



Maternal history of depression is associated with enhanced theory of mind in depressed and nondepressed adult women

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ABSTRACT

Theory of mind forms the basis of social cognition and develops on a stereotyped ontogenetic timetable. Yet, there are individual differences in theory of mind that may be transmitted through genetic and/or environmental mechanisms. In the current study we examined the relation of maternal history of depression to individual differences in theory of mind in a sample of adult women. Sixty-one depressed women (23% with a positive maternal history of depression) and 30 non-depressed women (33% with a positive maternal history of depression) completed the 'Reading the Mind in the Eyes task', a test of theory of mind decoding. Women with a maternal history of depression performed better on the Eyes task than those without. Further, the younger the mother's onset of depression, the better the current probands' Eyes task performance. These results are consistent with a broader literature linking hypersensitive social cognition and depression risk. We discuss the potential clinical implications of our results.

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1. Introduction

Major Depressive Disorder (MDD) is associated with significant deficits in the ability to decode the mental states of others (Lee et al., 2005; Uekermann et al., 2008; Wang et al., 2008). Mental state decoding forms the foundation of 'theory of mind,' and is crucial to negotiating social interactions (Sabbagh, 2004). The symptoms most strongly associated with impaired theory of mind decoding in MDD include anhedonia, psychomotor retardation, and depressed mood, suggesting that a lack of motivation to attend to the mental states of others may, at least in part, account for these individuals' poor performance (Lee et al., 2005). These studies are consistent with a large literature supporting impairments in the less complex task of detecting basic facial emotions in MDD (Bourke et al., 2010).

Paradoxically, evidence also suggests that individuals who exhibit subthreshold depression (i.e., dysphoria) are significantly *more* accurate than are non-dysphoric controls at theory of mind decoding and other social cognitive tasks, such as detecting deception and social decision-making (e.g., Bodenhausen et al., 1994; Forgas, 1995; Lane and DePaulo, 1999; Harkness et al., 2005; Harkness et al., 2011). Similarly, individuals with a past history of MDD, currently in remission, show superior accuracy on theory of mind decoding in comparison to never-depressed individuals (Harkness et al., 2010), although they are impaired in tests of theory of mind *reasoning* (Inoue et al., 2004, 2006). Further, recent studies have found that happy mood induction decreases accuracy on

theory of mind decoding tasks in previously depressed individuals (Harkness et al., 2010), whereas sad mood induction enhances theory of mind decoding and reasoning abilities in non-depressed controls (Converse et al., 2008).

The results above suggest a dissociation in theory of mind decoding between individuals with severe clinical MDD and those with subthreshold or remitted MDD. Specifically, these latter individuals may have an exquisite sensitivity to others' mental states, which is eclipsed when in a severe MDD episode by the amotivational symptoms of the syndrome (Lee et al., 2005). The enhanced sensitivity to mental states seen in dysphoria is consistent with a growing body of research proposing that depression promotes an analytical style of processing that selectively enhances accuracy on complex social tasks (see Andrews and Thomson, 2009). Further, related research has proposed that mild to moderate depression, in particular, is associated with a hypersensitivity to subtle social cues (see Allen and Badcock, 2003).

The social cognitive advantage shown in people with depression vulnerability has been explained in terms of a specific *social motivation* to know others' minds (Weary and Edwards, 1994; Harkness et al., 2011). For example, dysphoric individuals, but not controls, are able to increase even further their performance on a complex theory of mind decoding task under conditions in which they believe that their performance has specific relevance to their social relationships (Harkness et al., 2011). According to some theorists, a hypersensitivity to subtle social cues may have adaptive significance in terms of solving interpersonal problems and/or minimizing social risk (Allen and Badcock, 2003; Andrews and Thomson, 2009).

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Despite depression-vulnerable individuals' motivation to understand, and accuracy in decoding, other minds, these individuals suffer from profound deficits in their actual social functioning (Joiner and Metalsky, 1995) and are vulnerable to developing more severe clinical MDD (Fergusson et al., 2005). Indeed, the social and interpersonal deficits exhibited by individuals at risk for depression may be the very features that motivate them to seek an understanding of others' minds (Allen and Badcock, 2003; Harkness et al., 2010, 2011). Alternatively, being exquisitely sensitive to others' mental states may cause the very interpersonal stressors that trigger more severe depression pathology (e.g., Potthoff et al., 1995). As such, the above research raises the intriguing possibility that superior theory of mind may not translate into superior social functioning and, indeed, may itself represent a translational phenotype of depression risk. Understanding the etiology of this social cognitive profile, then, becomes relevant to understanding the social cognitive basis of depression.

Studies of normally developing children have shown inter-generational transmission of individual differences in theory of mind (Hughes and Cutting, 1999; Ruffman et al., 1999; Sabbagh and Seamans, 2008). Therefore, the primary purpose of the current study was to test the hypothesis that individuals with a maternal history of depression show a tendency to superior theory of mind skills. Our sample included adult women in a current episode of major depression versus a matched group of women with no history of psychopathology. A subsample of the women in each group was positive for a maternal history of depression.

Theory of mind can be separated into at least two component processes (Sabbagh, 2004): 1) decoding others' mental states based on immediately observable information (e.g., decoding mental states from pictures of eyes); and 2) reasoning about mental states to explain or predict others' actions (e.g., making judgments about false beliefs). These two levels of theory of mind work together to facilitate social interactions. Further, in both cases, accurate mental state judgments are crucial to negotiating the social interaction. Therefore, of particular interest are individual differences in accuracy at the foundational level of decoding others' mental states based on information that is gleaned from the environment. The "Reading the mind in the eyes task" (Eyes Task; Baron-Cohen et al., 2001) is capable of detecting subtle differences in social intelligence and is the most widely used test of theory of mind decoding in adults.

Consistent with past studies using the Eyes task, we predicted that women with MDD would show poorer theory of mind performance than nondepressed women. At the same time, consistent with maternal history of depression as an indicator of depression risk portending superior social cognition, we predicted that women in both the depressed and nondepressed groups who were positive for a maternal history of depression would be *more* accurate in their mental state decoding than those without this history.

Our second goal was to examine whether differences in theory of mind decoding in women with versus without a maternal history of depression are seen across eyes stimuli of a negative, positive, or neutral valence. Emerging evidence suggests that individuals with a positive maternal history of depression show a negative attentional bias (Joormann et al., 2007), and are slower to categorize negative emotional information (Mannie et al., 2007), than those without. Therefore, we predicted that women with a maternal history of depression would be more accurate than those without in their decoding of negatively-valenced eyes, in particular.

2. Method

2.1. Subjects

Ethical approval for this study was obtained by the Health Sciences Research Ethics Board at Queen's University. All participants were competent to give consent, and provided written informed consent after a complete description of the study procedures. Sixty-one adult women (mean age = 43.45, *SD* = 14.70) in a current

episode of unipolar MDD were referred from an outpatient psychiatry service in a mid-sized city in Ontario, or were recruited through advertisements posted in the wider community. A further 30 nondepressed adult women were recruited through advertisements. Only women were recruited in the current study because evidence suggests that sex differences exist in theory of mind decoding skills (Baron-Cohen et al., 1997). We recognized that our projected sample size would not be powerful enough to permit including gender as a moderator, particularly in the context of the 2:1 sex ratio in the prevalence of depression that makes recruitment of men very difficult. Exclusion criteria for the MDD group were a current or past diagnosis of a psychotic disorder, bipolar disorder, or substance dependence. Women in the nondepressed group had no current or past history of any psychiatric diagnosis. Diagnostic status was confirmed using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I/P; First et al., 1995) (see below).

Of the 103 women who initially participated in the study, seven were excluded because they had a history of mania, psychosis, or substance dependence, and five were excluded because of technical malfunctions with the experimental tasks. The excluded and included participants did not differ in terms of age, education status, or occupation status (all *P*s > .10). Thus, the final sample consisted of 91 participants (61 depressed and 30 nondepressed). These women are part of a larger sample participating in studies of social cognition in depression (Lee et al., 2005).

2.2. Measures

2.2.1. Diagnostic interview

All participants were assessed with the full SCID-I/P. This structured interview derives diagnoses according to Diagnostic and Statistical Manual for Mental Disorders criteria (DSM-IV-TR; American Psychiatric Association, 2000). SCID interviews were conducted by a doctoral-level interviewer who was trained to reliability status and supervised closely throughout the project by the first author (see Grove et al., 1981). Reliability status was achieved when the trainee matched a gold-standard rater's diagnoses on at least three consecutive SCID interviews that she observed and at least three consecutive SCID interviews that she conducted. The interview began with questions regarding the participants' age, education level, occupation status, and ethnicity. Consistent with the community from which the participants were recruited, the sample was 96% White.

Participants were also administered the Family History Interview (FH-RDC; Andreasen et al., 1977). This is a structured interview that specifies the Research Diagnostic Criteria for major psychiatric diagnoses of family members based on information obtained from the target proband. This is the most widely used method of soliciting family history information from adult participants in psychopathology and genetic research, and the measure has documented good reliability and validity (Andreasen et al., 1977; Ptok et al., 2001; Milne et al., 2009). Interviews were conducted by a doctoral-level interviewer who was unaware of the goals and hypotheses of the current study and of participants' performance on the experimental tasks. The interviewer was trained and supervised closely throughout the project by the first author.

2.2.2. Depression measures

Participants were administered the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) and the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1967). The BDI-II is a 21-item self-report inventory that assesses the presence and severity of depressive symptoms. Responses are scored on a scale of 0–3 with higher scores indicating greater depression severity. Cronbach's alpha in the present sample was .95. The 17-item HRSD is a semi-structured, clinician-rated interview designed to assess severity of depression and has documented acceptable reliability and validity (Bagby et al., 2004). HRSD interviews were conducted by a doctoral-level interviewer who was trained and supervised closely throughout the project by the first author.

2.2.3. Reading the mind in the eyes task (Eyes task; Baron-Cohen et al., 2001)

The Eyes task consists of 36 black-and-white photographs (15 cm × 6 cm) of the eye region of faces edited from just above the eyebrows to halfway down the bridge of the nose. Participants are instructed to select one of four mental state adjectives (the standardized correct adjective and three distracters) that best depict the mental state shown in the eyes. The photographs were centered on a computer screen, and the four adjectives were placed at the four corners of the photograph equidistant from the center of the screen. Participants responded by pressing one of four keys on the keyboard (S, X, K, M) that were spatially analogous to the location of the adjectives. The location of the correct answer was counter-balanced across items. Participants' responses and response times were recorded digitally. See Fig. 1a for a sample item from the Eyes task.

The target adjectives used in the Eyes task have been categorized into three emotional valence categories: positive (e.g. "Friendly"), negative (e.g. "Upset"), and neutral (e.g. "Reflective"). Classifications were made by an independent sample of 12 non-depressed women who were presented with the 36 eyes from the Eyes task with the target adjective (i.e., correct answer with no distracters) centered below the eye picture. Participants ranked the stimuli for emotional valence on a 7-point scale, on which 1 = *very negative*, 4 = *neutral* and 7 = *very positive*. Those stimuli that had mean ratings significantly below neutral, (one-sample *t* = 2.20, *df* = 11, $\mu = 4$, *P* < 0.05, uncorrected) were classified as negative, those stimuli with mean ratings significantly

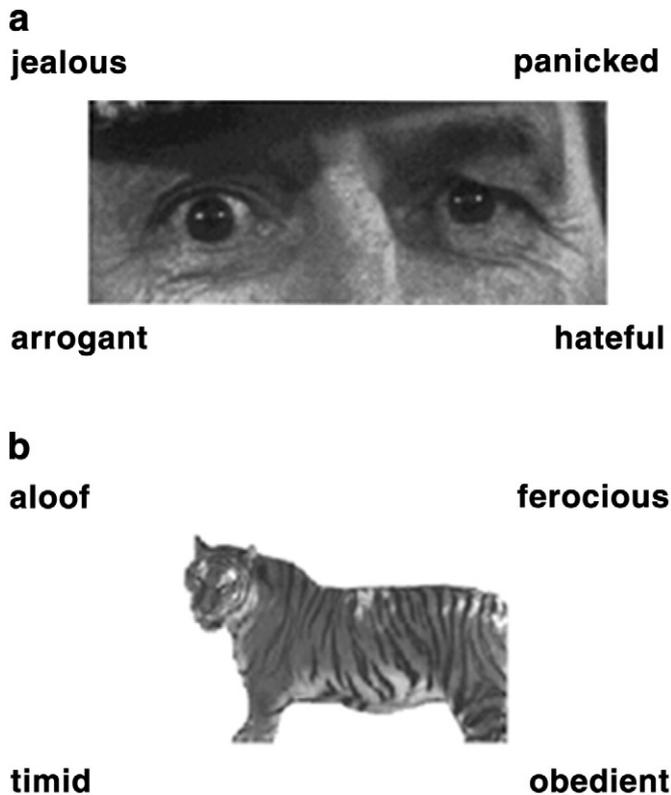


Fig. 1. Sample items from a) Eyes task (panicked is correct), and b) Animals task (ferocious is correct).

above neutral were classified as positive, and those stimuli that did not differ significantly from neutral were classified as neutral. These valence categories have been used in several studies (Harkness et al., 2005, 2010, 2011; Lee et al., 2005).

2.2.4. Animals task

The Animals task was used as a control task to ensure that any group differences can be attributed specifically to differences in mental state decoding. In this task participants viewed 12 black-and-white photographs of animals and selected the best out of four adjectives that described the animals in a format similar to the Eyes task. This task controls for peripheral differences in task demands or low-level perceptual processing. The Animals task was developed by Harkness et al. (2005) and has been used in several studies (Harkness et al., 2005, 2010, 2011; Lee et al., 2005). See Fig. 1b for a sample item from the Animals task.

2.3. Procedure

All participants were administered the SCID-I/P, HRSD, FH-RDC, and BDI-II. Then participants completed the experimental tasks, which were combined and presented in a single block (48 trials total). Preceding the trials, participants completed a practice trial that showed a stimulus from the Eyes task. Participants were instructed to respond as quickly and as accurately as possible. Their responses and response latencies in milliseconds (ms) were recorded digitally with measurement error not exceeding 16 ms. Participants were compensated \$10 for travel.

3. Results

The Eyes task has been used in over 100 studies and is the most widely used test of theory of mind decoding in adults. In the present sample, more participants selected the target than would be expected by chance for all but one item on the Eyes task (Binomial Test, $P < 0.0013$), and all but one item on the Animals task (Binomial test, $P < 0.0041$). After deleting these items, the Eyes and Animals tasks consisted of 35 and 11 items, respectively.

3.1. Demographic and clinical group differences

The depressed group was significantly younger than the non-depressed group ($M_s = 39.92, 50.63$; $SD_s = 12.04, 17.05$; $t[89] = 3.46$,

$P = 0.001$). The categorical demographic characteristics by depression group are presented in Table 1. A series of chi-square analyses revealed that the depressed and non-depressed groups were not significantly differentially distributed across levels of marital status, $\chi^2(2) = 1.65$, $P = 0.65$, or education status, $\chi^2(3) = 6.19$, $P = 0.10$. However, depressed and nondepressed groups were significantly differentially distributed across occupational categories, $\chi^2(3) = 9.41$, $P < 0.05$, such that the nondepressed group had significantly more participants in professional occupations than sales/service occupations, whereas the reverse was true for the depressed group, $OR = 8.05$, $P < 0.01$. Age and occupation status did not emerge as significant covariates in any of the models below. Therefore, the uncontrolled models are presented for ease of interpretability.

Table 1 also presents the proportion of women in the depressed and nondepressed groups with a maternal history of depression. Maternal histories of other psychiatric disorders were too low to permit statistical analysis. Further, only 13 women reported a paternal history of depression, thus precluding analysis of paternal depression in the current model. Those with versus without a maternal history of depression did not differ significantly in terms of age, $t(89) = 1.26$, $P = 0.21$, and were not significantly differentially distributed across categories of marital status, $\chi^2(3) = 6.00$, $P = 0.11$, education, $\chi^2(3) = 0.59$, $P = 0.90$, or occupation status, $\chi^2(3) = 0.67$, $P = 0.88$.

Table 2 presents the clinical characteristics of the depressed group stratified by presence or absence of maternal history of depression. The depressed women with a maternal history of depression did not differ significantly from those without in terms of any of these characteristics, including the presence versus absence of a comorbid anxiety disorder diagnosis (all $P_s > 0.33$).

3.2. Maternal depression and theory of mind decoding

Accuracy on the Eyes task was significantly correlated with accuracy on the Animals task, $r = 0.33$, $P = 0.001$. However, Eyes task performance was not significantly associated with any of the demographic or clinical characteristics of the sample listed in Tables 1 and 2, including comorbid anxiety (all $P_s > 0.18$). A 2 (depression group: depressed vs. nondepressed) \times 2 (maternal history of depression: present vs. absent) Analysis of Covariance (ANCOVA) was specified to examine group differences in theory of mind decoding on the Eyes task. Accuracy on the Animals task and reaction time on the Eyes task were entered as covariates. The estimated marginal means are presented in Fig. 2. The model revealed a significant main effect of depression group, $F(1, 91) = 6.73$, $P = 0.01$, $\eta^2 = 0.07$, such that, as expected, the depressed participants performed significantly more poorly than the nondepressed controls. Further, the main effect of maternal depression was significant, $F(1, 91) = 4.55$, $P = 0.04$, $\eta^2 = 0.05$, such that, as hypothesized, those with a maternal history of depression performed significantly better on the Eyes task than those without. There was no evidence of a significant group by maternal depression interaction, $F(1, 91) = 0.16$, $P = 0.69$, $\eta^2 = 0.002$.

Table 1

Demographic characteristics of the sample by depression group.

Variable	Group	
	Non-Depressed ($n = 30$)	Depressed ($n = 61$)
Marital Status, married/divorced or widowed/never married	14/9/7	27/13/21
Education, grade 8 or less/grades 9–12/part college/graduated college	0/0/9/21	6/5/14/36
Occupation, unemployed/homemaker or student/sales or service/professional	10/8/5/7	25/9/23/4
Maternal history of depression, present/not present	10/20	14/47

Table 2
Clinical characteristics of the depressed group by maternal history of depression.

Variable	Group			
	Maternal Depression (n = 14)		No Maternal Depression (n = 47)	
	Mean	(S.D.)	Mean	(S.D.)
BDI	24.71	(12.45)	28.61	(13.20)
HRSD	10.64	(6.11)	12.62	(7.03)
Number of previous episodes	5.92	(5.60)	5.15	(6.04)
Age at first onset	20.00	(11.21)	23.07	(10.48)
Anxiety disorder comorbidity, present/not present	6/8		18/29	
Currently being treated, yes/no	12/2		39/8	

3.3. Maternal depression age of onset and theory of mind

Sixteen of the 24 women with a maternal history of depression were able to report the age of onset of their mother's depression. Four women reported an approximate age (e.g., "early 20s"). In these cases, we picked the mid-point of the period, as long as the participants could estimate within a 5-year window. The ages of onset of mothers' depression ranged from 15–71 ($M = 33.75$, $SD = 15.92$). The younger the mother's age of onset of depression, the better the participants performed on the Eyes task, $r = -0.64$, $P = 0.008$. That is, 42% of the variance in women's performance on the Eyes task in those with a maternal history of depression could be explained by the age at which their mother became depressed. This association was still highly significant even when controlling for Animals task accuracy, Eyes task response time, and the participants' own depression status, partial $r = -0.65$, $P = 0.02$.

Given the small subsample for these analyses we created confidence intervals based on a distribution of 20,000 correlations from bootstrapped samples. Even when partialling Animals task accuracy and Eyes task response time, the 95% confidence intervals ranged from -0.87 to -0.07 , $P = 0.02$, and none included zero. P represents the 2-tailed probability of obtaining a correlation of zero or higher.

3.4. Maternal depression and the valence of mental states

To determine whether the relation of maternal history of depression and accuracy on the Eyes task was specific to stimulus valence we conducted a 3 (valence: positive, negative, neutral) \times 2 (depression group) \times 2 (maternal history of depression) mixed model ANOVA with valence as the within-group factor and depression group and maternal history of depression as between-group

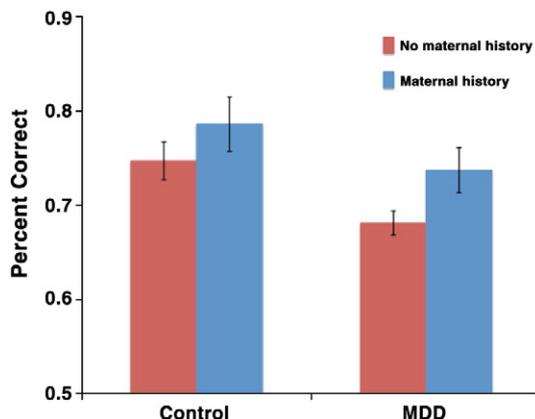


Fig. 2. Mean accuracy data (% correct) on the Eyes task for depressed and control subjects by presence or absence of maternal history of depression.

factors. The model revealed a significant main effect of valence, Wilks' $\lambda = 0.92$, $F(2, 86) = 3.89$, $P = 0.02$, $\eta^2 = 0.08$, such that overall participants performed worst on the negative eyes. The valence by depression group interaction only approached significance, Wilks' $\lambda = 0.95$, $F(2, 86) = 2.28$, $P = 0.10$, $\eta^2 = 0.05$. The 2-way interaction of valence and maternal history of depression failed to reach significance ($P = 0.52$, $\eta^2 = 0.02$), nor was there a significant 3-way interaction of valence, depression group, and maternal history of depression ($P = 0.50$, $\eta^2 = 0.02$). An analysis of reaction times across mental states of a positive, negative, or neutral valence revealed no evidence for a main effect of valence ($P = 0.44$, $\eta^2 = 0.02$), or an interaction of valence with depression group ($P = 0.85$, $\eta^2 = 0.004$), maternal history of depression ($P = 0.49$, $\eta^2 = 0.02$), or both depression group and maternal history of depression ($P = 0.69$, $\eta^2 = 0.009$).

The current results are important because they suggest that women with a maternal history of depression may have enhanced social cognitive abilities.

4. Discussion

The current study provides novel and intriguing evidence that women with a maternal history of depression are more accurate in their theory of mind decoding than are those without this history. This difference held as a main effect and was not significantly moderated by women's own MDD status. That is, across women with and without MDD, maternal history of depression was associated with better theory of mind performance. Further, differences between those with and without a maternal history of depression on the Eyes task were robust when controlling for demographic differences between groups, Eyes task response times, and performance on a control task. These differences were also found across mental states of a negative, positive, and neutral valence. Therefore, the current results suggest that women with a positive maternal history of depression may have enhanced theory of mind decoding abilities.

The relation of maternal history of depression to enhanced theory of mind decoding in the current sample of women with MDD is particularly intriguing because these women as a group demonstrated significantly poorer performance on the Eyes task than the healthy control women. This main effect of depression group is consistent with previous studies that have shown deficits in theory of mind in patients with severe clinical syndromes (see Bora et al., 2009), and in the case of MDD in particular, these deficits have been linked to the amotivational symptoms of the syndrome (Lee et al., 2005). That the depressed women with a maternal history of depression showed significantly enhanced theory of mind decoding abilities even in the context of severe MDD symptoms implicates theory of mind even further as a potential translational phenotype of depression risk. It also suggests that cognition in depression is complex and can be influenced by pre-existing, stable vulnerability factors as well as by the acute symptomatic state.

The current results are preliminary and need to be replicated. Nevertheless, they are consistent with a growing body of evidence that supports a profile of enhanced social cognitive abilities in individuals with risk markers for depression. Researchers have postulated that depression and dysphoria encourage a hypersensitive, analytical, and detail-oriented approach to complex social problems that is motivated by a desire to regain control over their social world (e.g., Yost and Weary, 1996; Gasper and Clore, 2002; Allen and Badcock, 2003; Forgas, 2007; Andrews and Thomson, 2009). Recent research in the area of social cognitive neuroscience has, indeed, implicated similar neural circuitry as central to both theory of mind decoding (Shamay-Tsoory et al., 2003; Sabbagh et al., 2004) and social decision-making, particular involving appraisals of the reward associated with social interactions (e.g., Tranel, 2002; Insel and Fernald, 2004; Moretti et al., 2009).

The exact mechanism(s) by which a maternal history of depression may be related to enhanced theory of mind abilities is unclear

and may involve both genetic and environmental mechanisms. In addition to passing on genes that code for depression, depression in mothers exposes children to a wide range of factors that heighten vulnerability for depression, including negative affect, dysfunctional cognitions, and a stressful environment (Goodman and Gotlib, 1999). In the current study we found that participants' performance on theory of mind was strongly predicted by the age at which their mother was depressed. Specifically, women whose mothers were depressed at a younger age, likely when the participants were children, had the *highest* scores on the Eyes task. This finding was based on a small subsample and must be interpreted with caution. Nevertheless, it further supports the likely operation of both genetic and social learning mechanisms.

Early-onset depression has a particularly high genetic loading (Zubenko et al., 2001). Therefore, it is possible that these mothers with an early onset to their depression were particularly likely to pass on phenotypic traits that are associated with risk for MDD. However, future research is needed to clarify the developmental expression of enhanced theory of mind decoding ability in those with a maternal history of depression, and to reconcile the results reported here with the developmental literature in this area. For example, depressed mothers have been shown to engage in less mental state talk with their children (Herrera et al., 2004), and the quantity and quality of mental state talk significantly predicts the development of theory of mind in general population samples of normally developing children (e.g., Jenkins et al., 2003). As such, there may be a dissociation between the theory of mind decoding abilities of vulnerable children and those of vulnerable adults that needs to be clarified.

Regardless of the exact mechanism underlying superior theory of mind abilities in individuals with a maternal history of depression, the accumulated evidence thus far points to a tentative, but consistent, pattern. Specifically, adults who possess risk markers for MDD, including the presence of subthreshold depression symptoms, a past history of MDD, and a maternal history of depression, show enhanced accuracy at decoding others' complex mental states. This may be due to a trait elevation in motivation to know others' minds. Due to the absence of research examining theory of mind abilities in children and adolescents with depressed mothers, the developmental timetable of expression of these abilities is still unknown. What is known, however, is that significant *deficits* in theory of mind decoding are observed once in the clinical state of MDD, possibly as a result of the amotivational symptoms of the syndrome that eclipse these individuals' underlying sensitivity.

4.1. Study limitations

The current results should be interpreted in the context of the following limitations. First, this sample consisted exclusively of women. Therefore, future research is needed to determine whether the results seen here generalize to men with and without a maternal history of depression. Similarly, there were not enough participants in the present study who reported a *paternal* history of depression to permit an examination of the role of father's depression to theory of mind ability. Further, the results here relate specifically to the foundational theory of mind skill of mental state *decoding*. Future studies are required to extend these results to the more complex skill of mental state *reasoning* using, for example, tasks that assess the accuracy of judgments regarding false beliefs or irony.

Second, the assessment of a maternal history of depression relied on the participants' own self-report. This variable is difficult to assess directly in samples of adults because in many cases the parent in question lives a great distance away or is deceased or incapacitated. The FH-RDC is the gold standard for assessing a family history of psychopathology by proband report (Milne et al., 2009). Nevertheless, biases on the part of the participant may have influenced reporting on this variable. For example, the women's own depressive symptoms

may have inflated rates of reporting on their mothers' history of depression. This is unlikely as we found no significant difference in the distribution of maternal history of depression between the depressed and nondepressed groups. Alternatively, women with better theory of mind decoding abilities may have been more sensitive to their mother's depression symptoms and, hence, over-reported these symptoms on the FH-RDC interview. This is also an unlikely alternative explanation for the present findings. The FH-RDC includes probes that require the participant to provide examples of symptoms observed in their relative. Only mothers who were reported as meeting DSM-IV criteria for MDD were included as a positive maternal history. In many cases, the participants were even aware of their mothers' treatment details (e.g., medications taken, hospitalizations) and onset age. Nevertheless, the preliminary results reported here should be replicated using a more rigorous and time-consuming data collection strategy that attempts to validate participant report with parent report, if available, and/or chart records.

Further understanding of this possible trait sensitivity to others' mental states ultimately could have important implications for the prevention of MDD in those at risk. In particular, cognitively- and interpersonally-based clinical strategies that train individuals to temper their sensitivities and to challenge their fundamental representations of the social world may lead to improvements in these individuals' day-to-day social functioning, thereby lessening their vulnerability to developing severe psychopathology.

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