



Coping and Observed Emotions in Children of Parents with a History of Depression

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Abstract

Objectives The ability to experience, express, and maintain positive emotions and reduce negative emotions during stress has been cited as a marker of resilience, yet much needs to be learned regarding what mechanisms underlie this ability in youth. The current study assesses relations between coping strategies and observed emotion expression and maintenance in offspring of depressed mothers as possible mechanisms to promote resilience.

Methods Mothers with a history of depression ($N = 160$) and their children (M age = 11.38) participated in two video-recorded interactions about a recent pleasant activity and a recent stressful experience in the family. Observed positive mood, anxiety, hostility, and sadness in youth were measured via a macro-level coding system and adolescents completed a self-report measure regarding how they cope with family stress.

Results Secondary control coping (e.g., cognitive restructuring, acceptance) was significantly related to higher positive mood and lower hostility during the stressful task when controlling for mothers' depressive symptoms, emotions during the pleasant activity task, primary control and disengagement coping, and child gender. Secondary control coping was not related to observed anxiety or sadness.

Conclusions Results highlight a link between coping and emotion expression and maintenance in the context of family stress and suggest that coping strategies differ in their effectiveness of managing distinct emotions. Secondary control coping in particular may foster resilience by promoting higher levels of positive mood and lower levels of hostility in children exposed to parental depression. Implications, study limitations, and future directions are discussed.

Keywords Coping · Emotion · Resilience · Stress · Parental depression

Understanding processes of risk and resilience is central to research on developmental psychopathology. Resilience is broadly conceptualized as the process of achieving positive outcomes in spite of exposure to risk (e.g., Luthar and

Eisenberg 2017; Masten 2014), with more specific definitions emphasizing the ability of individuals to experience, express, and maintain positive emotions and reduce negative emotions within a stressful context (Davidson 2000). In line with this model, previous studies have implicated positive affect as a protective mechanism, relating to lower levels of psychopathology, while negative affect has been linked to higher levels of internalizing and externalizing problems (e.g., Jaser et al. 2011; Murphy et al. 2017). However, relatively little research has focused on investigating mechanisms that may explain how some individuals are able to experience higher positive and lower negative emotions during stressful experiences. The purpose of the present study is to investigate the role of coping in adolescents' expression and maintenance of happiness, anxiety, anger, and sadness during stress, highlighting possible targets for preventive interventions.

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Children of parents with a history of major depressive disorder (MDD) present an important population for studying coping and emotional responses as processes of risk and resiliency, as these youth experience depression and other mental health problems at rates from 3 to 5 times higher than youth in the general population (National Research Council/Institute of Medicine [NRC/IOM], 2009; Goodman et al. 2011). While multiple factors contribute to this relation (e.g., genetics, exposure to external stressors), conceptual models of risk and resilience in families with parental depression emphasize the role of interpersonal stress in the parent-child relationship resulting from depression as having implications for the development of psychopathology in youth (Hammen et al. 2004). Adolescence may be a particularly important developmental period to examine these processes, given increases in parent-child conflict and depressive symptoms in youth during the transition. Taken together, the ways that adolescents cope with familial stress may influence the ability of youth to maintain higher positive mood and lower levels of various negative emotions (e.g., anger, anxiety, sadness) during stress, providing mechanistic implications for psychosocial adjustment.

Coping is defined as efforts to regulate one's cognitions, emotions, behaviors, and physiology in response to stress and can be organized into three categories: primary control coping (problem solving, emotional expression, emotional modulation), secondary control coping (acceptance, cognitive restructuring, positive thinking, distraction), and disengagement coping (avoidance, denial, wishful thinking) (Connor-Smith et al. 2000). Past studies have linked disengagement coping to higher levels of psychosocial problems and primary and secondary control coping to lower levels of psychosocial problems, citing secondary control strategies as particularly beneficial for stress that is out of one's control (e.g., parental psychopathology) (see Compas et al. 2017 for a meta-analytic review). Less work has focused on the role of coping in producing emotions in youth, but preliminary evidence supports a link between coping and emotions such that higher use of primary and secondary control coping strategies and lower use of disengagement coping strategies may be related to increased positive and decreased negative emotions in adolescents (e.g., Andreotti et al. 2013; Belden et al. 2015; Compas et al. 2017; Gross and John 2003; Jaser et al. 2011; Murphy et al. 2017).

Past work on coping and emotions has been limited in several respects. First, most studies have investigated emotions at the broad, aggregate level (e.g., "negative affect"). This presents a barrier to understanding risk and resilience, as coping strategies may differ in their effectiveness in managing *specific* emotions (Compas et al. 2017). Many emotions, such including happiness, anxiety,

sadness, and anger, have unique effects on cognitive processes (e.g., attention, executive functioning) as well as distinct environmental correlates (Clifford et al. 2015; Engen et al. 2017; Kim-Spoon et al. 2015). Similarly, coping strategies may tap into different cognitive and environmental resources (e.g., problem solving may involve external resources while cognitive reappraisal involves internal, executive functioning processes). Thus, it follows that the impact of strategies on emotions may depend on the compatibility between the coping effort and emotional experience. A second shortcoming of prior work is the reliance on questionnaires, rather than observational methods, for assessing emotions, which are susceptible to informant bias and confounding processes with outcomes. Two salient exceptions come from Jaser et al. (2011) and Murphy et al. (2017) who employed observational methods to assess emotions in two populations coping with unique types of stress. First, Jaser and colleagues assessed positive mood in offspring of depressed parents using a macro-level coding system during videotaped parent-child interactions. In this study, higher levels of primary and secondary control coping and lower levels of disengagement coping, measured by parent- and child- report, was related to higher positive mood. Observed positive mood, in turn, was related to fewer depressive symptoms in adolescents. Notably, maternal depressive symptoms were associated with greater use of secondary control coping and lower levels of positive affect in youth, suggesting that depressive symptoms in parents may play a direct role in understanding coping and emotions as resilience processes in youth. In a second study, Murphy et al. (2017) assessed relations between self-reported coping and observed positive and negative affect in adolescents with cancer. Adolescents were coded for expression of positive affect (positive mood) and negative affect (sadness and anxiety) during videotaped interactions with their parents during which they discussed their cancer diagnosis. Adolescents' self-reported use of secondary control coping in response to cancer-related stress predicted higher levels of observed positive mood, but not sadness or anxiety, over time in this sample. This study built on findings from Jaser et al. (2011) by investigating the role of specific negative emotions and provides preliminary evidence that coping may differentially relate to observed emotions, highlighting a link between secondary control coping and positive emotion. However, Murphy and colleagues did not assess the relations between primary control coping or disengagement coping in relation to observed affect.

To date, no studies have examined the association between multiple types of coping, including primary, secondary, and disengagement coping, with multiple types of positive and negative emotions in the context of an observational family stress paradigm. Examining happiness,

anxiety, anger, and sadness may be particularly important to measure given that they (a) represent the commonly accepted basic/core emotions (Johnson-Laird and Oatley 1989) and (b) map onto symptoms of psychopathology (i.e., anxiety and sadness represent the broader symptoms of common internalizing disorders, hostility reflects externalizing problems). Additionally, prior research has shown that parents with depression tend to engage in negative and stressful interactions with their children even after the depressive episode remits (Hammen et al. 2004; Jaser et al. 2005, 2008; Langrock et al. 2002), suggesting that the discussion of a stressful experience may provide a particularly salient context to assess interpersonal and family-related stress in parents with depression histories and their offspring. Thus, the present study examines associations between adolescents' coping efforts and four emotions, happiness/positive mood, anxiety, anger/hostility, and sadness, during interactions with their currently or previously depressed mothers. Interaction topics include: (1) a discussion of a recent *pleasant activity* that the parent-child dyad had enjoyed doing together, and (2) a discussion of a recent *stressful experience* within the family.

Given the current study's emphasis on coping with family stress, hypotheses focus on emotion expression during the second task (a recent stressful activity) as well as emotion maintenance from task 1 to task 2 (i.e., level of observed emotions during the stressful task when controlling for level of observed emotions during the pleasant task) as possible indicators of resilience. First, significant associations are expected to emerge between coping and observed emotions such that higher levels of self-reported primary and secondary control coping and lower disengagement coping correlate with (a) higher levels of happiness/positive mood and (b) lower levels of anxiety, hostility, and sadness during the stressful interaction task. Second, because studies have demonstrated that secondary control coping, or attempts to *adapt* to the situation rather than change it, is particularly beneficial in dealing with uncontrollable stress within the parent-child relationship, adolescents' use of secondary control coping in response to family stress is hypothesized to uniquely predict higher positive mood and lower anxiety, hostility, and sadness above the impact of other coping types during the stressful interaction task. Third, secondary control coping is also expected to be associated with the maintenance of emotions during the stressful interaction task when accounting for emotions displayed during the pleasant activity task (i.e., secondary control coping will be significantly, positively associated with positive mood during task 2 when controlling for levels of positive mood in task 1, and a significantly negatively associated with anxiety, hostility, and sadness during task 2 when controlling for anxiety, hostility, and sadness in task 1, respectively). Maternal self-

reported depressive symptoms will be included in all analyses in order to consider and account for possible differences in the relation between observed emotions and coping due to maternal depressive symptoms.

Although not a primary focus of the study, supplemental analyses were conducted to further investigate the potential role of timing (current vs. past) and chronicity (single vs. multiple episodes) of maternal depression in the association of coping and observed emotions. Given findings from Jaser et al. (2011) that maternal depressive symptoms were associated with greater use of secondary control coping and lower levels of positive affect in youth, it stands to reason that the relation between coping and affect may vary based on maternal depression variables. However, no specific hypotheses were made given the lack of prior work in this area. Finally, exploratory analyses were conducted to examine the strength in the association between each type of coping and each emotion. These analyses provide a preliminary investigation regarding possible specificity in the relation between primary control, secondary control, and disengagement coping with each type of observed emotion.

Methods

Participants

The sample included 160 mothers ($M = 41.16$ years, $SD = 7.17$) with current or past depression and their children (80 girls, 80 boys) between the ages of 9 and 15 ($M = 11.38$ years, $SD = 2.00$). All parents met criteria for at least one episode of MDD during the lifetime of their child. Children identified as 74.4% European American, 12.5% African American, 3.1% Asian, 1.9% Latino or Hispanic, and 8.1% other or mixed race/ethnicity. Parents' identified as 81.3% European American, 12.5% African American, 0.6% Asian, 2.5% Latino or Hispanic, and 3.1% other or mixed race/ethnicity. Mothers' level of education included 6.3% of mothers with less than high school, 8.8% completed high school (or equivalency exam), 30.0% had some college or technical school, 33.1% had a college degree, and 21.9% had a graduate education. Annual household income ranged from less than \$5,000 to more than \$180,000, with 25.5% having incomes below \$25,000, 20.3% between \$25,000 and \$40,000, 17.0% between \$40,000 to \$60,000, 20.3% between \$60,000 to \$90,000, and 17.0% above \$90,000.

Procedures

In order to enroll a broadly representative sample of mothers with depression histories regardless of their history of seeking or receiving treatment, the sample was recruited

from several sources in and around a southern metropolitan area and a small northeastern city, including general medical practices, media outlets, and mental health clinics/practices. Advertisements for the study focused on family stress as well as the impact of parental depression. Families were eligible if the mother met criteria for MDD during the lifetime of her child and the following criteria were met: (a) mother had no history of Bipolar I disorder, schizophrenia, or schizoaffective disorder; (b) child had no history of autism spectrum disorders, mental retardation, Bipolar I disorder, or schizophrenia; and (c) child did not currently meet criteria for conduct disorder or substance/alcohol abuse or dependence. Upon expressing interest in the study, each mother completed an initial phone interview and eligible families were brought into the lab for the assessment, including questionnaires completed by mothers and children, and two 15-minute video recorded parent-child interactions between the mother and the child. Informed consent was obtained from all parents and assent was obtained from all youth. Eligibility was determined via structured clinical interviews (SCID) conducted both during the phone screen and during baseline assessments by trained interviewers.

For the interaction tasks, the mother and child completed a form together to identify something pleasant they had recently done together (task 1) and something stressful and difficult for the family that had occurred the last time the mother was sad, down, and/or irritable for (task 2). All families in the study were able to identify appropriate topics for both discussions. The pleasant activity task was administered first. A cue card was provided with questions to guide the discussion, including: “What happened when we [pleasant event]?” “How did we feel when we [pleasant event]?” “What are some other fun activities would we like to do together?” “What prevents us from doing fun activities together?” After 15 min, the interviewer entered the room to switch the cue cards and tell the mother and child to shift to the stressful topic for the second 15-minute interaction (i.e., stressful task). The cue card for the second task had the following questions: “What happened the last time [stressful event]?” “What kinds of feelings or emotions do we usually have when mom is sad, down, irritable, or grouchy?” “What do we do to reduce the stress when mom is sad, down, irritable or grouchy?” After 15 min, the interviewer turned off the camera and debriefed with the mother and child to ask how the interactions went for them and answer any questions.

The Institutional Review Boards at the two participating university research sites approved all procedures in the study. All participants provided informed consent prior to participation in the study and each participant received \$40 compensation for their participation in the baseline assessment.

Measures

Children’s coping

The parental depression version of the Responses to Stress Questionnaire (RSQ; Connor-Smith et al. 2000; Jaser et al. 2005, 2008) was used to assess how children responded to stressors related to their mothers’ depression (e.g., My mom/dad seems to be sad or cries a lot of the time; My mom/dad does not want to do things with the family; My mom/dad is too upset, tense, grouchy, angry, and easily frustrated). The current study utilized scores from the three coping factors assessed by the RSQ: primary control coping, secondary control coping, and disengagement coping (Connor-Smith et al. 2000). Children were asked to rate each item with regard to the degree/frequency with which he/she used each coping strategy in response to the identified stressors. To control for response bias and individual differences in base rates of item endorsement, proportion scores were calculated by dividing the score for each factor by the total score for the RSQ (Vitaliano et al. 1987). Internal consistency for primary control coping was $\alpha = .77$; internal consistency for secondary control coping was $\alpha = .73$; and internal consistency for disengagement coping was $\alpha = .79$.

Children’s observed emotions during interactions with mothers

Mother-child pairs participated in two 15-min interactions, first about a pleasant activity that the mother and child enjoyed doing together in the past several months (task 1; pleasant activity interaction task), and second about a recent stressful time when the mother was feeling depressed, down, or grouchy, which made it difficult for the family (task 2; stressful interaction task). Emotions observed during the second task were the focus of the analyses, as this task was designed to represent an aspect of uncontrollable stress within families of mothers with a history of depression. Children’s emotions were assessed using the Iowa Family Interaction Ratings Scales (IFIRS), a macro-level coding system to code mothers’ and children’s verbal and non-verbal communication, behaviors, and emotions in a videotaped interaction (Melby and Conger 2001). Emotions are coded on a scale of 1–9 based on the frequency and intensity of observed verbal and nonverbal observations throughout the interaction, with 1 reflecting the absence of the emotion and 9 indicating an emotion that is “mainly characteristic” of the child during the interaction (Melby and Conger 2001).

The mother–child interaction tasks were coded by a team of trained graduate and undergraduate research assistants at a single study site. To become a trained coder, research

assistants first passed a written test of code definitions and examples with 90% accuracy, reached 80% reliability on previously coded videos, and met weekly throughout the study to discuss recently coded interactions and clarify questions to prevent drift between coders. All videos were double coded independently by two research assistants, who then met to discuss and reach consensus. In accordance with the IFIRS manual, when ratings differed by a single point, the higher score was used. Ratings that differed by more than two points were resolved through discussion. Consensus scores for each discrepant code were created by discussing the examples for each code and referring to the coding manual to verify example accuracy. Four codes were chosen for the current study to represent the specific emotions of interest: positive mood (happiness), anxiety (fear/anxiety), hostility (anger), and sadness (sadness). All intraclass correlations (ICCs) were above the minimally acceptable threshold of .5, with three of four codes producing high ICCs in the acceptable range (Cicchetti 1994; Koo and Li 2016; Portney 2009): .83 (Positive Mood, task 1), .75 (Positive Mood, task 2), .56 (Anxiety, task 1), .59 (Anxiety, task 2), .85 (Hostility, task 1), .84 (Hostility, task 2), .77 (Sadness, task 1), and .75 (Sadness, task 2).

Maternal depression

Mothers’ current depressive symptoms were assessed with the Beck Depression Inventory-II (BDI-II), a standardized and widely used self-report checklist of depressive

symptoms with adequate internal consistency and validity in distinguishing severity of MDD (Beck et al. 1996; Steer et al. 2001). Internal consistency in the current sample was $\alpha = .93$.

Mothers’ history of depression during the lifetime of the child was determined during the screening process using the MDD section of the Structured Clinical Interview for DSM (SCID; First et al. 2001). This section of the SCID was administered by trained graduate students in clinical psychology to determine (a) whether mothers met criteria for current depression, and (b) whether mothers had experienced one or multiple episodes of depression during the lifetime of their 9–15-year-old child.

Data Analyses

Descriptive statistics are reported as means and standard deviations (Table 1). Cronbach’s coefficient alpha was used as an indicator of the internal consistency of the instruments. Comparisons of study variables based on child gender, parental education, household income, and study site were assessed with *t*-tests and ANOVAs and variable(s) with significant differences were included as covariates in regression analyses. Bivariate correlations were conducted among key study variables, maternal depressive symptoms, and child age (Table 1). The associations of coping and observed emotions during the stressful task were further examined via two iterations of linear regression models with each emotion observed during the stressful interaction task

Table 1 Correlations, means, and SDs of adolescent observed mood, coping, maternal depressive symptoms, and child age

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PM (T1)	–												
2. PM (T2)	.24***	–											
3. AX (T1)	.08	.07	–										
4. AX (T2)	.15 ⁺	.07	.27***	–									
5. HS (T1)	–.26**	.02	.07	–.14 ⁺	–								
6. HS (T2)	–.16*	–.06	.07	.03	.48***	–							
7. SD (T1)	–.29***	–.26***	.02	–.16 ⁺	.08	–.01	–						
8. SD (T2)	.01	–.35***	–.05	.04	–.10	–.14	.33***	–					
9. PCC	.08	.13	–.16*	.08	–.17*	–.01	–.08	.06	–				
10. SCC	.17*	.37***	.05	.02	–.09	–.18*	.03	–.07	.27***	–			
11. DC	–.18*	–.15 ⁺	.01	–.12	.17*	–.06	.09	–.08	–.65***	–.27***	–		
12. BDI-II	–.07	–.21**	.08	–.10	–.06	.04	.04	–.05	–.18*	–.05	.20*	–	
13. Child age	–.06	–.15 ⁺	.02	–.05	.12	.04	.16 ⁺	.10	–.05	–.11	.13	.08	–
Mean	6.00	4.00	4.93	5.15	3.71	4.07	3.89	5.34	0.16	0.23	0.20	19.23	11.38
SD	1.46	1.39	1.22	1.26	1.98	2.05	1.47	1.60	0.04	0.05	0.03	12.35	2.00

PM = Observed adolescent positive mood; *AX* = Observed adolescent anxiety; *HS* = Observed adolescent hostility; *SD* = Observed adolescent sadness; *T1* = Task 1, pleasant activity interaction task; *T2* = Task 2, stressful interaction task; *PCC* = Adolescent primary control coping; *SCC* = Adolescent secondary control coping; *DC* = Adolescent disengagement coping; *BDI* = Beck Depression Inventory-II

⁺*p* < .06, * *p* < .05, ***p* < .01, ****p* < .001

as the dependent variable in separate regressions. First, each coping factor (i.e., primary control coping, secondary control coping, disengagement coping) was individually entered into each regression to test the relation between coping and emotion *expression*, with maternal depressive symptoms and child gender as covariates. Second, the hypothesis regarding emotion *maintenance* was tested by adding observed emotion during the pleasant activity (task 1) to this model (Table 3). Analyses of emotions during the stressful task controlling for emotions in the pleasant activity task allow for tests of the association between coping and residual scores for each emotion; i.e., levels of emotions observed during the stressful task that are higher or lower than would be expected based on levels of emotions observed during the pleasant activity task. Statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 25.0; IBM 2016).

Results

Descriptive Statistics

The mean level of mothers' depressive symptoms on the BDI-II was 19.23 ($SD = 12.35$), at the upper limit of the 'mild' symptom range. Forty-three mothers met criteria for current MDD and 117 mothers met criteria for past MDD based on the SCID. Means and standard deviations for measures of adolescent's self-reported coping scores and observed emotions during both tasks are presented in Table 1. Observed emotion scores of 3 indicating that the emotion is "minimally" characteristic, scores of 5 indicating that the emotion is "somewhat" characteristic, and scores of 7 indicating that the emotion is "moderately" characteristic of the adolescent's behavior. Mean values of negative mood codes (anxiety, hostility, sadness) during the stressful interaction task range between 4.07 and 5.34, indicating that they are somewhat characteristic of the sample during this task. Paired samples *t*-tests show that positive mood significantly decreased from task 1 to task 2 ($t(150) = 14.41$, $p < .001$) while hostility ($t(150) = -2.20$, $p < .05$) and sadness ($t(150) = -10.17$, $p < .001$) significantly increased from Task 1 to Task 2. No significant differences between observed anxiety in task 1 and task 2 were found ($t(150) = -1.61$, $p > .10$).

Independent sample *t*-tests and one-way ANOVAs were conducted to assess whether levels of children's observed emotions and/or coping strategies differed depending on demographic variables (i.e., child gender, gross household income, education level) or recruitment site. Significant gender differences emerged for observed hostility during the stress discussion task ($t(150) = -4.25$, $p < .01$) and disengagement coping ($t(155) = 2.27$, $p < .05$) in youth

such that females exhibited higher levels of hostility and lower levels of self-reported disengagement coping compared to males. No other group differences were found. Only child gender is included as a covariate in subsequent regression analyses.

Associations of Coping, Observed Emotion and Mothers' Depressive Symptoms

Bivariate correlations among adolescent coping, observed emotions in both tasks, mothers' depressive symptoms, and child age are presented in Table 1. Adolescent's use of primary control coping emerged as a significant correlate with observed and anxiety ($r = -.16$) and hostility ($r = -.17$) during the pleasant activity task ($p < .05$). Secondary control coping was significantly positively correlated with positive mood in the pleasant ($r = .17$) and stressful ($r = .37$) tasks and negatively correlated with hostility in the stressful task ($r = -.18$) ($ps < .05$). Last, disengagement coping was significantly correlated with decreased positive mood ($r = -.18$, $p < .01$) and increased hostility ($r = .17$, $p < .01$) during the pleasant activity task. While not a primary focus of the study, it is notable that mothers' depressive symptoms were significantly correlated with higher levels of primary control coping ($r = -.18$, $p < .06$) as well as with lower levels of observed positive mood during the stressful interaction task ($r = -.21$, $p < .01$). Child age was not significantly related to any study variables and is therefore not included in regression models.

In linear regression analyses for emotions expressed during the stressful interaction task, secondary control coping was significantly, positively related to observed positive mood ($\beta = .37$, $p < .001$) and negatively related to observed hostility ($\beta = -.19$, $p < .05$) when controlling for other types of coping, mothers' depressive symptoms, and child gender (Table 2). Unexpectedly, no significant findings emerged between coping and observed anxiety or observed sadness in youth. In assessments of emotion maintenance, secondary control coping remained significantly positively associated with observed positive mood during the stressful task when positive mood during the pleasant activity task (task 1) was entered into the model ($\beta = .35$, $p < .001$) (Table 3). Additionally, the relation between secondary control coping and observed hostility during the stressful task remained significant when controlling for levels of observed hostility during the pleasant activity interaction task ($\beta = -.18$, $p < .05$). No other significant associations between coping and emotion maintenance emerged. Notable findings regarding the role of parental depression demonstrate a significant association between mothers' BDI-II score and emotion expression ($\beta = -.21$, $p < .01$) and maintenance ($\beta = -.19$, $p < .05$) of positive mood. Last, child gender was significantly related

Table 2 Regression analyses predicting observed mood during the stressful interaction task

	Positive mood (task 2)		Anxiety (task 2)		Hostility (task 2)		Sadness (task 2)	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Child PCC	-.02	-.21	-.02	-.17	.01	.14	.01	-.31
Child SCC	.37	4.45***	-.01	-.11	-.19	-2.31*	-.10	-1.10
Child DC	-.01	-.11	-.13	-1.13	-.07	-.65	-.11	-1.28
BDI-II	-.21	-2.66**	-.08	-1.00	.05	.58	-.03	-.51
Child gender	.06	.71	-.02	-.19	.30	3.75***	-.04	-.44
	Model adjusted R ² = .15		Model adjusted R ² = -.01		Model adjusted R ² = .11		Model adjusted R ² = -.02	

Post-hoc tests were conducted for each variable adjusting the Type I error for each domain using the Bonferroni method; all values remained significant with the exception of child SCC predicting hostility (task 2)

Task 2 = Stressful interaction task; PCC = Primary control coping; SCC = Secondary control coping; DC = Disengagement coping; BDI-II = Beck Depression Inventory-II

p* < .05, *p* < .01, ****p* < .001

Table 3 Regression analyses predicting observed mood during the stressful interaction task, controlling for observed mood during the pleasant activity task

	Positive mood (task 2)		Anxiety (task 2)		Hostility (task 2)		Sadness (task 2)	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Observed mood (task 1)	.17	2.20*	.30	3.67***	.47	6.64***	.35	4.19***
Child PCC	-.01	-.08	.07	.70	.04	.45	-.02	-.16
Child SCC	.35	4.28***	-.03	-.39	-.18	-2.42*	-.13	-1.44
Child DC	.02	.17	-.07	-.62	-.15	-1.67	-.17	-1.56
BDI-II	-.19	-2.45*	-.09	-1.14	.10	1.44	-.05	-.56
Child gender	.05	.65	-.004	-.05	.22	3.11**	-.03	-.33
	Model adjusted R ² = .18		Model adjusted R ² = .07		Model adjusted R ² = .32		Model adjusted R ² = .11	

Positive mood (task 1) predicting positive mood (task 2) and child SCC predicting hostility (task 2) were no longer significant following Bonferroni correction

Task 2 = Stressful interaction task; Observed mood (task 1) = Observed mood during the pleasant activity interaction task for each dependent variable; PCC= Primary control coping; SCC = Secondary control coping; DC = Disengagement coping; BDI-II = Beck Depression Inventory-II

p* < .05, *p* < .01, ****p* < .001

to expression ($\beta = .30, p < .001$) and maintenance ($\beta = .22, p < .001$) of hostility.

Supplemental analyses were conducted to investigate the potential role of timing (current vs. past) and chronicity (single episode vs. recurrent) of mothers’ major depression episodes (MDEs) by separately running each regression model by mothers’ depression group status. The association of secondary control coping with positive mood expression remained significant within the regression model for families of mothers with current MDD ($\beta = .37, p < .05$) and past MDD ($\beta = .35, p < .001$) (Table 4). Similarly, secondary control coping remained significantly associated with the maintenance of positive mood (i.e., positive mood in Task 2 controlling for positive mood in Task 1) for both families with current maternal MDD ($\beta = .38, p < .05$) and maternal MDD history ($\beta = .33, p < .001$). When groups were separated based on families of mothers who had experienced only a single MDE compared to multiple MDEs, different findings emerged (Table 5). For single MDE families, secondary control coping was not

significantly related to the expression or maintenance of observed positive mood. However, for families of mothers with recurrent depression, secondary control coping was significantly associated with both the expression ($\beta = .39, p < .001$) and maintenance ($\beta = .37, p < .001$) of observed positive mood. Interestingly, parental depressive symptoms were significantly linked to positive mood expression in families with current ($\beta = -.35, p < .05$) but not past MDD and recurrent ($\beta = -.23, p < .01$) but not single-episode MDD.

Regression analyses for hostility also demonstrated differential findings based on depression status. First, secondary control coping was significantly associated with the maintenance of hostility in families of mothers with current MDD ($\beta = -.29, p < .05$) but not past MDD ($\beta = -.15, p > .10$) (Table 6). Interestingly, adolescent disengagement coping also emerged as a significant predictor of maintenance of hostility in families of mothers with current MDD only. When assessed separately by single versus recurrent episodes of depression, secondary control coping

Table 4 Regression analyses predicting observed positive mood during the stressful interaction task (current vs. past MDE)

	Families of mothers with current MDD (<i>N</i> = 43)				Families of mothers with past MDD (<i>N</i> = 117)			
	Positive mood (task 2)		Task 2 PM controlling for task 1 PM		Positive mood (task 2)		Task 2 PM controlling for task 1 PM	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Task 1 PM	—	—	.19	1.32	—	—	.17	1.79 ⁺
Child PCC	-.13	-.70	.11	-.61	.01	.12	.03	.24
Child SCC	.37	2.56*	.38	2.59*	.35	3.57***	.33	3.32***
Child DC	-.14	-.72	-.12	-.60	-.01	-.08	.02	.18
BDI-II	-.35	-2.39*	-.29	-1.94 ⁺	-.03	-.35	-.03	-.31
Child Gender	.16	-1.13	-.21	-1.41	.14	-1.48	.14	1.54
	Model adjusted R ² = .26		Model adjusted R ² = .28		Model adjusted R ² = .10		Model adjusted R ² = .12	

Child SCC and maternal BDI-II predicting positive mood (task 2) were no longer significant following Bonferroni correction

Task 2 = Stressful interaction task; *Observed mood (task 1)* = Observed mood during the pleasant activity interaction task for each dependent variable; *PCC* = Primary control coping; *SCC* = Secondary control coping; *DC* = Disengagement coping; *BDI-II* = Beck Depression Inventory-II

Table 5 Regression analyses predicting observed positive mood during the stressful interaction task (single vs. multiple MDEs)

	Families of mothers with a single major depressive episode (<i>N</i> = 21)				Families of mothers with recurrent depression (<i>N</i> = 134)			
	Task 2 PM		Task 2 PM controlling for task 1 PM		Task 2 PM		Task 2 PM controlling for task 1 PM	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Task 1 PM	—	—	-.30	-1.03	—	—	.19	2.15*
Child PCC	.57	1.50	.41	1.00	-.08	-.77	-.07	-.72
Child SCC	.25	.98	.34	1.26	.39	4.53***	.37	4.30***
Child DC	.64	1.82 ⁺	.55	1.51	-.04	-.32	-.02	-.15
BDI-II	-.09	-.40	-.08	-.33	-.23	-2.78**	-.21	-2.46*
Child gender	.16	.67	.32	1.12	.04	.47	.04	.50
	Model adjusted R ² = .07		Model adjusted R ² = .39		Model adjusted R ² = .18		Model adjusted R ² = .20	

Task 1 PM and maternal BDI-II predicting task 2 PM when controlling for task 1 PM were no longer significant following Bonferroni correction

Task 2 = Stressful interaction task; *Observed mood (task 1)* = Observed mood during the pleasant activity interaction task for each dependent variable; *PCC* = Primary control coping; *SCC* = Secondary control coping; *DC* = Disengagement coping; *BDI-II* = Beck Depression Inventory-II

⁺*p* < .06, **p* < .05, ***p* < .01, ****p* < .001

was related to the expression ($\beta = -.21$, $p < .05$) and maintenance ($\beta = -.20$, $p < .05$) of hostility only in families of mothers with recurrent depression (Table 7). Of note, child gender was also significantly related to observed expression ($\beta = .34$, $p < .001$) and maintenance ($\beta = .32$, $p < .001$) of hostility only in families with recurrent depression. No significant findings emerged in the relations between coping and observed anxiety or sadness when assessed by maternal depression status groups (see online Supplemental Tables 8–11 for results).

Last, two-tailed *z*-tests were conducted to explore possible differences in strength of the associations between secondary control coping with each specific emotion at the bivariate level. Analyses indicated that the correlation between secondary control coping and positive mood was significantly different from the correlations between secondary control coping and anxiety ($z = 3.26$, $p < .01$) as well as secondary control coping and sadness ($z = 4.06$, $p < .001$) in task 2. To provide a more stringent test of specificity, *t*-tests were conducted to examine the

Table 6 Regression analyses predicting observed hostility during the stressful interaction task (current vs. past MDE)

	Families of mothers with current MDD (N = 43)				Families of mothers with past MDD (N = 117)			
	Hostility (task 2)		Task 2 HS controlling for task 1 HS		Hostility (task 2)		Task 2 HS controlling for task 1 HS	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Task 1 HS	—	—	.60	4.33***	—	—	.42	4.86***
Child PCC	-.14	-.65	-.07	-.39	.07	.64	.08	.76
Child SCC	-.19	-1.09	-.29	-2.03*	-.18	-1.88	-.15	-1.72
Child DC	-.36	-1.61	-.43	-2.34*	.02	.19	-.06	-.52
BDI-II	.11	.64	.00	-.003	.06	.60	.10	1.20
Child Gender	.04	.26	.12	.83	.39	4.22***	.28	3.27***
	Model adjusted R ² = -.01		Model adjusted R ² = .34		Model adjusted R ² = .15		Model adjusted R ² = .30	

Child SCC and DC predicting task 2 HS controlling for task 1 HS were no longer significant following Bonferroni correction

Task 2 = Stressful interaction task; Observed mood (task 1) = Observed mood during the pleasant activity interaction task for each dependent variable; PCC = Primary control coping; SCC = Secondary control coping; DC = Disengagement coping; BDI-II = Beck Depression Inventory-II

⁺*p* < .10, **p* < .05, ****p* ≤ .001

Table 7 Regression analyses predicting observed hostility during the stressful interaction task (single vs. multiple MDEs)

	Families of mothers with a single major depressive episode (N = 21)				Families of mothers with recurrent depression (N = 134)			
	Task 2 HS		Task 2 HS controlling for task 1 HS		Task 2 HS		Task 2 HS controlling for task 1 HS	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Task 1 HS	—	—	.50	2.21*	—	—	.43	5.49***
Child PCC	.50	1.27	.31	.88	-.03	-.34	.01	.13
Child SCC	-.48	-1.81 ⁺	-.38	-1.61	-.21	-2.42*	-.20	-2.49*
Child DC	-.11	-.31	-.11	-.34	-.08	-.76	-.14	-1.41
BDI-II	-.23	-.97	-.07	-.33	.11	1.24	.13	1.74 ⁺
Child gender	.11	.46	.08	.38	.34	3.94***	.26	3.32***
	Model adjusted R ² = .04		Model adjusted R ² = .26		Model adjusted R ² = .15		Model adjusted R ² = .32	

The following findings were no longer significant after performing the Bonferroni correction: (a) Task 1 HS predicting task 2 HS for single episode families; (b) Child SCC predicting Task 2 HS for recurrent depression families

Task 2 = Stressful interaction task; Observed mood (task 1) = Observed mood during the pleasant activity interaction task for each dependent variable; PCC = Primary control coping; SCC = Secondary control coping; DC = Disengagement coping; BDI-II = Beck Depression Inventory-II

⁺*p* < .10, **p* < .05, ****p* < .001

difference between secondary control coping as related to each specific emotion in the linear regression analyses. Results of these tests again indicated a significant difference between the relation of secondary control coping and positive mood compared to the relation of secondary control coping and anxiety (*t*(150) = 2.83, *p* < .05) and sadness (*t*(150) = 2.04, *p* < .05). These differences remained significant even when levels of emotion exhibited during the

pleasant task were controlled for in analyses (positive mood vs. anxiety: *t*(150) = 2.45, *p* < .05; positive mood vs. sadness: *t*(150) = 2.04, *p* < .05). Additionally, the association between secondary control coping and hostility significantly differed from the association between secondary control coping and anxiety at the multivariate level (*t*(150) = 2.06, *p* < .05) and specificity analyses approached significance at the bivariate level (*z* = 1.79, *p* = .07).

Discussion

In this study, we examined the link between coping strategies and emotions as a possible source of resilience in children of mothers with current and/or past depression. Multiple methods were employed to capture these processes, including child and parent reports on standardized questionnaires and direct observations of children during interactions with their mothers. Preliminary evidence that coping strategies may differ in their effectiveness of managing specific emotions and that parental depressive symptoms and child gender may play a role in the display of emotions during stress emerged.

Partial support for the first hypothesis was found, such that secondary control coping was significantly associated with higher observed positive mood and lower hostility in correlation analyses. Surprisingly, no other significant relations emerged between primary control, secondary control, or disengagement coping and observed emotions in the second task, suggesting that secondary control coping may be linked to specific emotions (i.e., positive mood and anger/hostility) while other emotions may be better explained by different variables (e.g., external stressors). Although hypotheses focused on observed emotions during the stressful discussion task, interesting bivariate patterns emerged such that primary control coping was significantly related to lower levels of observed anxiety and hostility in the *pleasant* activity discussion task, while disengagement coping was significantly related to higher hostility and lower positive mood in the pleasant task. One plausible explanation for these findings is that these coping strategies are particularly helpful (primary control coping) or detrimental (disengagement coping) for the successful engagement in pleasant activities with a parent, thereby fostering increased positive and decreased hostile/negative affect when discussing a recent pleasant activity. For example, the ability to problem-solve (a primary control strategy) may improve the ability of families to successfully identify a pleasant activity and follow through with plans, while efforts to avoid family interactions (a disengagement strategy) may decrease participation in enjoyable parent-child activities, thereby changing the affect exhibited when discussing these topics.

The second hypothesis, which conceptualized secondary control coping as a particularly helpful strategy in the context of family stress, was partially supported in linear regression analyses. Significant associations between secondary control coping and observed positive mood and hostility were retained in multivariate analyses when accounting for primary control coping, disengagement coping, mothers' depressive symptoms, and child gender. Because children are unable to control or manipulate parenting behaviors that are influenced by depression and

family stress (e.g., withdrawal, intrusiveness), this finding suggests that types of coping aimed at adapting to the situation (e.g., accepting that depression/conflict is part of the family) are more successful in promoting positive mood and decreasing hostility compared to coping strategies aimed at altering the stressor (e.g., problem solving) or disengaging from the stressor (e.g., denial). This finding is consistent with previous studies that have found secondary control coping strategies to be tied to the regulation of positive affect (e.g., Murphy et al. 2017) above the impact of other types of coping and extend these findings by demonstrating an association between secondary control coping and observed hostile affect. Unexpectedly, secondary control coping was not associated with observed sadness or anxiety in multivariate analyses. This could be an indication that (a) other factors not accounted for in the current analyses (e.g., child symptoms, parent behavior during the interaction) may either interact with children's use of secondary control coping to predict, or independently predict, displays of sadness and/or anxiety, (b) the coding system did not adequately capture youth anxiety and/or sadness, or (c) that the relatively low intraclass correlation for anxiety and, to an extent, sadness may impact findings. It is also notable that anxiety was the only negative emotion that did not significantly increase from the pleasant activity interaction to the stressful interaction, suggesting that children's anxiety could be in-part related to the nature of the task (i.e., being video-recorded in an unfamiliar setting) rather than the content of the interaction task itself, which would in turn negate the potential impact of coping with family stress on this emotion.

In tests of the third hypothesis, some support that coping may influence the ability to maintain positive emotions and dampen negative emotions in a stressful as compared with a non-stressful situation was found for two emotions. First, secondary control coping accounted for the residual variance in levels of observed positive mood during the stressful task after controlling for observed levels of positive mood during the pleasant activity task. That is, children who reported using more secondary control coping in response to family stress in their daily lives displayed higher levels of positive mood during the stressful interaction task than would have been predicted based on initial levels of positive mood displayed during the pleasant activity task. This suggests that utilizing coping strategies aimed at adapting to the source of stress within the family may allow children to sustain higher-than-expected levels of positive emotions when transitioning from a pleasant to a stressful interpersonal task with their mothers. Children's use of secondary control coping was also significantly associated with lower levels of observed hostility during the stressful task after controlling for levels of observed hostility during the pleasant activity task; i.e., children who reported using

more secondary control in coping with family stress displayed lower levels of hostility during a stressful task than would have been predicted based on levels of hostility during the first task (pleasant activity task). Taken together, these findings provide insight into the emotion-maintenance framework of resilience by suggesting that secondary control coping is associated with the ability to sustain positive emotions and reduce the negative emotion of anger/hostility during stressful encounters.

Supplementary analyses provided preliminary evidence that predictors of observed emotions in the context of family stress may differ based on whether mothers are currently depressed as well as whether mothers have experienced single or recurrent depressive episodes during the lifetime of their child. First, secondary control coping remained significantly associated with observed positive mood when groups were separated based on current versus past depression. However, secondary control coping was only significantly related to the expression and maintenance of positive mood in families of mothers with recurrent, but not single-episode, depression when separated by depression frequency. This could indicate that utilizing strategies to adapt to the stressor is particularly helpful for adolescents who have had exposure to more than one episode of parental depression. Additionally, findings suggest that maternal depressive symptoms may have a greater negative impact on positive mood when the adolescent has been exposed to multiple episodes, as BDI-II was significantly related to positive mood for offspring of mothers with recurrent but not single-episode MDD histories. Although evidence suggests that parenting behaviors continue to be affected after a depressive episode has remitted, this finding may reflect that recurrent episodes cultivate more negative parent-child interactions, making parental depressive symptoms more impactful, or increase the overall level of *uncontrollable* stress within the home, making secondary control coping strategies (e.g., cognitive reappraisal) particularly helpful.

In regressions for hostility separated by depression timing, secondary control coping emerged as significant predictor of hostility maintenance in families with current MDD only as well as a significant predictor of hostility expression and maintenance in families with recurrent maternal depression only. Similar to findings of positive mood, this may indicate that recurrent depression fosters an environment of increasingly uncontrollable stress, making secondary control coping skills particularly useful in decreasing this specific form of negative affect. Additionally, gender emerged as a significant predictor of hostility for mothers with past, but not current MDD and recurrent, but not single-episode MDD. This finding further explains the relation between gender and hostility observed in the primary analyses (i.e., that female adolescents displayed

higher levels of observed hostility compared to males), suggesting that this association may be specific to families that are not exposed to current depression in mothers, yet have been exposed to multiple episodes over their lifetime. Differential findings for secondary control coping did not emerge in analyses separated by depression timing and frequency groups for observed anxiety or sadness.

Exploratory analyses uncovered some evidence for the specificity in the association of secondary control coping with different emotions. The strength of the association between positive mood and secondary control coping was significantly stronger than that between secondary control coping and each of the negative emotions, suggesting a particular benefit in the use of secondary control coping for promoting the emotion expression and maintenance of positive emotions. The lack of association between secondary control coping and anxiety and sadness is unexpected given the relatively consistent findings of this form of coping with reports of symptoms of anxiety and depression (see Compas et al. 2017, for a meta-analytic review); however, these findings may reflect the fact that observed emotions do not directly parallel clinical symptoms.

The current study has several limitations that should be acknowledged. First, though having multiple coders of observed emotions is a strength, the inter-rater reliabilities for coding anxiety were relatively low (0.56 and 0.59). This could indicate some rater disagreement for this particular emotion and influence the validity of results (i.e., results could be a function of measurement error). Findings regarding observed anxiety should therefore be interpreted with caution. Second, this study would benefit from assessing children's perceived control over familial stress. Although maternal depression is inherently uncontrollable for offspring, a measure of perceived control would serve to (a) whether offspring *view* parental MDD and associated interpersonal family stress as an uncontrollable stressor and (b) provide more context to understand the secondary control coping to observed emotion relationship in this sample. A third limitation of this study is that the analyses are cross-sectional, which precludes testing directionality. It is important to recognize the possible bidirectional nature of positive and negative emotions with coping. The broaden and build hypothesis, for example, suggests that positive emotions may lead to expanding attention and cognition, thereby enhancing the flexibility and creativity of coping choices (Fredrickson 1998, 2001). The same bidirectional nature may exist for negative emotions, such that higher levels of sadness, hostility, and/or anxiety may limit the scope of cognition and, consequently, the scope and flexibility of available coping choices. Additionally, interpersonal models of coping suggest that there may be an element of bidirectionality to coping as well, such that the

child's coping efforts may influence parent displays of emotion and vice versa. Future studies should examine parent-child interactions longitudinally, including measures of coping and observed emotions for both the parent and the child, to investigate additional pathways of resilience. Last, other factors, such as genetic influences, child symptoms, the developmental timing of past parental depressive episodes, and gender of the parent, could have implications for the current results and should be considered in future analyses.

Despite these limitations, this study adds considerably to the field's understanding of how coping relates to the expression and maintenance of specific emotions in the context of family stress and makes an important contribution in understanding resiliency through observed emotions. Findings highlight that one pathway to resilience for children of depressed parents may be the ability to generate and maintain positive emotions and dampen negative emotions, particularly hostility, during interpersonal stress via secondary control coping. This study also utilized an observational paradigm, providing a more stringent test of the association of coping and emotion expression/maintenance compared to self- and other-report methods to measure emotions. Taken together, findings aid in clarifying the role of coping with uncontrollable stressors, emotion expression/maintenance, and specificity in the relations between coping and emotion in a sample youth at high risk for developing of mental health problems. Specifically, secondary control coping strategies may be particularly effective in promoting higher levels of positive mood and lower levels of hostility in a stressful interpersonal context, as well as influencing the maintenance of positive mood and dampening of anger when transitioning to a stressful from non-stressful situation. Clinically, results suggest that interventions strengthening secondary control coping strategies may have a direct impact on emotion expression and maintenance which could, in turn, promote resiliency in at-risk youth. Future studies should continue to include observations of emotionally salient tasks and multi-informant reports of coping strategies and mental health symptoms to further explore the relations between coping and specific emotions.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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