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Family Meta-Emotion and the Onset of Major Depressive Disorder in Adolescence: A Prospective Longitudinal Study

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Family Meta-Emotion and the Onset of Major Depressive Disorder in Adolescence:

A Prospective Longitudinal Study

Abstract

Meta-emotion philosophy refers to an organized set of thoughts, reactions and feelings about one's emotions and the emotions of others (Gottman, Katz, & Hooven, 1997). This study investigated the prospective relationship between family meta-emotion processes and adolescent-onset Major Depressive Disorder (MDD). Adolescents (N = 198, mean age 12.5 years) and one of their parents each completed the Meta-Emotion Interview (Katz & Gottman, 1986), and adolescents were followed-up at ages 15, 16.5 and 19 years to assess for MDD onset. In the Meta-Emotion Interviews, parents and adolescents were asked about both their own, and the others', anger and sadness. Results showed that parent-report of their own meta-emotion philosophy of sadness prospectively predicted MDD onset in adolescence, as did adolescent-report of low parental emotion coaching in relation to sadness, and adolescent self-perceived emotional competence in relation to sadness. Adolescents' perceptions of family emotional environments characterized by high levels of parental anger expression and family conflict also prospectively predicted MDD onset. These findings highlight the continued importance of family emotional processes in adolescence, and provide insight into how parents' and adolescents' perceptions of emotional processes within the family, particularly in relation to sadness, may be prospectively associated with risk for adolescent onset MDD.

Key words: meta-emotion, anger, sadness, family, adolescence, depression.

In early childhood, emotions are predominately regulated externally by parents and other adults. As children develop into adolescents, emotions become more internally-regulated, although family factors continue to influence this process (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Understanding the relationships between family emotional processes and adolescent adjustment is a growing area of interest (e.g., Davis, Sheeber, Hops, & Tildesley, 2000; Schwartz, Sheeber, Dudgeon, & Allen, 2012; Yap, Whittle, et al., 2008). A useful theoretical construct for examining family emotional processes in adolescence is meta-emotion philosophy, which refers to an organized set of thoughts, reactions and feelings about one's own emotions and the emotions of others (Gottman, Katz, & Hooven, 1996; Gottman et al., 1997). According to the meta-emotion framework, a parent's awareness, acceptance, expression and regulation of their own emotion are an underlying basis for their reactions to, and coaching of, their children's emotions. In turn, these parenting beliefs and practices are thought to influence the child's own emotional competence (defined as their awareness, expression and regulation of emotion), and subsequent adjustment (Gottman et al., 1996; Katz & Hunter, 2007; Katz, Maliken, & Stettler, 2012). The current study examined family meta-emotion constructs in relation to sadness and anger, and specifically aimed to investigate the prospective associations between parental meta-emotion philosophy, parental emotion coaching practices, and adolescent emotional competence, and the onset of Major Depressive Disorder (MDD) in adolescence.

MDD commonly has its onset in adolescence, with approximately 12-28% experiencing an episode of depression by age 19 (Lewinsohn, Rohde, & Seeley, 1998; Merikangas et al., 2010). Meta-emotion constructs may be particularly relevant for understanding the development of MDD, the essential symptoms of which are emotional in nature. Research shows that virtually all adolescents suffering from MDD endorse depressive mood (Lewinsohn et al., 1998), and between a third to a half experience irritable mood

(Safer, 2009). Considerable evidence suggests that family emotional processes are associated with the development of emotional competence (Eisenberg, Cumberland, & Spinrad, 1998; Morris et al., 2007) and MDD (Schwartz et al., 2012; Sheeber, Hops, & Davis, 2001) in adolescence.

Within the adolescent meta-emotion literature, most studies have compared the families of adolescents with and without depression (e.g., Hunter et al., 2011; Katz et al., 2014; Shortt et al., 2016), or have examined depressive and/or internalizing symptoms as an outcome (Katz & Hunter, 2007; Stocker, Richmond, Rhoades, & Kiang, 2007). Such studies have found that parents with meta-emotion philosophies that are higher in awareness and acceptance of their own and their child's emotions tend to have better-adjusted children. For example, Katz and Hunter (2007) found that mothers who reported being more accepting and expressive of their own emotions had adolescent children with lower overall depressive symptoms, higher self-esteem, and fewer internalizing, externalizing, and total problems. Another study found that parents of depressed adolescents reported being significantly less accepting of youth happiness than parents of non-depressed adolescents (Katz et al., 2014). Inconsistently, Shortt and colleagues (2016) found that fathers of depressed adolescent boys reported significantly more awareness of their child's sadness than fathers of non-depressed boys. As the authors comment, this may reflect fathers' exposure to a relatively high frequency and intensity of sadness when their child is depressed. All these studies rely on parental report of their own meta-emotion philosophy, and we are not aware of any meta-emotion studies that have examined adolescents' perceptions of the family emotional environment, and responses to their parents' emotions, which are likely to offer an important, and potentially divergent, perspective (Morris, Robinson, & Eisenberg, 2006).

Several studies have explored parenting *style* in relation to adolescent outcomes. Within the meta-emotion field, parenting styles are theorized to derive from a parent's meta-

emotion philosophy. The *emotion-coaching* style of parenting (Gottman and DeClaire, 1997), in which parents are aware of their children's emotions, accept them, and use them as an opportunity to teach and develop closeness, has emerged as an important factor that is generally associated with positive outcomes. Findings show that adolescents whose parents report high levels of emotion coaching display less aggressive and dysphoric behaviours during mother-adolescent interactions, and report fewer depressive symptoms and higher self-esteem than adolescents with parents low in emotion coaching (Katz & Hunter, 2007). Concordantly, parents of depressed adolescents have been found to engage in less emotion coaching of adolescent sadness (as reported by adolescents) compared to the parents of non-depressed adolescents (Shortt et al., 2016). Another study found that adolescents' ratings of their parents' emotion coaching were negatively associated with their levels of internalising symptoms (Stocker et al., 2007). In contrast, Katz and colleagues (2014) found that parents of depressed adolescent boys reported coaching happiness significantly more than parents of healthy boys, although there was no group difference based on adolescents' reports of parental coaching. Importantly, these studies highlight the value of examining adolescents' perceptions of parental emotion coaching, in addition to parental self-report.

Few meta-emotion studies have examined the association between adolescents' own awareness, expression and regulation of emotion with adjustment. To the best of our knowledge, only Hunter and colleagues (2011) have interviewed adolescents about their own emotional competence and found that depressed adolescents were less likely to have high levels of awareness and effective regulation strategies for negative emotions, compared with healthy adolescents. Outside of the meta-emotion field, research consistently suggests that adolescents who are aware of their own emotions, and are able to regulate them, have fewer symptoms of depression (Larsen et al., 2013; Silk, Steinberg, & Morris, 2003; Yap, Allen, & Ladouceur, 2008; Yap et al., 2011).

The meta-emotion literature reviewed above is relatively consistent in its findings that (i) parental meta-emotion philosophies that are high in awareness and acceptance, (ii) parenting styles that are high in emotion coaching, and (iii) adolescent emotional competence are all factors associated with better adolescent adjustment, particularly in relation to depression. However, a significant limitation is that all these studies are cross-sectional and so cannot elucidate the directionality of the findings; that is, they cannot determine whether the differences in meta-emotion precede the onset of depressive symptoms and disorders, or whether they emerge concomitantly, or as a consequence. The current study, with its prospective design, disentangles the temporality of effects, thus contributing significantly to the evidence base.

A further limitation of the existing meta-emotion literature is that studies have usually collapsed variables relating to sadness and anger. While such variables are highly correlated in some samples (e.g., Hunter et al., 2011), there is also considerable evidence to suggest that family emotional processes in relation to anger and sadness may be differentially related to adolescent depression. For example, youth depression has been associated with parental reinforcement of adolescent depressive behavior, but the reciprocation of aggression (Schwartz et al., 2012). Theoretical literature also suggests that these emotions have distinct social functions and influence social partners in different ways (Halberstadt, Crisp, & Eaton, 1999). For example, a social function of anger is to impose change upon another person, whereas sadness may elicit sympathy, comfort and reassurance from others (Fischer & Manstead, 2008). Thus, it is reasonable to expect that individuals may perceive and respond to these emotions differently, both within themselves and others. Accordingly, the current study examines sadness and anger separately, enabling a direct comparison of whether meta-emotion variables in relation to both of these emotions differentially predict adolescent-onset MDD.

Finally, existing meta-emotion studies predominantly examine parental-report constructs (with the exception of the emotion coaching construct, which has commonly been assessed based on adolescent-report). As adolescents are becoming increasingly autonomous, independent, and responsible for their own emotional competence, it seems likely that their developing meta-emotion is important when considering their risk for MDD. As such, the current study equally considers constructs derived from both parent and adolescent meta-emotion interviews.

The current study aimed to investigate the prospective relationships between parent- and adolescent-reported meta-emotion constructs in relation to sadness and anger, and MDD onset over the course of adolescence. The six meta-emotion variables under consideration were: (i) parents' self-reported meta-emotion philosophy, (ii) parent- and (iii) adolescent-report of parental emotion coaching, (iv) adolescent-report of the family emotional environment, (v) parent-report of adolescent emotion regulation, and (vi) adolescent-report of their own emotional competence. It was hypothesized that the following constructs would prospectively predict the onset of MDD in adolescence: (i) low levels of parental self-reported awareness, acceptance and regulation of their own emotion; (ii) low levels of parent- and (iii) adolescent-rated parental emotion coaching; (iv) adolescent-report of family emotional environments characterised by frequent and intense parental expression of negative emotion, adolescents' negative reaction to their parents' emotion, and family conflict; (v) parent-report of poor adolescent emotion regulation; and (iv) adolescent-report of low emotional competence. Only one known relevant meta-emotion study has examined sadness and anger separately (Shortt et al., 2016), and found that parental meta-emotion constructs in relation to sadness, but not anger, were associated with adolescents' clinical status (i.e., depressed versus not depressed). While related research into parenting behaviors (Schwartz et al., 2012) and adolescent emotional competence (Jackson, Kuppens, Sheeber, &

Allen, 2011; Yap et al., 2011) has demonstrated the importance of anger, in addition to sadness, to adolescent depression, it was considered that findings based on previous meta-emotion research would be most relevant to the current study. Thus, on the basis of limited evidence, it was hypothesized that meta-emotion constructs in relation to sadness would be more strongly predictive of MDD onset than meta-emotion constructs in relation to anger.

Method

Participants

Participants were recruited as part of a large, longitudinal study called the Adolescent Development Study (Yap, Whittle, et al., 2008). The Early Adolescent Temperament Questionnaire – Revised (Ellis & Rothbart, 2001) was administered to 2,453 grade six primary school students from metropolitan Melbourne, Australia, from which a sample of 415 adolescents at high, medium, and low risk for mental health problems was selected. To this end, equal numbers of students were selected with scores on the Negative Affectivity and Effortful Control dimensions of temperament that were 0–1, 1–2, 2–2.5, and greater than 2.5 standard deviations above and below the mean. From this sample, 245 students consented to participate in the Time 1 (T1) intensive assessment phase, of which 202 adolescents and parents/guardians participated in a Meta-Emotion Interview (MEI).

A diagnostic interview (along with other assessments, including demographics and socio-economic status) was administered at T1 when adolescents were approximately 12.5 years of age, and was repeated at three follow-up time points when participants were aged approximately 15 (T2), 16.5 (T3) and 19 (T4) years. Three participants reported a history of MDD at T1 and so were excluded from the current analyses in order to enable prospectivity in relation to MDD onset. A further adolescent participated in the MEI assessment with her grandmother due to parental illness on the day of the assessment. As the focus of the current

study was on *parental* meta-emotion, and the grandmother did not hold a parental role in the participant's life, this family was excluded from the current analyses, leaving a final sample of 198 families. Of the final sample, 50.00% of adolescents were female, and 82.32% of the parents/guardians were female (162 biological mothers and one female relative). The vast majority of adolescents identified their ethnicity as Australian (92.00%).

Procedure

This study was approved by the Human Research Ethics Committee of the University of Melbourne, and informed consent was obtained from adolescents and parents/guardians before participation in the study.

Diagnostic interviews from T1 to T4. At each of the four waves of the Adolescent Development Study, adolescents were administered the Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime version (K-SADS-PL), and a battery of questionnaires. Diagnostic interview data from all time points were integrated by two reviewers and a consensus variable was constructed that indicated whether participants had experienced an onset of MDD at any time between the T1 and T4 time points.

Meta-Emotion Interview at T1. At T1, adolescents and parents participated individually in the Child and Adolescent Meta-Emotion Interview (CAMEI) and Parent Meta-Emotion Interview (PMEI), respectively.

Measures

Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime version (K-SADS-PL). The K-SADS-PL (Kaufman et al., 1997) is a semi-structured diagnostic interview designed to assess current and past episodes of psychopathology in children and adolescents according to DSM-IV criteria. The T1 diagnostic interview assessed for current and lifetime episodes of MDD, and the T2-T4 diagnostic interviews assessed for current MDD, and any new episodes of MDD since the

date of last assessment. Recordings of 20-25% of all K-SADS-PL interviews at each of the four waves of data collection were re-rated by a second coder. The kappa coefficient for symptom-level agreement was found to be 0.80 at T1, 0.78 at T2, 0.86 at T3 and 0.81 at T4, suggesting excellent inter-rater reliability across diagnoses at all time-points.

Meta-Emotion Interview (MEI)

The MEIs are semi-structured interviews conducted with individuals about their own and others' emotions (Katz & Gottman, 1986). Both the PMEIs and CAMEIs were audio recorded and then coded using a checklist rating system specific to each of the MEIs. The current study administered the MEIs only for anger and sadness.

Parent Meta-Emotion Interview (PMEI). The PMEI comprises seven subscales that are identical for both the anger and sadness scales. Three of the subscales examine the parent's *awareness*, *acceptance* and *regulation* of their own anger/sadness. The remaining four subscales examine the parent's *awareness, acceptance* and *coaching* of their child's anger/sadness, as well as the parent's perception of their child's ability to *regulate* anger/sadness.

Child-Adolescent Meta-Emotion Interview (CAMEI). In the CAMEI, the sadness rating scale has nine subscales, and the anger rating scale has ten, but they are otherwise identical. In both, there are four subscales assessing the adolescent's emotional competence; *awareness, expressivity, regulation,* and *remediation* of anger/sadness. Also in both the anger and sadness scales are five subscales that measure the adolescent's perception of: (i and ii) parental *emotion-coaching* of anger/sadness (rated separately for mothers and fathers), (iii) the *family emotional environment (*e.g., the frequency and intensity of parental emotional expressions of anger/sadness), (iv) *adolescent's negative reaction to parent's emotion* (e.g., whether the adolescent feels frightened, attacked or confused when parents express anger/sadness), and (v) *family meta-emotion philosophy* (e.g., whether the child has insight

into the family's dealings with anger/sadness). The anger scale also includes the *family stress* subscale which assesses the adolescents' perception of family stress and conflict.

MEI ratings. All MEI items were coded on a Likert-type scale, generally ranging from 1 (*strongly disagree*) to 5 (*strongly agree)*. Some items were simply coded as 2 (*disagree*) or 4 (*agree*). The MEIs were coded by trained coders who did not conduct the interviews, thus minimizing rater bias. Inter-rater reliability for the PMEI was computed on 29% of the sample, with an average kappa score of 0.63 across subscales (range = .50 to .83). In the CAMEI, inter-rater reliability was calculated on 25% of the interviews, with an average kappa score of 0.65 across subscales (range = .47 to .88). Kappa scores of this magnitude represent substantial agreement (Viera & Garrett, 2005).

Constructs derived from meta-emotion interviews (MEI). Consistent with previous research (Katz & Hunter, 2007; Katz et al., 2014; Katz & Windecker-Nelson, 2004; Yap, Allen, et al., 2008), the current study utilized the approach outlined in Table 1 to create 12 meta-emotion constructs (6 each for anger and sadness) by summing subscales derived from either the PMEI or CAMEI. Higher scores on each of the constructs indicate theoretically better functioning.

Missing Data

For the six CAMEI constructs (three each for sadness and anger), between 8.08 to 18.18% of data were missing due to the interview being incomplete or the recordings of the interview being corrupted. There were no missing data for the six PMEI constructs. Data pertaining to adolescent MDD onset were missing for 47 (23.74%) participants due to attrition. These 47 participants were no different to the 151 with available MDD onset data according to gender, $\chi^2(1) = 0.25$, $p = .616$, socio-economic status, $t(194) = -1.24$, $p = .217$, baseline scores on the key temperament scales of Negative Affectivity, $t(195) = 0.89$, $p = .372$, Effortful Control, $t(196) = -0.66$, $p = .508$, and baseline depression symptoms (as

measured by the Centre for Epidemiological Symptoms – Depression scale (Radloff, 1977)), $t(182) = -0.38$, $p = .708$. Participants with missing MDD onset data were slightly younger than those with complete data, $t(196) = -1.98$, $p = .049$, however, the mean difference in age was less than two months, so this was not considered meaningful. The participants with and without missing MDD onset data were also no different on 9 of the 12 MEI constructs used in the current analyses, t(range from 161—196) = -1.87—1.35 , all ps > .05. The three exceptions were that adolescents with missing data reported family emotional environments characterised by less frequent and intense parental expression of anger and family conflict, $t(180) = 2.22$, $p = .028$, perceived parents as using more emotion coaching of sadness, $t(160) = 2.01$, $p = .046$, and their parents perceived them as having lower emotion regulation abilities for anger, $t(196) = -2.27$, $p = .024$, compared to participants with available MDD onset data. All missing data were missing completely at random (MCAR) according to Little's MCAR test, $\chi^2(163) = 190.31$, $p = .071$. Missing data were estimated using multiple imputation in M*plus* (version 7.11) with 50 imputed datasets.

RESULTS

Descriptive Analyses

Mean scores on each of the twelve MEI constructs are reported in Table 2. *T*-tests showed that mothers reported significantly higher scores than fathers on constructs pertaining to meta-emotion philosophy of sadness, $t(196) = -3.36$, $p = .001$, and emotion coaching of sadness, $t(196) = -3.21$, $p = .002$. Similarly, female adolescents rated themselves as having higher emotional competence in relation to sadness than male adolescents, $t(179) = -3.99$, $p < .001$. A total of 42 (27 female) of the 151 adolescent participants (27.8%) with available diagnostic data experienced the onset of MDD following the T1 assessment, with significantly higher rates of onset among girls than boys, $\chi^2(1) = 4.11$, $p = .043$ (see Table 3). MDD onset was not associated with the gender of the parent who completed the PMEI, $\chi^2(1)$

= 3.21, p = .571, adolescent age at T1, $t(149) = 0.16$, p = .875, or socio-economic status, $t(148) = 1.37$, p = .172, so these three variables were not included as covariates in the final models. Correlations between MEI variables, MDD onset, and adolescent gender are listed in Table 4.

Design of Path Analyses

Path analyses were run using M*plus* and weighted least squares mean- and variance-adjusted (WLSMV) estimation, which is recommended for use with categorical outcome variables (Muthén & Muthén, 1998-2012). Six models were specified based on the 12 MEI constructs defined in Table 1. Each model included the MEI constructs for both anger and sadness as predictor variables, and adolescent MDD onset as the outcome. This design allowed direct comparison of the effects of meta-emotion variables relating to anger and sadness in the prediction of MDD onset. All models controlled for adolescent gender, given its significant effect on the outcome variable.

Path Analysis Results

The mean fit indices across the 50 imputed data sets for five of six models indicated adequate fit. Only the fit indices for the model assessing adolescent-report of their own emotional competence were indicative of poor fit (see model fit information in Table 5). Thus, the results of this final model should be interpreted with caution.

Parental meta-emotion philosophy predicting MDD onset. The R-square statistics showed that the model including constructs for parental meta-emotion philosophy of anger and sadness accounted for 11.6% of variance in MDD onset. Table 5 shows that parental meta-emotion philosophy of sadness, but not anger, significantly predicted MDD onset in adolescence. Specifically, adolescents whose parents reported lower levels of awareness, acceptance and regulation of sadness, but not anger, were more likely to experience the onset of MDD, after controlling for adolescent gender.

Parent-report of emotion coaching predicting MDD onset. The model including parent-report of emotion coaching of anger and sadness predicted 10.5% of variance in MDD onset. Table 5 shows that, after controlling for adolescent gender, neither parent-report of emotion coaching of anger nor sadness significantly predicted adolescent-onset MDD.

Adolescent-report of emotion coaching predicting MDD onset. In contrast, the model including adolescent-report of emotion coaching showed that MDD onset was prospectively predicted by lower levels of parental coaching of sadness, but not anger, as perceived by adolescents, after controlling for adolescent gender (see Table 5). This model accounted for 10.7% of variance in MDD onset.

Adolescent-report of family emotional environment predicting MDD onset. The model including adolescent-report of the family emotional environment in relation to anger and sadness predicted 16.4% of variance in MDD onset. Table 5 shows that, after controlling for adolescent gender, MDD was prospectively predicted by adolescents' perceptions of the family emotional environment in relation to anger, but not sadness. Specifically, family environments in which adolescents perceived a higher frequency and intensity of parental expressions of anger, where adolescents reacted more negatively to parents' anger, and where adolescents perceived higher levels of family stress and conflict, were more likely to be associated with adolescent onset MDD.

Parent-report of adolescent emotion regulation. The model including parent-report of adolescents' emotion regulation in relation to anger and sadness accounted for 9.5% of variance in MDD onset in adolescents. As shown in Table 5, neither parent-report of adolescent regulation of anger nor sadness significantly predicted MDD onset after controlling for adolescent gender.

Adolescent-report of their own emotional competence. As previously noted, fit indices for the model including adolescent-report of their own emotional competence showed a poor fit

to the data (see Table 5), and so the results should be interpreted with caution. The model explained 11.5% of variance in MDD onset, and results showed that adolescent-report of their own competence in relation to sadness, but not anger, significantly predicted MDD onset, after controlling for adolescent gender (see Table 5). Specifically, adolescents who reported relatively low levels of awareness, expression, regulation and remediation of sadness were more likely to experience the onset of MDD in adolescence.

In this model, possible collinearity was observed between the two predictor variables (r = .66, p < .001). To address concerns about collinearity, two separate models were specified including only one of the predictor variables (i.e., either adolescent-report of their competence for anger or sadness), along with the covariate of adolescent gender. These just-identified models replicated the significant findings. That is, after controlling for adolescent gender, adolescent-report of their emotional competence in relation to sadness (β = -.27, p = .010), but not anger (β = -.15, p = .214), significantly predicted MDD onset.

Adolescent gender. Adolescent gender was found to significantly predict MDD onset in five of the six models, reflecting the finding that more girls than boys experienced the onset of MDD across adolescence. While adolescent gender did not emerge as a significant covariate in the original model assessing adolescent report of their emotional competence, which was noted to have poor fit, it was significant in the two models that were re-run with single predictors (β = .25 , p = .017 in the model including adolescent anger competence; β = .30, p = .005 in the model including adolescent sadness competence).

Integrative model of significant constructs. Given that four MEI constructs were identified as significant predictors of MDD onset across the six models (i.e., parental meta-emotion philosophy of sadness, adolescent-report of parental emotion coaching of sadness, adolescents' perceptions of the family environment in relation to anger, and adolescent-report of their own competence in relation to sadness), a final integrative model was specified to

examine whether each of these four constructs accounted for independent variance in MDD onset when included in the same model, after controlling for adolescent gender. This model explained 23.5% of variance in MDD onset but model fit was relatively poor, as shown in Table 5, suggesting the results should be interpreted with caution. Results showed that only one of the four constructs remained significant in the integrative model. Specifically, adolescents' perceptions of the family environment in relation to anger ($\beta = -.27$, $p = .005$), significantly predicted MDD onset. The three constructs relating to sadness (i.e., parental meta-emotion philosophy of sadness, adolescent-report of parental emotion coaching of sadness, and adolescent-report of their own competence in relation to sadness) did not account for significant, independent variance in MDD onset after controlling for adolescent gender (although the effect of parental meta-emotion philosophy of sadness approached significance, $\beta = -.18$, $p = .055$). It should be noted that the two non-significant adolescent-report constructs were relatively highly correlated ($r = .62$, $p < .001$) which may have reduced the possibility of these constructs predicting independent variance in MDD onset when included in the same model, and contributed to poor model fit.

Discussion

In partial support of our hypotheses, the results showed that MDD onset in adolescence was prospectively predicted by parents' report of their own meta-emotion philosophy, and adolescents' report of their parents' emotion coaching, the family emotional environment, and their own emotional competence. Three of these four effects were observed in relation to sadness, and one in relation to anger. Specifically, parents who reported a meta-emotion philosophy of sadness that was lower in awareness, acceptance, and regulation had adolescents with a greater prospective risk of MDD onset. Adolescents who perceived that their parents engaged in lower levels of emotion coaching of sadness, and who had lower levels of competence in relation to sadness (i.e., lower awareness and poorer ability to

express and regulate sadness), were also at greater prospective risk of MDD onset. In contrast, adolescents' perceptions of the family environment in relation to anger, and not sadness, were prospectively associated with MDD onset. Specifically, adolescents who perceived a relatively high frequency and intensity of parental anger, who reacted negatively to their parents' anger, and who perceived high levels of family stress and conflict, were more likely to experience the onset of MDD across the course of adolescence. There was no evidence to suggest a prospective relationship between parental self-report of emotion coaching, or parental-report of adolescent emotion regulation, and adolescent onset MDD. Together these results suggest that several family meta-emotion processes in relation to sadness, and one in relation to anger, may be associated with risk for depression onset in adolescence.

The finding that MDD onset across adolescence was prospectively predicted by parental meta-emotion philosophy extends results from previous research that has examined the cross-sectional association between parent meta-emotion philosophy and child and adolescent adjustment (Hooven, Gottman, & Katz, 1995; Hunter et al., 2011; Katz & Hunter, 2007; Katz & Windecker-Nelson, 2004). Katz and Hunter (2007), who found that maternal acceptance and expression of their own negative emotions was cross-sectionally associated with lower depressive symptoms in adolescents, suggested that parents who are accepting of their own emotions may adaptively model emotional competence for their children. Conversely, when a parent lacks insight into their own emotional experience, or believes certain emotions to be unacceptable, the adolescent may lose the opportunity to learn how to effectively regulate those emotions. In relation to adolescent depression, the present findings highlight that parental meta-emotion philosophy of sadness is particularly important, suggesting that parents who are aware, accepting, and able to regulate their own sadness may help their children become emotionally competent in relation to sadness, and thus less

vulnerable to developing depression. Critically, the current findings add to the evidence base by demonstrating that parental meta-emotion philosophy of sadness is *prospectively* associated with risk of adolescent MDD – that is, adolescent exposure to parental meta-emotion philosophies of sadness before the onset of MDD predicts their subsequent risk.

Our finding that parental emotion coaching is associated with decreased risk for MDD is also consistent with previous research suggesting that parental emotion coaching is a protective factor in child development (Katz & Hunter, 2007; Stocker et al., 2007). Parents who provide emotional 'scaffolding' may contribute to the adaptive emotional development of their children (Duncombe, Havighurst, Holland, & Frankling, 2012; Katz & Windecker-Nelson, 2004; Yap, Allen, & Sheeber, 2007). The current findings add to this evidence base by showing that emotion coaching, particularly in relation to sadness, is *prospectively* associated with lower vulnerability to MDD in adolescents, and thus may be a protective factor. Importantly, the current study found that only adolescents' perceptions of their parents' emotion coaching of sadness, rather than the parents' own reports, were significantly associated with risk for depression. This suggests that adolescents who perceive less parental 'scaffolding' when they experience sadness are at particular risk for developing MDD, possibly because they feel overwhelmed or unable to regulate this particular emotion (Katz et al., 2012). Thus it may be adolescents' perception of the coaching they receive and the benefit they derive from it, rather than parents' perception of their own behaviour, that has particular salience when it comes to predicting adolescent MDD onset. Alternatively, it may be that parents' reporting of emotion coaching was biased by factors such as social desirability or over-estimating the amount of actual emotion coaching they practice (as opposed to how much they intend to practice), and that adolescents' perceptions of parental emotion coaching more reliably estimate the occurrence of this behavior in the family.

In further support of the particular salience of adolescents' perception of meta-emotion constructs, the current study also found that adolescents' report of their own emotional competence in relation to sadness was prospectively associated with MDD onset. (However, we note that poor model fit and possible collinearity was observed in the original model. While separate modelling of the two variables addressing adolescent emotional competence replicated the original pattern of results, these findings should nonetheless be interpreted with caution.) The current study found that adolescents who reported being less aware of their sadness, less able to share and appropriately express this emotion, and who reported difficulty regulating and remediating their sadness were subsequently more likely to develop MDD over the course of their adolescence. This is consistent with Hunter and Katz's (2011) findings that depressed adolescents had lower levels of awareness and poorer regulation of negative emotions, compared with healthy adolescents, as well as other research that has consistently linked better emotional awareness and regulation with lower levels of depression (e.g., Hunter et al., 2011; Larsen et al., 2013; Silk et al., 2003; Yap, Allen, et al., 2008). The current findings significantly add to this evidence base by suggesting that this association is prospective; early adolescents who are struggling with their sadness are at increased risk of developing depression across the future course of their adolescence. Again, the current findings also highlight that adolescents' competence in relation to sadness, rather than anger, is particularly relevant for MDD onset. Adolescents who are aware of their own sadness, and confident in their ability to appropriately express and regulate it, may be less vulnerable to experiencing the persistent dysphoria that is characteristic of MDD.

Interestingly, parents' perceptions of their child's emotion regulation abilities were not predictive of MDD onset in the current study. It may be that the external expression of emotion that parents observe is less important than the internal processes that adolescents perceive when they experience emotion. The relatively low concordance between informants

in the field of child and adolescent mental health is well established (De Los Reyes et al., 2015), so it may be that parental report of these emotional processes is less salient than the adolescent's self report. Indeed, low correlations between constructs based on parent- and adolescent-report of adolescents' emotional regulation/competence were observed in the current study, although it should be noted that the parent- and adolescent-reported constructs were based on different subscales derived from different interview questions and scoring items.

While a pattern of meta-emotion processes in relation to sadness was identified in the current study, it was also found that adolescents' perceptions of the family emotional environment in relation to anger, but not sadness, prospectively predicted MDD onset. Indeed, this was the only construct that remained significant in the integrative model including all four significant constructs (although the relatively poor fit of the integrative model necessitates caution in interpreting these findings). This construct incorporated adolescents' perceptions of their parents' expressions of anger, their own negative reactions to their parents' anger, and their perceptions of family stress and conflict. These findings are consistent with research showing that children growing up in families where expressions of anger are frequent or under-regulated are more vulnerable to developing MDD (Schwartz et al., 2014; Schwartz et al., 2017). It is possible that the stress associated with exposure to family environments characterised by frequent and intense expressions of parental anger, associated feelings of insecurity, along with high rates of potentially destabilising family conflict, may increase adolescents' vulnerability to MDD onset in a way that exposure to parental sadness does not. In support of this interpretation, the evolutionary social risk hypothesis of depression (Allen & Badcock, 2003) asserts that depressed behaviour arises as a means by which to prevent social exclusion. Accordingly, depressed individuals are believed to be hyper-sensitive to perceived social threats from others, such as conflictual,

angry and aggressive behaviors, that signal potential rejection. In contrast, the expression of sadness signals a lack of threat and need for support by the other. Thus, parental anger may elicit a depressive response from adolescents to prevent parental rejection, whereas parental sadness may result in a different affective behavioural response from adolescents. Accordingly, our finding that perceived anger and conflict within the family environment is associated with higher vulnerability for adolescent-onset depression in consistent with the social risk hypotheses, whereas our findings that highlight the importance of meta-emotion constructs pertaining to sadness and subsequent depression may be better interpreted in context of Gottman and colleagues' (1996, 1997) meta-emotion theory, as previously discussed.

Finally, in accordance with well-established findings (e.g., Merikangas et al., 2010), gender emerged as a significant predictor of adolescent-onset depression, independent of all the MEI constructs examined in this study, with girls at higher risk than boys. While results showed few overall differences in way that males and females (both parents and adolescents) reported on MEI constructs, a pattern did emerge in relation to females' reporting on sadness, with mothers reporting higher scores on meta-emotion philosophy and emotion coaching of sadness than fathers, and adolescent girls reported higher levels of self-perceived competence in relation to sadness than adolescent boys. These findings are consistent with previous research showing mothers to be more accepting, supporting and responsive to adolescent's negative emotional experiences than fathers (Klimes-Dougan et al., 2007; Stocker et al., 2007). The current study suggests that mothers' meta-emotion philosophies and parenting practices may be stronger than fathers' specifically in relation to sadness, as opposed to anger, or negative emotions generally. In relation to perceived emotional self-competence, our results are also consistent with findings that females report greater emotional awareness and use of emotion regulation techniques than males (Nolen-Hoeksema, 2012). That the

current gender findings emerge only in relation to sadness reflects research suggesting that sadness is socialised differently across genders, with more acceptance and openness in females compared to males (Zeman, Cassano, Perry-Parrish, & Stegall, 2006).

One of the unique contributions made by the present study is the equal consideration of parent and adolescent reports of family meta-emotion constructs. As noted, there has been limited attention paid to adolescents' perceptions of family meta-emotion processes, which perhaps reflects a continuing bias in our models of families, such that we view parents as active agents of socialization, and children as recipients of parental influence (Sheeber, Hops, Alpert, Davis, & Andrews, 1997). The current study highlights the importance of adolescent perceptions of family meta-emotion processes, which emerged as particularly significant in the prospective prediction of MDD onset. While these associations may have been inflated by single-source bias, the longitudinal design, as well as the use of data based on the ratings of independent researchers, suggest that these findings are likely to be robust.

Other strengths of the study include the prospective, longitudinal design. While such a study cannot infer causality, it is possible for us to directly examine the temporality of effects, and to discount the possibility that the observed relationships are due to state dependent factors (Cowan & Cowan, 2002; Sheeber et al., 2001). In addition, the independent consideration of meta-emotion processes in regards to sadness and anger enabled us to identify emotion-specific relationships that would not be possible had we collapsed across negative emotions, as numerous previous studies have done. In doing so, we have been able to highlight the prospective importance of family meta-emotion processes in relation to sadness to adolescent onset MDD, along with adolescents' perceptions of anger and conflict in the family environment.

Limitations of the current study also require consideration. Firstly, only two negative emotions were assessed. To enhance understanding of family meta-emotion processes and

adolescent-onset MDD, it will be important for future work to consider other potentially important positive and negative emotions, including happiness and guilt, for example. Indeed, one recent study examining meta-emotion philosophy of positive emotions found that parents of depressed adolescents were less likely to be accepting of adolescent positive emotion than were parents of healthy adolescents (Katz et al., 2014). Together with the current findings and others (Katz & Hunter, 2007), this suggests that family meta-emotion processes in relation a range of positive *and* negative emotions may contribute to an emotional climate that is optimal for adolescent emotional development and adjustment.

Secondly, only MDD outcomes were considered in the current analyses. Hence, it is unknown whether the family meta-emotion processes identified as prospective predictors in the current study are specific to risk for depression, or whether they represent a more general vulnerability to psychopathology in adolescence.

Thirdly, the meta-emotion constructs were based solely on self-report, and thus may be biased by subjectivity, social desirability, and other reporter-specific factors. It would be interesting for future studies to assess whether behavioural measures of family meta-emotion processes replicate the current results. However, the cognitive and reflective nature of some meta-emotion constructs may be difficult to observe behaviorally and may be more reliably assessed using self-report methodologies.

Fourthly, due to the relatively low number of fathers involved in the current study, we lacked the statistical power to comprehensively investigate differences in parental meta-emotion processes between mothers and fathers. Previous research has identified such differences between parents (Katz et al., 2014; Klimes-Dougan et al., 2007; Shortt et al., 2016; Stocker et al., 2007), and it would be informative for future studies to examine the independent contribution of maternal and paternal meta-emotion processes to vulnerability to adolescent depression.

Finally, while all missing data in this study were MCAR and estimated using multiple imputation, it should be noted that there was a relatively high proportion of missing data, particularly in relation to the outcome variable of MDD onset, and so the findings should be interpreted with a degree of caution until they can be replicated. In addition, while the average kappa scores across the PMEI and CAMEI were substantial, some individual subscales were somewhat lower, indicating higher variability in ratings on some subscales, which should also be taken into consideration when interpreting the results.

In conclusion, the findings of this study suggest that family meta-emotion processes are prospectively associated with adolescents' risk for MDD. The identification of such potentially modifiable risk factors can enhance our understanding of adolescent-onset depression, and contribute to the development of prevention and early intervention programs to alleviate this highly prevalent and disabling condition. For example, an evaluation of an intervention that aims to help parents develop an emotion coaching style of parenting, found that preadolescents' whose parents completed the intervention reported a reduction in internalizing symptoms over a ten month follow-up period (Kehoe, Havighurst, & Harley, 2014). Such findings, in combination with those of the current study, are suggestive of the potential etiological significance of family meta-emotion processes in relation to adolescent-onset depression, and highlight the importance of further research in this area.

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Table 1

Meta-Emotion Interview (MEI) Constructs

	Construct	Scale	Meta-Emotion Interview subscales	Number of items	Example Subscale Item
1.	Parental meta-emotion philosophy – anger	PMEI	Parental awareness of own emotion	12	Parent experience this emotion
			Parental acceptance of own emotion	17	Parent accepts this emotion (it has value, it's part of life)
2.	Parental meta-emotion philosophy – sadness		Parental regulation of own emotion	12	Parent has remediation techniques that work for this emotion
3.	Parent-report emotion coaching – anger	PMEI	Parent awareness of adolescent emotion	9	Parent notices that child has this emotion
4.	Parent-report emotion coaching – sadness		Parent acceptance of adolescent emotion	13	Parent seems comfortable with child's emotion and expression
			Parent coaching of emotion	11	When child is upset, parent talks about situation, emotion
5.	Adolescent-report emotion coaching – anger	CAMEI	Adolescent report of mother coaching	9	Mother is aware that child experiences this emotion
			Adolescent report of father coaching	9	Father talks to child about the nature of this emotion
6.	Adolescent-report emotion coaching – sadness		Adolescent report of family's meta-emotion philosophy	3	Child has insight into family's dealings with this emotion
7.	Family emotional environment – anger	CAMEI	Family emotional environment	11	Child is aware that [parent] experiences this emotion
8.	Family emotional environment – sadness		Child's negative reaction to parent's emotion	12	Child is [not] frightened when [parent] experiences this emotion
			Family stress (anger scale only)	5	There is [no] conflict between parents
9.	Adolescent emotion regulation – anger	PMEI	Adolescent emotion regulation	9	Child can self-regulate this emotion
10.	Adolescent emotion regulation – sadness				
11.	Adolescent emotional competence – anger	CAMEI	Adolescent awareness of own emotion	7	Child experiences this emotion
			Adolescent expressivity of emotion	4	Child shares emotion with others
12.	Adolescent emotional competence – sadness		Adolescent dysregulation of emotion	5	Child [does not have] difficulty regulating intensity
			Adolescent remediation of emotion	15	Child is aware of their own remediation process

Note. The twelve constructs were derived by summing scores on the relevant Meta-Emotion Interview subscales. Higher scores on each of the constructs indicate theoretically better functioning. PMEI = Parent Meta-Emotion Interview; CAMEI = Child and Adolescent Meta-Emotion Interview.

Table 2

Mean (SD) Meta-Emotion Interview Construct Scores for Parents and Adolescents across Gender

Construct (range of possible scores)	Parent Gender[a]		Adolescent Gender	
	Mothers (n = 163)	Fathers (n = 35)	Girls (n range 80-99)	Boys (n range 81-99)
1. Parental meta-emotion philosophy – anger (66-170)	147.75 (7.12)	146.59 (6.62)	147.53 (7.20)	147.55 (6.91)
2. Parental meta-emotion philosophy – sadness (66-170)	150.91 (6.46)	146.81 (6.94)*	150.33 (6.88)	150.04 (6.58)
3. Parent-report emotion coaching – anger (63-132)	117.88 (8.50)	117.52 (9.59)	117.63 (8.87)	118.00 (8.53)
4. Parent-report emotion coaching – sadness (63-132)	124.52 (6.97)	120.03 (9.70)*	123.43 (7.67)	124.01 (7.74)
5. Adolescent-report emotion coaching – anger (21-103)			70.21 (7.96)	69.93 (9.19)
6. Adolescent-report emotion coaching – sadness (21-103)			77.37 (7.36)	76.97 (6.79)
7. Family emotional environment – anger (28-140)			89.39 (8.67)	88.62 (9.40)
8. Family emotional environment – sadness (23-115)			79.94 (4.96)	79.97 (4.63)
9. Adolescent emotion regulation – anger (12-39)	32.19 (3.93)	33.02 (3.58)	32.75 (3.67)	31.93 (4.04)
10. Adolescent emotion regulation – sadness (12-39)	33.17 (3.44)	34.14 (2.85)	33.70 (3.20)	32.97 (3.48)
11. Adolescent emotional competence – anger (31-154)			109.35 (6.32)	107.62 (6.33)
12. Adolescent emotional competence – sadness (31-154)			112.05 (7.20)	107.92 (6.74)**

[a] Parent gender not applicable for constructs based on adolescent report (Child and Adolescent Meta-Emotion Interview), in which adolescents report on both parents (constructs numbered 5 and 6), the whole family (constructs 7 and 8), or themselves (11 and 12).

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

Table 3

Rates of Major Depressive Disorder Onset between Time 2 to Time 4

	Females	Males	Total
T2 (n = 178; 88 female)	9	6	15
T3 (n = 152; 78 female)	8	1	9
T4 (n = 143; 70 female)	10	8	18
T2-T4 (n = 151; 77 female)	27 (35.06%)	15 (20.27%)	42* (27.81%)

*Significantly more females than males, $p = .043$

Table 4

Correlations Among Meta-Emotion Interview Constructs, Adolescent Gender, and MDD Onset

Construct	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Parental meta-emotion philosophy – anger[a]	—												
2. Parental meta-emotion Philosophy – sadness[a]	.26**	—											
3. Parent-report coaching – anger[a]	.27**	.21**	—										
4. Parent-report coaching – sadness[a]	.18**	.33**	.51**	—									
5. Adolescent-report coaching – anger[b]	.01	-.02	.16*	.09	—								
6. Adolescent-report coaching – sadness[b]	-.11	.01	.12	.14	.56**	—							
7. Family emotional environment – anger[b]	.07	.07	.13	.13	.47**	.31**	—						
8. Family emotional environment – sadness[b]	-.01	-.02	-.02	.00	.15	.07	.21**	—					
9. Adolescent emotion regulation – anger[a]	.21**	.03	.32**	.16*	.22**	.03	.26**	.12	—				
10. Adolescent emotion regulation – sadness[a]	.15*	.05	.15*	.13	.11	.02	.27**	.11	.28**	—			
11. Adolescent emotional competence – anger[b]	.04	.05	.23**	.17*	.65**	.46**	.30**	-.03	.24**	.04	—		
12. Adolescent emotional competence – sadness[b]	-.03	.06	.15*	.12	.42**	.62**	.23**	-.02	.18*	.02	.66**	—	
13. Adolescent gender[c]	-.01	.02	-.02	-.04	.02	.03	.04	-.01	.11	.11	.14	.29**	—
14. MDD onset[d]	-.11	-.17*	-.14	-.14	-.08	-.18*	-.27*	-.09	-.13	-.07	-.08	-.15	.17

Note. Pearson correlations. N ranges from 126-198.
[a]Construct derived from parent-report. [b]Construct derived from adolescent-report. [c]Adolescent gender coded: 1 = male, 2 = female. [d]MDD onset coded: 0 = no onset, 1 = onset.
*$p < 0.05$. **$p < 0.01$

Table 5

Path Analyses Predicting Adolescent Major Depressive Disorder Onset from Meta-Emotion Constructs

	Parameter estimates				Mean Model Fit Indices[d]		
Predictors[a]	*b*	*SE b*	β	*p*	Chi-square (*df*) (*p*, *SD*)	CFI (*SD*)	RMSEA (*SD*)
					0.163 (2)	1.000	0.000
Parent meta-emotion philosophy[b]					(.922, 0.000)	(0.000)	(0.000)
1. Anger	-0.01	0.02	-.09	.450			
2. Sadness	-0.03	0.02	-.21	.040			
Gender	0.44	0.21	.22	.029			
					0.551 (2)	1.000	0.000
Parent-report emotion coaching[b]					(.759, 0.000)	(0.000)	(0.000)
3. Anger	-0.01	0.01	-.12	.329			
4. Sadness	-0.02	0.01	-.14	.194			
Gender	0.46	0.21	.22	.024			
					0.816 (2)	0.999	0.002
Adolescent-report emotion coaching[c]					(.665, 0.581)	(0.003)	(0.007)
5. Anger	0.01	0.02	.04	.757			
6. Sadness	-0.04	0.02	-.25	.024			
Gender	0.44	0.21	.22	.031			
					0.518 (2)	1.000	0.000
Family emotional environment[c]					(.772, 0.278)	(0.000)	(0.000)
7. Anger	-0.04	0.01	-.33	.001			
8. Sadness	-0.01	0.02	-.05	.624			
Gender	0.43	0.22	.21	.039			
					4.213 (2)	0.906	0.075
Adolescent emotion regulation[b]					(.122, 0.000)	(0.016)	(0.000)
9. Anger	-0.04	0.03	-.16	.133			

10. Sadness	-0.03	0.03	-.09	.415			
Gender	0.44	0.21	.22	.030			
Adolescent emotional competence[c]					17.789 (2) (<.001, 2.595)	0.803 (0.027)	0.201 (0.016)
11. Anger	0.01	0.03	.07	.671			
12. Sadness	-0.04	0.02	-.30	.044			
Gender	0.41	0.22	.20	.051			
Integrative model of significant constructs					15.650 (4) (.004, 2.497)	0.903 (0.019)	0.121 (0.013)
2. Parent meta-emotion philosophy – sadness[b]	-0.03	0.02	-.18	.055			
6. Adolescent-report emotion coaching - sadness[c]	-0.01	0.02	-.08	.472			
7. Family emotional environment – anger[c]	-0.03	0.01	-.27	.005			
12. Adolescent emotional competence - sadness[c]	-0.02	0.02	-.14	.287			
Gender	0.43	0.22	.21	.036			

Note. Each block of results represents one of the seven path analyses conducted. Gender = adolescent gender; CFI = comparative fix index; RMSEA = root mean square error of approximation.

[a]Predictors in the first six models comprise two MEI constructs relating to corresponding anger and sadness scales, and adolescent gender. The numbers 1-12 correspond to the numbering of MEI constructs as defined in Table 1. The seventh, integrative model includes the four previously identified significant constructs as predictors. [b]Construct derived from parent-report (PMEI). [c]Construct derived from adolescent-report (CAMEI). [d]Mean model fit indices across the 50 multiple imputations.