HHS Public Access

Author manuscript

J Exp Child Psychol. Author manuscript; available in PMC 2019 September 01.

Published in final edited form as:

J Exp Child Psychol. 2019 June ; 182: 151–165. doi:10.1016/j.jecp.2019.01.017.

The Effect of Content and Tone of Maternal Evaluative Feedback on Self-Cognitions and Affect in Young Children

Judy Garber[1], **Sherryl H. Goodman**[2], **Steven M. Brunwasser**[3], **Sarah A. Frankel**[4], and **Catherine G. Herrington**[3]

[1]Department of Psychology and Human Development, Vanderbilt University, Nashville, TN

[2]Department of Psychology, Emory University, Atlanta, GA

[3]School of Medicine, Vanderbilt University, Nashville, TN

[4]Department of Psychiatry, Columbia University, New York, NY

Abstract

Feedback that young children receive from others can affect their emotions and emerging self-views. The current experiment tested the effect of negative content (criticism) and negative tone (hostile) of the feedback on children's affect, self-evaluations, and attributions; we also explored whether maternal history of depression and children's temperament moderated these relations. Participants were 152 mothers and children (48% girls) ages 4 to 5 (M= 61.6 months, SD = 6.83). The task involved three scenarios enacted by dolls; the child doll made something (e.g., picture, house, numbers) that had a mistake (e.g., no windows on the house), and proudly showed it to the mother doll, who then gave feedback (standardized, audio recorded) to the child. Children were randomized to one of four maternal feedback conditions (i.e., negative or neutral content in either a negative or neutral tone). Negative content (criticism) produced significantly more negative affect and lower self-evaluations than neutral content. When the tone of the feedback was hostile, children of mothers who had been depressed during the child's life were significantly more likely to make internal attributions for mistakes than were children of nondepressed mothers. In addition, among children with low temperament negative affectivity, in the presence of negative tone, negative content significantly predicted more internal attributions for the errors. Findings are discussed in terms of understanding the role of evaluative feedback in children's emerging social cognitions and affect.

Keywords

preschool-age children; maternal feedback; criticism; social cognitions

What is the effect of criticism on young children's development? Criticism has been shown to predict a wide range of outcomes including lower academic motivation and achievement, and greater self-criticism, depression, and externalizing behaviors (e.g., Blatt, 2004;

Corresponding Author: Judy Garber, Ph.D., Department of Psychology & Human Development, Vanderbilt University, 0552 Peabody, 230 Appleton Place, Nashville, TN 37203-5721.

Conflict of Interest: Declaration of interests for all authors: none

Gravener et al., 2012; Luyten & Blatt, 2013; Nietzel & Harris, 1990). Criticism from important others (e.g., parents, teachers), in particular, has been shown to play a crucial role in the development of children's social cognitions such as self-criticism (e.g., Kopala-Sibley & Zuroff, 2014), attributions (Garber & Flynn, 2001), and self-worth (Bleys et al., 2016), which are known to be vulnerabilities related to depression (Abela & Hankin, 2008; Abramson, Metalsky, & Alloy, 1989).

There has been increasing interest in the developmental origins of such cognitive vulnerabilities (e.g., Blatt & Luyten, 2009; Garber & Martin, 2002; Goldner, Scharf, Edelstein, & Havshush, 2015; Kopala-Sibley & Zuroff, 2014). Theories assert that the quality of relationships early in life have a strong influence on the development of social cognitive patterns (Beck, 1967; Blatt & Zuroff, 1992; Bowlby, 1980). Repeated exposure to maladaptive caretaking experiences, such as criticism, early in development may lay the foundation for future negative self-schemas and biased attributions (e.g., Ingram, Miranda, & Segal, 1998; Pesonen et al., 2006). These dysfunctional cognitive patterns then serve as a vulnerability to the development of depression following adverse life events (Morley & Moran, 2011).

Much of the evidence supporting these theoretical perspectives, however, has been derived from self-report, retrospective recall, and cross-sectional designs (e.g., Alloy et al., 2001; Garber & Flynn, 2001; Goldner et al., 2015). Recall of early life experiences can be affected by factors other than the experiences themselves, such as current mood (e.g., Gamble & Roberts, 2005; Winkielman & Schwarz, 2001). A few prospective studies have found that early attachment relationships predicted children's self-esteem and responses to failure (e.g., Cassidy, 1988; Lee & Hankin, 2009; Sroufe, 2005). Most investigations, however, have not used longitudinal, observational, or experimental methods to examine the effect of parents' behaviors (e.g., criticism) on children's emerging self-views and affect.

A few experimental studies have demonstrated that by age 4 or 5, children use evaluative feedback from others to make judgements about themselves (e.g. Cutting & Dunn, 2002; Ziegert, Kistner, Castro, & Robertson, 2001). For example, in a laboratory study, young children who experienced a failure expressed more negative self-views when the failure was accompanied by criticism as compared to when it was not criticized (Cutting & Dunn, 2002). Overall, however, experimental evidence of the effects of criticism on the types of cognitions that are vulnerabilities to depression is still limited (e.g., Bretherton & Munholland, 2008; Hankin, 2008; Moran, Neufeld-Bailey, & DeOliviera, 2008). Therefore, the first aim of the current study was to experimentally manipulate criticism to observe its effect on young children's affect and cognitions in the moment.

Additionally, criticism is not expected to affect all children in a uniform way; that is, considerable variability has been found in children's reactions to negative evaluations. For example, some young children show helpless responses to failure and criticism (Cutting & Dunn, 2002; Heyman Dweck, & Cain, 1992; Lecce et al., 2011; Smiley & Dweck, 1994), and such helplessness tends to denigrate their views of their intelligence and predicts negative emotions, reduced expectations, less persistence, and worse performance (Diener & Dweck, 1978, 1980). Variability in children's responses to criticism also occurs as a function

of the adult's feedback targets – either the child's intelligence or effort (Kamins & Dweck, 1999; Mueller & Dweck, 1998). In the current study, we explored variability in children's responses to criticism as a function of the way the feedback was delivered. Using an experimental paradigm similar to one used previously in several studies of young children (e.g., Heyman et al., 1992; Kamins & Dweck, 1999; Slagt, Dubas, van Aken, Ellis, & Deković, 2017), we examined the extent to which the *content* of maternal evaluative feedback (i.e., criticism versus neutral) affected young children's emotions and cognitions.

Interestingly, tone of voice (e.g., hostile vs. neutral) typically has not been assessed or manipulated separately from criticism, and sometimes has been confounded with it (e.g. Cutting & Dunn, 2002). Therefore, we defined criticism by the *content* of the feedback and varied whether children received the content expressed with a hostile or neutral *tone*. To control for possible variability in children's capacity to accurately detect emotions based only on voice tones, we included the Diagnostic Analysis of Nonverbal Accuracy (DANVA; Nowicki & Duke, 1994), which assesses children's ability to identify an adult's affect from the sound of their voice. Thus, the present experiment aimed to test the effects of specific characteristics of evaluative feedback on young children's affect and self-cognitions.

A second goal of this study was to explore other possible sources of variability in children's reactions to evaluative feedback. Individual differences in response to feedback emerge around age 4 (Kamins & Dweck, 1999). Seminal work by Dweck, Heyman, and colleagues (Dweck, 2017; Heyman et al., 1992; Kamins & Dweck, 1999) has shown that some, *but not all*, children respond to criticism of their abilities with negative affect (e.g., sadness) and negative cognitions (e.g., judging oneself as bad). For example, Heyman et al. (1992) demonstrated that after receiving criticism, kindergartners who viewed "badness" to be stable and unmalleable showed more negative affect and lower self-evaluations than children without such a belief. The current study expanded upon this literature by exploring whether the effects of evaluative feedback varied by two factors– mothers' history of depression and children's temperament.

Studies have shown that offspring of depressed mothers report more negative thinking (e.g., lower self-worth, negative attributions) than children of non-depressed mothers (e.g. Garber & Robinson, 1997; Goodman, Brogan, Lynch, & Fielding, 1993). Such cross-sectional group comparisons of levels of negative cognitions, however, do not address whether the *association* between feedback and children's cognitions differs between children of mothers with versus without a history of depression. In an experimental study of young children of depressed mothers, Murray, Woolgar, Cooper, and Hipwell (2001) reported that these at-risk children were more likely than offspring of non-depressed mothers to express negative cognitions (low self-worth and hopelessness) after exposure to a mild stressor (i.e., losing at a game with a peer). The present study built upon this important finding by examining the effect of negative versus neutral feedback on children's affect and cognitions in young children of mothers with and without a history of depression.

A second potential moderator of children's responses to feedback is their own temperament negative affectivity. Children who are high in negative affectivity (NA) may be more susceptible to the effects of maternal criticism as a function of their being more highly stress

reactive (Gunnar & Quevedo, 2007), or because they are particularly likely to focus on the negative consequences of events (e.g. Derryberry & Reed, 1994). Correlational studies have found that children with higher negative emotionality are more susceptible to parenting and other environmental influences (e.g., Belsky & Pluess, 2009; Slagt, Dubas, Dekovic, & van Aken, 2016). In a meta-analysis of the relation between parenting and child temperament, Slagt and colleagues (2016) concluded that, compared to children with an easier temperament, children with a more difficult temperament were more vulnerable to negative parenting, especially when parenting was assessed through observations rather than questionnaires.

Slagt et al. (2017) highlighted several advantages of experimental studies, most particularly that the "manipulation of the environment creates standardized, clear, and targeted measures of environmental stimuli. Such measures decrease 'noise' in the assessment of environmental stimuli and increase the power to detect interactions if present" (p. 80). A few experimental studies have shown that infants with high negative emotionality (NE) benefited more from positive parenting interventions than did those low on NE (Cassidy, Woodhouse, Sherman, Stupica, & Lejuez, 2011; Klein Velderman, Bakermans-Kranenburg, Juffer, & Van IJzendoorn, 2006). These experiments, however, examined positive rather than negative parenting. Experiments can be used to explore children's immediate responses to ethically acceptable levels of negative feedback (van IJzendoorn & Bakermans-Kranenburg, 2015). In a laboratory experiment, Slagt and colleagues (2017) tested whether children's temperamental NE moderated the relation between standardized parent feedback and children's affective responses to it, and found that it did not. In the current study, we tested whether the impact of negative maternal feedback (i.e., criticism; hostility) on children's affective and cognitive reactions differed as a function of children's levels of trait negative affectivity.

Finally, the current experiment used puppet role-play scenarios, which were developed by Cutting and Dunn (2002) and Heyman et al. (1992), to simulate negative feedback from mothers to children. In this experimental paradigm, a puppet representing the child makes a few small mistakes, which are shown to a puppet representing an adult (i.e., parent, teacher). This particular experimental paradigm has been effective in assessing and changing children's emotions and behaviors in response to criticism (Kamins & Dweck, 1999; Slagt et al., 2017; Zentall & Morris, 2010). These prior studies have provided evidence of the validity of this puppet task for demonstrating that criticism impacts children's affect and behavior (e.g., Mizokawa, 2013; Slagt et al., 2017).

In summary, the current study addressed the following questions: (1) To what extent does negative feedback (i.e., criticism) impact children's affect and self-cognitions? We hypothesized that children would respond to negative evaluative feedback relative to neutral feedback with more negative affect, lower judgments of their own abilities (self-evaluations), and more negative internal attributions for the errors. (2) How does the tone (neutral vs. hostile) of the feedback affect children's emotional and cognitive responses? We expected that children would react to hostile as compared to neutrally toned feedback more negatively. (3) Finally, we explored the extent to which the strength of the associations between feedback and children's affective and cognitive responses to such feedback varied as a

function of mother's history of depression (i.e., risk) or children's temperamental negative affectivity. We proposed two alternative hypotheses regarding maternal depression. Whereas children of mothers with a history of depression might be *more* sensitive to criticism (i.e., react more negatively), they also might be *less* reactive to negative feedback because they are more used to it. On the other hand, children of mothers with no history of depression may be *more* likely to react negatively to critical or hostile maternal feedback in an experimental setting because it is a distinct departure from their usual experiences. Regarding children's temperament negative affectivity (NA), we expected that compared to children with low NA, those with high NA would react more negatively to criticism.

Method

Participants

Participants were 152 mothers and children recruited from preschools and participant lists in two cities in the Southeastern United States. Children were four to five years old (M = 61.6 months, SD = 6.83); 48% were female. The child sample was 80.3% Caucasian, 9.9% African American, 3.3% Asian-American, and 6.5% multiple races, other, or unknown; 2.6% were Latino/Hispanic. Mothers ranged in age from 26- to 50-years-old (M = 37.5 years, SD = 4.34) and had a similar racial composition as the children (80.9% Caucasian, 8.6% African-American, 3.3% Asian, 5.9% multiple races, other, or unknown; 1.3% Latino/Hispanic). Most mothers were married (92.1%); all but 9.2% of the mothers had a college education or higher.

Procedures

Compliance with Ethical Standards.—The study protocol was approved by university institutional review boards for the protection of human subjects. Prior to starting the procedures, experimenters obtained informed consent from mothers, and explained to children that there were no right or wrong answers and they could ask to stop at any time. Children were encouraged to ask questions if they did not understand something.

Participant Compensation.—At the completion of the experiment, each child selected a toy to take home as a thank you for participating.

Measures

Stories Task.—We used the puppet role-play scenarios developed by Cutting and Dunn (2002) and Heyman et al. (1992), to simulate negative feedback from mothers to children. In this experimental paradigm, a puppet representing the child makes a few small mistakes, which are shown to a puppet representing an adult (i.e., parent, teacher). This particular experimental paradigm has been effective in assessing and changing children's emotions and behaviors in response to criticism (Kamins & Dweck, 1999; Slagt et al., 2017; Zentall & Morris, 2010). These prior studies have provided evidence of the validity of this puppet task for assessing the impact of criticism on children's affect and behavior (e.g., Mizokawa, 2013; Slagt et al., 2017).

Children were told that they were going to play a game using two dolls, and were asked to "choose one doll to be your mommy and one to be you" from three same-sex child dolls (White, African-American, and Hispanic) and three mother dolls of similar racial composition. Children were reminded that the child doll "is you" and the mother doll "is your mommy," and were told that they would listen to stories about "you and your mommy," and would be asked questions after each story. The manipulation consisted of three stories acted out using the dolls, presented to the child in random order. Pretend stories were used so that no judgment or criticism was given directly to the children. The scenarios were made vivid by using props that matched the story content (e.g., a picture of a family), so that the children would experience the situation and feedback as real as possible. Each story involved the child creating a product (e.g., drawing a picture, building a house, writing numbers), and subsequently proudly showing it to the mother. As each story was told, the experimenter moved the dolls to act out the scene. In each case, the stories were told in the second person (e.g. "*You* have been working really hard to draw a picture…").

One story described how the child worked hard to draw a picture of a family, but left the feet off one person in the picture. A second story described how the child spent a lot of time building a house out of blocks, but forgot to put windows in the house. A third story described how the child was writing out the numbers 1 through 10, but omitted the number 8. At the end of each story, after the child presented the mother with the drawing, house, and written numbers, respectively, an audio recording was played of the mother's response to the child's product (i.e., drawing, house, or numbers). A standardized audio recording of the mother's feedback was used so that all children heard the same content and tone for the condition to which the child was randomly assigned.

In the negative content condition, the mother pointed out the child's error (e.g. "*There are no windows on that house. That's not what I call building a house the right way. I am disappointed in you.*"). In the neutral content condition, the mother did not comment on the child's error (e.g. "*Oh, look at what you made. You built a house out of blocks. Did you want me to see it now?*"). In the negative tone conditions, a hostile, disapproving tone of voice was used, either with negative or neutral content. Children were randomized to one of four conditions: neutral tone/neutral content (20 girls, 22 boys), neutral tone/negative content (21 girls, 19 boys), negative tone/neutral content (15 girls, 19 boys), and negative tone/ negative content (17 girls, 19 boys). Each child heard all three stories in the same tone and content of the condition to which they were randomized; story order was counterbalanced across children.

After each scenario, children were asked a series of questions similar to those used in previous studies utilizing this paradigm (e.g., Mizokawa, 2013; Slagt et al., 2017). Table 1 presents a summary of the variables derived from the stories. After the audio recording of the mother's response was played, children were asked separately for each emotion: "how much did you feel… [sad, mad, scared, happy (reverse scored)]." To scaffold their ability to respond to the 4-point Likert scale, visuals displaying a page with four circles increasing in size were shown to the children. They could point to the largest circle, for example, indicating a response of "very much." Responses were summed across the three stories to

create a composite that reflected overall *Child Affect;* McDonald's omega was 0.81, 95% Confidence Interval (CI) [0.76, 0.85].

For *Self-Evaluation*, children were asked: "How well did you… (draw the picture; build the house; write the numbers)?" The response format was similar to one that has been used successfully with preschool-age children on the Perceived Competence Scale for children (Harter, 1999). Children were asked to first choose "good" or "not good," and then to indicate "really" or "sort of." McDonald's omega was 0.74, 95% CI [0.65, 0.81].

To assess *Internal Attributions*, we used a forced choice format similar to that used in the Children's Attributional Style Questionnaire (Seligman et al., 1984). Children were asked to choose between two reasons (internal versus external) for the outcome. For example, "Did you not draw the feet because…" (a) "You are not good at drawing pictures of families" or (b) "You did not get enough time to make the picture." Higher scores were given for the internal attribution response; McDonald's omega was 0.65, 95% CI [0.48, 0.74].

Finally, to ensure that children left the session on a positive note, the experimenter presented to all children a fourth story in which the child doll won at a game. The mother doll then complimented the child, and, in all but the neutral/neutral condition, apologized to the child for her earlier negative content and/or tone. (i.e., "You won! Look at what a great job you did playing the game. I am so proud of you. Also, I am sorry for not sounding nice before. I think you did a wonderful job on *everything* you did today! Good for you!"). The script for the child procedure is available upon request.

Diagnostic Analysis of Nonverbal Accuracy (DANVA).—To assess children's ability to accurately detect emotions based on voice tones, which is a potential confound, the experimenter administered a modified DANVA (Nowicki & Duke, 1994). The DANVA consisted of twelve trials in which the child listened to a recording of an adult reciting the same phrase ("I am going out of the room now, and I'll be back later") using different tones of voice, for which the child indicated the adult's affect (happy, sad, mad, or scared). Three items for each of the four emotions were presented in the same mixed order for all children. Higher scores indicated a greater number of affects correctly identified. Internal consistency of the DANVA was shown to be $\alpha = 0.77$ (Nowicki & Duke, 1994). In this sample, children identified the correct tone in about half the trials (50.2%, 95% CI [47.3%, 53.0%], $SD = 17.6\%$), which was significantly greater than chance (25.0%): $t(144) = 17.54$, $p < .001$.

Measures of Potential Moderators

To assess mothers' current and past mood disorders (i.e., Major Depressive Episode, Dysthymia, Mania, Hypomania), we administered the mood module of the Structured Clinical Interview for *DSM-IV-TR* axis I disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1995). Forty-four mothers (29%) had a history of a depressive disorder during the child's lifetime. All diagnostic interviewers were Masters or Bachelor level in a mental health field, received extensive training and supervision in administering the SCID, and were unaware of the child's data. A senior clinician reviewed every interview and, in all cases, agreed with the diagnosis.

To assess children's temperament, mothers completed the 36-item *Children's Behavior Questionnaire (CBQ)*(Rothbart, Ahadi, Hershey, & Fisher, 2001), which measures temperament in 3- to 7-year-old children. Mothers responded using a 7-point Likert scale ranging from "extremely *untrue* of your child" to "extremely *true* of your child." The CBQ yields scores on three subscales: Negative Affectivity, Surgency, and Effortful Control. In the current study, we focused on the Negative Affectivity (CBQ-NA) subscale, which is characterized by sadness, fear, and distress in response to limitations. The CBQ has adequate internal consistency and validity (Rothbart et al., 2001). In the current sample, internal consistency for the 12-item CBQ-NA subscale was $\alpha = .74$.

Data Analysis Plan

We ran separate sets of analyses for each dependent variable – children's affect, self-evaluation, and internal attributions. We tested each hypothesized moderator: mothers' history of depression (i.e., risk: high vs. low) and children's negative affectivity (CBQ-NA score). All analyses included the child's DANVA score as a control variable. We used a step-down modeling approach following these steps: (a) specify a loaded model with all 2- and 3-way interactions of interest (see equation below); (b) remove non-significant 3-way interactions; (c) remove non-significant 2-way interactions.

$$y = \beta_0 + \beta_1 Content + \beta_2 Tone + \beta_3 Risk + \beta_4 Temperament + \beta_5 Verbal\ Accuracy + \beta_6 (Content\ x\ Tone) + \beta_7 (Content\ x\ Risk) + \beta_8 (Content\ x\ Temperament) + \beta_9 (Tone\ x\ Risk) + \beta_{10} (Tone\ x\ Temperament) + \beta_{11} (Content\ x\ Tone\ x\ Risk) + \beta_{12} (Content\ x\ Tone\ x\ Temperament)$$

We used the simple slopes method to probe significant interactions when the moderator (i.e., maternal history of depression) was categorical (Aiken & West, 1991) and the Johnson-Neyman (J-N) method when the moderator (child negative affectivity) was continuous (Johnson & Neyman, 1936; Preacher, Curran, & Bauer, 2006). For moderators that are continuous, the J-N approach is superior compared to the more traditional simple-slopes approach, which involves evaluating the association between the primary predictor and outcome at a few arbitrarily selected values of the moderator. The J-N technique evaluates the association between the primary predictor and outcome across the full range of possible levels of the continuous moderator (Preacher et al., 2006).

The J-N approach identifies the precise levels of the continuous moderator at which the regression of the outcome variable on the focal predictor is significant. J-N plots (see Figure 1) show the value of the unstandardized regression coefficient (*b*) corresponding to the regression of the outcome variable on the focal predictor on the y-axis plotted against the continuous moderator on the x-axis. When the 95% confidence bands (depicted as curved red lines) around the coefficient line (straight black line) do not contain 0, the coefficient corresponding to the regression of the outcome on the focal predictor is significant (indicated by shaded regions). When the confidence interval (CI) contains 0, the effect of the focal predictor on the outcome variable is not significant. To calculate the reliability of the dependent variables, we used Green and Yang's (2009) version of McDonald's omega. We calculated the confidence intervals using 1,000 percentile bootstrap samples.

Results

Descriptive Statistics and Correlations among Study Variables

Table 2 displays the means and standard deviations of the dependent variables, moderators, and DANVA scores for the whole sample and by condition. Table 3 presents the correlations among the study variables.

Effects of Critical Content and Hostile Tone on Children's Affect and Cognitions

Children's Affect—Children in the negative content condition reported significantly more negative affect than those in the neutral content condition: β = 7.50, t = 4.76, p = .000; 95% CI [4.39, 10.62]. The effect of tone showed a nonsignificant trend on children's affect ratings: β = 2.86; t = 1.80. p = .074; 95% CI [−0.28, 5.99]. Mothers' depression history and children's negative affectivity did not moderate the effects of content or tone on children's affect ratings after receiving feedback.

Children's Cognitions

Self-evaluations.: Children in the negative content condition (i.e., criticism) reported significantly lower self-evaluations than did children in the neutral content condition: β = 1.62; t = 3.98, p = .000; 95% CI [.82, 2.43]. The main effect of tone of voice on children's self-evaluations was not significant: β = −0.55 t = −1.33, p =.185; 95% CI [−1.36, 0.26]. Mothers' depression history and children's negative affectivity did not significantly moderate the effects of content or tone on children's self-evaluations.

Internal attributions.: The two-way interaction of tone by risk on children's internal attributions was significant, indicating that negative tone predicted an increased odds of internal attributions among offspring of depressed mothers (i.e., high risk; aOR = 5.93, 95% CI [1.58, 23.36]), but not among children of never depressed mothers (aOR = 0.77, 95% CI [0.29, 2.00]).

The three-way interaction of content by tone by child negative affectivity on children's internal attributions was significant revealing that the effect of content on children's attributions depended on both tone and level of children's negative affectivity (NA). When tone was neutral, the effect of negative content (i.e., criticism) on internal attributions was not significant regardless of children's levels of NA. When tone was negative, however, the effect of negative content was significant and *positive* when children's NA was low (0.75 SDs below the sample mean or lower). That is, among children scoring at least 0.75 SDs below the mean (low NA), and in the presence of negative tone, negative content significantly predicted more internal attributions. Among children with high NA (scoring at least 0.70 SDs above the mean) and in the presence of negative tone, the effect of negative content on internal attributions was significant and negative. The effect of content on internal attributions in the presence of negative tone was not significant at levels of NA between −0.75 and +0.70 SDs (see Figure 1).

Discussion

The primary aim of this experiment was to explore the effects of criticism on young children's affect and cognitions (i.e., evaluations of the self; judgements about the causes of errors). In particular, we varied the negative feedback with regard to its content (critical versus neutral) and tone of voice (hostile versus neutral). The second aim of the study was to explore whether the relations between criticism and children's emotional and cognitive reactions varied as a function of two potential moderators – mothers' history of depression and children's temperament negative affectivity.

Children's Affective Reaction to Negative versus Neutral Feedback

Consistent with our hypothesis, children receiving criticism reported more negative affect as compared to children receiving neutral feedback. This result parallels the finding of Slagt et al. (2017) who, using a similar experimental paradigm involving role-play scenarios with puppets, showed that young children in a negative feedback condition increased more in their negative affect than did children in the neutral content condition. Moreover, this finding provides further validation that the experimental manipulation of the content of the feedback induced negative affect in young children.

Tone of voice showed a nonsignificant trend to produce more negative affect ratings. This weaker effect for tone on children's affect might have been due to the tone manipulation possibly being less powerful. Tone of voice did affect children's attributions when the moderators (i.e., maternal depression history, child temperament) were included in the analyses (discussed below).

Children's Cognitions in Reaction to Negative versus Neutral Feedback

Children's self-evaluations.—As hypothesized, criticism resulted in lower self-evaluations as compared to neutral feedback. This finding is consistent with theories (e.g. Beck, 1967; Bowlby, 1980) and correlational evidence (e.g. Mezulis, Hyde, & Abramson, 2006; Murray et al., 2001) that maternal criticism can affect young children's judgements of their competence. Exposure to criticism at an early age may be one mechanism through which children begin to formulate a negative self-view. The timing, duration, and frequency of negative feedback likely differentiates between what is "normal" and constructive input that facilitates learning, from persistent negative input, which may increase the likelihood of developing a negative self-view.

Criticism is a broad construct to which children might react quite differently depending on the type and manner in which it is expressed. For example, criticism or negative feedback that targets children's abilities has more negative outcomes than criticism of children's effort (Kamins & Dweck, 1999). Similarly, criticism that is generic results in more trait-like self-evaluations as compared to nongeneric criticism (Cimpian, Arce, Markman, & Dweck, 2007). Indeed, generic feedback tends to lead children to think in trait terms, such that later mistakes could signal a negative trait (e.g., low ability) and thereby undermine motivation (Dweck, 2006).

Thus, some corrective responses from adults (e.g., parents and teachers) are expected and likely help children learn, particularly if it is specific and directed toward improving effort. On the other hand, if negative feedback is persistent, generic, and directed at more stable characteristics such as ability, then it may contribute to a child developing negative self-evaluations that endure. Future studies need to identify the processes through which negative feedback moves from constructive to detrimental, and the duration of exposure leading to more enduring effects. The current study demonstrated that even brief criticism had at least a short-term impact on young children's self-evaluations and affect.

Internal attributions.—The findings with regard to effects of criticism on children's internal attributions were more complex due to significant moderators. A two-way interaction showed that negative tone produced increased odds of children endorsing internal attributions in those whose mothers had a history of depression, but not among offspring of mothers without a depression history. Thus, when the tone of the feedback was hostile, children of mothers who had been depressed during the child's life were more likely to blame themselves for mistakes than were children of never depressed mothers. These results are consistent with correlational studies that have shown that offspring of depressed parents report a more negative attributional style than do children of nondepressed parents (e.g., Garber & Robinson, 1997). The current study is the first to demonstrate experimentally that feedback delivered in a hostile tone of voice produced more self-blaming attributions for mistakes among children whose mothers had a history of depression as compared to children of never depressed mothers. Depressed mothers have been observed to be more hostile in their interactions with their children (Lovejoy, Graczyk, O'Hare, & Neuman, 2000); perhaps their offspring have learned to associate maternal hostility with being blamed for bad outcomes. This result is consistent with a study that found that children who endorsed more negative explanations for their mother's depressive symptoms had more negative self-esteem and higher levels of adjustment problems (Goodman, Tully, Connell, Hartman, & Huh, 2011).

It is possible, however, that evidence that maternal history of depression moderated the relation between hostile tone and children's internal attributions might not necessarily be due to parenting per se, but rather it could be a function of other factors such as shared genes or the prenatal environment. Nevertheless, we focus here on parenting (e.g., criticism and hostility) based on strong evidence of the role of the environment even in the context of genetic influences (Natsuaki et al., 2014), strong theoretical models for the mediating role of parenting (Goodman & Gotlib, 1999), and the potential implications for interventions given evidence that parenting is modifiable. Observational as well as additional experimental studies are needed to explore the extent to which maternal hostility consistently produces internal attributions in at-risk offspring, and whether chronic exposure to hostile feedback predicts the onset and maintenance of children's internal attributions for negative outcomes over time. Additionally, future studies should include measures that explicitly assess parenting style and behaviors.

There also was a significant three-way interaction of content by tone by child temperament negative affectivity (NA). Among children with low NA, when the tone was negative, the effect of negative content was significant and *positive*. That is, for children low in negative

affectivity, receiving maternal criticism in a hostile tone produced greater self-blame (i.e., more internal attributions). Whereas negative feedback may be effective in teaching children to take responsibility for their errors, giving such feedback in a hostile tone may have additional harmful effects by increasing their self-blame, at least in low NA children.

In contrast, for children with high NA, negative tone combined with negative content predicted less self-blame (i.e., lower internal attribution scores). Given that this finding was unexpected, it should be interpreted with caution. We speculate, however, that the high NA children may already be so negative that receiving hostile criticism might move them toward more external explanations rather than toward self-blame. Future studies need to replicate this finding and directly examine whether externalization of blame increases after exposure to hostile criticism among children high in negative affectivity.

Strengths, Limitations, and Future Directions

One strength of the current study was that we used an experimental manipulation of critical content and hostile tone to assess the effect of feedback on children's affective and cognitive reactions. Although evidence exists of significant relations between parents' behaviors and children's emotions and thoughts, these studies have tended to be retrospective or correlational analyses of self-report measures. Even the few prior observational studies of mothers' naturalistic reactions to their children's failures have been correlational rather than experimental (Mezulis et al., 2006; Murray et al., 2001). The current study design involved randomization and systematically controlling the type of feedback children received, which allowed us to conclude that maternal criticism produced negative affect and low self-evaluations in young children.

Another strength of this study was that the tone manipulation was standardized so that every child in the same condition received the exact same tone of voice. In addition, we controlled for children's ability to accurately detect emotions based on voices by using the DANVA, although covarying children's DANVA scores in the analyses might have weakened the effects of the tone manipulation. An even more negative tone than used here may be required before greater differences in young children's responses to hostile tone become more evident. Future studies might test the impact of a harsher tone of voice, although the strength of the manipulation must be balanced with ethical concerns about producing too much distress in young children in a laboratory setting.

A possible limitation of this study was that the "maternal" feedback was communicated through dolls rather than directly from the mothers. Although the doll manipulation provided experimental control, it might not have been sufficiently strong enough to elicit the intensity of reactions to real-life criticism. Perhaps feedback from children's own mothers would have a stronger impact children's affective and cognitive responses.

A related concern is whether this pretend paradigm actually gets at children's self-evaluations, as opposed to accessing their as-if puppet-selves in the context of the game. That is, we cannot conclude with certainty that children's responses to the questions reflected their actual feelings in the scenarios as compared to how they think they would or should feel in such situations. A possibly more ecologically valid design would involve the

child and mother actually interacting in a controlled laboratory setting rather than using puppets or dolls, which require some level of symbolic reasoning ability (DeLoeche, 2011). Although this laboratory paradigm almost certainly elicited the types of thoughts and feelings children have in these kinds of situations, consistent with other studies of these constructs (e.g., Cimpian et al., 2007; Slagt et al., 2017), future research needs to address how children's responses to this laboratory paradigm compare to their responses to real-world criticism.

Further, as with other aspects of parenting, mothers' and fathers' cultural background, religious beliefs, and childhood experiences with their own parents likely affect their child rearing practices in general, and their use of criticism, in particular (Bornstein, 2012). For example, some parents may believe that criticism, even when harsh, builds character, whereas other parents may think that severe disapproval harms children's developing self-esteem. An interesting question for future research is whether the effect of criticism on children varies as a function of their culture's predominant views about the value of criticism. Given the relatively homogeneous ethnic and racial composition of our sample, it is possible that our findings may not generalize to a more diverse or less well-educated population.

Another limitation of the current study was that the measure of mothers' depression history was categorical (i.e., present or absent). Maternal depression can be quite heterogeneous and may affect children differently depending upon its severity and chronicity (Brennan et al., 2000). Future studies should explore the relation of these various aspects of mothers' depression to children's emotional and cognitive reactions to maternal feedback. In addition, the relatively small sample size of mothers with depression might have limited our power to detect some significant effects. Finally, although maternal history of depression has been linked with more dysfunctional parenting (e.g., Lovejoy et al., 2000), future investigations should directly explore which of mothers' actual behaviors moderate the link between maternal criticism and children's outcomes, particularly in mothers with a history of depression.

In summary, the present experiment demonstrated that criticism produced higher levels of negative affect and lower self-evaluations in young children than did neutral feedback. In addition, a more hostile tone of voice elicited more internal attributions for errors among children of mothers with histories of depression. Reducing parental criticism and hostile tone may benefit children's emerging affective and cognitive responses to feedback. Parent training approaches (e.g., Parent-Child Interaction Therapy [PCIT]; Positive Parenting Program [Triple P] Sanders, Kirby, Tellegen, & Day, 2014), which teach caregivers to communicate with children in a warm and caring way, may be useful for parents who want to learn how to provide corrective, but noncritical feedback to their young children. When feedback is critical and hostile, however, some children may begin to develop a negative attributional style, which is a vulnerability for depression (e.g., Abela & Hankin, 2008; Abramson et al., 2002). Overall, the effects of criticism on children's emotional and social cognitive development tend to be negative, although this can vary by a range of factors such as tone of voice, target of the criticism (e.g., ability vs. effort), context (e.g., family

environment; culture), whether the criticism is generic or specific, and children's temperament.

Acknowledgements

This work was supported in part by a training grant from the National Institute of Mental Health (T32 MH018921). We appreciate the assistance of Anne-Marie Olarte, Allison H. Federoff, Courtney Nichols, Wynne Duong, Lisa Hayes, Gabrielle Levine, Samantha Schreiber, Rachel Swan, Amanda Kimmel, and Sarah Brand with data collection, Laurel L. Duncan for data management, data collection, and participant recruitment, and Youngwon Kim with constructing the Tables.

Funding: National Institute of Mental Health (T32 MH018921). This funding source had no role in study design, data collection or analysis, or writing of the paper.

References

Abela JRZ & Hankin BL (2008). Cognitive vulnerability to depression in children and adolescents In Abela JRZ & Hankin BL (Eds.). Handbook of depression in children and adolescents (pp. 35–78). New York, NY: Guilford.

Abramson LY, Alloy LB, Hankin BL, Haeffel GJ, MacCoon DG, & Gibb BE (2002). Cognitive vulnerability–stress models of depression in a self-regulatory and psychobiological context In Gotlib IH & Hammen CL (Eds.), Handbook of depression (pp. 268–294). New York, NY: Guilford Press.

Abramson LY, Metalsky GI, & Alloy LB (1989). Hopelessness depression: A theory-based subtype of depression. Psychological Review, 96, 358–372.

Aiken LS, & West SG (1991). Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage.

Alloy LB, Abramson LY, Tashman NA, Berrebbi DS, Hogan ME, Whitehouse WG, et al., (2001). Developmental origins of cognitive vulnerability: Parenting, cognitive, and inferential feedback style, of the parents of individuals at high and low cognitive risk for depression. Cognitive Therapy and Research, 25, 397–423.

Beck AT (1967). Depression: Clinical, experimental, and theoretical aspects: University of Pennsylvania Press.

Belsky J, & Pluess M (2009). Beyond diathesis–stress: Differential susceptibility to environmental influences. Psychological Bulletin, 135, 885–908. [PubMed: 19883141]

Blatt SJ (2004). Experiences of depression: Theoretical, clinical, and research perspectives. Washington, DC: American Psychological Association.

Blatt SJ, & Luyten P (2009). A structural-developmental psychodynamic approach to psychopathology: Two polarities of experience across the life span. Developmental Psychology, 21, 793–814. 10.1017/s0954579409000431.

Blatt SJ, & Zuroff DC (1992). Interpersonal relatedness and self-definition: two prototypes for depression. Clinical Psychology Review, 12, 527–562. 10.1016/0272-7358(92)90070-O.

Bleys D, Soenens B, Boone L, Claes S, Vliegen N, & Luyten P (2016). The role of intergenerational similarity and parenting in adolescent self-criticism: An actor-partner interdependence model. Journal of Adolescence, 49, 68–76. [PubMed: 27007498]

Bornstein MH (2012). Cultural approaches to parenting. Parenting, Science and Practice, 12(2–3), 212–221.

Bowlby J (1980). Loss: Sadness and depression (Vol. Basic Books). New York.

Brennan PA, Hammen C, Anderson MJ, Bor W, Najman JM, & Williams GM (2000). Chronicity, severity, and timing of maternal depressive symptoms: Relationships with child outcomes at age five. Developmental Psychology, 36, 759–766. [PubMed: 11081699]

Bretherton I, & Munholland KA (2008). IWMs in attachment relationships: Elaborating a central construct in attachment theory In Cassidy J, & Shaver PR (Eds.), Handbook of attachment: Theory, research, and clinical applications (pp. 102–127). (2nd ed.). New York, NY: Guilford Press.

Carter JS, & Garber J (2011). Predictors of the first onset of a major depressive episode and changes in depressive symptoms across adolescence: Stress and negative cognitions Journal of Abnormal Psychology, 120(4), 779–796. doi: 10.1037/a0025441 [PubMed: 21928863]

Cassidy J (1988). Child-mother attachment and the self in six-year-olds. Child Development, 59(1), 121–134. doi:10.2307/1130394 [PubMed: 3342707]

Cassidy J, Woodhouse SS, Sherman LJ, Stupica B, & Lejuez CW (2011). Enhancing infant attachment security: An examination of treatment efficacy and differential susceptibility. Development and Psychopathology, 23(1), 131–148. [PubMed: 21262044]

Cimpian A, Arce HMC, Markman EM, & Dweck CS (2007). Subtle linguistic cues affect children's motivation. Psychological Science, 18(4), 314–316. 10.1111/j.1467-9280.2007.01896.x [PubMed: 17470255]

Cutting AL, & Dunn J (2002). The cost of understanding other people: Social cognition predicts young children's sensitivity to criticism. Journal of Child Psychology and Psychiatry and Allied Disciplines, 43(7), 849–860.

DeLoache JS (2011). Early development of the understanding and use of symbolic artifacts Goswami U (Ed.). The Wiley-Blackwell Handbook of Childhood Cognitive Development, 2nd Edition, (pp. 312–336). London: Blackwell Publishing, ISBN: 978-1-405-19116-6

Derryberry D, & Reed MA (1994). Temperament and the self-organization of personality. Development and Psychopathology, 6(04), 653–676.

Diener CI, & Dweck CS (1978). An analysis of learned helplessness: Continuous changes in performance, strategy and achievement cognitions following failure. Journal of Personality and Social Psychology. 36, 451–462. doi:10.1037/0022-3514.36.5.451

Diener CI, & Dweck CS (1980). An analysis of learned helplessness: (II) the processing of success. Journal of Personality and Social Psychology, 39, 940–952. doi:10.1037/0022-3514.39.5.940 [PubMed: 7441483]

Dweck CS (1998). The development of early self-conceptions: Their relevance for motivational processes In Heckhausen J & Dweck C (Eds.), Motivation and self-regulation across the life span (pp. 257–280). New York: Cambridge University Press.

Dweck CS (2006). Mindset: The new psychology of success. New York: Random House.

Dweck CS (2017). The Journey to Children's Mindsets—and Beyond. Child Development Perspectives, 11(2), 139–144.

First MB, Spitzer RL, Gibbon M, & Williams JBW (1995). Structured Clinical Interview for DSM-IV Axis I Disorders. Washington, D.C.: American Psychiatric Press.

Gamble SA, & Roberts JE (2005). Adolescents' perceptions of primary caregivers and cognitive style: The roles of attachment security and gender. Cognitive Therapy and Research, 29(2), 123–141.

Garber J, & Flynn C (2001). Predictors of depressive cognitions in young adolescents: Negative interpersonal context leads to personal vulnerability. Cognitive Therapy and Research, 25(4), 353–376.

Garber J, & Martin NC (2002). Negative cognitions in offspring of depressed parents: Mechanisms of risk In Goodman SH, & Gotlib IH (Eds.), Children of depressed parents: Mechanisms of risk and implications for treatment. (pp. 121–154). Washington, DC: American Psychological Association Books.

Garber J, & Robinson NS (1997). Cognitive vulnerability in children at risk for depression. Cognition and Emotion, 11, 619–635.

Goldner L, Scharf M, Edelstein M, & Havshush Y (2015). Parents' and children's cognitive style: The role of parents' practices. The Journal of Nervous and Mental Disease, 203(12), 958–965. [PubMed: 26649931]

Goodman SH, Brogan D, Lynch ME, & Fielding B (1993). Social and emotional competence in children of depressed mothers. Child Development, 64, 516–531. [PubMed: 8477632]

Goodman SH, & Gotlib IH (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. Psychological Review, 106(3), 458–490. [PubMed: 10467895]

Goodman SH, Tully E, Connell AM, Hartman CL, & Huh M (2011). Measuring children's perceptions of their mother's depression: The Children's Perceptions of Others' Depression Scale–Mother

Version. Journal of Family Psychology, 25(2), 163–173. 10.1037/a0023082 … [PubMed: 21480696]

Gravener JA, & Rogosch FA, Oshri A, Narayan AJ, Cicchetti D, & Toth SL (2012). The relations among maternal depressive disorder, maternal expressed emotion, and toddler behavior problems and attachment. Journal of Abnormal Child Psychology 40, 803–813. DOI 10.1007/s10802-011-9598-z [PubMed: 22146899]

Green SB, & Yang Y (2009). Reliability of summed item scores using structural equation modeling: An alternative to coefficient alpha. Psychometrika, 74, 155–167.

Gunnar MR, & Quevedo KM (2007). The neurobiology of stress and development. Annual Review of Psychology, 58, 145–173.

Hankin BL (2008). Stability of cognitive vulnerabilities to depression: A short-term prospective multi-wave study. Journal of Abnormal Psychology, 117(2), 324–333. [PubMed: 18489208]

Harter S (1982). The perceived competence scale for children. Child Development, 53, 87–97.

Harter S (1999). The construction of the self: A developmental perspective: New York: Guilford Press.

Heyman GD, Dweck CS, & Cain KM (1992). Young children's vulnerability to self-blame and helplessness: Relationship to beliefs about goodness. Child Development, 401–415. [PubMed: 1611943]

Ingram RE, Miranda J, & Segal ZV (1998). Cognitive theory and data on distal vulnerability In Ingram RE, Miranda J, & Segal ZV (Eds.), Cognitive vulnerability to depression. New York, NY: Guilford.

Johnson PO, & Neyman J (1936). Tests of certain linear hypotheses and their application to some educational problems. Statistical Research Memoirs, 1, 57–93.

Kamins ML, & Dweck CS (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. Developmental Psychology, 35(3), 835–847. [PubMed: 10380873]

Klein Velderman M, Bakermans-Kranenburg MJ, Juffer F, & Van IJzendoorn MH (2006). Effects of attachment-based interventions on maternal sensitivity and infant attachment: differential susceptibility of highly reactive infants. Journal of Family Psychology, 20: 266–274. 10.1037/0893-3200.20.2.266. [PubMed: 16756402]

Kopala-Sibley DC, & Zuroff D (2014). The developmental origins of personality factors from the self-definitional and relatedness domains: a review of theory and research. Review of General Psychology, 18, 137–155. 10.1037/gpr0000013.

Lecce S, Caputi M, & Hughes C(2011). Does sensitivity to criticism mediate the relationship between theory of mind and academic achievement? Journal of Experimental Child Psychology. 110, 313–331.doi:10.1016/j.jecp.2011.04.011 [PubMed: 21624614]

Lee A, & Hankin BL (2009). Non-secure attachment, dysfunctional attitudes, and low self-esteem predicting prospective symptoms of depression and anxiety during adolescence. Journal of Clinical Child and Adolescent Psychology, 38(2), 219–231. [PubMed: 19283600]

Lovejoy MC, Graczyk PA, O'Hare E, & Neuman G (2000). Maternal depression and parenting behavior: A meta-analytic review. Clinical Psychology Review, 20(5), 561–592. [PubMed: 10860167]

Luyten P, & Blatt SJ (2013). Interpersonal relatedness and self-definition in normal and disrupted personality development: retrospect and prospect. American Psychologist, 68(3),172–183. 10.1037/a0032243 [PubMed: 23586492]

Mezulis AH, Hyde JS, & Abramson LY (2006). The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. Developmental Psychology, 42(6), 1012–1025. [PubMed: 17087538]

Mizokawa A (2013). Relationships between maternal emotional expressiveness and children's sensitivity to teacher criticism. Frontiers in Psychology, 4, 1–7. Retrieved from http://login.proxy.library.vanderbilt.edu/login?url=https://search-proquest-com.proxy.library.vanderbilt.edu/docview/1509632729?accountid=14816 [PubMed: 23382719]

Moran G, Neufeld-Bailey H, & DeOliviera CA (2008). The roots of depression in early attachment experiences In Dobson KS, & Dozois DJA (Eds.), Risk factors in depression (pp. 289–316). Amsterdam, Holland: Elsevier.

Morley TE, & Moran G (2011). The origins of cognitive vulnerability in early childhood: Mechanisms linking early attachment to later depression. Clinical Psychology Review, 31(7), 1071–1082. [PubMed: 21820386]

Mueller CM, & Dweck CS (1998).Praise for intelligence can undermine children's motivation and performance. Journal of Personality and.Social Psychology, 75, 33–52. doi: 10.1037/0022-3514.75.1.33 [PubMed: 9686450]

Murray L, Woolgar M, Cooper P, & Hipwell A (2001). Cognitive vulnerability to depression in 5-year-old children of depressed mothers. Journal of Child Psychology and Psychiatry, 42(7), 891–899. [PubMed: 11693584]

Natsuaki MN, Shaw DS, Neiderhiser JM, Ganiban JM, Harold GT, Reiss D, & Leve LD (2014). Raised by depressed parents: is it an environmental risk?. Clinical Child and Family Psychology Review, 17(4), 357–367. [PubMed: 24817170]

Nietzel MT, & Harris MJ (1990). Relationship of dependency and achievement/autonomy to depression. Clinical Psychology Review, 10, 279–297. 10.1016/0272-7358(90)90063-G.

Nowicki S, & Duke MP (1994). Individual differences in the nonverbal communication of affect: The Diagnostic Analysis of Nonverbal Accuracy Scale. Journal of Nonverbal behavior, 18(1), 9–35.

Pesonen A-K, Ra¨ikko¨nen K, Heinonen K, Ja¨rvenpa¨a¨ A-L, Strandberg TE (2006). Depressive vulnerability in parents and their 5-year-old child's temperament: A family system perspective. Journal of Family Psychology, 20 (4), 648–655. [PubMed: 17176200]

Preacher KJ, Curran PJ, & Bauer DJ (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. Journal of Educational and Behavioral Statistics, 31(4), 437–448.

Rothbart MK, Ahadi SA, Hershey KL, & Fisher P (2001). Investigations of Temperament at Three to Seven Years: The Children's Behavior Questionnaire. Child Development, 72(5), 1394–1408. doi: 10.1111/1467-8624.00355 [PubMed: 11699677]

Sanders MR, Kirby JN, Tellegen CL, & Day JJ (2014). The Triple P-Positive Parenting Program: A systematic review and meta-analysis of a multi-level system of parenting support. Clinical Psychology Review, 34, 337–357. doi:10.1016/j.cpr.2014.04.003 [PubMed: 24842549]

Seligman MEP, Peterson C, Kaslow NJ, Tanenbaum RL, Alloy LB, & Abramson LY (1984). Attributional style and depressive symptoms among children. Journal of Abnormal Psychology, 93, 235–238. [PubMed: 6725758]

Slagt M, Dubas JS, van Aken MAG, Ellis BJ, & Deković M (2017). Children's differential susceptibility to parenting: An experimental test of "for better and for worse". Journal of Experimental Child Psychology, 154, 78–97. doi:10.1016/j.jecp.2016.10.004 [PubMed: 27837656]

Slagt MI, Dubas JS, Dekovic M, & van Aken MAG (2016). Differences in sensitivity to parenting depending on child temperament: A meta-analysis. Psychological Bulletin, 142, 1068–1110. [PubMed: 27513919]

Smiley PA, & Dweck CS (1994). Individual differences in achievement goals among young children. Child Development, 65, 1723–1743. doi:10.1111/j.1467-8624.1994.tb00845.x [PubMed: 7859551]

Sroufe LA (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. Attachment & Human Development, 7(4), 349–367. [PubMed: 16332580]

van IJzendoorn MH, & Bakermans-Kranenburg MJ (2015). Genetic differential susceptibility on trial: Meta-analytic support from randomized controlled experiments. Development and Psychopathology, 27, 151–162. 10.1017/S0954579414001369 [PubMed: 25640837]

Winkielman P, & Schwarz N (2001). How pleasant was your childhood? Beliefs about memory shape inferences from experienced difficulty of recall. Psychological Science, 12(2), 176–179. [PubMed: 11340929]

Zentall SR, & Morris BJ (2010). "Good job, you're so smart": The effects of inconsistency of praise type on young children's motivation. Journal of Experimental Child Psychology, 107, 155–163. [PubMed: 20570281]

Ziegert DI, Kistner JA, Castro R, & Robertson B (2001). Longitudinal study of young children's responses to challenging achievement situations. Child Development, 72(2), 609–624. [PubMed: 11333088]

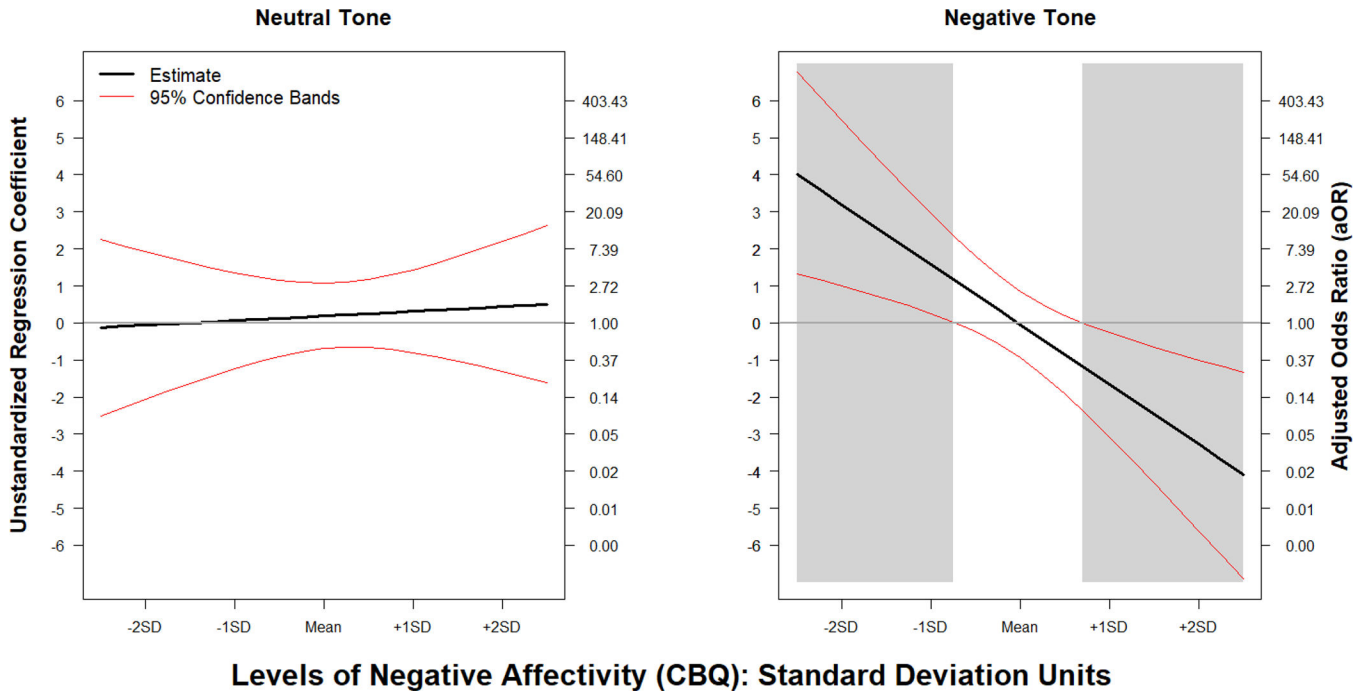

Fig. 1.

Three-way interaction of Content by Tone by Negative Affectivity temperament (NA) predicting children's Internal Attributions. The magnitude of the effect of negative content on internal attributions (y-axis) is plotted against levels of children's negative affectivity (x-axis) in both the neutral (left panel) and negative (right panel) tone conditions. The effect of content on internal attributions was not significant when tone was neutral regardless of level of children's NA. In the negative tone condition, the effect of content was significant and positive at low levels of child NA, and significant and negative at high levels of NA. The y-axis on the left-hand side of each panel shows the unstandardized regression coefficient associated with the regression of internal attributions on content, whereas the right-side y-axis shows the same effect in adjusted odds ratio units. Shaded regions show where the effect of content on internal attributions was significant (i.e., confidence bands did not contain 0).

Table 1

Dependent Variables and Potential Moderators

Variable	Scale/Questions	Response Options	Higher scores indicate:
Dependent Variables			
Affect	How much did you feel… [sad, mad, scared, happy (reverse coded)] when mommy said that?	0=not at all, 1=a little, 2=some, 3=very much	more negative affect (range 0 – 12)
Self-Evaluation	How well did you… (draw the picture)?	*Good: 1*=really, 2=sort of, *Not Good:* 3=sort of, 4=really	more negative evaluation (range 3 – 12)
Internal Attributions	Did you not (draw) ____ because…?	0=External; 1=Internal	more internal attributions (range 0 – 3)
Potential Moderators			
Risk	Maternal history of depression in child's life	0=No, 1=Yes	high risk
Negative Affectivity (NA)	CBQ NA Child Temperament Score (12 items)	7-point scale: "extremely *untrue*" to "extremely *true"* of your child;"	more NA (mean range 1 – 12)

Note. CBQ = Child Behavior Questionnaire; NA = negative affectivity

Table 2

Means and standard deviations of study variables by condition

	Neutral Content			Negative Content			Total		
Tone	**Neutral (*n* = 42)**	**Negative (*n* = 34)**	**Total (*n* = 76)**	**Neutral (*n* = 40)**	**Negative (*n* = 36)**	**Total (*n* = 76)**	**Neutral (*n* = 82)**	**Negative (*n* = 70)**	**Total (*n* = 152)**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
Children's Age (months)	62.00 (7.11)	61.51 (7.21)	61.78 (7.11)	61.55 (6.54)	61.47 (6.72)	61.51 (6.58)	61.78 (6.80)	61.49 (6.91)	61.65 (6.83)
DANVA	6.39 (2.43)	6.26 (2.19)	6.33 (2.31)	6.88 (1.95)	6.56 (2.16)	6.73 (2.04)	6.63 (2.21)	6.41 (2.16)	6.53 (2.18)
Children's Responses to Stories									
Affect	10.67 (10.03)	12.92 (8.68)	11.68 (9.46)	17.70 (2.73)	20.91 (9.70)	19.22 (9.95)	14.10 (10.59)	17.03 (10.00)	15.45 (10.39)
Self-evaluation	5.60 (2.39)	3.83 (1.89)	5.26 (2.20)	7.15 (2.73)	6.72 (2.86)	6.95 (2.79)	6.35 (2.66)	5.81 (2.60)	6.11 (2.64)
Internal Attributions	3.98 (0.98)	4.03 (0.90)	4.00 (0.94)	4.00 (0.99)	4.06 (0.97)	4.03 (0.97)	3.99 (0.97)	4.04 (0.93)	4.01 (0.95)
	Neutral Content			**Negative Content**			**Total**		
Tone	**Neutral**	**Negative**	**Total**	**Neutral**	**Negative**	**Total**	**Neutral**	**Negative**	**Total**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**
Moderators									
Mothers' Depression History (Risk)	0.27 (0.45)	0.35 (0.49)	0.31 (0.46)	0.33 (0.48)	0.32 (0.75)	0.33 (0.47)	0.30 (0.46)	0.34 (0.48)	0.32 (0.47)
Child NA (CBQ)	4.03 (0.87)	3.83 (0.89)	3.94 (0.88)	4.09 (0.90)	4.00 (0.75)	4.04 (0.83)	4.06 (0.88)	3.91 (0.82)	3.99 (0.85)

Note. CBQ = Child Behavior Questionnaire; NA = negative affectivity; DANVA = Diagnostic Analysis of Nonverbal Accuracy; SD = standard deviation; Mothers' Depression History (Risk): 0 = no depression in child's life, 1= depression in child's life

Table 3

Correlations among study variables

Measure	Child Sex	Child Age	Child NA	Mom Dep Hx	Affect	Self-evaluation	Internal Attrib	DANVA
1. Child Sex	--							
2. Child Age	0.01	--						
3. Child Negative Affectivity	−0.17*	0.06	--					
4. Mom Depression History	0.05	−0.08	0.10	--				
5. Child Affective Reaction	−0.15~	−0.17*	0.10	−0.02	--			
6. Child Self-Evaluation	0.09	−0.07	0.07	0.03	0.45***	--		
7. Child Internal Attributions	−0.06	−0.24**	0.08	−0.09	0.23**	0.14~	--	
8. DANVA Sum	−0.10	0.45***	−0.04	−0.11	−0.05	0.15~	0.003	--

Note. Child sex: girls = 0, boys =1; Maternal Depression History: 0 = no depression in child's life, 1= depression in child's life;

Mom Dep Hx = Mothers' Depression History; NA = negative affectivity temperament; Attrib = attribution; DANVA = Diagnostic Analysis of Nonverbal Accuracy

Significance (2- tailed):

~ $p < .10$;

* $p < .05$

** $p < .01$

*** $p < .001$