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Adolescent Recognition of Parental Affect: Influence of Depressive Symptoms

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Abstract

This study examined depressive biases in adolescents' labelling of parental affect. Adolescents (151 girls; 82 boys) and their parents engaged in videotaped problem-solving interactions (PSIs). Adolescents then participated in a video-mediated recall procedure in which they watched the videotaped interaction and indicated how they thought their parents were feeling. Indices of parents' affect during the PSIs were also provided by parent self-report and behavioral observations. Adolescent depressive symptoms were associated with over-reporting of parental aggressive affect and under-reporting of parental happy and neutral affects, relative to both directly observed and self-reported parental affect. Depressive symptoms were not associated with over-reporting of parental dysphoric affect. Given the importance of accurately reading affective cues for negotiating interpersonal interactions, these findings likely have implications for understanding processes that contribute to adverse relationships amongst the families of adolescents with depressive symptoms.

Keywords

adolescent depression; affect recognition; video-mediated recall

Adolescence is a formative period of development, characterized by changes in social cognition and increased sensitivity to interpersonal environments (Blakemore, 2008; Davey, Yucel & Allen, 2008). Though these developmental changes promote the skills necessary for greater independence, they can also create vulnerability to emotional and behavioral

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dysregulation (Nelson, Leibenluft, McClure, & Pine, 2005). Indeed, the increase in the prevalence of depression during early to middle adolescence (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Seeley & Lewinsohn, 2008) may well reflect developmental processes, including changes in social cognition. As such, examining social cognition in adolescents with depressive symptoms may reveal critical processes relevant to the etiology and maintenance of depressive conditions.

The strong evidence base establishing connections between family processes and adolescent depression (Herring & Kaslow, 2002) suggests that the family environment may be an important setting in which to investigate the manner in which depressive symptoms are associated with adolescents' perceptions of interpersonal situations. In particular, research suggests that adolescents are at risk for depression as a function of ongoing exposure to adverse family environments characterized by the absence of supportive and warm interactions and by elevated levels of harsh and conflictual interactions (e.g., Sheeber, Davis, Leve, Hops, & Tildesley, 2007). Research on clinical samples, moreover, indicates that the quality of parent-child interactions predicts both the course of depressive episodes (Asarnow, Goldstein, Thompson, & Guthrie, 1993; Sanford et al., 1995) and response to treatment (Birmaher et al., 2000).

Furthermore, the association between family interactions and adolescent depression appears to be bi-directional. Conflictual family environments lead to increases in depressive symptoms (e.g., Sheeber, Hops, Alpert, Davis, & Andrews, 1997), and conversely, depressed persons behave in ways that increase interpersonal strains (Rudolph et al., 2000). This latter effect may be mediated, in part, by the adolescents' affective reactivity and regulation during family interactions. A key contributor to affective reactivity may be the characteristic ways in which the adolescents interpret the behavior of other family members. For instance, in adult samples it has been demonstrated that depressed individuals preferentially attend to negative interpersonal signals (Gotlib, Krasnoperova, Yue & Joormann, 2004; Mathews, Ridgeway, & Williamson, 1996) and that depressed mood impacts on social reasoning in a way that makes individuals more sensitive to negative social outcomes (Allen & Badcock, 2003). It is likely that as depressive symptoms increase, such sensitivity is no longer functional, but rather leaves the individual so hypersensitive that they persistently misperceive benign social cues as threatening (Allen & Badcock, 2003).

Some research (Downey & Walker, 1992; Sanders, Dadds, Johnston & Cash, 1992) suggests that the interpersonal impairments characteristic of depression may be attributable, in part, to difficulties in recognizing others' emotions. To the extent that depressed adolescents have difficulty reading others' affective states they may perceive others' behavior as being more negative and less positive than it actually is. This could result in many of the social behaviors that characterize depressed adolescents, including withdrawal, reassurance seeking, or irritability, and result in further adverse consequences within their interpersonal exchanges and relationships.

Research with depressed adults suggests that they have a deficit in reading others' facial affect (e.g., Feinberg, Rifkin, Schaffer, & Walker, 1986). The most consistent finding is that depressed persons have difficulties identifying positive affect, requiring greater intensity of stimuli (Joorman & Gotlib, 2006), and misperceive positive and neutral affects as negative (Gur et al., 1992; Hale, Jansen, Bouhus, & Van Den Hoofdakker, 1998; Levkovitz, Lamy, Ternochiano, Treves, & Fennig, 2003). Additionally, some studies have also reported impairment in the recognition of negative emotions (Joorman & Gotlib, 2006). For example, depressed persons have been shown to be less accurate than controls in the discrimination of sad expressions (Surguladze et al., 2004).

Fewer studies have been conducted with depressed children or adolescents. Nonetheless, available research suggests that depressed adolescents also demonstrate impairments in recognizing others' emotions (Downey & Walker, 1992; Walker, 1981). Sanders and colleagues (1992) examined the concordance between independently observed levels of maternal angry and depressed affect, and their children's perceptions of their mothers' affect. They reported that ratings of both depressed and conduct-disordered children did not correlate with those of independent observers, whereas those of non-clinic children correlated moderately.

The majority of research suggests that depressed children and adolescents show impairments in the processing of anger and positive/neutral affective states in particular (e.g., Mendlewicz, Linkowski, Bazelmans, & Philippot, 2005; van Beek & Dubas, 2008; cf. Guyer et al., 2007). For example, depressed children are more likely to perceive positive or neutral emotions as negative (Downey & Walker, 1992; Walker, 1981). Similarly, van Beek and Dubas (2008) reported that children and adolescents with higher levels of depressive symptoms perceived more anger and less joy (but not more sadness) in low intensity affective faces. In sum, this research suggests that depressed children and adolescents are, like their adult counterparts, impaired in the processing of facial affect cues.

One concern regarding the available research is that with one exception (Sanders et al., 1992), all of the studies have used affective pictures as the stimulus materials. Though this approach is beneficial for the purposes of standardization, it lacks ecological validity. It is unclear how depressed persons process emotional information in situations that are more realistic and etiologically relevant. Affect recognition typically occurs in the context of interpersonal situations in which people benefit from a broader set of affective cues (i.e., body/voice), contextual factors that define the situation, and familiarity with the other interactants. It is unclear, therefore, whether similar deficits would emerge in more interpersonally relevant situations. The Sanders and colleagues' study, moreover, asked the children to provide a global affect rating at the end of the interaction. Given, depressive biases in recall and synthesis of information (Mathews & MacLeod, 2005), this approach could result in an overestimate of the extent to which depressed children and adolescents misperceive affect relative to a more molecular assessment. Finally, most of the research on youth samples has collapsed across children and adolescents. Given the dramatic increase in the incidence of depression after puberty (Angold, Costello, & Worthman, 1998), and the aforementioned developmental changes in social cognition during adolescence (Blakemore, 2008; Davey et al., 2008), it is important to examine these processes specifically in adolescent depressed samples.

In the current study we examined the association between adolescents' depressive symptoms and their ability to label the affect their parents displayed during family interactions. Because this scenario provides the participants with information about the context in which the affect is expressed, they may be better able to identify and label the emotion. It was hypothesized that depressive symptoms would be associated with a negative bias in adolescents' reports of their parents' emotions relative to both the impressions of independent observers and parents' own self-reports. In particular, it was hypothesized that greater symptom levels would be associated with more reports of aggressive and dysphoric affect and fewer reports of happy and neutral affects than would be indicated by independent observer and parent reports.

Method

Participants

Participants were 233 adolescents (151 girls and 82 boys) and their parents (221 mothers and 148 fathers), participating in a study of family processes associated with adolescent depression (Sheeber et al., 2007). Adolescents ranged in age from 14 to 18 years ($M = 16.11$) and lived with at least one parent or permanent guardian. Adolescents were selected and enrolled using a two-gate recruitment process consisting of an in-school depression screening using the Center for Epidemiological Studies-Depression Scale (CES-D) and a subsequent diagnostic interview (K-SADS, Orvaschel & Puig-Antich, 1994). This selection approach was designed to provide a sample of adolescents with substantial variability in levels of depressive symptoms, ranging from normative through diagnostic levels. Specifically, 82 participants met criteria currently for either Major Depressive Disorder ($n=79$) or Dysthymia ($n=3$); 78 had subdiagnostic levels of depressive symptoms (i.e., elevated scores on the CES-D in the absence of disorder), and 83 were in the healthy range (i.e., scoring less than $\frac{1}{2}$ SD above the mean score of students in an earlier epidemiological sample). As part of our recruitment strategy, adolescents were matched on demographic variables, such that there were no differences in sex, age, or race/ethnicity across levels of depression. Detailed recruitment procedures are presented in Sheeber et al. (2007). Of families enrolled in the larger study ($n=243$), 10 were excluded because audiotaped VMR data were unavailable due to technical problems. These participants did not differ from those retained on measures of either depressive symptoms or demographic characteristics.

Procedures and Measures

Problem-Solving Interaction and Video-Mediated Recall Procedures—

Adolescents and their parents engaged in two 10-minute problem-solving interactions (PSIs) in which they tried to resolve two areas of conflict identified based on the Issues Checklist (Robin & Weiss, 1980). The topic of greater conflict (as indicated by parent and adolescent report of frequency and intensity) was discussed second in order to have the most emotionally intense interaction proximal to the video-mediated recall procedure. Only the second interaction was used for the VMR in order to minimize participant burden.

Immediately subsequent to the PSIs, adolescents participated in a semi-structured video-mediated recall procedure (VMR). VMR procedures are used to elicit participants' feedback regarding the thoughts and feelings they experienced during the interaction (Welsh & Dickson, 2005). Adolescents watched and responded to a videotape of the second problem-solving interaction in private. The video replay was paused automatically every 20s and participants were asked how their parent(s) were feeling. The question was phrased in an open-ended manner and participants responded in their own words. The participants were given 20 seconds to respond before the next section of the interaction was played. The timing and duration of pauses were based on research indicating that longer pauses produce redundancy in the verbalizations (Halford & Sanders, 1988) and is consistent with other research using this approach (Welsh & Dickson, 2005). Responses were audiotaped for subsequent coding.

Living in Familial Environments Coding System (LIFE; Hops, Biglan, Tolman, Arthur, & Longoria, 1995)—The LIFE is an event-based, microsocial observational system. The validity of the LIFE to meaningfully represent behavior derived from parent-adolescent interactions has been established in numerous studies of adolescent depression (e.g., Sheeber et al., 2007; Katz & Hunter, 2007). Parent affect was coded from videorecordings of the interactions by observers blind to adolescent depression scores. For this study, we used four affect codes: aggressive, dysphoric, neutral, and happy.

Approximately 20% of videos were coded by a second observer to assess inter-rater reliability; Kappas for the observed parent affect codes ranged from .70 to .89.

A separate team of observers coded the adolescent participants' audiotaped descriptions of their parents affect, obtained during the VMR procedure, using the same LIFE codes. Observer agreement, again based on 20% of the data being coded by two independent observers, ranged from Kappas of .75 to .80.

For each 20s block of video, each affect was rated as present or absent based on observational data and participant VMR-response data, separately. More than one affect could be recorded (by trained observers) or reported (by adolescents) within each block. Sums were created for observational and VMR data reflecting the number of blocks during which each affect was present.

Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977)—

The CES-D is a widely-used, self-report measure that has respectable psychometric properties for use in adolescent populations (Radloff, 1991; Asarnow et al., 2005). The CES-D was administered on two occasions. As noted above, adolescents first completed the CES-D during the school screening which served as the first-gate of the selection procedure. Adolescents subsequently completed the CES-D during the lab-based family assessment in order to provide a continuous measure of depressive symptoms. Data from this second assessment was used as the outcome variable in this report. Because the CES-D, as a continuous measure, provides a more nuanced assessment of gradations in severity than diagnostic groupings, these scores were used as the measure of depression as has been done in previous work on this sample (e.g., Chen, Johnston, Sheeber, & Leve, 2009).

Multiple Affect Adjective Checklist-Revised (MAACL-R; Lubin & Zuckerman, 1985)—

The MAACL-R is a frequently used measure, with demonstrated psychometric adequacy for assessing mood states (Lubin, Van Whitlock, Reddy, & Petren, 2001). Respondents are presented with a 'checklist' of affective words and asked to mark those that describe how they feel. Scores on each scale are created by summing the number of items checked. Parents completed the state form of the MAACL-R at the conclusion of the PSI, with instructions to mark the words which described how they felt during the interaction. The hostility (sample words: mean, angry, hostile), depression (sample words: alone, sad, forlorn) and positive affect (sample words: affectionate, pleasant, joyful) scales were used in this report. Reliabilities for MAACL subscales, as indexed by Cronbach's alpha, ranged from .65 to .91.

Results

In order to examine the influence of adolescent depressive symptoms on perceptions of parents' affect, we ran two series of regressions in which the dependent variables were adolescents' reports of their parents' aggressive, dysphoric, neutral, and happy affects as obtained during the VMR procedure. As parents of adolescents with greater self-reported depression may experience and display more negative and less positive affect than do those of adolescents with less self-reported depression, we included a covariate reflecting "actual" parent affect in each series of regressions. In the first series, actual parent affect was operationalized as observed affect, as coded by trained observers. In the second series, "actual" parent affect was defined as parents' self-reported affect during the interaction. In both sets of analyses, the statistic of interest was the significance of the β for depressive symptoms, after controlling for actual parent affect. Given evidence of sex differences in affect-processing skills of children and adolescents (McClure, 2000), we initially included

adolescent sex as a moderator. However, as none of the effects were significant, we have not included them in the analyses reported.

In the first set of analyses (Table 1), higher levels of adolescent depressive symptoms were associated with fewer adolescent reports of parental happy and neutral affects, and more frequent reports of parental aggressive affect, for both mothers and fathers, after controlling for observed parent behavior. The effect for father happy affect fell just short of the traditional threshold for identifying findings as significant. Notably, adolescent depressive symptoms were not associated with more frequent reports of parental dysphoric behavior.

In the second set of analyses, the covariate was parent-reported affect during the interaction as reported on the MAACL-R. As the MAACL-R does not have a *neutral* scale, analyses were run predicting aggressive, happy, and dysphoric behavior only. Higher levels of adolescent depressive symptoms were associated with fewer reports of happy and more frequent reports of aggressive affect, on the part of both mothers and fathers, controlling for self-reported parent affect. As before, adolescent depressive symptoms were not associated with more frequent reports of parental dysphoric behavior. In contrast to the effects for observed parent affect, self-reported parent affect was not associated with adolescent VMR reports of parent affect (with the exception of maternal positive affect).

Discussion

The results suggest that adolescent depressive symptoms are associated with misreading of affect in close interpersonal relationships. In particular, higher levels of adolescent symptoms were associated with over-reporting of parental aggressive affect and under-reporting of parental happy and neutral affects, relative to both directly observed and self-reported parental affect. The effect sizes were small to medium, with the larger effects emerging in predicting adolescent reports of parental aggressive affect relative to parent self-report. Overall, these findings are consistent with prior evidence that youth with depressive symptoms and disorder demonstrate a negative bias in perceiving and labelling affect (Mendlewicz et al., 2005; van Beek & Dubas, 2008).

An important distinction between the current study and previous research (cf. Sanders et al., 1992) is that the stimuli to which the adolescents responded consisted of interactive behavior by the adolescents' parents during emotionally evocative family interactions rather than static images of strangers. As such, they enabled the adolescent participants to draw on a wider set of physical (e.g., voice, posture) and contextual (e.g., discussion topic) cues as well as on their knowledge of family norms and behavioral styles in making judgements as to parents' affective states. That the results within this more naturalistic context largely replicated previous findings, suggests that the deficits observed are robust and manifest themselves in personally relevant situations. Notably, a recent VMR study, investigating the related construct of perceived partner criticism amongst married couples (Smith & Peterson, 2008), also found that higher levels of depressive symptoms were associated with increased self-perceptions of partner criticism within couples, relative to both observer- and partner-reports. The investigators reported, moreover, that the association between depression and marital discord was exacerbated by the negative bias. An important direction for future research will be to examine the extent to which such misperceptions contribute to the interpersonal difficulties that depressed adolescents experience. In particular, underperceiving positive affect and overperceiving aggressive affect, may lead depressed persons to overlook available social reinforcement and support (Joorman & Gotlib, 2006) and over-estimate the social threat in their environments, leading in turn to defensive depressive behaviors with the potential to elicit adverse reactions from others (Rudolph et al., 2000).

Greater levels of depression were not, however, associated with over-reporting of parental dysphoric affect. This result is consistent with that reported by van Beek and Dubas (2008), who suggested that depression is likely associated with misperception of emotions associated with approval or rejection. Indeed, most functional or evolutionary views of depression have conjectured that depressed states are defensive reactions to threats to social well being (Allen & Badcock 2003). Our results suggest that depressed states may be associated with enhanced vigilance to affective signs of disapproval or rejection and perhaps with a higher threshold for recognizing affective cues associated with approval. Clarifying the cognitive processes that underlie these deficits will be an important future direction.

Though less central to the hypotheses, it is perhaps worth noting that parents' self-reported affect was not significantly associated with adolescents' VMR reports (with the exception of maternal positive affect). The absence of association likely reflects the lack of coherence between disparate aspects of emotion, such that correlations between experiential, behavioral, and physiological components are often weak (Mauss, Levenson, Carter, Wilhelm, & Gross, 2005). This lack of coherence may be exacerbated in parenting situations and in observational situations, wherein parents may be motivated to regulate some of the outward expression of felt affect. It is notable, in contrast, that the adolescents' VMR reports did correlate with the data obtained by objective observers, who like the adolescents, were responding to behavioral expressions of affect.

One potential limitation of the current investigation is that adolescents described their parents' affect while viewing videorecordings of the interactions. These reports are thus "retrospective" in nature and it is possible that they were influenced either by the adolescents' own behavior or by subsequent parental behaviors during the interaction, rather than being a pure index of the adolescents' reading of their parents' behavior as the interaction unfolded. However, though we cannot rule out the potential influence of these factors, the validity of VMR approaches for capturing cognitions and affect as they occur during interactions has been supported by behavioral and physiological data (Lorber, 2007; Welsh & Dickson, 2005), and allow for confidence in the findings.

Another caveat is that the cross-sectional nature of the data does not enable us to ascertain the extent to which observed deficits represent concomitants of depressive symptoms or conversely, exist prior to the onset of depressive symptoms and represent a vulnerability factor. Some data on adult patient populations suggest that depressive disturbances in processing of others' affect may be state dependent (Gray et al., 2006; Levkovitz et al., 2003). However, evidence that negative attentional biases prospectively predict (Beevers & Carver, 2003) and are maintained subsequent to (Joorman & Gotlib, 2007) depressive symptoms and disorder, suggest the possibility that deficits in correctly processing affective stimuli have the potential to disrupt interpersonal functioning and, hence, create a chronic vulnerability to depressive conditions (see Beevers, Rohde, Stice, & Nolen-Hoeksema, 2007), as described above. Additionally, the findings that physically maltreated children demonstrate a bias toward identifying faces as displaying anger, which has been hypothesized to reflect hypervigilance born of maltreatment (Pollak, Cicchetti, Hornung, & Reed, 2000; Pollak & Kistler, 2002), raises the possibility that the adverse affective climate characteristic of families of depressed youth, may contribute to biases in their processing of affective information. Hence, it will be important to examine the prospective influence of biases in affective recognition on interpersonal functioning and emergence of depressive conditions.

Finally, we did not examine the influence of other forms of symptomatology. Though findings are consistent with both cognitive and evolutionary models of depression, the extent to which findings are a function of elevated levels of depression specifically, as opposed to

symptomatology, more generally, cannot be determined by this investigation. Research is thus needed to determine the extent to which the observed biases are specific to depression.

The study also had a number of strengths. Key among these was that the influence of depressive symptoms on the ability to read others' affect was examined in the context of a personally and etiologically relevant social interaction. That depressive symptoms are associated with misreading of others' affect in situations in which one benefits from a range of behavioral and contextual cues as well as from an understanding of group (in this case, family) norms strongly suggests the relevance of the misperceptions to social interactions. The investigation also benefitted from the use of two methods for indexing parents' "actual" affect. The convergence of results across these two methods provides for greater confidence in the results.

In sum, our findings suggest that adolescents with elevated levels of depression under-perceive parental positive and neutral affects and over-perceive parental angry affects. Given the importance of accurately reading affective cues for negotiating interpersonal interactions, these findings may not only provide evidence of cognitive biases in interpreting affective behavior within the family, but also point towards processes that contribute to adverse relationships amongst the families of depressed adolescents. If defensive processing styles impede depressed adolescents' ability to read interpersonal cues accurately, this may result in maladaptive responses that could further compromise family relationships.

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Table 1

Adolescent VMR Report of Parent Affect Controlling for Observed and Self-Reported Parent Affect

Predictors	Aggressive			Dysphoric			Neutral			Happy		
	B	β	T(df)	B	β	T(df)	B	β	T(df)	B	β	T(df)
Observed Parent Affect												
Mothers												
LIFE	.42	.43	7.09(215)***	.24	.21	3.16(215)**	.28	.12	1.84(215)	.25	.28	4.21(215)***
CES-D	.09	.18	2.95(215)**	.00	-.01	-0.15(215)	-.09	-.13	-1.97(215)*	-.06	-.14	-2.16(215)*
Fathers												
LIFE	.38	.38	5.06(142)***	.18	.20	2.38(142)*	.30	.12	1.43(142)	.28	.31	3.85(142)***
CES-D	.10	.22	2.88(142)**	.03	.08	0.96(142)	-.15	-.22	-2.67(142)**	-.07	-.15	-1.89(142)
Self-Reported Parent Affect												
Mothers												
MAACL	.32	.06	0.95(215)	.41	.07	1.06(215)				.22	.23	3.46(215)**
CES-D	.14	.27	4.04(215)***	.00	-.01	-0.15(215)				-.08	-.20	-2.99(215)**
Fathers												
MAACL	.36	.12	1.46(144)	.46	.12	1.35(144)				.06	.06	.77(144)
CES-D	.11	.23	2.78(144)***	.02	.05	0.54(144)				-.08	-.19	-2.28(144)*

*
 $p < .05$.**
 $p < .01$.***
 $p < .001$.