormal Psychology, 101*, 165-173.

Joiner Jr, T. E., Alfano, M. S., & Metalsky, G. I. (1993). Caught in the crossfire: Depression, self-consistency, self-enhancement, and the response of others. *Journal of Social and Clinical Psychology, 12*, 113-134.

Joiner, Jr, T.E., & Coyne, J. C. (Eds.) (1999). *The interactional nature of depression*. Washington, DC: American Psychological Association.

Joiner Jr, T. E., & Metalsky, G. I. (1995). A prospective test of an integrative theory of depression: A naturalistic study of college roommates. *Journal of Personality and Social Psychology, 69*, 778-788.

Lee, L., Harkness, K. L., Sabbagh, M. A., & Jacobson, J. A. (2005). Mental state decoding abilities in clinical depression. *Journal of Affective Disorders, 86*, 247-258.

Montag, C., Ehrlich, A., Neuhaus, K., Dziobek, I., Heekeren, H., Heinz, A., & Gallinat, J. (2010). Theory of mind impairments in euthymic bipolar patients. *Journal of Affective Disorders, 123*, 264-269.

Murphy, F. C., Sahakian, B. J., Rubinzstein, J. S., Michael, A., Rogers, R. D., & Paykel, E. K. (1999). Emotional bias and inhibitory control processes in mania and depression. *Psychological Medicine, 29*, 1307-1321.

Nezleck, J. G., Hampton, C. P., & Shean, G. D. (2000). Clinical depression and day-to-day social interaction in a community sample. *Journal of Abnormal Psychology, 109*, 11-19.

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.

Rippere, V. (1980). What makes depressed people feel worse? *Behavior Research and Therapy, 18*, 87-97.

Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition and Personality, 9*, 185-211.

Schwartz, G.E., Fair, P.L., Salt, P., Mandel, M.R., & Klerman, G.L. (1976). Facial expression and imagery in depression: An electromyographic study. *Psychosomatic Medicine, 38*, 337-347.

Steer, R. A., Ball, R., Ranieri, W. F., & Beck, A. T. (1999). Dimensions of the Beck Depression Inventory-II in clinically depressed outpatients. *Journal of Clinical Psychology, 55*, 117-128.

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

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 and Motor Skills, 92*, 857-868.

Weary, G., & Edwards, J. A. (1994). Social cognition and clinical psychology: Anxiety, depression, and the processing of social information. In R. S. Wyer, Jr. & T. K. Srull (Eds.), *Handbook of social cognition* (pp. 289-338). Hillsdale, NJ: Erlbaum.

Weissman, M. M., & Paykel, E. S. (1974). *The depressed woman: A study of social relationships*. Chicago: University of Chicago Press.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67, 361-370.

Table 1. Means, standard deviations, and *t* values for measures of depression and anxiety

Measure Group	Mean	SD	*t*	*p*	*d*
BDI-II					
College	8.40	7.17	15.34	< .001	2.40
Counseling	28.07	9.09			
HADS-D					
College	2.53	2.33	12.15	< .001	1.95
Counseling	8.71	4.09			
HADS-A					
College	7.21	3.62	10.21	< .001	1.61
Counseling	13.26	3.90			

Note. BDI-II is the Beck Depression Inventory, revised version; HADS-D is the depression subscale of the Hospital Anxiety and Depression Scale; HADS-A is the anxiety subscale of the Hospital Anxiety and Depression Scale.

Table 2. Correlations among depression, anxiety, and mental state decoding ability scores in counseling group (n = 91)

Measure	BDI-II	HADS-D	HADS-A
HADS-D	.64**		
HADS-A	.56**	.44**	
Eyes Test	-.23*	-.28**	-.11

Note. BDI-II is the Beck Depression Inventory, revised version; HADS-D is the depression subscale of the Hospital Anxiety and Depression Scale; HADS-A is the anxiety subscale of the Hospital Anxiety and Depression Scale.

* - $p < .05$; ** - $p < .01$

Table 3. Correlations among depression, anxiety, and mental state decoding ability scores in college group (n = 73)

Measure	BDI-II	HADS-D	HADS-A
HADS-D	.82**		
HADS-A	.58**	.58**	
Eyes Test	-.24*	-.12	-.10

Note. BDI-II is the Beck Depression Inventory, revised version; HADS-D is the depression subscale of the Hospital Anxiety and Depression Scale; HADS-A is the anxiety subscale of the Hospital Anxiety and Depression Scale.

* - $p < .05$ ** - $p < .01$

Table 4. Correlations between depression scores and Eyes Test scores as a function of item valence.

	Negative	Positive	Neutral
BDI-II	-.026	-.206	-.234
	ns	*p* = .009	*p* = .003
	n = 160	*n* = 160	*n* = 160
HADS-D	-.046	-.176	-.257
	ns	*p* = .025	*p* = .001
	n = 163	*n* = 163	*n* = 163