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RESPONSES TO NEGATIVE AFFECT**

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WHEN CRYING TURNS TO HITTING: EXAMINING MATERNAL RESPONSES TO
NEGATIVE AFFECT

A dissertation submitted in partial fulfillment
of the requirements for the degree of

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by

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ABSTRACT

WHEN CRYING TURNS TO HITTING: EXAMINING MATERNAL RESPONSES TO NEGATIVE AFFECT

Brooke Edelman

Most children exhibit some form of physical aggression in the first years of life, and physical aggression is particularly common in toddlerhood (Hay, 2005; Lorber et al., 2017; Lorber et al., 2019; Nærde et al., 2014; Tremblay & Nagin, 2005). Further, aggression is conceptualized as a byproduct of frustration and related negative affect (Berkowitz, 1989), and early physical aggression is empirically linked to anger (Lorber et al., 2015). The current study is part of a body of research examining early aggression and will explore the mechanisms by which children's negative affect escalates to aggression in a brief conflict episode. Given parents' role as "external regulators" (Thompson, 1994), we hypothesized that one pathway to aggression might be parent-child interactions around children's negative affect. Alternatively, children might escalate from negative affect to aggression independently from parent responses. That is, we proposed aggression may result from *within-child* stability of negative affect, as high levels of negative affect have disruptive effects on behavior. During a laboratory visit, a community sample of 69 mothers-toddler dyads participated in a structured interaction task designed to elicit conflict. Child negative affect, child aggression, and parent responses to negative affect (negative emotional expression, harshness, soothing, and distraction) were coded in five second intervals. 1-1-1 logistic multilevel mediation

models were created to examine relations between constructs. Our findings are consistent with frustration-aggression and child escalation models and suggest that the relation between negative affect and aggression forms in “real time” (Berkowitz, 1989; Dollard et al., 1939; Snyder et al., 1994). Further, both within-child stability of negative affect and maternal harshness in response to negative affect predicted subsequent aggressive behavior. Negative emotional expression, soothing, and distraction neither facilitated nor hindered children’s escalation from negative affect to aggression. Given the sequelae of early aggression, it is critical to understand and address the proximal antecedents of aggressive behavior. Our findings support a dyadic intervention in which patterns of parent-child interactions are the appropriate target for prevention and intervention.

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INTRODUCTION

Development of Early Aggression

Physical aggression is particularly common in the second and third year of life (Hay, 2005; Tremblay & Nagin, 2005, Naerde et al., 2014). In his seminal work, Tremblay et al. (1999) found that approximately 80% of children engaged in at least one aggressive act by 17 months. Tremblay's work has since been replicated, and physical aggression among 12- to 24- month-old children is well documented (Alink et al., 2006; Baillargeon et al., 2007; Coté et al., 2006; Del Vecchio & O'Leary, 2006; Lorber et al., 2017; Van Zeijl et al., 2006).

Normative developmental changes facilitate the development of aggression in the first years of life. During this period, children come to have their own goals (e.g., wanting a desirable but forbidden toy). Advancements in mobility allow children to engage in goal-directed behavior, which may ultimately be blocked by the caregiver (e.g., caregiver restraining the child from the toy). Children's increased understanding of goals and the source of their frustrations support the growth of anger, which develops as early as 2 months of age and increases significantly during the first years of life (Tremblay & Nagin, 2005). Advances in muscle strength and coordination allow children use aggression to act on socially directed anger (Adolph & Robinson, 2015; Campos et al., 2000; Tomasello et al., 2005). Moreover, increasing muscle strength makes physical aggression more possible and provides opportunities for it to become increasingly targeted (e.g., Adolph & Robinson, 2015).

These cognitive, emotional, and physical changes set the stage for dyadic conflict, which significantly increases during toddlerhood (Fagot & Leve, 1998; Lorber &

Egeland, 2011). As toddlers assert their autonomy, parents also begin to hold children responsible for their actions and increase demands for appropriate behavior (Hoffman, 1975; Shaw et al., 2000). Developmental milestones such as locomotion and goal-oriented behavior also require parents to expend more effort in controlling their children (Shaw & Bell, 1993; Shaw et al., 2000). As the focus of parenting shifts from positive support to direction and control, challenges between the parent and child become more frequent and children are provided with more opportunities to effectively aggress in conflictual encounters (Hay, 2005). Thus, early aggression is best understood within a developmental framework wherein pathways to aggression rely on the continuous, dynamic interplay between a child and her environment (e.g., Greenberg et al., 1993; Sameroff, 1995).

Negative Affect and Aggression

Physical aggression is conceptualized theoretically as a partly instinctive way of expressing negative feelings and reacting to aversive events (Tremblay & Nagin, 2005). Revised formulations of the frustration-aggression theories of aggression (e.g., Berkowitz, 1989, 1990) propose that frustration, irritability, and annoyance give rise to aggressive behaviors because they are aversive. Aversive events produce negative affect which trigger flight or fight tendencies like aggression (Baron, 1984; Berkowitz & Heimer, 1989; Finman & Berkowitz, 1989). That is, emotions bias or modulate action (Breur & Elson, 2017; Frijda et al., 1989; Saami et al., 1998).

One developmental pathway to aggression may be within-child stability of negative affect. Negative affect and aggression may emerge from the same externalizing construct (Lorber et al., 2014; Perra et al., 2021; Shaw & Bell, 1993), and patterns among

externalizing behaviors such as distress to limitations and aggression form in “real time” (Lorber et al., 2014; Granic & Patterson, 2006). High levels of negative affect have disruptive effects on ongoing behaviors, increasing the likelihood of aggression as negative affect is reinforced by attention and modulation of arousal (Roberts & Strayer, 1987). Del Vecchio & O’Leary (2006), for example, found that toddlers’ aversive misbehavior (including negative affect) temporally preceded aggression toward a caregiver in a brief interaction. Similarly, preschoolers who express more anger in a baseline task are more likely to initiate aggressive conflict with peers (Arsenio et al., 2000). Aggression can thus be conceptualized as a byproduct of increasing levels of negative affect (Lorber et al., 2015).

In this way, toddlers may escalate from negative affect to aggression independently from any caregiver responses—that is, negative affect and aggression might coalesce in a “self-organizing process” (Lewis, 2000). Alternatively, parents may respond to negative affect in specific ways that either exacerbate or minimize the child’s prevailing negative emotions, facilitating or hindering the child’s escalation from negative affect to aggression.

Parents’ Responses to Negative Affect

The caregiving system is activated by emotion (Solomon & George, 1996) and the emotional quality of parent-child interaction influences children’s expression, experience, and regulation of emotions (Dix, 1991; Valiente et al., 2004). Negative affect triggers certain caregiving behaviors that serve to moderate the emotional experiences of their children. The way that parents help children manage their emotions contributes to the children’s emotional expression and regulation, which in turn influences their

behavior (Denham et al., 2000; Eisenberg et al., 2001; Valiente et al., 2004). Thus, parents serve as external regulators for their children, and this process is especially salient during the toddler years and within conflict episodes (Kopp, 1989; Lamb & Malkin, 1986; Spinrad et al., 2007; Thompson, 1994; Davidov & Grusec, 2006).

Individual differences in how parents respond to children's negative emotions predict important aspects of psychosocial development (Gottman et al., 1996). For example, attachment theory suggests that sensitive and contingent responses provide a context for regulating negative emotional expression and maintaining positive affect (Capatides & Bloom, 1993; Cohn & Tronic, 1983; Malatesta et al., 1989). Gottman et al.'s (1996) theoretical concept of emotion coaching, in which parents support and validate emotions, is related to positive outcomes in children including self-regulation skills (Gottman et al., 1996; Katz & Windecker-Nelson, 2004). Alternatively, overreactive responses to negative affect reinforce the idea that negative emotions should not be expressed, threatening children's ability to regulate and contributing to maladaptive coping behaviors (Eisenberg et al., 1996; Gottman et al., 1996; Jones et al., 2002).

Empirical work demonstrates relations between parents' responses to negative affect and aggressive behavior, though these studies have been done with older children. For example, Carson and Parke (1996) found that fathers who respond to their preschoolers' negative affect with negative affect of their own have children who were rated as more aggressive by their teachers. Similarly, mothers who reciprocate children's negative affect with their own negative emotional displays have children rated as more aggressive with peers (Lindsey et al, 2002). Finally, parents' punitive responses to third-

through six- grade children's negative emotions predict increased emotional dysregulation and poorer social functioning, including instances of verbal and physical aggression (Eisenberg et al., 1996; McDowell & Parke, 2000).

Less understood is how parents' reactions to negative affect influence toddler behavior *within a conflict episode*. Specific caregiver reactions to negative emotional displays may amplify the child's negative affect, and high levels of negative affect may ultimately get expressed in aggressive behavior *in real time* (Baumeister et al., 2007). For example, a mother might respond to her child's negative affective cue by yelling, likely heightening the child's negative affect, and the child may escalate to a more aversive behavior like aggression. We propose that some responses to negative emotion are more likely sustain and exacerbate children's negative affect, and in doing so set the stage for increases in aversive behavior in the child.

Negative Emotional Expression

The first of such reactions is parents' own expression of negative affect, including facial expressions such as frowning or pouting as well as angry vocalizations like yelling. Caregivers' own emotions may affect their child's emotion expression via emotion contagion. Caregivers' emotions create an affective environment to which the child is continuously exposed, and this environment impacts children's emotional expression and arousal by induction. That is, the emotional state of the parent directly influences the emotion of the child through a resonance or contagion mechanism (Campos et al., 1989; Haviland & Lelwica, 1987; Termine & Izard, 1988). For example, if caregivers express anger, children may internalize this state and then express negative emotional displays (Termine & Izard, 1988).

Parents' emotions also affect children's emotional expression through simple imitation or modeling. Young infants model caregivers' emotions and exhibit similar expressions to their mothers in research settings (Field et al., 1988; Malatesta & Haviland, 1982). For example, infants as young as 10 weeks old react to maternal vocal and facial expressions of anger with their own displays of anger and sadness, and this finding has been replicated in older infant and toddler samples (e.g., Haviland & Lelwica, 1987; Izard et al., 1995).

Thus, there are different mechanisms by which mothers' negative emotion may incite children's own negative emotional displays. This contingent responsivity (when one partner simplifies and/or imitates the other's behavior) positively reinforces the emotional display for the child (Field, 1994). Behavioral theory would predict that the child would continue to express and experience negative affect. The interaction would likely escalate, and the toddler may ultimately aggress, given that higher levels of negative emotion precede aggression.

Harshness

Related to mothers' negative emotional expression is harshness. Harshness comprises behavior directed at the child that is excessively angry and physically rough, including harsh verbal and physical discipline. Negative emotional expression and harshness may overlap. For example, if a mother screams, "you are a bad boy," she displays both negative emotional expression and harshness. If the mother says, "you are a bad boy," but does so in a neutral tone, she displays only harshness.

Harsh responses following children's negative affect may also facilitate children's escalation from negative affect to aggression. According to Patterson's Coercion model,

reciprocal, escalating interchanges reinforce emotions and behaviors in both parent and child (Patterson, Reid, & Dishion, 1992). Central to the coercion theory is the role of reinforcement. Within a conflict episode, harsh responses reinforce and amplify negative affect. Consider a situation where a child responds to a directive by screaming and the parent reacts by grabbing the child, in doing so providing attention to the scream. The child will continue to scream, the parent may continue to grab the child, and the interaction escalates. That is, harsh discipline exacerbates the child's arousal, resulting in a heightened negative emotional response from the child (Eisenberg et al., 1999; Gross & Levenson, 1993; Hoffman, 2000; Kiel et al., 2011). Eventually, the child's heightened negative emotional response and increased arousal may manifest into aggressive behavior.

Research suggests that parents who respond harshly to their children's negative emotions have children who express negative emotions in dysregulated ways such as aggression (Buck, 1984; Duncombe et al., 2012; Fabes et al., 2001; Gable & Isabella, 1992; Tompkins, 1962). Further, the effect of harsh discipline on negative emotional responses occurs in real time. For example, in a sample of 24- to 48- month-old children, maternal harsh discipline in a 5-sec interval predicted the increased likelihood of child negative affect in the following interval (Del Vecchio & Rhoades, 2010). Thus, mothers who seek to decrease children's emotional expression with harsh behaviors may inadvertently be provoking increased negative affect and the probability that aggression occurs.

Soothing

Some caregivers may positively reinforce negative affect with soothing behaviors. These responses are similar to lax or permissive responses to misbehavior, in that they “give in” in an attempt to cease an aversive stimulus. This type of parental response has been shown to contribute to the development of externalizing behaviors including aggression over time (e.g., Gardner, 1989; Patterson et al., 1992; Querido et al., 2002). We would expect parents to show more soothing behaviors in a conflict, given that (a) negative affect is an aversive stimulus for parents, and so they may soothe to stop their child from crying; and (b) permissive responses are related to negative emotion in parents, which is heightened during conflict (Leung & Slep, 2006; Lorber & O’Leary, 2005).

Within a conflict episode, positive responses to children’s negative affect may inadvertently reinforce the negative affect. For example, consider a child who is screaming because she wants a forbidden toy. Her mother rubs her back, and in doing so positively reinforces the child’s negative affect with attention. The child would likely continue to express negative affect. Prolonged negative affect increases the likelihood of an eventual behavioral response—thus, as the child’s negative affect is reinforced and persists, she will continue to be frustrated and may escalate to more aversive behaviors like aggression (Petrie et al., 1998; Roberts & Strayer, 1987).

We do not suggest that all soothing is problematic. Rather, we propose that being responsive and sensitive to the child may mean refraining from soothing within a conflict episode. A caregiver can be sensitive and warm without comforting in a conflictual moment. In fact, responsiveness to emotional distress and warmth are distinct constructs

(Roberts & Strayer, 1987). In some situations, comforting may be a parental response that neglects pragmatic solutions and promotes learned helplessness (Roberts & Strayer, 1987). In other situations, reassurance is associated with more behavioral distress, such as when a child is receiving a medical procedure (Blount et al., 1989).

Distraction

Other caregiver responses to negative emotional displays may reduce the likelihood of a subsequent aggressive response. One such response is distraction. When parents re-orient the child away from a distressing stimulus, they serve as “external regulators” by minimizing the child’s arousal. Shifting attention away from the source of frustration is associated with decreased anger in children (Calkins & Johnson, 1998; Grolnick et al., 1996; Gilliom et al., 2002).

While even infants engage in visual shifting on their own, young children benefit from caregivers’ distraction and redirection techniques (Kohlhoff & Morgan, 2014). Behavioral interventions for toddlers (e.g., Parent-Child Interaction Therapy for Toddlers) encourage caregivers to use distraction to manage disruptive child behaviors (Girard et al., 2018; Kohlhoff & Morgan, 2014). When caregivers distract, they help the child de-escalate via a reduction in emotional distress, anger, and frustration (e.g., Dennis & Kelemen, 2009; Morris et al., 2011; Silk et al., 2006). Empirical evidence suggests that parental distraction is positively correlated with child coping and negatively related to behavioral distress (Blount et al., 1989; Gonzalez et al., 1993). Specifically, mothers who use attention shifting behaviors have toddlers who more effectively modulate their emotional arousal (Calkins & Johnson, 1998). It is reasonable to expect that the

regulatory effects of distraction would occur in real-time, decreasing the likelihood of an exchange that may ultimately end in aggression.

The Proposed Study

Within-child stability of negative affect and parents' reactions following negative affect may predict subsequent aggressive behavior, and these processes should be particularly salient in conflictual situations. We do not suggest that maternal negative emotional expressions or soothing, for example, always promote aggressive behaviors. Rather, certain parental responses to negative affect may become problematic during conflict. In the present study, we examine associations between negative affect and aggression *as they unfold in real time*.

The proposed study has two main innovations. Theoretical models of parent-child interactions emphasize the nature of dynamic, within-person processes (Patterson, 1982). However, empirical examinations of moment-to-moment bidirectional associations have largely focused on mother-infant interactions (e.g., Beebe et al., 2007; Feldman et al., 2003; Cohn & Tronic, 1989). Toddlerhood is an important period when social and emotional problems of clinical significance emerge (Baillargeon et al., 2007). To our knowledge, only three studies have examined parent-toddler bidirectional associations as they unfold in real time. Del Vecchio and Rhoades (2010) found that maternal harsh discipline in a given 5-sec interval predicted increased likelihood of the child displaying negative affect in the following 5-sec interval, and Del Vecchio and O'Leary (2006) found that mothers of aggressive toddlers displayed more permissive and overreactive discipline when addressing misbehaviors than did mothers of nonaggressive toddlers. Similarly, Ravindran and colleagues (2019) found that within-mother increases in

nonsupport in a given 15-sec interval predicted within-child increases in aversive behavior in the following interval. However, none of these studies directly examined aggression as an outcome. Given that individual differences in early aggression are consequential and associated with a range of adverse outcomes (e.g., Campbell et al., 2006), it is important to understand the developmental precursors of early aggression. This work is novel in that it will examine patterns of interaction between parents and toddlers that culminate in aggression.

Second, many studies involving parent-child escalatory patterns consider the child's *aversive behavior* as a starting point for the conflictual pattern of interaction. I propose that child's negative affect within a conflict episode may also instigate a problematic exchange. Specifically, the ways that caregivers respond to their child's negative affect may increase or decrease likelihood of the child ultimately aggressing. Thus, this study examines the real-time behavioral implications of caregivers serving as "external regulators" (Thompson, 1994).

Study Hypotheses

The proposed study has two specific hypotheses:

- (1) Children escalate from negative affect to aggression independently —that is, within-child stability in negative affect will increase the likelihood of the child aggressing.
- (2) Maternal responses mediate the relation between children's negative affect and aggression. Specifically, mothers' own expression of negative affect, harsh responses and soothing behaviors following children's negative affect will

increase the odds of the child subsequently aggressing. Mothers' use of distraction will decrease the odds of the child aggressing.

METHODS

Participants

A community sample of 69 toddlers (37 girls; $M = 27$ months, $SD = 5.85$) and their mothers were recruited through letters sent to a mailing list of households in the Suffolk County area as part of a larger study on parent behaviors, cognitions, emotions, and language development. Mothers averaged 35 years of age ($SD = 5.41$) and reported an average income of \$83,00 per year (Range: \$10,500- \$220,000). Mothers were 83% Caucasian, 10% Hispanic, 6% African American, and 3% Asian/Pacific Islander. Mothers were eligible for inclusion if they had a child between 18 and 36 months of age. Data collection occurred between 2007 and 2009.

Procedure

During a laboratory visit, mothers-toddler dyads participated in a 25-minute video taped structured interaction, in addition to completing other questionnaires and tasks not of present focus. The interaction consisted of three tasks that presented the mother with typical but challenging situations for her and her child. These tasks were designed to elicit parent-child conflict. First, the mother was instructed to have her child clean up toys (by putting them into a plastic bin) as independently as possible within 5 minutes. The mother was then asked to instruct her child to build a specific block design for a maximum of 10 minutes. Finally, the mother was instructed to have her child play independently while she engaged in a 10-minute phone conversation with the experimenter. The experimenter cued the mother when it was time to proceed to the next activity though offered no additional instruction or advice. Variations of this structured

interaction task have been used successfully to obtain information about child misbehavior (e.g., Acker & O’Leary, 1996; Slep & O’Leary, 1998).

Measures

From digital recordings of the structured tasks, three independent pairs of trained and reliable coders assessed (a) child negative affect; (b) child aggression; and (c) parent responses to negative affect using coding schemes developed for this study. Coders were blind to other study data and hypotheses. Maternal and child behavior were coded and rated on a binary scale with 0 (*no evidence of behavior*) to 1 (*at least one instance of behavior*) during each 5-sec interval of the interaction.

Child Codes

Aggression. A coding scheme for aggression was created by two experts in early aggression. Aggression comprised kicking, hitting/smacking, throwing, biting, pushing/shoving, pinching, scratching, and swiping. The aggression coding scheme was designed to categorize instances of physically aggressive behavior by infants and toddlers, consistent with behaviors assessed via the Child Behavior Record (CBR; Lorber et al., 2019). The CBR incorporates seven physically aggressive behaviors from the Infant Externalizing Questionnaire, which has exhibited multiple indications of reliability and validity (Lorber et al., 2014). The CBR also adds items related to other physically aggressive acts identified by Hay and colleagues (Hay et al., 2011).

We adopt the topographic approach suggested by Tremblay (2000) in which aggression is defined by descriptive characteristics of behavior rather than the intended effect on the target. Thus, we classified overt behaviors from toddlers (e.g., hitting) as

aggressive even if we could not assess cognitive capacities such as intent to harm and/or means-end calculation about the impact of an aggressive act.

Negative Affect. Children's negative affect was rated as absent or present for each 5-sec interval. Child negative affect was coded when the child displayed (a) negative vocalizations such as crying or sobbing, whimpering, screaming, fussing, whining, shrieking or tantruming; and/or (b) facial expressions of negative affect, including frowning and pouting (Braungart-Rieker & Stifter, 1996; Stubbs et al., 2001).

Maternal Codes

Mothers' responses to children's negative affect were coded for the presence or absence of negative emotional expression, harshness, soothing, and/or distraction in the 30 seconds following each instance of negative affect.

For this study, I defined harshness as distinct from yelling or screaming. I conceptualize the latter as belonging to the category of mothers' negative emotional expression. Harsh parenting is more about the content of the verbalizations versus an angry delivery, though these may co-occur. Together, negative emotional expression and harshness parallel the overreactivity factor on the Parenting Scale (Arnold et al., 1993).

Negative Emotional Expression. Mothers' negative emotional expression refers to the mothers' expression of negative emotions and occurs when the mother expresses anger, irritation, or frustration. Mothers' negative emotional expression comprised (a) negative vocalizations, defined as irritation, anger, or frustration in the *tone* of voice, and angry expressions like yelling, screaming, shouting; and (b) expressions of negative affect, including frowning, biting lips, giving irritated looks, or tense posture.

Harshness. Mothers' harshness comprised harsh verbal and physical discipline directed at the child (Arnold et al., 1993). Harsh verbal discipline included negative verbal content in which the parent criticized, blamed, expressed disapproval, or otherwise spoke critically to the child. Harsh physical discipline included negative physical responses in which the mother used force against the child's body, including spanking, dragging, hitting, restraining, and other forceful behaviors (Dishion et al., 1987; Webster-Stratton et al., 1989).

Soothing. Mothers' soothing comprised positive verbal and nonverbal responses. Positive verbal responses included verbally reassuring the child and/or using a wimpy tone (Del Vecchio, 2015; Webster-Stratton et al., 1989). Positive nonverbal responses included showing physical affection—for example, by hugging, rubbing the child's stomach, "petting" the child's head, and/or smiling at the child (Webster-Stratton et al., 1989).

Distraction. Mother's distraction included efforts that served to divert attention from a negative, distressing, uncomfortable stimulus. Distraction was coded when parents directed the child's attention to something other than the source of frustration such as the prohibited toy (Kleiber et al., 2007; Putnam et al., 2002; Holodynski & Friedlmeier, 2006). Distraction included the mother's use of toys or other objects, non-procedural talk (discussing something unrelated to the present task), and/or describing her own behavior (e.g., Girard et al., 2018).

Microanalytic research shows that aversive, problematic exchanges between parent and child generally last between 15 seconds and 1 minute (e.g., Dishion et al., 1994; Timmer et al., 2002; Wahler et al., 1981). Thus, for each instance of negative

affect, we coded (a) mothers' responses within the next 30-seconds (e.g., did she show harshness or not); and (b) if the child aggressed in the following 30-seconds.

Analytic Strategy

First, preliminary analyses were conducted to test statistical assumptions including (a) descriptive statistics; and (b) data screening for outliers and missing data.

Next, interrater reliability was calculated for each coding category. Interrater reliability was calculated on 100% of the videos. Due to the low base rate behavior of aggression, Holley and Guilford's *G* was used as the measure of interrater reliability as it is less impacted by low base rates (Gwet, 2008; Xu & Lorber, 2014). *G* has zero sensitivity to skewed marginals, resulting in a value of .80 with 90% agreement (Heyman et al., 2014). The interrater reliability for all other codes were assessed using Kappa (Cohen, 1960), a widely used interrater agreement statistic for nominal data. *G* and Cohen's kappa are interpreted similarly (Xu & Lorber, 2014). Values above .75 are considered excellent (Cicchetti, 1994).

We then examined the relations between negative affect, maternal responses to negative affect, and aggression with logistic multilevel models. Multilevel analyses are the preferred way to handle the nesting of behaviors inherent in studies of social behavior, where behaviors are often nested within episodes that are further nested within dyads (Heyman et al., 2014). This type of analysis (Figure 1) allows for the examination of effects at the group dyadic level while accounting for the non-independence of observations within each dyad (Khan & Shaw, 2011).

We proposed that maternal responses to children's negative affect would increase or decrease the likelihood of subsequent aggression. Thus, we hypothesized that maternal

responses at Time $t + 1$ would mediate the relation between child negative affect at Time t and child aggression at Time $t + 2$. We also theorized that it was possible children escalate on their own; that is, within-child stability in negative affect would increase the likelihood of aggressing—with child negative affect at time $t + 1$ mediating the relation between child negative affect at Time t and child aggression at Time $t + 2$ (Figures 2-6).

Traditional methods for assessing mediation (e.g., Baron & Kenny, 1986; MacKinnon et al., 2002) are inappropriate for multilevel or clustered data because the assumption of independence of observations is violated (Preacher et al., 2011). Thus, we proposed 1-1-1 multilevel mediation models wherein the antecedent, the mediators, and the outcome were measured at a lower level of analysis, but the Level-1 units (each sequence beginning with child negative affect) were nested in Level-2 units (each dyad). Unlike multi-level structural equation models, multilevel mediation can accommodate unequal spacing between the data (Kowk et al., 2008). We expected some dyads to have several sequences within short windows of time while other dyads would have sequences more evenly spaced across the 25-minute task. Multilevel mediation models are also more suitable for smaller samples, with only 50 Level-2 units necessary to accurately estimate standard errors (Maas & Hox, 2005; Paccagnella, 2011). Considering the dichotomous nature of the dependent variable (child aggresses or not), we used a logistic model to estimate the odds that aggression occurred at the end of the sequence. Multilevel logistic regression models estimate the odds that an event will occur while taking the dependency of the data into account.

All analyses were conducted with SAS Studio (SAS OnDemand for Academics, 2021) using the SAS PROC GLIMMIX procedure, which handles multilevel regression

for binary variables. Estimates for fixed and random direct and indirect effects were evaluated for statistical significance. Regression coefficients were converted to odd ratios to determine the change in odds per unit increase of the predictors. Fit indices (e.g., Bayesian information criterion) were used to compare models.

RESULTS

Data Preparation

Generally, data are in multivariate (“wide”) format. To analyze the data using multilevel mediation, we first transformed the data into the univariate (“long”) format, in which each row represented a specific time interval, and each column represented a variable. The data was structured to reflect the timed nature of our hypotheses. That is, for each variable of negative affect at time t , the following were calculated: 1) was there at least one instance of negative affect in the following 30-seconds (0= no, 1= yes); 2) was there at least one instance of negative emotional expression in the following 30-seconds (0 = no, 1= yes); 3) was there at least one instance of harshness in the following 30-seconds (0 = no, 1= yes); 4) was there at least one instance of soothing in the following 30-seconds (0 = no, 1= yes); 5) was there at least one instance of distraction in the following 30-seconds (0 = no, 1= yes); and 6) was there at least 1 instance of aggression in the 30-60 seconds after time t (0 = no, 1= yes).

Descriptive Statistics and Preliminary Analyses

Descriptive statistics are presented in Table 1. The data set consisted of 69 upper-level units of dyads, with between 0-149 lower-level units each, totaling 20,657 lower-level units. Maternal responses to negative affect frequently co-occurred, with 49% of maternal responses consisting of at least two codes (e.g., harshness and soothing). Further, negative affect and aggression were highly correlated, with 79% instances of aggression occurring following an expression of negative affect in the minute prior. There was no missing data in the sample.

Coders blind to study hypotheses independently coded 100% of videos. Interrater reliabilities were averaged across all videos. The kappa coefficients of interrater agreement for negative affect, negative emotional expression, harshness, soothing, and distraction ($\kappa = .82$, $\kappa = .88$, $\kappa = .82$, $\kappa = .91$, $\kappa = .78$) fell into the excellent category of inter-rater reliability (Cicchetti, 1994). The *G*-index coefficient of the interrater agreement for aggression ($G = .96$) fell in the excellent range of inter-rater reliability, demonstrating near perfect agreement (Xu & Lorber, 2014).

Primary Analyses

The data were structured hierarchically into two levels, with each sequence of negative affect nested within dyads. We specified multilevel equation models to adjust parameter estimates for sampling error, item uniqueness, and standard errors from clustering (Marsh et al., 2009; Rabe-Hesketh & Skrondal, 2022). Multilevel models were structured with a 1-1-1 model, with all variables entered at level 1 as random effects. SAS GLIMMIX was used to fit the logistic multilevel model. GLIMMIX obtains maximum likelihood estimates of model parameters using Laplace approximations, which approximate the likelihood function directly and is a preferred method for categorical response variables. Maximum likelihood estimation is appropriate for dyadic data analysis (Spain et al., 2011).

Figures 2-6 present the regression parameters of the multilevel models. Significant indirect effects (β) were converted to odds ratio for ease of interpretability. For each model, we examined the total effect, *a* path (relation between child negative affect at time *t* and the mediator at time *t* + 1), *b* path (relation between mediator at time *t* + 1 and aggression at time *t* + 2, controlling for child negative affect at time *t*), direct

effect (relation between child negative affect at time t and aggression at time $t + 2$, controlling for the mediator), and indirect effect (the portion of the relation between child negative affect at time t and aggression at time $t + 2$ explained by the mediator). Overall goodness of fit for each model (Table 3) was assessed using a chi-squared statistic appropriate for logistic multilevel mediation models (χ^2 / df ; Schumacker & Lomax, 2010). Values close to 1 indicate a good model fit (Ding et al., 1995)

Within-Child Stability

In the multilevel mediation analysis for the within-child stability model, child negative affect at time $t + 1$ significantly mediated the association between negative affect at time t and aggression at time $t + 2$ (indirect effect $\beta = 1.98$, OR = 7.24, $p < .05$). A chi-square goodness-of-fit test demonstrated good fit ($\chi^2 = 0.84$).

Maternal Negative Emotional Expression

Maternal negative emotional expression at time $t + 1$ did not mediate the relation between negative affect at time t and aggression at time $t + 2$ (indirect effect $\beta = -1.18$, $p > .05$). A chi-square goodness-of-fit test demonstrated good fit ($\chi^2 = 0.69$).

Maternal Harshness

The results showed that maternal harshness significantly mediated the relation between child negative at time t and aggression at $t + 2$ (indirect effect $\beta = 2.15$, OR = 8.58, $p < .05$). A chi-square goodness-of-fit test demonstrated good fit ($\chi^2 = 0.79$).

Maternal Soothing

Maternal soothing at time $t + 1$ did not mediate the association between negative affect at time t and aggression at time $t + 2$ (indirect effect $\beta = -1.22$, $p > .05$). A chi-square goodness-of-fit test demonstrated good fit ($\chi^2 = 0.65$).

Maternal Distraction

Maternal distraction at time $t + 1$ did not mediate the association between negative affect at time t and aggression at time $t + 2$ (indirect effect $\beta = -.77$, $p > .05$). A chi-square goodness-of-fit test demonstrated good fit ($\chi^2 = 0.77$).

Comparison of Models

An information criteria index (Bayesian information criteria; BIC; Raftery, 1995; Schwarz, 1978) was used to compare the two models with significant mediating effects (within-child stability model and maternal harshness model). BIC is robust to extra parameters and is thus appropriate for multilevel models (McCoach & Black, 2008). Further, the BIC index applies various corrections for model complexity to a log likelihood model fit (Cherkassky & Ma, 2003). Smaller BIC values indicate a better model, and a BIC difference greater than 10 suggests very strong evidence for one model over another (Raftery, 1995). The difference between the BIC values for the within-child stability model (BIC = 24756.64) and maternal harshness model (BIC = 20069.54) exceeded 10. Thus, the maternal harshness model exhibited a better comparative model fit.

DISCUSSION

The goal of the present study was to examine the mechanisms by which children escalate from negative affect to aggression. Our results suggest that both within-child stability in negative affect (model 1) and maternal harshness in response to negative affect (model 3) facilitate an escalation from negative affect to aggression in one minute conflict episodes.

As expected, negative affect was associated with an increased likelihood of aggression one minute later, and most instances of aggression occurred following an instance of negative affect. Our findings are consistent with the frustration-aggression hypothesis and suggest that physical aggression is a behavioral response to aversive emotions. Most of the frustration-aggression literature considers older populations; there is some literature to suggest that elevated levels of frustration predict subsequent aggressive behaviors in latency aged children (e.g., Hanratty et al., 1972; Shackman & Pollak, 2014; Strayer & Roberts, 2004; Zeman et al., 2002). Our results provide evidence that negative affect primes aggressive behaviors even in toddlerhood. Further, our study adds to the existing literature on child escalation by providing evidence that the relation between negative affect and aggression forms in real time (Snyder et al., 1994), with toddlers escalating from negative affect to aggression within one minute.

We sought to understand the mechanisms that may underlie the relation between negative affect and subsequent aggression. As expected, within-child stability of negative affect predicted aggressive behavior. That is, continuation of negative affect from the first to the second interval was associated with an increased likelihood of aggression. Our results thus suggest that there may be something particularly problematic about the

continuation of negative affect. There is some research to suggest that prolonged negative affect uniquely predicts aggression—for example, Shackman and Pollak (2014) found that children who exhibited greater negative affect during a provocation task and maintained the negative affect in the following recovery period were more likely to subsequently engage in a peer directed aggression.

Though we did not assess the intensity of negative affect, it is possible that children who express negative affect for consecutive intervals experience the affect more intensely. Intense affect is inherently more difficult to regulate, and children with high levels of negative emotions are more likely to be aggressive (Klaczynski & Cummings, 1989). Within the frustration-aggression hypothesis framework, the strength of a behavioral reaction is related to the strength of the motive—that is, a more frustrated child will engage in more significant behaviors to achieve her goals (Izard, 1977).

We also hypothesized that the link between negative affect and aggression may be explained by parenting responses, which could either facilitate an escalation to aggression by exacerbating the child's negative emotions or minimize the likelihood of aggression by dampening the child's negative affect. Our hypotheses were somewhat supported. Harsh responses to negative affect, including physical discipline and negative verbal content, mediated the relation between negative affect and aggression. Interestingly, however, mothers' negative emotional expression did not. Our study is unique in that we separated harsh parenting behaviors from negative emotional expressions, with the latter representing the caregiver's expressed emotional state (observed by facial expressions, tone of voice, etc.) and the former representing the caregiver's harsh verbalizations and behaviors. Our results provide evidence for a coercion model in which harsh responses to

negative affect instigate reciprocal, escalating exchanges that may ultimately terminate in aggression. For example, the child cries, her mother responds harshly (thereby reinforcing the expression of negative affect with attention), the child cries more intensely, the mother responds harshly again, and the child eventually aggresses. Though we did not assess a repeated back-and-forth between child and parent, it is possible that such a pattern of iterative interactions occurred within our 30-second intervals. On the other hand, mother's negative emotional expression did not mediate the relation between negative affect and aggression. Our results thus suggest emotion contagion and modeling of negative affect may not facilitate an escalation to aggression.

To our surprise, neither distraction nor soothing mediated the relation between negative affect and aggression. Though we initially conceptualized distraction as efforts to shift attention away from the source of negative affect, the very act of distracting a child actually involved drawing attention to the negative affect (e.g., "don't be so upset, look at this shiny toy!") and thus did not serve to dampen the child's arousal. Thus, distraction within a conflict episode may not be an appropriate strategy to manage child negative affect. Similarly, our results suggest that soothing responses neither exacerbate nor minimize the child's expression of negative affect. That is, positive attention to negative affect is an ineffective response to negative affect *within a conflict episode*.

Importantly, we do not view our stance to be at odds with attachment theory, which proposes that sensitive and warm responses to negative affect are related to decreases in negative affect (Ainsworth et al., 1974; van den Boom, 1994). Attachment theory focuses on the *appropriateness* or *responsiveness* of parent's responses to children's behaviors (Ainsworth et al., 1974; Patterson, 1982; Rothbaum & Weisz, 1994).

Maternal soothing and distraction, however, may be more appropriate in one context (e.g., child is hurt after falling and scraping her knee, the child sees something scary) and less so in others (e.g., a conflict episode wherein child is protesting her parent's limits). In the latter scenario, responding sensitively and adequately (Ainsworth & Wittig, 1969) to the *context* likely means diverting attention away from the child's negative affect so as to not reinforce the protestation.

Limitations and Future Directions

Several limitations are important to consider when interpreting our results. Perhaps the most significant is that our argument rests on a back-and-forth, iterative process between parent and child. For example, the child cries, the mother responds in a certain way, the child continues crying, the mother responds more intensely, etc. However, we did not capture this pattern of dyadic interactions at such a microscopic level. Even so, a more accurate model would have had both child's negative affect and maternal response at time $t + 1$ as mediators in a 1-(1-1)-1 serial mediation model. By doing so, we could have teased apart child and parent effects and better understood the bidirectional association(s) between maternal responses and child affect in the second time interval. The inclusion of both mediators in the model would have elucidated the unique contributions of each, helping us better understand if escalation from negative affect is better explained by within-child stability in negative affect, caregiver responses, or both. However, we were limited by statistical programs which do not allow for such an analysis with binary variables.

Additionally, as noted above, our coding of all variables was binary. In doing so, we did not capture the varying levels of intensity in child negative affect. Just as we

conceptualize negative affect and aggression as existing on the same externalizing continuum, we can conceptualize negative affect as existing on a continuum from less to more intense. That is, a child may escalate from whining, to crying, to screaming, and, eventually, to aggression. It is likely that caregivers respond differently to distinct forms of negative affect, as more aversive emotional displays are more likely to trigger harsh or intrusive responses (Dix, 1991). Similarly, our binary coding of aggression prevents an examination into the ways that negative affect may escalate to different kinds of aggressive behaviors. Some forms of aggression (e.g., a kick or punch) may be more clinically significant than other forms (e.g., a swat). Lorber et al. (2021), for example, propose that some aggressive behaviors reflect an aggressive competence (Hay, 2005) whereas other aggressive acts are merely reflexive, unsophisticated responses to the environment. Finally, we did not capture or model situations in which there were different maternal responses occurring in the same interval, which happened in approximately half of all intervals. Coding in this way makes it difficult to understand the unique effects of each maternal response on child behavior. It is possible that maternal responses interact, minimizing or exacerbating the effects of each other. Research suggests, for example, that parents who display overreactive discipline strategies also tend to display more soothing behaviors toward their children (Leung & Slep, 2006; Lorber & O’Leary, 2005).

Clinical Implications

Our results suggest that children escalate from negative affect to aggression rather quickly. Harsh parenting behaviors increase the likelihood of an aggressive response, while negative emotional expression, soothing, and distraction neither facilitate nor hinder children's escalation from negative affect to aggression. Within a conflict episode, therefore, ignoring the child's emotion may be the most clinically appropriate response. Shifting attention away from sources of frustration is consistently associated with decreased anger, and reduced negative affect may interrupt children's pathway from negative affect to aggression (e.g., Gilliom et al., 2002). Well-regarded behavioral parent training such as the Incredible Years and Parent-Child Interaction Therapy emphasize active ignoring or differential attention, defined as positive attention to appropriate behaviors and ignoring of inappropriate behaviors. Many studies find that such differential attention is a mechanism of change—that is, contingent ignoring leads to positive changes in children's behavior (e.g., Eisenstadt et al., 1993; Nixon et al., 2003).

Though we initially conceptualized distraction as strategy that would pull attention away from a negative stimulus, the truth is that even distraction efforts by the mother required direct attention to the child. Thus, perhaps the best way to distract a child from the source of negative affect is to simply ignore the negative affect. Fox (1989) proposed that the redirection of attention ranges from more active strategies (such as engagement in alternative activities) to less active strategies (such as looking away). In this framework, ignoring can be considered a distraction/redirection strategy. In fact, some regulation models predict that parents' ignoring of emotion is a distraction strategy that facilitates children's acquisition of emotion regulation skills (Denham, 2007). For

example, Gilliom et al. (2002) found attention shifting to be an effective strategy in minimizing anger.

We are not proposing that ignoring is always an effective approach. Certainly, we would not encourage caregivers to ignore a child's cries after she scrapes her knee, for example. In such situations, children benefit from the support and attention of caregivers (Bauchner et al., 1994). In the case of a conflict, however, attention to negative affect may facilitate the child's escalation to aggression. Thus, maternal regulation strategies that work in one setting may be less effective in controlling negative arousal and frustration in other settings (Thompson & Calkins, 1996).

It is also important to consider the timing of maternal attention to negative affect. We believe that maternal attention during the expression of negative affect may be inappropriately timed. Cohen (2002), for example, found that maternal attention to infant distress was ineffective during the infant's highest levels of distress. Emotion coaching strategies such as suggesting a coping skill, identifying the source of the emotion, and problem-solving are likely best saved until the child is no longer exhibiting negative affect.

We therefore suggest that mental health and early childhood providers coach parents to selectively ignore children's negative affect during conflict. Parent training protocols should be adapted to explicitly discuss how parents can respond to children's aversive emotions. Further, such programs can place an emphasis on the caregiver's own behavioral responses to the child's negative affect. To avoid harsh responses, caregivers can be provided with coping skills to minimize harsh behaviors before responding to the child. Parent-Child Interaction Therapy for Toddlers (PCIT-T), for example, includes a

C.A.R.E.S. module that provides caregivers with skills to promote relaxation and positive self-talk during stressful parenting situations (Girard et al., 2018). Other programs more directly address parents' emotional socialization practices. For instance, Tuning into Kids is a 6-session parenting program that targets parent emotion awareness, regulation, and emotion coaching skills (Havighurst et al., 2010).

Given the consequential sequelae of early aggression, it is critical to understand and address the patterns of parent-child interactions that predict aggressive behaviors. Early intervention for child aggression is clearly indicated given that parent-child interactions are most malleable during the period from infancy to toddlerhood (Keenan & Shaw, 1994; Tremblay et al., 2004). Our findings support a dyadic intervention model in which the parent-child relationship, rather than the individual child or parent alone, is the appropriate and critical target for treatment.

Table 1*Descriptive Statistics*

	Negative Affect <i>t</i>	Negative Affect <i>t + 1</i>	Negative Expression <i>t + 1</i>	Harsh <i>t + 1</i>	Soothe <i>t + 1</i>	Distract <i>t + 1</i>	Aggression
M ^a	33.42	69.12	6.58	12.14	6.72	11.28	5.75
SD	35.79	56.29	8.59	15.10	13.17	11.80	8.45
Min- Max ^b	0-149	0-211	0-38	0-77	0-76	0-55	0-44

^a Mean indicates mean frequency of intervals containing response across dyads

^b Minimum and maximum frequency of intervals containing response across dyads

Table 2*Overall Model Fit*

Model	Pearson Chi- Square	Pearson Chi-Square/ DF ^a	Schwarz's Bayesian Criterion	-2 Log Likelihood
Model 1: Child Escalation	34505.08	.84	24756.64	24671.95
Model 2: Maternal Negative Expression	28709.00	.69	17319.12	17234.44
Model 3: Maternal Harshness	32462.72	.79	20069.54	19984.86
Model 4: Maternal Soothing	27031.40	.65	15077.77	14993.08
Model 5: Maternal	31629.06	.77	20767.57	20682.88

^a Values close to or less than 1 indicate a good model fit (Ding et al., 1995)

Figure 1

1-1-1 Multilevel Mediation Model

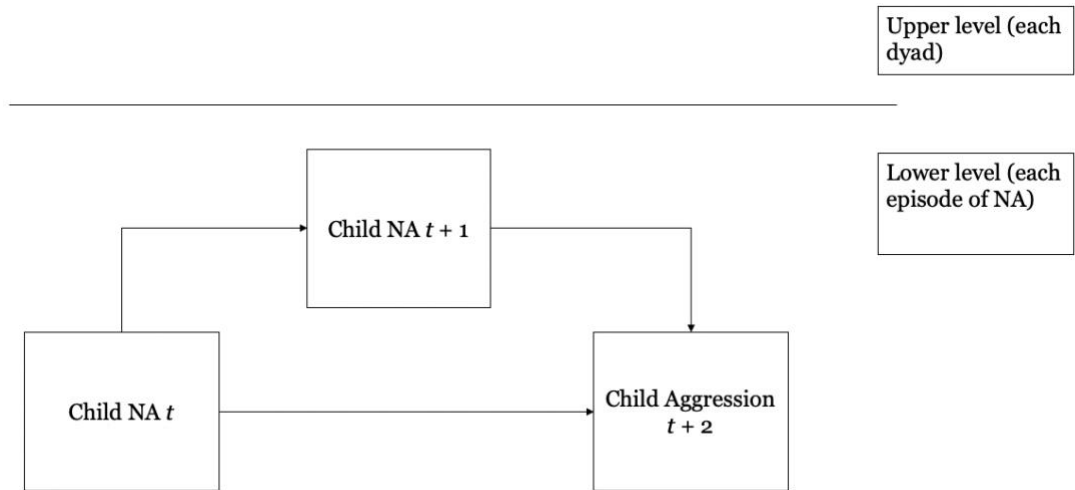
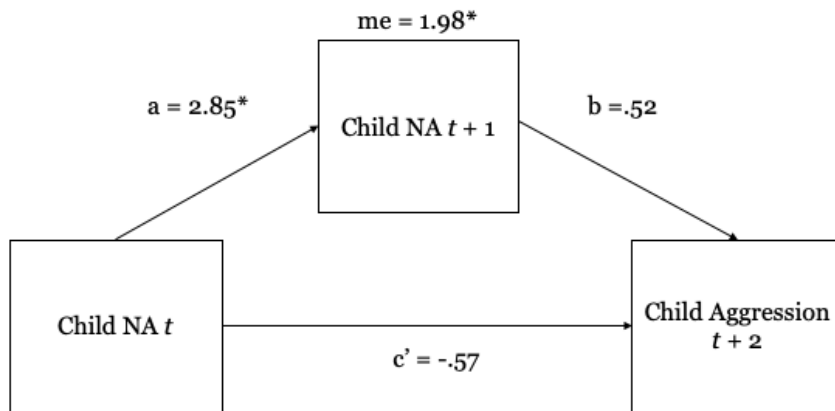


Figure 2

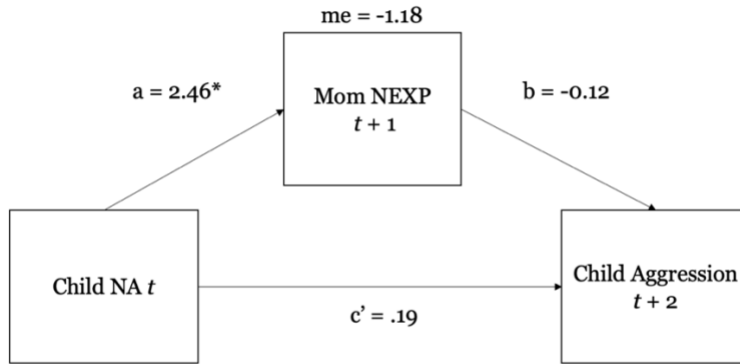
Model 1. Within-Child Escalation to Aggression



Note. “me” indicates mediating (indirect) effect

Figure 3

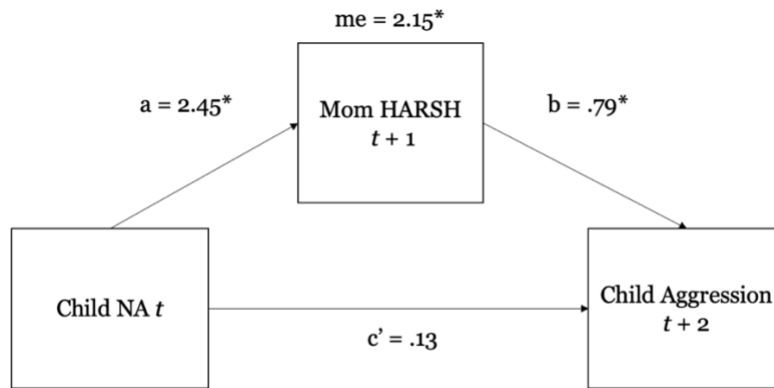
Model 2. Negative Affect, Negative Expression, and Child Aggression



Note. “me” indicates mediating (indirect) effect

Figure 4

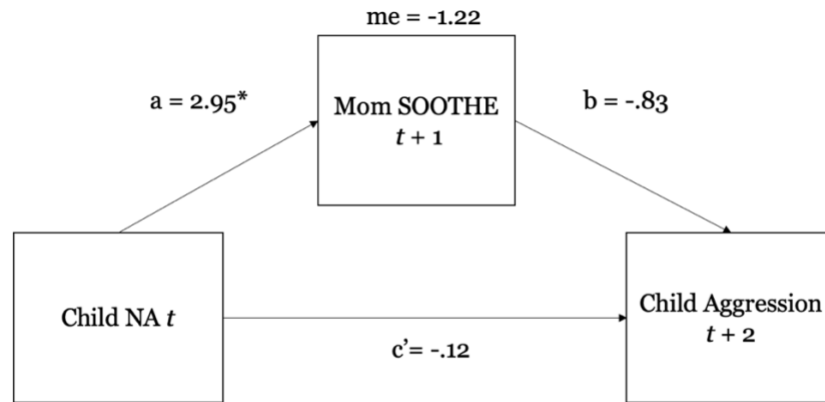
Model 3. Negative Affect, Harshness, and Child Aggression



Note. “me” indicates mediating (indirect) effect

Figure 5

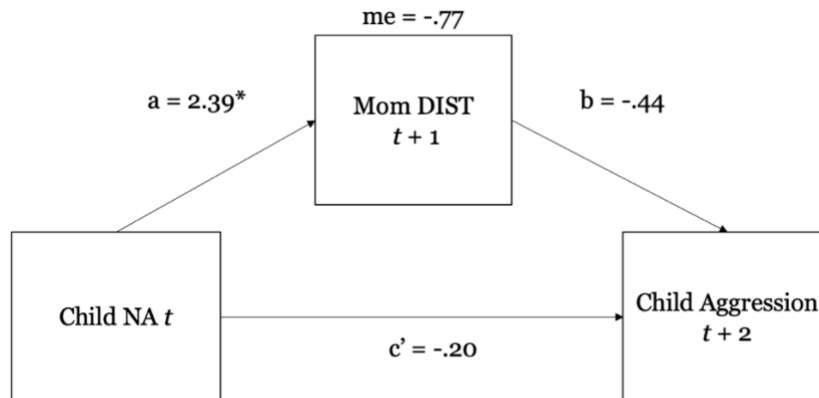
Model 4. Negative Affect, Soothing, and Child Aggression



Note. “me” indicates mediating (indirect) effect

Figure 6

Model 5. Negative Affect, Distraction, and Child Aggression



Note. “me” indicates mediating (indirect) effect

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