INTIMATE PARTNER VIOLENCE AND RISK FOR PSYCHOPATHOLOGY: THE ROLE OF EMOTION REACTIVITY AND EMOTION REGULATION

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Psychology—Doctor of Philosophy

2020

ABSTRACT

INTIMATE PARTNER VIOLENCE AND RISK FOR PSYCHOPATHOLOGY: THE ROLE OF EMOTION REACTIVITY AND EMOTION REGULATION

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Objective: The present study investigated mechanisms by which exposure to intimate partner violence (IPV) in the first five years of life confers risk for the development of internalizing and externalizing psychopathology. Emotion reactivity and emotion regulation were identified as potential mediators and/or moderators. While research suggests that emotion regulation is sensitive to environmental influences, little is known about how IPV exposure influences emotion regulation. Emotion regulation is an important developmental task of early childhood and the inability to regulate emotion flexibly can increase risk for psychological disorders. In IPV-exposed populations, children who tend to avoid or intervene in incidents of IPV may be at risk for internalizing and externalizing problems, respectively. **Method:** A series of variable-oriented and person-oriented analyses were used to investigate emotion reactivity and emotion regulation strategy use in 206 children followed longitudinally and oversampled for IPV exposure. Models examined emotion reactivity and emotion regulation, observed at age 4, as mechanisms in the association between early childhood IPV exposure and internalizing and externalizing behavior problems at age 7. Second, the timing of early childhood IPV exposure in relation to emotion regulation strategies was explored. A final set of analyses used Latent Profile Analysis to explore the presence of multiple profiles of adjustment to different patterns of IPV exposure, including associations with subsequent behavior problems. **Results:** Path analyses indicated that less intervention at age four was associated with more internalizing problems at age seven, while reactivity was associated with concurrent age four internalizing problems. In

growth mixture modeling, groups characterized by chronic high IPV and increasing IPV shared associations with less intervention and more withdrawal, respectively. Profiles of emotional responding identified through latent profile analysis further indicated that a demobilizing profile (low intervention, high withdrawal) was associated with IPV exposure and internalizing psychopathology. **Discussion:** Path analysis findings suggest that emotion reactivity may be a reflection of current behavior problems while problems with regulation identified at age four may predict a continuation of these problems into the school-aged period. Follow-up analyses investigating individual differences in the timing of early childhood IPV exposure and profiles of reactivity and regulation indicated that the demobilizing strategy can be identified through person-centered analysis using emotion regulation as a behavioral indicator of emotional security.

ACKNOWLEDGEMENTS

I would like to thank my Advisor, G. Anne Bogat, Ph.D., for her encouragement and guidance during my time in graduate school. I appreciate her persistent dedication to the personal and professional mentorship of early-career scholars. I also thank the members of my committee, Alytia Levendosky, Ph.D., Jason Moser, Ph.D., and Claire Vallotton, Ph.D., for their valuable feedback on this project.

I am lucky to have endlessly supportive and inspiring parents in Janet and Charles Garcia. My mother has modeled a life of public service, with generous portions of empathy, wisdom, and fierce advocacy for the underserved. My father has modeled levity in the face of adversity. In addition, I am grateful to my great-uncle, Dr. Eugene Garcia, who has served as an important advocate for higher education in our family.

Lastly, I would like to thank my husband, Sean. More than fifteen years ago, I told him about my goal to complete a doctoral degree, and he has been determined to partner with me on this journey. Along the way, we have learned to support each other, and we raise our son with this in mind.

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INTRODUCTION

Emotion reactivity is defined as the extent to which an individual experiences emotions, strongly or intensely, in response to a wide array of stimuli and for a prolonged period of time before returning to baseline level of arousal (Nock, Wedig, Holmberg, & Hooley, 2008). Studies demonstrate that IPV exposure is associated with maternal report of increased emotional reactivity in infants, toddlers, and preschoolers (Crockenberg & Langrock, 2001; Davies, Cicchetti, & Martin, 2012; El-Sheikh & Reiter, 1996). In addition, young children with a history of IPV exposure display heightened or blunted emotion reactivity in response to laboratory stress tasks (e.g., Du Rocher Schudlich, White, Fleischhauer, & Fitzgerald, 2011). However, a second central component of emotional functioning, emotion regulation, is rarely studied in the context of IPV. Emotion regulation is the process of monitoring, evaluating, and modifying emotional responses (Thompson, Lewis, & Calkins, 2008). When children experience fear, anger, and sadness in the context of frequent family conflict, emotion regulation can help children modulate their emotion reactivity, including negative emotions, and ultimately adapt to challenging home environments.

Observing how children habitually respond to incidents of IPV may help researchers identify emotion regulation strengths and deficits. Children are not passive observers of IPV, and several common reactions to IPV have been catalogued. In one national survey, approximately half of the children yelled at their parents or tried to get away during a violent episode between the parents; nearly a quarter had called for help at least once (Hamby, Finkelhor, Turner, & Ormrod, 2011). Children's response to violence is also related to past exposure to IPV (Davies, Sturge-Apple, Winter, Cummings, & Farrell, 2006; Harold, Shelton, Goeke-Morey, & Cummings, 2004). For example, Davies and Cummings (1998) showed that in school-aged

children, exposure to high levels of interparental conflict was positively associated with attempts to intervene during conflict.

These common responses to IPV (e.g., intervening in conflict, withdrawal) can also be described as emotion regulation strategies. Identifying conceptual links between a child's response to IPV and the broader literature on emotion regulation will help researchers generate **new and more specific** hypotheses about the mental health outcomes of IPV exposure. From studies on emotion regulation, it is clear that emotion regulation strategies that are adaptive in the short-term can nonetheless lead to social dysfunction and create long-term problems when responding to emotion-eliciting events (Morris, Silk, Steinberg, Myers, & Robinson, 2007). For example, avoidance or withdrawal can function to decrease immediate distress but ultimately reinforce anxiety. As such, emotion regulation strategies that develop in the context of IPV contribute to risk for psychopathology when applied inflexibly to other environments (Cicchetti, Ackerman, & Izard, 1995). These individual differences in emotion regulation may represent a key mechanism in mediating or moderating associations between IPV and psychopathology.

The current research had three aims. The first aim specified unique pathways of risk for internalizing and externalizing psychopathology. Because children can vary in their response to similar levels of IPV exposure, and specific emotion regulation strategies are differentially associated with different types of psychopathology (for a review, see Gross & Jazaieri, 2014), two pathways were hypothesized. First, withdrawing quickly from incidents of IPV can protect children from harm. However, if this strategy generalizes to all situations that involve negative emotions, the child may develop a pattern of avoiding the first signs of internal distress or external conflict. Behavioral avoidance is associated with maintenance of anxiety (Campbell-Sills, Ellard, & Barlow, 2014), and when this strategy is forged or reinforced in the high stakes

context of IPV, it may contribute to the development of internalizing disorders. Second, the tendency to intervene in parent-partner IPV may also characterize risk for psychopathology. While this response constitutes an active strategy aimed at changing the situation (e.g., problem solving), which might be adaptive, it may also represent an impulsive reaction to heightened emotion, resulting in inappropriately approaching an uncontrollable and volatile situation. If this behavior is reinforced and elaborated, children may learn to seek out and approach external threats to safety, leading to externalizing behavior disorders. Children and adults with a history of IPV exposure struggle with both of these scenarios: avoidance of conflict or, alternatively, approaching and perhaps initiating incidents of violence (Cummings, Cheung, Koss, & Davies, 2014; Katz & Low, 2004). If behavioral indicators of an internalizing and externalizing trajectory are evident in preschool, when emotion regulation is rapidly developing, they may hold the key to predicting patterns of later maladjustment. To date, no studies have explored withdrawal from and intervention in conflict as distinct emotion regulation strategies linked to internalizing and externalizing psychopathology, respectively.

The second aim investigated early environmental influences, such as IPV, on emotional functioning. While a few common responses to IPV have been identified in school-aged children, we know little about the timing of when children are exposed to IPV affects these responses. Withdrawal and intervention, in particular, have been associated with different levels of interparental conflict (Harold, Shelton, Goeke-Morey, & Cummings, 2004), but there is no research on when these effects are sensitive to influence, and research is needed in the preschool-age period, when emotional functioning is changing rapidly. The emotion regulation literature can guide predictions about when these strategies develop, and accordingly, when, during development, they are most sensitive to negative environmental influences such as IPV.

Lastly, the third aim explored an extended range of emotion regulation strategies in preschool children affected by IPV. In addition to withdrawing from and intervening in episodes of IPV, which researchers have investigated, there are other likely responses to family conflict (i.e., help-seeking, distraction, and gathering information). These additional emotion regulation strategies, along with the first two, represent five responses to IPV that are easily measured in preschool children. The construct of emotional functioning in response to IPV becomes increasingly complex as we consider potential combinations of different emotion regulation strategies, and the associations these strategies share with emotion reactivity. Therefore, it is important to determine distinct subgroups of children who vary in their patterns of emotional functioning (both reactivity and regulation strategies). By allowing for these more complex relationships that better represent subgroups of children, researchers can better account for different types of adaptation to IPV and multifinality of outcomes.

The following sections review extant research on associations between IPV exposure in early childhood, the development of emotion reactivity and emotion regulation strategy use, and long-term outcomes including internalizing and externalizing psychopathology. Three areas are emphasized: longitudinal pathways of risk for internalizing and externalizing problems, the timing of when IPV occurs and its influence on emotional functioning, and profiles of emotional functioning among IPV-exposed children.

IPV and Risk for Psychopathology

IPV Definition and Prevalence. IPV is a prevalent stressor in family life and has pernicious effects on child emotion functioning. IPV is defined here as physical, sexual, or psychological harm by a current or former romantic partner or spouse to another (Black et al.,

2011); these types of IPV include physical violence, sexual violence, threats of physical or sexual violence, and psychological/emotional violence (Saltzman, 2004).

The National Intimate Partner and Sexual Violence Survey (NISVS), conducted by the U.S. Centers for Disease Control, provides the most recent comprehensive data on the prevalence and characteristics of IPV in the United States (Black et al., 2011). This national telephone survey of 16,507 adults found that 35.6% of women, equivalent to an estimated 42.4 million women, reported physical violence, rape, or stalking by an intimate partner in their lifetime. Physical violence was the most common form of IPV, affecting 33.9% of women. In addition, 9.4% reported ever being raped by a current or former intimate partner, and 10.7% reported being stalked. One in five women (22.3%), or an estimated 29 million U. S. women, experienced severe physical violence by an intimate partner (e.g., hit with a fist, beaten, slammed against something). Psychological aggression, including expressive aggression and coercive control, was measured separately. Nearly half of all participants (48.8%) reported a lifetime history of psychological aggression (Black et al., 2011).

Many children are directly or indirectly exposed to incidents of IPV. Women of childbearing age may be at a heightened risk for IPV because younger age is significantly associated with increased rates of IPV. For example, among women ages 15-49, younger age was strongly associated with increased risk of past year IPV (Abramsky et al., 2011). In the NISVS, most women (69%) reported experiencing IPV for the first time before age 25. Findings from the National Crime Victimization Survey (NCVS; data collected by the Bureau of Justice Statistics) found that of women reporting violent crime from an intimate partner, at least 43% had children under the age of 12 in the home (Catalano, 2012). Similarly, Fantuzzo and Fusco (2007) found that children were present in 44% of domestic violence incidents, and 58% of the directly exposed

children were younger than 6 years old. Using census data to form a comparison group, households with IPV were significantly more likely to have children compared to non-IPV households (Fantuzzo & Fusco, 2007). Notably, children under the age of 6 are exposed to higher rates of IPV compared to older children (Fantuzzo, Boruch, Beriama, Atkins, & Marcus, 1997; Gjelsvik, Verhoek-Oftedahl, & Pearlman, 2003).

Internalizing and Externalizing Psychopathology. Long-term outcomes for children exposed to IPV in early childhood include increased risk for concurrent or later psychopathology. Research indicates that children exposed to IPV are at a greater risk for experiencing a range of internalizing and externalizing problems compared to children not exposed to IPV (e.g., Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). Additionally, studies that measure both IPV exposure and direct physical abuse find that IPV exerts effects on psychological functioning similar to physical abuse. The results of one mega-analysis indicated that children who witness family violence do not differ in levels of depressive symptoms compared to children who are physically abused, although exposure to both forms of family violence is associated with greater risk for psychopathology (Sternberg, Baradaran, Abbott, Lamb, & Guterman, 2006).

Effect sizes for IPV exposure on child psychopathology range from small to moderate. For example, one meta-analysis of 60 studies found moderate mean-weighted effect sizes for the relationship between IPV exposure and childhood internalizing symptoms (d=.48) and externalizing symptoms (d=.47; Evans, Davies, & DiLillo, 2008). Based on a subset of six studies, the largest effect size was found for the relationship between IPV exposure and childhood trauma symptoms (d=1.54). However, other meta-analytic findings found no evidence that effect size differed significantly by outcome (Kitzmann, Gaylord, Holt, & Kenny, 2003; Wolfe et al., 2003).

More specifically, IPV is associated with internalizing symptoms such as anxiety and depressive symptoms (e.g., Katz & Windecker-Nelson, 2006; Litrownik, Newton, Hunter, English, & Everson, 2003; Maikovich, Jaffee, Odgers, & Gallop, 2008; Martinez-Torteya, Bogat, Von Eye, & Levendosky, 2009; Moylan et al., 2010). IPV exposure is also consistently associated with elevated rates of post-traumatic stress symptoms such as hyper-arousal in infants (Bogat, DeJonghe, Levendosky, Davidson, & von Eye, 2006; Lannert et al., 2014; Levendosky, Bogat, & Martinez-Torteya, 2013) and preschool-aged children (Galano, Miller & Graham-Bermann, 2014; Graham-Bermann, Castor, Miller, & Howell, 2012). With regard to externalizing symptoms, research indicates that IPV exposed children are more likely than their peers to experience conduct disordered behavior and aggression (e.g., Herrera & McCloskey 2001; Jouriles et al. 2001; Levendosky, Leahy, Bogat, Davidson, & von Eye, 2006; Paterson, Carter, Gao, Cowley-Malcolm, & Iusitini, 2008; Pelcovitz et al., 2000).

IPV-Related Emotional Functioning as an Early Indicator of Psychopathology

Notably, not all children develop psychopathology following exposure to IPV. One meta-analysis found that a sizeable minority of IPV-exposed children show average or better than average developmental functioning compared to non-IPV exposed children (Kitzmann et al., 2003). Thus, it is necessary to identify mediators and/or moderators that help account for pathways between early childhood IPV exposure and subsequent psychopathology. Impairments in emotional functioning, such as problematic emotion reactivity and emotion regulation, are likely involved in the transmission of risk from the parent-partner relationship to the child (Davies, Winter, & Cicchetti, 2006). Indeed, the study of emotion reactivity and regulation in the context of IPV is directly relevant to research in developmental psychopathology because IPV's unique effects on emotion reactivity and regulation may help explain the high rates of

psychopathology in children exposed to IPV. Problems with mastering the task of emotion regulation can lead to unwanted emotional arousal and a limited ability to adapt to later stressors, ultimately resulting in internalizing and externalizing disorders. That is, emotion reactivity and emotion regulation may mediate relationships between IPV and adverse psychological outcomes.

Research demonstrates that exposure to violence in the home can significantly influence children's emotional functioning, including emotion reactivity and emotion regulation. From infancy, there is evidence that heightened emotion reactivity is a common and easily observed emotional response in children exposed to IPV (Davies & Cummings, 1998; Davies et al., 2006). However, research has failed to consider whether individual differences in emotion regulation is an early indicator of risk that might explain children's diverse reactions to IPV. The following sections introduce the concepts of emotion reactivity, emotion regulation, and their associations with IPV.

Emotion Reactivity. As described earlier, emotion reactivity is defined as aspects of the child's initial response to a stressor, including the intensity of response, latency to response, response threshold, and overall intensity of response behaviors such as crying (Rothbart, 1989; Eisenberg et al., 1996). Regulation, in contrast, involves the child's ability to respond to this reactivity and modulate affective arousal (Calkins, Smith, Gill, & Johnson, 2001; Thompson, 1994).

Developmental theorists suggest that reactivity patterns arise from a combination of genetic, in utero neuroendocrine influences and environmental experiences (Cole et al., 1996). Experiences within the family are also thought to affect reactivity through processes involving the child's attachment system, cognitive appraisals of threat, or social learning (Lavi, Katz, Ozer, &

Gross, 2019). In turn, individual differences in emotion reactivity may be associated with increased susceptibility to behavior problems (Carthy, Horesh, Apter, & Gross, 2010).

Decades of child development research indicate that a history of exposure to marital conflict often leaves children predisposed to heightened and more negative emotion reactivity during laboratory stress tasks or as indexed by parental report of reactivity (Cummings, Iannotti, & Zahn-Waxler, 1985; Cummings, Vogel, Cummings, & El-Sheikh, 1989; Davies et al., 2006; Ingoldsby, Shaw, Owens, & Winslow, 1999). According to Davies and Cummings' (1994) Emotional Security Theory (EST), heightened reactivity in response to conflict can be an adaptive strategy for children exposed to chronic or severe destructive interparental conflict, including IPV. For instance, reactivity to anger allows children to quickly identify and cope with dangerous situations. However, a hypervigilant pattern of responding to conflict becomes a problem when it provokes individuals to make negative interpretations and respond defensively to challenging or novel interpersonal settings. Thus, IPV-associated changes in emotion reactivity are a marker of emotional insecurity, and they have been implicated in the development of behavior disorders. In one longitudinal study from age two to age three, Davies, Cicchetti, and Martin (2012) found that fear reactivity during novel laboratory tasks was a strong mediator in associations between interparental aggression and children's internalizing and externalizing symptoms.

Psychobiological markers of reactivity have also been assessed. Notably, hostile interparental conflict is associated with greater heart rate reactivity in response to simulated conflict for girls and lower heart rate for boys compared to nonexposed peers (El-Sheikh, Cummings, & Reiter, 1996). With regard to cortisol reactivity, interparental conflict shares associations with both blunted cortisol reactivity (Davies, Sturge-Apple, Cicchetti, & Cummings, 2007) and heightened cortisol reactivity (Davies, Sturge-Apple, & Cicchetti, 2011; Koss et al.,

2012) in children. Interestingly, there is evidence for both competing hypotheses of attenuation and sensitization of cortisol reactivity in children with exposure to IPV. Mixed results indicate the need to further study behavioral and biological emotion reactivity in the context of IPV.

Emotion Regulation. According to Thompson (1994), a developmental definition of emotion regulation is "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (pp. 27-28). With development, infants increasingly employ internal and external strategies for regulating emotion (Thompson, 1994). This regulation unfolds in the first year of life with help from caregivers who interpret and respond to the infant's affective cues, thereby serving as an external regulatory tool (Stifter, 2002). Thompson's definition recognizes that external influences (e.g., parental behavior) can support or hinder emotional self-control. Additionally, the definition highlights that regulation targets the dynamics of emotion. That is, emotionally well-regulated people are capable of altering how long and how intensely they feel emotions. In the current research, distinctions were made between the intensity of the behavioral response (emotion reactivity), the pattern of modulation over time (emotion regulation), and the specific strategies employed to influence emotion trajectories (emotion regulation strategies).

In contrast to research on emotion reactivity, few studies explore emotion regulation in children exposed to IPV. One exception is a line of research based on EST (Davies & Cummings, 1994; Davies & Martin, 2013); however, these researchers do not position their work in the larger context of the developmental work on emotion regulation. EST proposes that in order to protect their own emotional security, children develop certain behavioral responses to "regulate exposure to interparental conflict." During incidents of IPV, EST theorists focus on two common responses that children have to marital conflict—withdrawing from conflict or attempting to

intervene in conflict (Cummings & Davies 1996). Research on EST indicates that children's reaction to interparental conflict is one component of emotional security, which mediates the relationship between interparental conflict and psychopathology (Davies, Winter, & Cicchetti, 2006). In particular, high levels of either withdrawal from or intervention in interparental conflict are thought to worsen emotional security and increase risk for psychopathology (Davies & Cummings, 1998; Davies et al., 2002). However, in their research, withdrawal and intervention are not compared, and the authors do not explain why or when specific strategies for regulating exposure to conflict may develop.

While research on EST has led to important advances in understanding how family processes influence child emotional functioning and risk for psychopathology, there has been little attention to the period of development when emotional functioning first develops and how emotional functioning is enacted in early childhood. Examining early indicators of emotional functioning in the preschool period is especially important because young children have difficulty communicating internal distress and soliciting help at this developmental stage. Researchers, families, and clinicians would benefit from being able to identify early signs of maladjustment in this vulnerable population using easily observable emotion regulation strategies. Integrating research on emotion regulation with research on IPV could help sharpen predictions about the early development of emotional functioning (i.e., reactivity and regulation) in the context of IPV.

Development of Emotion Regulation. The development of emotion regulation is multi-determined (Calkins & Hill, 2007). The prevailing theory is that emotion regulation is acquired through the dynamic interplay between biological processes and the quality of early relationships (Thompson, 2011; Cole, 2014). In regard to intrapsychic development, in the first few years of

life, the development of cognitive and attentional processes contributes to children's emerging capacities to control emotional expression and emotion-driven behaviors (Fox & Calkins, 2003).

External support from caregivers is also central in aiding the development of emotion regulation. Infants first learn about emotion when caregivers respond to infant emotions, mirror emotions back to the child, and assist with regulation (Spangler & Grossman, 1993). From birth, the caregiver helps the infant establish basic behavioral and physiological organization by reading the infant's signals and providing optimal levels of stimulation. This response modulates arousal in the infant, allowing the infant to reach behavioral and physiological organization (Field, 1994). Through this process, the infant learns about his or her personal stimulus threshold, and learns to model the regulatory behaviors of the parent (e.g., seek out and approach optimal stimulation or withdraw from non-optimal stimulation). Co-regulation, defined as shared patterns of affective oscillation across adult and child, is an infant's first experience with influencing the trajectory of his/her emotional experience (Butler & Randall, 2013).

The relational context of the family is thus critical to the development of emotion regulation. Research demonstrates that in particular, the quality of early parent-child interactions shapes the development of emotion regulation (for a review, see Morris et al., 2007). If emotional signals are responsively attended to, the child's experience of negative affect, such as fear and anger, comes to be associated with expectations that the attachment figure will provide relief. As a result, the experience of negative affect may come to be less threatening to the child (Bell & Ainsworth, 1972). The child progressively internalizes regulatory abilities, which leads to increasingly independent emotion regulation. Thus, co-regulation of emotions within the parent-child relationship is foundational for the development of intrinsic emotion regulation (Weinfeld, Sroufe, Egeland, & Carlson, 2008).

Emotion Regulation Strategies in Early Childhood. When a goal to regulate emotion is activated, individuals vary in which emotion regulation strategies are identified, selected, and implemented (Gross, 2015). According to Gross's Process Model of Emotion Regulation, emotion regulation strategies can be grouped into categories of situation selection, situation modification, attentional deployment, and response modulation. Not all strategies are available to young children, who do not yet independently select or modify situations.

Emotion regulation strategies change quickly, in tandem with the development of other physical, cognitive, and social transitions across early childhood. Some of the first emotion regulation strategies involve self-soothing and attentional deployment away from a distressing stimulus. Tronick and colleagues (1980) studied young infants' responses to the Still Face Paradigm, in which mothers fell expressionless after interacting with their infants face-to-face. From three months of age, infants employ attentional deployment away from the stressful stimulus, which is measured when infants look away from the mother's inexpressive face. As infants turn their gaze away from the stimulus (mother), arousal temporarily decreases (Cohn & Tronick, 1983; Gianino & Tronick, 1988). Young infants also use physical self-soothing by sucking or manipulating parts of the body (e.g., finger and hand in the mouth, touching the hair, ears). In the first year of life, infants learn to use emotion regulation strategies that involve intentional communication. For example, in one longitudinal study of infants from 5 months to 10 months, the authors found that orienting and avoiding behavior decreased over time while the use of communication increased (Braungart-Rieker & Stifter, 1996).

Development of emotion regulation continues to progress throughout toddlerhood and the preschool years (Shankoff & Phillips, 2000). A burst of language at 18 months helps toddlers connect with the larger interpersonal world and communicate a need for external emotion

regulation. Theory of mind typically develops in the second year of life. This allows children to consider the emotional state of others as distinct from their own. Understanding the desires and emotions of others helps children develop social skills while also enhancing their understanding of their own emotions and developing self-regulation (Thompson, Goodvin & Meyer, 2006). The emotion regulation strategy of social referencing, or scanning a caregiver's facial cues in times of uncertainty, is seen early in infancy but increases in frequency from nine to 18 months (Emde, 2000). Co-regulation with caregivers remains important as toddlers learn strategies for coping with new situations and new fears that develop after initial exploration away from a secure base (Lieberman, 1995).

In the preschool years, advances in multiple domains of development help preschoolers perform more complex self-regulation strategies to handle frustrating events and the delay of gratification (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). New cognitive capacities and improvements in motor skills allow for greater self-sufficiency and independence in their everyday life. Thus, independent emotion regulation strategies are expected to increase during this time of development. External influences also shape the expression of emotion, as preschoolers learn culturally appropriate ways to express and regulate emotions and emotion regulation goals change accordingly (Kiel & Kalomiris, 2015; Shonkoff & Phillips, 2000). In laboratory situations, preschoolers are more effective than younger children in using emotion regulation strategies such as distracting themselves from an inaccessible toy in order to reduce the buildup of stress (Bridges, Grolnick, & Connell, 1997). Problem solving skills strengthen, and preschoolers increasingly learn how to execute situation change strategies to act directly on problems that trigger emotion reactivity.

In summary, emotion regulation strategies are rapidly changing in early childhood, in tandem with advances in other domains of development. Social and independent emotion regulation strategies are used throughout early childhood, but purposeful self-regulation increases in preschool as cognitive, motor, and communication capacities develop. While preference for specific emotion regulation strategies likely form early in life when regulation is emerging, few studies include detailed measurement of these individual strategies when investigating early childhood emotion regulation. These distinctions are important because deficits in specific strategies are differentially associated with various mental health disorders (Gross & Jazaieri, 2014). Thus, identifying the type of emotion regulation (e.g., specific strategies used), in addition to the general use of emotion regulation, is a promising approach for research in developmental psychopathology.

Evaluating Distinct Emotion Regulation Strategies

Emotion regulation is a potential mechanism in the relationship between IPV exposure and psychopathology. In relation to psychopathology, a recent meta-analysis of adult emotion regulation strategy research suggests that the use of reappraisal, acceptance, and problem solving share negative associations with symptoms of psychopathology such as anxiety, depression, and substance use disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010). These findings suggest that actively changing one's cognitions about a distressing event, or taking steps to change the situation, may protect individuals from anxiety, depression, and problematic aggression. These emotion regulation strategies involve approaching, rather than avoiding, distressing cognitions or situations. In contrast, frequent use of expressive suppression, rumination, and avoidance is positively linked with negative psychological symptoms.

Below, five emotion strategies are discussed that may be particularly relevant for children with exposure to IPV, especially as they relate to psychopathology and their relative efficacy in managing negative emotions in the moment (e.g., relations with emotion reactivity). The five emotion regulation strategies include withdrawing, intervening in conflict, distraction, help-seeking, and information gathering. Each of these strategies may be used during incidents of IPV, and there is precedence for studying each of these strategies in the preschool period.

Withdrawing from IPV. EST theorizes that at extreme levels, avoiding parental conflict is an indicator of emotional insecurity, as withdrawing from conflict increases the burden for the child to protect him/herself in an uncertain situation (Cummings & Davies, 1996). In the emotion regulation literature, withdrawing from stressful situations is one emotion regulation strategy that is positively associated with internalizing psychopathology (Gross & Jazaieri, 2014). While behavioral avoidance can reduce distress in the short term, anxious individuals tend to overly rely on avoidant coping, and depressed individuals over-utilize social withdrawal as a coping mechanism (Rubin, Copland, & Bowker, 2009). This avoidant approach can lead to problems if an individual overestimates the emotional impact of future events and unnecessarily limits activities based on these estimations. Indeed, the avoidance of feared stimuli is a core feature across anxiety disorders (Rapee, 2002). When bouts of anxiety or other feared outcomes are successfully avoided, this strategy is reinforced. Further, by avoiding the experience of negative emotion, there is less opportunity to engage in other downstream emotion regulation strategies and increase self-efficacy in emotion regulation. Similarly, individuals with depression may be motivated to use social withdrawal as an emotion regulation strategy because they predict that their negative affect will worsen in social settings (Campbell-Sills & Barlow, 2007). By avoiding these settings, however, they also miss out on opportunities to disprove this hypothesis by

experiencing positive events. Given associations between behavioral avoidance and internalizing psychopathology, research is needed to examine whether withdrawal influences the relationship between IPV exposure and internalizing behavior problems.

Intervening in IPV Conflict. Attempts to approach IPV incidents in order to intervene is another common reaction in IPV-exposed children. In one study, children in higher conflict homes were more likely to attempt to intervene compared to children from low conflict families (Garcia O'Hearn, Margolin, & John, 1997). These children may expect that conflict is likely to persist, escalate in severity, and spill over and ultimately affect the family system. Thus, children may focus on active intervention in an attempt to control parental behaviors before conflict escalates and results in more serious consequences.

Intervention in conflict would be categorized as problem solving in the emotion regulation strategy taxonomy. As an emotion regulation strategy, problem solving often has beneficial effects on emotion because problem solving can act to modify or eliminate stressors (Aldao et al., 2010). However, in the context of IPV, the situation is largely outside of the child's control, and (unsuccessful) attempts to intervene may actually prolong the child's exposure to IPV and increase emotional distress. Approaching incidents of IPV may also reflect impulsivity and related deficits in explicit emotion regulation. Davies and Martin (2013) write that, "Perseveration on conflicts between parents may also reflect effortful control impairments that undermine the ability to inhibit prepotent negative responses in favor of a more balanced, contextually-sensitive response" (p. 11). Thus, intervening in conflict can index the undercontrol of negative emotion. Research suggests that underregulation of emotional expressions is associated with externalizing behavior problems in children (Southam-Gerow & Kendall, 2002), and it may be that intervening in conflict predicts externalizing psychopathology, in particular. In

past studies, involvement in parental conflict has been associated with childrens' externalizing problems, (Ablow et al., 2009; Mueller, Jouriles, McDonald, & Rosenfield, 2015). However, past studies rely on school-aged childrens' self-report of involvement in past conflict, but even young children start to intervene in conflict before they can reliably report on their own behavior. More research is needed using direct observation of intervention as an emerging behavior in young children.

While withdrawal and intervention are two strategies emphasized in the EST literature, there are several other emotion regulation strategies that children may employ during incidents of IPV. These include distraction, help-seeking, and information gathering. Understanding additional emotion regulation strategies may allow for a more complete understanding of emotional functioning during incidents of IPV.

Distraction. Distraction involves a shift in gaze or internal attention away from distressing stimuli. Findings on the efficacy of distraction and links to psychopathology are mixed. In lab studies with children, distraction leads to diminished emotional responses to negative emotion-eliciting stimuli (Bennett, Phelps, Brain, Hood, & Gray, 2007). Mischell, Ebbeson, and Zeiss (1972) used a delay-of-gratification paradigm and established that preschool children instructed to use self-distraction techniques (e.g., attending to an alternate stimulus, thinking "fun thoughts") were the most able to delay gratification. Distraction also leads to greater delayed gratification in children who spontaneously use this strategy in a laboratory setting compared to children who do not (Rodriguez, Mischel, & Shoda, 1989). Research with infants and toddlers also confirms that active re-engagement away from frustrating stimuli is associated with decreased distress (Braungart & Stifter, 1991; Grolnick, Bridges, & Connell, 1996). These findings are consistent with hypotheses that approaching a frustrating stimulus

increases emotional distress while distraction techniques can be effective in decreasing distress in the moment. In regard to long-term outcomes, one longitudinal study found that when six month old infants oriented away from a frustrating event and toward another object or their caregiver, they had less aggression at age two (Crockenberg, Leerkes, & Barrig Jo, 2008). Similarly, another longitudinal study found that more effective use of distraction at age two was associated with low levels of externalizing problems in preschool (Hill, Degnan, Calkins, & Keane, 2006). However, while distraction can reduce negative affect temporarily, this strategy can also contribute to symptoms of anxiety and mood disorders because it might preclude the use of effective reappraisal or active problem solving strategies aimed at changing the situation (Campbell-Sills & Barlow, 2007). This may be less of a concern in the context of IPV because, again, incidents of IPV are not under the control of the child. Thus, distraction is hypothesized to be a situationally-appropriate strategy without links to long-term psychopathology in this population.

Help-Seeking. Help-seeking is ubiquitous in early childhood as children seek to resolve practical and emotional challenges (Benenson & Koulnazarian, 2008; Coughlin, Hembacher, Lyons, & Ghetti, 2015). When placed in a distressing situation, even very young infants have the ability to communicate with an adult in order to solicit help or comfort. Social situation modification strategies include soliciting help through eye gaze, vocalizations, or locomotion toward a caregiver or an experimenter. As an active emotion regulation strategy, help-seeking is thought to be more effective in managing distress than passive strategies (Stifter & Braungart, 1995). Graziano, Calkins, and Keane (2011) found evidence that toddlers' use of help-seeking was positively related to sustained attention, a positive outcome, while avoidant strategies were not. However, other researchers caution that high levels of help-seeking behavior can interact

with permissive parenting to increase negative emotionality long-term if parents fail to foster independence (Premo & Kiel, 2016; Spinrad, Stifter, Donelan-McCall, & Turner, 2004). Help-seeking as an emotion regulation strategy has not been assessed in the context of IPV exposure. While hypotheses were exploratory, help-seeking was expected to be associated with positive outcomes given the active nature of this strategy.

Information Gathering. Cognitive change strategies are difficult to study in young children, but information gathering is an exception. Use of cognitive change strategies such as reappraisal is linked to decreased psychopathology (Carthy, Horesh, Apter, Edge, & Gross, 2010). Children use information gathering as a cognitive change emotion regulation strategy when they ask questions aimed at learning more about the situation, potentially changing their perspective, without asking for the situation to be changed (Silk et al., 2006). While few studies code for information gathering, one study of three-year-old children found that anger decreased more often than expected following information gathering, which was even more effective than distraction as an emotion regulation strategy (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). This may be because information gathering, along with distraction and help-seeking, may be adaptive alternatives to withdrawal from or intervention in conflict.

In summary, the research reviewed here contributes to our understanding of the link between IPV, emotion regulation, and internalizing and externalizing psychopathology. Withdrawing from incidents of IPV and intervening in the conflict have been studied as two common reactions to IPV exposure because both have the potential to disrupt emotional security (Davies & Cummings, 1998). However, these two strategies have not been examined separately as early predictors for distinct types of psychopathology (internalizing and externalizing, respectively), as the broader literature on emotion regulation and psychopathology might suggest.

The current study allowed us to identify whether these specific emotion regulation strategies mediate the relationship between IPV exposure and later internalizing or externalizing psychopathology.

Timing of IPV and Emotional Development

In addition to specifying which emotion regulation strategies develop in IPV-exposed children, it is important to identify when these differences emerge. The negative effects of IPV exposure on emotional functioning may differ depending on when children are exposed to violence. In a study of school-aged children first exposed as infants (0-1), as toddlers (1-2 years of age), as preschoolers (3-5 years of age) or as school-aged children (ages 6-12), younger age of exposure was associated with higher levels of behavior problems on the Child Behavior Checklist (Graham-Bermann & Perkins, 2010). In other studies, when children are older than five-years-of age, they have lower risk of negative outcomes (Fantuzzo et al., 1997; Holden et al., 1998). No extant studies have considered whether there are similar timing effects of IPV on emotion reactivity and emotion regulation, which are promising mediators in the relationship between IPV and behavior problems. This is notable because children's ability to regulate emotion, in particular, is closely linked with their developmental progress (Bell & Wolfe, 2004). While IPV research demonstrates that early exposure is generally related to more deleterious outcomes compared to exposure later in childhood, there is no systematic investigation of the timing of IPV in relation to emotion reactivity and emotion regulation. Timing hypotheses rely on literature detailing the developmental trajectory of emotion reactivity and regulation.

Emotional development begins at birth. Experiences of pleasure and displeasure are present in the first days of life (Sroufe, 1979). While emotion reactivity is immediately observable (e.g., the infant's first cry), emotion regulation unfolds gradually over the course of

early childhood and beyond. Individual differences in emotion reactivity, while remaining vulnerable to environmental threat, are considered more endogenous and immutable in comparison to emotion regulation. That is, emotion reactivity changes less as people grow older (e.g., Terracciano, McCrae, Brant, & Costa, 2005), but emotion regulation abilities continue to transform drastically throughout early childhood and even into old age (Carstensen, Fung, & Charles, 2003; John & Gross, 2004; Blanchard-Fields, Stein, & Watson, 2004). As individuals mature and experience the costs and benefits of using different emotion regulation strategies, they learn to regulate emotions in increasingly healthier ways (John & Gross, 2004). In fact, Fonagy and Target (2002) concluded that, "In one sense we can consider the whole of child development to be the enhancement of self-regulation" (p. 313).

Timing Hypotheses. The development of emotion reactivity and regulation should be considered when exploring how when a child is exposed to IPV influences emotional functioning. In particular, there may be different sensitive periods for the effects of IPV on emotion regulation, compared to emotion reactivity. Research demonstrates that trauma that occurs in infancy, even before the development of autobiographical memory, exerts a long-lasting effect on emotion reactivity. Emotion reactivity is sensitive to influence at a young age in part because stress affects the developing HPA axis and sympathetic nervous system (Hibel, Granger, Blair, & Cox, 2011).

However, the use of independent emotion regulation strategies increases throughout the preschool years. The preschool period is an active time in which children are learning and implementing new strategies for regulating emotion. Later developing emotion regulation strategies such as cognitive change and situation change may be especially vulnerable to environmental input at this time. Therefore, I hypothesized that IPV exposure in the first few years of life would be associated with individual differences in emotion reactivity but not

regulation. In contrast, I hypothesized that IPV exposure in the preschool years would be associated with both emotion reactivity and independent emotion regulation strategies.

Exploring Multifinality of Outcomes

While helpful in testing longitudinal predictions about specific pathways of risk, models that focus on individual emotion regulation strategies in isolation are limited in their ability to replicate more complex patterns of emotional functioning. There are two problems with this approach. First, it oversimplifies the process of emotion regulation. While studies have traditionally examined one strategy at a time, recent research indicates that individuals spontaneously use multiple emotion regulation strategies in response to emotion-eliciting events (Aldao & Nolen-Hoeksema, 2013). Relatedly, an individual's flexibility in using a range of different strategies may be more important than the use of any one strategy in predicting adaptive or maladaptive functioning (Aldao, Sheppes, & Gross, 2015, Bonanno & Burton, 2013).

Second, it is difficult to account for the diverse emotional and mental health outcomes associated with IPV when using variable-oriented models. For example, when considering emotion reactivity, profiles associated with problematic parent-partner conflict may actually be characterized by either heightened or blunted emotional reactivity (e.g., El-Sheikh et al., 1996). In regard to the regulation of exposure to conflict, problematic parent-partner conflict is associated with extreme attempts to either avoid or intervene directly in conflict (Davies et al., 2002). Additionally, there are a number of distinct psychological disorders associated with early exposure to IPV, and researchers struggle to identify risk factors specific to different types of psychopathology (Sturge-Apple, Skibo, & Davies, 2012).

To address these issues, researchers should move towards more complex models that include more than one emotion regulation strategy, different patterns of emotional functioning,

and multiple outcomes in IPV-exposed children. Thus, a third goal of this research was to use a person-centered approach to identify whether there were subgroups of children who displayed different emotional responses when exposed to similar home environments. Such an approach is presented in a reformulation of EST (Davies & Martin, 2014). EST now predicts that there are different patterns or profiles that capture the heterogeneity of how children respond to IPV. While extant research seems to provide contradictory findings when analyzing one variable at a time (e.g., emotion reactivity alone), considering the broader organization of variables can help researchers make sense of the IPV literature. In fact, a pattern-based approach is more consistent with the original definition of emotional security as a "dynamic, nonlinear control system that can flexibly organize an array of behaviors to defend against the threat posed by interparental conflict" (Davies & Martin, 2014, p. 1440). As such, different children are expected to develop distinct patterns of emotional functioning associated with diverse environmental precursors and long-term psychological sequelae.

EST's four emotional security profiles are secure, mobilizing, dominant and demobilizing (Davies & Martin, 2014). Each proposed profile specifies a different type of adaptation to the home environment. Profiles are characterized by family precursors, internal representations, emotional functioning, and associations with psychopathology.

Secure Profile. Children with secure emotional security profiles, thought to develop in the context of non-violent homes, are able to coordinate resources efficiently in order to respond to clear, direct threat. They are able to regulate distress and return to their activities after the conflict is resolved. EST predicts that secure children experience less emotion reactivity than children in other profiles. Additionally, secure children are less likely to interpret their distress as

an unmanageable threat because they hold secure representations of how family conflict is resolved. Thus, they are less likely to identify an urgent need to regulate emotion.

Mobilizing Profile. Children with mobilizing emotional security profiles, in contrast, hold hostile representations of how interparental conflict will influence the family. Mobilizing profiles emerge in families with escalating interadult anger, child-related conflict, and inconsistent resolution (Davies & Martin, 2014). As a result, they experience high subjective distress during incidents of IPV and may be more likely to use social de-escalation strategies in attempts to protect the family system. While they activate strong emotion regulation goals to minimize distress, they have fewer emotion regulation strategies at their disposal. They rely heavily on dramatic displays of distress (up-regulation of distress) and problem solving, a situation modification strategy, to intervene in interparental conflict. They tend to act quickly to intervene in the high-stakes context of family violence.

Dominant Profile. A dominant profile is forged in families characterized by disengagement and chaos, anger escalation, "frightened" parent behavior, and no resolution. Children with dominant emotional security profiles directly defeat threat through confrontation. They hold benign representations of the impact of interparental conflict for the self, but hostile representations of how interparental conflict will affect the family. While they are hypervigilant to threat, they down-regulate vulnerable emotions while up-regulating dominant emotions, displaying little outward distress. They are thought to overvalue aggression under the belief that it will protect vulnerable family members. While dominant children appear unstressed, their larger goal is to use emotional suppression, a response modulation strategy, to appear in control.

Demobilizing Profile. Lastly, a demobilizing emotional security profile is characterized by hostile representations of interparental relationship quality. It is associated with severe levels

of violence and aggression in the family system. Children in the demobilizing profile experience high vulnerable distress, and doubt their ability to regain emotional security or stay safe from harm during incidents of IPV. They down-regulate fear to reduce their salience as a target of negative hostility. Furthermore, children with this profile have few emotion regulation strategies to select from, and they may experience a lack of felt security associated with a low level of emotion regulation self-efficacy. Passive emotion regulation strategies such as expressive suppression, distraction, and avoidance are chosen in an attempt to lessen the subjective experience of distress. These children may view the situation and resulting distress as overwhelming, and they tend to diffuse these experiences through strategies involving submission and appeasement.

There has been one longitudinal study to empirically validate these four EST profiles. Davies and colleagues (2016) identified behaviors associated with each profile in a sample of preschool children and found support for diverse outcomes associated with each profile as predicted by EST. Specifically, the dominant profile was associated with externalizing psychopathology, the mobilizing pattern with both internalizing and externalizing psychopathology, and the demobilizing pattern with internalizing psychopathology. In this study, children were exposed to a simulated interadult argument and coders rated the degree to which children's behaviors corresponded with each of the four EST patterns. For example, criteria for the mobilizing pattern included "…demonstrative expressions of arousing distress (e.g., crying, fret- ting, intense facial distress, and clinginess) that are commonly accompanied by high involvement in the conflict (e.g., comfort- seeking, attempts to side with one parent that fall short of directly disparaging the other parent), active forms of flight or avoidance (e.g., quickly moving away from the conflict, plugging ears, and making a great deal of noise), and/or coy, ingratiating,

or overenthusiastic behaviors that co-occur with anxiety, apprehension, and awkwardness (e.g., sudden, unexplainable intense smiling; reverting to "baby talk")" (Davies et al., 2016, p.1650). Notably, composite characteristics and behaviors were not evaluated independently, making it difficult to identify which aspects of emotional functioning are pathogenic. Further, the researchers did not explore the influence of IPV or interparental conflict other than including change in conflict as a covariate in latent difference score models. Thus, it is unclear whether predictions about the etiology of EST profiles was validated.

The present research replicated emotional security profiles, but used emotion reactivity and emotion regulation strategies as the only indicators. Thus, these profiles were empirically derived, while Davies et al. (2016) selected for characteristics that would sort children into pre-determined groups. Analyses in the present research were guided by the premise that observation of basic emotional functioning in preschool-aged children is a sufficient way to identify patterns of risk and resilience. Using such basic behavioral indicators may help researchers and clinicians assess young children, because preschoolers struggle to communicate about their internal worlds. Extending hypotheses from path analyses in the first section in favor of a person-oriented approach, this alternative approach explored individual differences by identifying profiles of emotional functioning (emotion reactivity and all five emotion regulation strategies) and their relation to IPV and psychopathology.

Profile-specific hypotheses for study variables are summarized in Table 1. I proposed that a data-driven analytical approach would identify and validate emotional security profiles. In other words, children matching a secure profile would use a variety of emotion regulation strategies, particularly active, independent strategies, and strategies that demanded more cognitive costs, such as information gathering, a cognitive change strategy. Thus, moderate emotion reactivity,

along with information gathering, distraction, and help-seeking, were expected to emerge. A mobilizing profile was hypothesized to be characterized by high emotion reactivity and persistent attempts to intervene in conflict. In a dominant profile, low emotion reactivity, along with attempts to intervene in conflict, were expected. Lastly, children fitting a demobilizing profile in the present study were hypothesized to exhibit moderate distress, high withdrawal, and low use of active strategies of help-seeking and intervention.

Current Project

The current project contributed to the literature by exploring several unaddressed questions about childrens' emotional responses to IPV exposure. First, more research is needed to identify IPV-related emotional functioning associated with pathways specific to internalizing and externalizing psychopathology. Research indicates that withdrawing from or intervening in incidents of IPV increases risk for the development of psychopathology in this population. If these reactions are conceptualized as emotion regulation strategies, we can generate new predictions about how various strategies are differentially associated with psychopathology. For example, strategies such as behavioral avoidance, rumination, and suppression are positively associated with internalizing disorders (Aldao et al., 2010; Garnefski, Kraaij, & van Etten, 2005), while confrontational strategies are associated with externalizing disorders (Thompson & Goodman, 2010). As such, a child's habitual response to the strong emotions provoked by IPV may hold predictive value in specifying risk for distinct types of psychological disorders and explaining associations between IPV and psychopathology.

Second, little is known about how the timing of early family stress affects the use of emotion functioning, and specifically, emotion regulation strategies (Thompson, 2013). Research on the development of emotion regulation strategies in high risk populations should be sensitive

to different patterns of IPV exposure, such as whether a child is exposed at specific times (e.g., during infancy or during preschool), or whether the child is exposed to IPV throughout multiple years. As children experience diverse patterns of exposure across early childhood, individual differences in the timing of IPV exposure should be explored. Predictions about timing can be generated based on extant knowledge about the developmental timelines of emotion reactivity and emotion regulation. In particular, emotion reactivity may be susceptible to IPV effects across early childhood, due to the influence of trauma on developing biological systems. In contrast, emotion regulation may be more affected by IPV during the preschool years as emotion regulation becomes more sophisticated and demands for independent emotion regulation increase. It follows that chronic exposure across early childhood would be associated with the highest levels of emotion reactivity and problematic emotion regulation.

Third, questions remain about the multifinality of outcomes in children exposed to IPV and how to model emerging profiles in early childhood that might affect these outcomes. Heterogeneity in the expression of emotional security is associated with differences in early family environments, child characteristics, and psychological sequelae (Davies & Martin, 2013). Several studies demonstrate the presence of different groups of children that vary in their behavioral response to family conflict (e.g., Davies, Hentges, & Sturge-Apple, 2016; Davies & Forman, 2002; Maughan & Cicchetti, 2002). However, these studies rely on the self-report of internal processes of school-aged children (an exception is Davies et al., 2016). More research in early childhood is needed to locate diverse subgroups of young children at increased risk for psychopathology and design interventions for children at risk for mental health problems. Using this approach, interventions can be broadened to include previously overlooked profiles of risk following early childhood exposure to trauma (Thompson, 2013).

The current project used an archival dataset to investigate the role of early emerging emotion regulation strategies in increasing the risk for mental health problems in children exposed to IPV. Participants were 206 mother-child dyads who participated in annual research visits starting during pregnancy and ending when the child was seven years old. Women were oversampled for IPV, and children varied in their exposure to IPV throughout childhood, from none to continuous. In the present research, observational coding was used to examine children's emotion reactivity and use of emotion regulation strategies during a distress-eliciting laboratory task at age four. In the task, children listened to recordings of simulated interadult conflict. We coded five emotion regulation strategies of withdrawal (e.g., hiding, trying to escape, covering ears), attempts to intervene (e.g., yelling for adults to stop), distraction, help-seeking behavior, and information gathering (e.g., asking questions about the incident). Emotion reactivity, defined as the level of negative affect, was coded separately based on facial and vocal indicators of distress.

Analyses employed variable-oriented and person-oriented approaches to examine relationships among three sets of variables: exposure to IPV in early childhood, children's emotion regulation strategies in response to simulated adult conflict at age four, and internalizing and externalizing behavior problems at age seven.

The first aim examined two specific emotion regulation strategies and their associations with risk factors and psychopathology (see Figure 1). Path analyses explored how IPV exposure influenced attempts to intervene or withdraw from simulated interadult conflict. Attempts to intervene was hypothesized to mediate relations between IPV exposure and externalizing behavior problems due to associations with undercontrolled emotion regulation. Alternatively, withdrawal from simulated conflict was hypothesized to mediate associations between IPV

exposure and internalizing behavior problems, because behavioral avoidance is a key component of depression and anxiety.

Covariates included in analyses were difficult child temperament and cumulative demographic risk. Temperament refers to constitutionally based individual differences in reactivity and self-regulation (Rothbart, Sheese, & Posner, 2014). Difficult temperament (e.g., low effortful control, high negative affectivity) may be associated with deficits in purposeful emotion regulation in preschool (Carlson, & Wang, 2007) and should be distinguished from environmental influences such as IPV. Demographic risk is also associated with individual differences in emotional functioning (Chen, Langer, Raphaelson, & Matthews, 2004), thus a cumulative risk variable (including income, marital status, age, negative life events, and drug use) was used to control for risk factors. Difficult temperament and IPV exposure were expected to share positive associations with attempts to intervene and withdraw, over and above cumulative risk.

The second aim involved identifying patterns of IPV exposure during the first four years of life that predicted emotional functioning at age four. Latent growth curve modeling was used to explore trajectories of IPV exposure across early childhood in relation to emotion reactivity and emotion regulation strategies. While no research has investigated different growth curves of IPV exposure in relation to emotion reactivity and emotion regulation, several hypotheses were generated from more general knowledge of child development. I hypothesized groups in which children's exposure to IPV (1) occurred chronically across early childhood, (2) declined during the first four years, or (3) increased during the first four years. In addition, a fourth group with no to low levels of IPV during early childhood was expected to emerge. I hypothesized that the first group, characterized by chronic IPV exposure across early childhood, would be associated with

heightened emotion reactivity and heightened emotion regulation strategy use (i.e., high levels of withdrawal or attempts to intervene). I hypothesized that the second group, characterized by IPV exposure that started at high levels and decreased, would be associated with high emotion reactivity and no differences in emotion regulation. Finally, I hypothesized that the third group, characterized by exposure that started at low levels and increased, would be associated with heightened emotion regulation strategy use and moderate emotion reactivity.

The third aim sought to identify distinct subgroups of children who varied in patterns of emotion regulation strategy use. Person-oriented strategies were used to re-evaluate aim one hypotheses and account for several different types of emotional functioning, as indexed by patterns of emotion reactivity and emotion regulation strategy use. Based on previous research, I predicted that there would be four distinct subgroups of children with different emotional reactions to IPV (e.g., secure, mobilizing, dominant, and demobilizing; Davies & Martin, 2013; Davies, Hentges, & Sturge-Apple, 2016). See Table 1 for predictions about emotion reactivity and emotion regulation strategy use that were expected to characterize four groups identified with Latent Profile Analysis. Profiles were validated using IPV exposure and internalizing and externalizing behavior problems to test hypotheses about precursors and sequelae of group membership.

METHOD

Participants

Participants were 206 mother-child dyads initially recruited as part of a longitudinal study investigating the effects of IPV on mothers and their children. Pregnant women were recruited from four counties in Mid-Michigan. Flyers were posted in community locations including women's health clinics, obstetric/gynecology clinics, libraries, stores, Head Start programs, WIC offices, and a domestic violence shelter. Women were required to be 1) in the last trimester of pregnancy, 2) between 18 and 40 years old, 3) English speaking, and 4) in a romantic relationship of six weeks or longer at some point during their pregnancy.

Recruitment efforts were made to include women who were ethnically and socio-economically diverse. Of the 189 participants who participated at the first wave of the present project (age 1), over half the women in the study identified as White/Caucasian (65%), with 24% identifying as Black/African American, 5% Latina, 4% Biracial, 1% Native American, and 1% Asian American. Women's average age was 27 years (SD=5). Thirty-eight percent of the women had a high school diploma, equivalent, or some high school education; 42% had some college education or trade school; 4% had an Associate's Degree; 9% had a Bachelor's Degree, and 6% had a graduate degree. At the time of the first interview, 62% were working outside of the home. The mean monthly income was $2,201 (SD=1752) and the median monthly income was $1,500. Forty-four percent of the women were single, never married; 44% were married, and 12% were separated, divorced, or widowed.

Data used in the current study were collected at five time points: when the child was 1, 2, 3, 4, and 7 years old. Of the original 206 mothers who entered the study at pregnancy, 189 mother-child dyads participated at age 1, and 165 mothers-child dyads participated at age 7.

Reasons for attrition included the following: 24 could not be contacted and left no forwarding information, 11 withdrew from the study, 1 mother was incarcerated, and, in 5 cases, the mother or child had passed away. In 14 cases, data was missing for all timepoints used in the present study (ages 1 through 7). Following best practices for types of missingness (Biering, Hjollund, & Frydenberg, 2015), data was imputed for 192 cases (206 - 14) using EM estimation (SYSTAT 12).

Measures

Mothers' experiences of IPV were measured via maternal report during interviews when the child was age 1, 2, 3, 4, and 7. Cumulative risk and child temperament were assessed via maternal report at age 1. At age 4, children participated in a task that involved exposure to simulated interadult conflict. Emotion reactivity and emotion regulation was assessed via observational coding of this task. Child internalizing and externalizing psychopathology was measured via maternal report at ages 4 and 7.

Maternal Report. *The Severity of Violence Against Women Scales* (SVAWS: Marshall, 1992) is a 46-item questionnaire assessing violent behaviors and threats the woman has experienced from her partner. There are nine categories of abuse and threats. Examples of items include "destroyed something belonging to you," "punched you," and "demanded sex whether you wanted to or not." Respondents rate their experiences of abuse on a 4-point scale ranging from "Never" to "Many Times." Coefficient alphas ranged from .95 to .96 for time points around child ages one, two, three, four, and seven. Scores ranged from 0 to 184 at each wave of the study. In the first aim, to account for total exposure to IPV throughout early childhood, scores at ages 1, 2, 3, and 4 were averaged to create a cumulative exposure to IPV variable.

Demographic Questionnaire. A questionnaire was administered to obtain basic demographic information. A cumulative risk score was created to account for maternal income, marital status, age, past negative life events and drug use. Five dichotomous variables were created and summed: income (below Medicaid cutoff = 1), marital status (single = 1), age (below 22 years = 1), negative life events using the Life Experiences Survey (Sarason, Johnson, & Siegel, 1978) (highest 25% percentile = 1), and drug use as measured with the Perinatal Risk Assessment Monitoring Survey (Gilbert, Shulman, Fischer, & Rogers, 1999) (any street drug use pre- or postnatal = 1). The cumulative risk score ranged from 0 to 5.

Toddler Temperament Scale (TTS; Fullard, McDevitt, & Carey, 1984)**.** This scale is appropriate for infants 12-36 months of age and consists of 97 items. This scale derives 9 subscales of temperament dimensions including activity, rhythmicity, approach, adaptability, intensity, mood, persistence, distractibility, and threshold. Examples of items include "the child cries after fall or bump," "the child sits still while waiting for food," and "the child is still wary of strangers after 15 minutes." Respondents rate their child's recent and current behavior, based on the previous four to six weeks, on a 6-point scale ranging from "Almost Never" to "Almost Always." Coefficient alphas for the current subscales were: activity: .55; rhythmicity: .49, approach: .79, adaptability: .56; intensity: .33, mood: .46, persistence: .60; distractibility: .41, threshold: .30. Mean subscales were calculated that range from 0 to 6. A difficult temperament latent variable was created using mean scores on the five subscales that were correlated with maternal report of difficult temperament by Fullard et al. (1984). These included high activity, low approach, low adaptability, negative mood, and high intensity.

Child Behavior Checklist for Ages 4-18 (CBCL; Achenbach, 1991). This 112-item instrument measures social and emotional functioning of children ages 4 to 18. The instrument

yields eight subscales, two broad band subscales concerning internalizing and externalizing behavior and a total problem behavior score. Internalizing Problems combines the Withdrawn, Somatic Complaints, and Anxious/Depressed scales, while Externalizing combines the Delinquent Behavior and Aggressive Behavior scales. Mothers are given a list of symptoms and asked to indicate how true the statement is for their child within the last six months. Sample internalizing items include "would rather be alone than with others," and "too fearful or anxious." Externalizing items include "disobedient at home" and "stubborn, sullen, and irritable." Participants rate the symptoms on a 3-point scale from "Not True" to "Very True or Often True." Coefficient alpha for the scale was .83 for the internalizing problem scale and .88 for the externalizing scale at age 7.

Observational Coding. *Exposure to Interadult Anger* (Cummings, 1987). Children participated in an experimental protocol at age four designed to assess children's responses to verbal conflict between adults (See Figure 2). Children were seated at a table next to a female research assistant, who initiated a coloring activity. After children were seated and engaged in coloring, a second research assistant located outside of the room turned on a 60-second audio recording of a simulated argument between two adults. Children remained in the room when the recording ended. There was one minute of silence before a second 30-second recording was played. The second recording featured the same voices from the first recording, but the adults were heard resolving the conflict and apologizing. Children were videotaped for an additional 60 seconds of play after hearing the second recording. A video camera was located behind a one-way mirror in direct view of children's faces. In the present study, these videotapes were coded to determine child emotion reactivity and emotion regulation strategies in response to the conflict.

Children's behavior was coded during all phases of the simulated conflict task to capture immediate and delayed responses to the conflict recording.

*Emotion Reactivity***.** Videos of the task were coded according to the emotion reactivity ethogram described in Table 2. Research assistants trained to reliability watched the entire episode to assign a global reactivity code to indicate the level (frequency and intensity) of fear, sadness, or anger expressed by the child during the interadult anger exposure. This approach is consistent with studies that use global indicators of emotion reactivity (e.g., Fortunato, Dribin, Granger, & Buss, 2008). Observations were coded on a four-point scale ranging from zero to three (0=No reactivity, 1=Mild reactivity, 2=Moderate reactivity, 3=High reactivity). Coders observed facial and vocal indicators of negative affect in the children. Bodily indicators of distress were not included in the current emotion reactivity coding scheme because they are difficult to differentiate from emotion regulation strategies (e.g., escape/avoidance). Guidelines for identifying facial indicators of distress were adapted from descriptions of fear, sadness, and anger provided in the Facial Action Coding System (Ekman & Rosenberg, 1997). Vocal indicators of distress included whines, yells, and statements expressing negative affect.

Emotion Regulation. Videos were also coded to assess children's use of five emotion regulation strategies: intervention, withdrawal, distraction, information gathering, and help-seeking. A four-point coding scale from zero to three (0=No withdrawal, 1=Mild withdrawal, 2=Moderate withdrawal, 3=High withdrawal) was used to rate the frequency and intensity of each emotion regulation strategy (Table 3). Each strategy was coded in independent streams. Research assistants watched the tapes five times to capture a global code for the use of each emotion regulation strategy. Codes for the strategies of intervention and withdrawal are described in classic studies that introduced the Exposure to Interadult Anger Task (Cummings, 1987; El-

Sheik, Cummings, & Goetsch, 1989). However, in the present coding scheme, emotion regulation strategies are distinguished from emotion reactivity, and intervening in conflict is introduced as an independent code. Emotion regulation strategies of information gathering, distraction, and help-seeking have been reliably assessed in preschoolers (Dollar & Stifter, 2012; Gilliom et al., 2002; Silk et al., 2006), but not in the context of a task involving exposure to interadult conflict. A detailed coding protocol is provided in Table 3.

Procedures

During initial recruitment for the Mother-Infant Study, women completed a brief telephone screening to determine eligibility. The Conflict Tactics Scale (Straus, 1979) was administered during the initial telephone screening to oversample for women experiencing IPV. For the purpose of recruitment, women were categorized as "battered" if they had experienced physical violence (items 6-14) during pregnancy. Overall, 161 women who called the project office to participate were deemed ineligible because they did not meet age, relationship status, or IPV experience criteria. There were no demographic differences between these excluded women and those who participated.

Data Collection. Undergraduate and graduate research assistants were trained to administer questionnaires and conduct protocols at each wave of the study. Throughout the period of data collection, research assistants attended a weekly training meeting to review procedures and discuss problems. During yearly study interviews, the participant was informed about anonymity and confidentiality. Women first completed an informed consent form that specified that their participation was voluntary and that they could withdraw from the study at any time without incurring any negative consequences. Interviewers read all questionnaires aloud and marked down participant's responses in order to control for variation in the level of literacy

among participants. Participants were compensated for their participation and were given a list of community resources available to women and children.

A team of undergraduate research assistants was trained to code videos of the Exposure to Interadult Anger task. All coders reached reliability (Cohen's $\kappa > .70$) with the master coder. Weekly training meetings were held to review the process of coding, review coding decisions, and discuss disagreements. After reaching reliability, 30% of observations were randomly selected for double coding. Double-coded videos and reliability statistics were reviewed at coding meetings and coding disagreements were resolved by consensus. Final inter-reliability reached .71 for reactivity, .93 for withdrawal, .83 for distraction, .91 for intervention, .73 for information gathering, and .81 for help-seeking (weighted kappa) in a 25% double coding.

RESULTS

Missing Data

To deal with missingness, data was imputed for 192 (206 – 14) cases using EM estimation (SYSTAT 12). Missing data accounted for 9% of data points. The MCAR statistic indicated that data was missing completely at random ($\chi^2 = 719.81$, df = 665, p = .07). Following imputation, outliers were addressed by replacing implausible values with the highest or lowest value within the range. In the case of ordered, Likert scale variables, values were not rounded to discrete numbers due to the possibility of introducing bias by not accounting for non-normal distributions (see Xia & Yang, 2016).

Descriptive Statistics

Variable means and standard deviations are found in Table 4. Bivariate correlations among variables are in Table 5. As expected, some variables were highly correlated, such as IPV across time points. For instance, age one IPV was most highly correlated with age two IPV (r = .54), and less so at later timepoints (r = .27 at age seven). IPV exposure at ages one, two, and three were consistently correlated with age four externalizing problems and age seven internalizing and externalizing behavior problems. Age four IPV was not associated with concurrent behavior problems, while age seven IPV correlated with concurrent internalizing behavior problems only. Internalizing and externalizing variables at ages four and seven were intercorrelated.

Among the five variables coded from the angry situation task at age four, emotion reactivity was significantly positively correlated with emotion regulation strategies of withdrawal (r = .30), intervention (r = .18), and information gathering (r = .34), indicating that children displaying higher levels of distress were more likely to engage in these strategies. Emotion

reactivity was significantly negatively correlated with distraction (r = -.39). Emotion reactivity was also correlated with parent report of internalizing (not externalizing) behavior problems at age four (r = .16) and age seven (r = .15), but not risk, difficult temperament, or IPV exposure. The only IPV variable correlated with emotion reactivity or regulation variables was the association between age four IPV exposure and the regulation strategy of withdrawal (r = .19).

Data Analytic Plan

Statistical analyses were completed using Mplus 7.3 (Muthen & Muthen, 2007) and SPSS 24.0 (SPSS: An IBM Company, 2010). For the first aim, hypotheses were analyzed with path analysis. Global fit was evaluated using the overall $\chi 2$ test of model fit, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean square residual (SRMR). AIC and BIC are reported as additional absolute model fit indices.

For the second aim, latent class growth curve modeling was used to test hypotheses regarding patterns of IPV exposure across early childhood. Growth mixture modeling (GMM) tests hypotheses about between-person differences in within-person change (Ram & Grimm, 2009). Fit indices such as the Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) identified the best fitting model. A three-step procedure was used to evaluate whether emotion regulation strategies were associated with latent growth curve membership. In the three-step model, one first determines the number of latent classes without the predictors on class membership (Step 1). Then the most likely class membership is saved, merged with the original data (Step 2), and analyzed separately from the latent trajectory model using a multinomial regression analysis (Step 3; van de Schoot, Sijbrandij, Winter, Depaoli, & Vermunt, 2017).

To evaluate hypotheses in the third aim, an exploratory Latent Profile Analysis was conducted. Latent Profile Analysis, like Latent Class Analysis, assumes that a few mutually exclusive classes can explain the frequency of co-occurrence between variables (Lanza, Flaherty, & Collins, 2003). Homogeneity within classes and heterogeneity between classes is maximized. The optimal number of classes was determined by consulting test statistics such as the Lo–Mendell–Ruben Adjusted Likelihood Ratio Test, Bootstrapped Likelihood Ratio Test, AIC, and BIC (e.g., Roesch, Villodas, & Villodas, 2010). Predictions from EST were also used to guide interpretation of the groups (See Table 1). To validate profiles, a three-step procedure was used to explore associations between group membership and hypothesized predictor and outcome variables (Asparouhov & Muthén, 2014).

Aim One

Figure 1 depicts a conceptual model that links the various Aim 1 hypotheses. A series of path analysis models evaluated hypotheses about pathways linking emotion regulation strategies of withdrawal from conflict and intervention in conflict with internalizing and externalizing behavior problems (See Figure 1). These emotion regulation strategies and emotion reactivity were hypothesized to be predicted by cumulative risk, early childhood IPV exposure (mean of exposure from ages one to four), and difficult temperament. Exploratory risk factors included prenatal IPV, gender, and parenting characteristics. Emotion regulation strategies and emotion reactivity were hypothesized to predict internalizing and externalizing behavior problems at age seven, controlling for concurrent IPV and age four behavior problems.

The first path analysis model tested whether reactivity and withdrawal from conflict were predicted by IPV, temperament, and cumulative risk, and whether reactivity and withdrawal to conflict were associated with the development of internalizing or externalizing behavior problems

at age seven (See Figure 3). The model took into account influence of age four behavior problems and concurrent IPV on age seven behavior problems.

For this first model, the χ^2 test of model fit was statistically significant ($\chi^2 = 270.40$, df = 30, $p < .001$), indicating likely model misfit. Other fit indices also indicated that overall model fit was poor (RMSEA = .13, CFI = .10, SRMR = .08). Examining the model, the only significant pathways were age seven behavior problems regressed on age four behavior problems, indicating stability in parental report of behavior problems across time. The main predictor variables for emotion reactivity and withdrawal were temperament, IPV exposure from ages one to four, and cumulative risk, however, none of these variables predicted observed emotion reactivity and withdrawal variables.

The second path analysis model tested the same pathways as model 1, replacing withdrawal from conflict with intervention in conflict, the other emotion regulation variable of interest in this aim (See Figure 4). Overall model fit for this second model was also poor. The χ^2 test of model fit was statistically significant ($\chi^2 = 122.91$, df = 22, $p < .001$). Other fit indices indicated poor fit (RMSEA = .16, CFI = .55, SRMR = .39). Notably, a significant negative relationship was estimated between intervention in conflict and age seven internalizing behavior problems.

Removing non-significant pathways from the full model, a model was estimated to investigate the relationship between intervention in conflict and internalizing behavior problems. This model included variables of reactivity, intervention in conflict, and internalizing symptoms at age seven. Both reactivity and intervention at age four predicted internalizing symptoms at age seven such that internalizing symptoms were associated with higher levels of reactivity and less intervention. When controlling for age four internalizing symptoms, reactivity was associated

with comorbid internalizing symptoms while age seven internalizing symptoms were predicted by intervention in conflict. In this final model (See Figure 5), the χ^2 test of model fit was not statistically significant ($\chi^2 = 3.24$, df = 25, $p = .20$). Other indices similarly indicated that overall model fit was good (RMSEA = .06, CFI = .97, TLI=.92, SRMR = .03).

As emotion reactivity and regulation variables were not predicted by proposed variables of IPV, temperament, or cumulative risk, additional questions remained about whether other known risk factors better predicted preschool emotional functioning. In post-hoc analyses, a second set of risk variables were included in a separate model (retaining IPV and cumulative risk) to investigate the influence of prenatal IPV and gender on emotion reactivity and withdrawal; no association emerged (Figure 8). Finally, parenting was considered as a predictor of child emotionality and regulation, but pathways for nurturing and harsh parenting were not significant (Figures 9 and 10). Similarly, a model including prenatal IPV exposure and gender as predictors did not improve fit for models with intervention as the regulation variable (Figure 11). While an association between early childhood IPV exposure and intervention in conflict emerged in the model that included prenatal IPV, it was not significant in models without prenatal IPV (a non-significant pathway). Nurturing parenting and discipline were included in subsequent models and no significant pathways emerged (Figures 12 and 13).

Aim Two

In the second aim, GMM was used to identify trajectories of exposure to IPV across early childhood. While cumulative IPV was indexed as a mean score in Aim 1, GMM was chosen for Aim 2 to better account for the trajectory of IPV exposure in early childhood, utilizing the longitudinal nature of the data. Additionally, while conventional growth models assume that the sample is drawn from a single population characterized by a single set of parameters (e.g., means,

variances, covariances), GMM is a method for identifying multiple unobserved sub-populations, describing longitudinal change within each unobserved sub-population, and examining differences in change among unobserved sub-populations (van de Schoot, et al., 2017). Thus, GMM allows for person-centered analysis of individual differences in IPV exposure across childhood.

Indicators were maternal report of child IPV exposure (SVAWS mean score, natural log transformed) across the first four years of the child's life (as reported at ages 1, 2, 3, and 4). Selecting among possibilities for the functional form of change over time (e.g., no-growth, linear, quadratic, etc), the linear model was chosen as the baseline model because of its simplicity and parsimony for representing the observed patterns of change present in the data. While the quadratic model was explored, estimated means of the quadratic growth factor were not significant for the baseline model nor in models estimating more than one class, indicating that linear models better fit the data.

A one-class linear growth model served as the baseline model. In the one-class model, the mean of the intercept and slope were .86 and -.09, respectively, describing an overall pattern of change that begins at .86 at age one and declines to .5 by age four.

Latent class models were then specified from two classes to five classes and compared to the baseline one-class model. Fit statistics for all five models are reported in Table 6. BIC decreased steadily from the one- to four- class models, while the rate of decrease slowed slightly between the four-class and five-class models. Similar patterns emerged for AIC and adjusted BIC. Entropy also remained high in the four-class model, indicating that cases were classified in confidence and there was adequate separation between the latent classes. Thus, the four-class model was retained for further analysis.

Class one (Stable Low IPV, N=127) was estimated to contain roughly two thirds of the sample (See Figure 6). The average trajectory for class one was calculated to begin at .25, and showed little change through age four. This class is characterized by cases with low levels of IPV across early childhood. Class two (Decreasing IPV, N=24) has a high mean intercept (2.84) with a negative mean slope (-.89), indicating a high level of IPV at age one that declines over time. Class three (Increasing IPV, N=23) has a low mean intercept (.38) and a positive slope (.54), indicating low IPV at age one that increases over time. Lastly, class four (Stable high, N=18) has a high mean intercept (2.69) and a small negative slope (-.10).

Classes were validated on hypothesized emotion regulation strategies at age four and child behavior problems at age seven. Specifically, withdrawal from conflict and intervention in conflict were entered as distal outcomes to test whether group membership predicts the use of these specific emotion regulation strategies. Internalizing and externalizing scales of the CBCL were also entered as distal outcomes to test whether IPV trajectories and emotion regulation covariates are associated with the development of behavior problems at age seven. Asparouhov and Muthen (2018) recommend the DU3STEP command as the preferred method for continuous distal outcomes in mixture modeling unless the model does not converge due to change in class membership with the 3-step method. Results indicated possible class formation changes when testing distal outcomes of intervention in conflict: thus, results were not reported. Instead, the Lanza (2013) method for distal outcome analysis was used for emotion regulation variables, and the DU3STEP method was retained for internalizing and externalizing variables.

For the emotion regulation strategy of withdrawal from conflict, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 9.20, p = .027]. Pairwise tests indicated that observed withdrawal during the simulated interadult conflict

task was higher in Class 3, Increasing IPV, when compared to Class 1, Stable Low IPV [χ^2 (1, N=192) = 8.01, p = .005].

For the emotion regulation strategy of intervention in conflict, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 21.44, p < .001]. Pairwise tests indicated that observed intervention in conflict was lower in Class 4, Stable High IPV, when compared to Class 3, Increasing IPV [χ^2 (1, N=192) = 4.10, p = .043], and Class 1, Stable Low IPV [χ^2 (1, N=192) = 14.39, p < .001].

For internalizing behavior problems at age seven, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 17.79, p < .001]. Pairwise tests indicated that internalizing behavior problems were lower in Class 1, Stable low IPV, when compared to Class 2, Decreasing IPV [χ^2 (1, N=192) = 11.37, p = .001], and Class 3, Increasing IPV [χ^2 (1, N=192) = 4.35, p = .037].

For externalizing behavior problems at age seven, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 11.91, p = .008]. Pairwise tests indicated that externalizing behavior problems were lower in in Class 1, Stable Low IPV, when compared to Class 2, Decreasing IPV [χ^2 (1, N=192) = 6.85, p = .009], Class 3, Increasing IPV [χ^2 (1, N=192) = 5.19, p = .023], and Class 4, Stable High IPV [χ^2 (1, N=192) = 4.37, p = .037].

Aim Three

Latent Profile Analysis (LPA) was conducted to examine patterns among emotion reactivity and emotion regulation strategy variables. LPA is a mixture model that identifies homogenous subgroups of individuals within heterogeneous populations (Gibson, 1959). LPA decomposes the population into mutually exclusive and exhaustive profiles, in some cases

yielding small but theoretically meaningful subgroups (Muthén, 2001). In the first model, the three coded variables [i.e., emotion reactivity mean, withdrawal and intervention] examined in aim one path analyses were entered as indicators into the LPA, a method that better accounts for individual differences in patterns of multiple variables. The model was then expanded to include all emotion regulation variables to consider additional diversity in regulation strategies. Profiles were validated on three distal outcomes: internalizing behavior problems, externalizing behavior problems, and cumulative IPV exposure. An automated three-step procedure was used to independently evaluate the relationship between latent profiles and outcome variables, while accounting for unequal variance between profiles (see Asparouhov & Muthén, 2018).

The first LPA model used emotion reactivity, withdrawal, and intervention as indicators. That is, the same emotion functioning variables used in aim one path analyses were entered as LPA indicators to offer a person-oriented re-analysis of emotional functioning. Models with two to five groups were estimated (See Table 8). The most viable model was a three-group model, as models with more than three groups were rejected due to insufficient group size (2 cases) and error messages involving the estimation of intervention variable parameters. However, concerns about differing group sizes complicated interpretation of the model and distal outcome analyses. The largest group consisted of 168 cases and was associated with high levels of IPV, which precludes identification of theoretically relevant at-risk groups predicted in Emotional Security Theory. As such, additional models were explored.

A second model was estimated that included emotion reactivity and all five emotion regulation variables to consider the use of more diverse regulation strategies in patterns of emotional response to the interadult conflict task. Model identification was poor for the full model including emotion reactivity and all five emotion regulation strategy variables.

Specifically, the two emotion regulation strategies of intervention and help-seeking were not reliably estimated in the full model, that is, when both were included. Intervention and help-seeking were two low incidence variables. The model was revised to exclude help-seeking while retaining intervention due to the theoretical importance of the intervention variable.

Fit indices for LPA models are listed in Table 9. A four-group solution exhibited good fit and identified groups that differed on indicators of emotion reactivity and emotion regulation strategies. AIC, BIC, and adjusted BIC decreased from the three-group to the four-group model. Entropy decreased but remained high (.85). Posterior probabilities (See Table 10) ranged from .89 to 1.00, indicating high likelihood that individuals belong in assigned groups. The Bootstrapped Likelihood Ratio test (BLRT) was significant (p<.001), indicating that a four-group model better fit the data than the three-group model. Fit indices decreased marginally from the four-group to the five-group model; however, one group contained only two cases, which is only 1% of the study sample. Additionally, problems with model identification emerged in the five-group model involving untrustworthy standard error estimates for the reactivity variable in the smallest group. Importantly, the four-group model contained groupings that were relevant to hypothesized groups; therefore, the four-group model was retained for further analysis.

Latent profile one (LP1, Withdrawers, N=98), the largest group, was characterized by high emotion reactivity, high withdrawal, high distraction and low intervention. The second latent profile (LP2, Non-responders, N=70), was comprised of children with low emotion reactivity, low withdrawal and intervention, but high distraction. Latent profile three (LP3, Diverse Strategy Users, N=14) included children with moderate levels of all five variables, indicating moderate reactivity and moderate use of a range of emotion regulation strategies. Latent profile four (LP4,

Interveners, N=10), was characterized by high emotion reactivity, high withdrawal, low distraction, and high intervention. See Table 11 and Figure 7.

Latent profiles were validated on distal outcomes of cumulative IPV exposure, age four and age seven internalizing behavior problems, and age four and age seven externalizing behavior problems using the three-step method with unequal variances assumed (DU3STEP).

For cumulative IPV exposure, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 35.38, $p < .001$]. Pairwise tests indicated that cumulative IPV exposure differed by group. Cumulative IPV exposure was higher in LP1, Withdrawers, when compared to LP2, Non-responders [χ2 (1, N=192) = 5.24, $p = .022$], LP3, Diverse Strategy Users [χ2 (1, N=192) = 32.62, $p < .001$], and LP4, Interveners [χ2 (1, N=192) = 4.22, $p = .04$].

For internalizing behavior problems at age 4, equality tests of distal outcome means across classes yielded a significant overall Wald test [χ^2 (3, N=192) = 17.77, $p < .001$]. Pairwise tests indicated that the internalizing mean was higher in LP1, Withdrawers, than LP2, Non-Responders [χ2 (1, N=192) = 14.36, $p < .001$], and LP3, Diverse Strategy Users [χ2 (1, N=192) = 12.66, $p < .001$]. Age 7 internalizing means also differed by group [χ^2 (3, N=192) = 23.02, $p < .001$]. Specifically, internalizing symptoms were higher in LP1, Withdrawers, than LP2, Non-responders [χ2 (1, N=192) = 19.54, $p < .001$], and LP4, Interveners [χ2 (1, N=192) = 14.79, $p < .001$].

In contrast to results for internalizing behavior problems, the overall Wald test was not significant for externalizing behavior problems. Post-hoc tests were conducted to follow up on group differences and consider additional theoretically relevant constructs involved in child emotion reactivity and regulation. However, groups did not differ by gender, prenatal IPV exposure, cumulative risk, and difficult child temperament.

DISCUSSION

This prospective longitudinal study established that there are specific emotion regulation strategies in early childhood that serve as precursors for the development of IPV-associated behavior problems in school-aged children. Using child age four observed reactions to a simulated interadult conflict task, evidence emerged of a demobilizing profile of emotional functioning, similar to one profile predicted by EST. Children responding with behavioral withdrawal and fewer attempts to intervene in conflict were more likely to be exposed to IPV in early childhood and experience behavior problems including internalizing and externalizing psychopathology as measured at age seven. Results help corroborate profile-based predictions of EST and demonstrate that simple reactivity and regulation variables can be observed to assess risk for psychopathology in IPV-exposed preschoolers before clinical symptoms develop.

Three approaches were used to explore how IPV exposure in early childhood influenced emotional functioning in children and risk for psychopathology. The first was a path analysis (aim one) using a cumulative IPV score which was not sensitive to timing and which aggregated variable-variable relationships across individuals. Hypothesized associations did not emerge. Interestingly, person-oriented approaches in aims two and three better captured the predicted patterns of both the timing-specific effects of IPV exposure and predicted profiles of children with different emotional responses to the simulated interadult conflict task, respectively. Findings contribute to a person-centered understanding of children coping with IPV exposure with attention to how individuals differ and develop in unique ways.

Aim One Findings

In aim one, path analysis was used to explore emotion reactivity and regulation as potential mediators in the relationship between early childhood IPV exposure (and additional risk

factors) and age seven behavior problems. A final model elucidated pathways involving the emotion regulation strategy of intervention in conflict at age four and later behavior problems. Less intervention at age four was associated with more internalizing problems at age seven while reactivity was associated with concurrent age four internalizing problems. Findings suggest that emotion reactivity may be a reflection of current behavior problems while problems with regulation identified at age four may predict a continuation of these problems into the school-aged period. That is, children who fail to approach the situation with attempts to intervene may have difficulty regulating their initial reactivity to the simulated conflict task, leading to under-control of emotion reactivity and a sense of helplessness. This lack of regulation at age four may predispose children to have difficulty down-regulating negative emotions in other settings, leading to internalizing psychopathology.

While a heightened tendency to intervene in conflict is considered a feature of emotional insecurity in EST (Davies et al., 2015), it is also important to consider the adaptive features of intervention as an emotion regulation strategy. In the context of emotion regulation research, intervention in conflict would be classified as a problem solving strategy, as children who intervene attempt to alter unfavorable circumstances that elicit undesired emotions (Gross, 2015). Problem solving is generally considered a constructive emotion regulation strategy (Aldao et al., 2010), which may explain why low levels of intervention in the present study are associated with risk for internalizing problems. One meta-analytic study found that the use of problem solving was negatively associated with symptoms of both depression and anxiety in adolescents with a moderate overall effect size (r = -.34, Schäfer et al., 2017). However, most research on emotion regulation strategies and psychopathology is conducted on school-aged children or adolescents and uses self-report measures of emotion regulation strategies (Becker-Weidman et al., 2010;

Heleniak et al., 2018). The present study corroborates these findings in young children via observation of intervention as an adaptive problem solving strategy.

Surprisingly, while some reactivity and regulation variables were validated through associations with concurrent and future psychopathology, reactivity and regulation variables were not reliably predicted by IPV or other risk variables in aim one path analyses. These findings contradict past studies linking IPV with either heightened or blunted reactivity in stress tasks (e.g., Du Rocher Schudlich et al., 2011). One contrast with past studies is in the use of a global reactivity score (El-Sheikh, 2005), and some researchers emphasize the need to identify specific emotions (Crockenberg & Langrock, 2001; Koss et al., 2011). For instance, Davies, Cicchetti, and Martin (2012) distinguished between sadness, anger, and fear emotional reactivity as mediators in associations between interparental aggression and maternal reports of children's maladjustment. This study found that fear and anger reactivity, not sadness, were predicted by exposure to interparental aggression. The present study used a more global assessment of reactivity that did not distinguish distinct emotions, and it is possible that isolating fearful reactivity may help establish associations with past exposure to IPV in path analyses.

As another consideration, both blunted and heightened emotion reactivity have been associated with exposure to IPV, and recent research emphasizes that reactivity at both extremes is linked to maladaptive outcomes (e.g., Davies, et al., 2016). One study identified infants with blunted behavioral reactivity in the context of heightened cortisol as a group at particular risk for internalizing problems, as this profile may indicate a suppression of emotion (Towe-Goodman et al., 2012). If some children respond to IPV exposure by blunting their expression of emotional distress, while others react with unregulated distress, both groups may be at risk for psychopathology but present with different levels of reactivity. The presence of these subgroups

would be obscured in path analysis models, as IPV's association with both blunted and heightened reactivity would be cancelled out when associations are aggregated in variable-oriented analyses. Similarly, individual children vary on when they are exposed to IPV and what patterns of emotion regulation emerge, and subgroups accounting for these individual differences are important to consider.

Thus, while results of path analysis models did not support a mediation model, two limitations of the analytic approach in aim one were addressed in subsequent aims. First, these models did not account for the longitudinal nature of IPV measurements, which occurred once a year across early childhood, providing four measurements of IPV exposure. Thus, a new set of analyses in aim two further explored the trajectory of IPV and its relationship to emotion reactivity and emotion regulation in the first four years of life.

Aim Two Findings

While many timing studies distinguish between major developmental periods (e.g., early childhood, middle childhood, adolescence), the current study indicates that timing of environmental stress *within* early childhood may be significant in contributing to patterns of emotion regulation strategy use. In aim two, growth mixture modeling (GMM) identified four profiles of IPV exposure across the first four years of life: a stable high IPV group, a stable no/low IPV group, an increasing IPV group, and a decreasing IPV group. In comparison to the stable no/low IPV group, groups with increasing, stable high, and decreasing IPV were differentially associated with emotion regulation and behavior problem variables.

First, examining emotion regulation variables of interest, only membership in the high stable IPV group was associated with *decreased* use of the intervention strategy. No differences in reactivity were found between groups, indicating that children in the high stable IPV group

react with similar levels of distress compared to children in the other groups, but they were less likely to attempt to address the stressful situation by intervening. This finding may indicate that children with prolonged, chronic exposure to IPV hesitate to intervene in conflict, perhaps losing confidence in their ability to effect change in such incidents or worrying about negative consequences for themselves if they intervene. This finding contradicts some past studies indicating that some children exposed to IPV respond by intervening in conflict (for a review, see Rhoades, 2008). However, it is important to consider the chronic nature of IPV exposure in the high stable IPV group. Because past research typically measures one-time or estimated cumulative exposure to IPV without attention to the chronicity of IPV, prior findings may not fully capture children's behavior when they are exposed to chronic IPV.

In addition, the association between IPV exposure and intervention in conflict is not typically studied in preschoolers, only in school-aged children and adolescents. An exception is a study by El-Sheikh, Cummings, and Reiter (1996) who found that preschoolers with a history of exposure to unresolved conflict were more likely to intervene, but only among girls. Some preschool children who do intervene may be temperamentally predisposed to approach situations, and not having been exposed to violence, they may be unaware of potentially dangerous consequences. Chronic exposure to IPV across early childhood may inhibit a naturally-occurring urge to intervene in preschoolers. Thus, it is important to examine the developmental stage when interpreting intervention as a response to interparental conflict. While intervention is considered a risk factor for older youth, less intervention may be indicative of increased behavioral inhibition in the preschool period following exposure to IPV in some children.

Helpfully, EST proposes that there are subgroups of children (secure, dominant, mobilizing, demobilizing) with distinct profiles of emotional security based in part on exposure to

past interadult conflict. A profile characterized by low intervention may relate to one of the cognitive components of EST, including the influence of IPV on cognitive appraisals of conflict and likelihood of resolution. For example, Goeke-Morey and colleagues (2013) found that interparental conflict was associated with increases in children's skepticism about resolution, which could extend to childrens' beliefs about their own self-efficacy in being able to affect change in arguments between adults. In this way, exposure to IPV that is chronic may lead to low problem solving self-efficacy, resulting in fewer attempts to intervene. However, the specific patterns of IPV timing in early childhood as related to emotional security have not been explored empirically until now. Follow-up studies should investigate problem-solving self-efficacy as a potential mechanism contributing to lack of intervention among children with chronic IPV exposure.

Second, the group characterized by increasing IPV across early childhood was associated with increased behavioral withdrawal in response to the interadult conflict task. This is an interesting subgroup, as past research indicates that on average, IPV tends to decrease over time due to the negative association between IPV and age following a peak in early adulthood (Shortt et al., 2012; Johnson, Giordano, Manning & Longmore, 2015). However, the benefit of GMM is in disaggregating this overall demographic trend to consider how multiple variables best capture the qualities of individual children. In the current study, membership in the increasing IPV group may confer specific risk for increased withdrawal as an emotion regulation strategy (and internalizing and externalizing psychopathology, as discussed below). The relationship between increasing IPV and withdrawal may indicate that escalating violence interferes with the use of proactive emotion regulation strategies, leading children to avoid a distressing event by moving away from it, closing their eyes, or otherwise restricting their engagement with the environment.

Children who learn early to use withdrawal as a predominant response to stressful events miss out on opportunities to develop more adaptive regulation behaviors, such as attention shifting and problem solving, which could explain the elevated risk for the development of psychopathology (Crockenberg, Leerkes, & Lekkaa, 2007).

Taken together, two of the timing groups, chronic high IPV and increasing IPV, show associations with emotion regulation strategies consistent with the demobilizing profile hypothesized in EST. Davies and colleagues emphasize that one way of adapting to the environmental stress of IPV is withdrawing from interparental conflict, a strategy thought to reduce the child's salience as a target of hostility (Davies & Martin, 2013). Children in this proposed profile lay low by walking away, hiding, and avoiding involvement when a parent is engaged in conflict. They would therefore be less likely to intervene, a characteristic that emerged in the high chronic IPV group in this research. Thus, the present study helps validate such a profile by identifying associations between the timing of IPV exposure and the behavioral responses of high withdrawal from and low intervention in conflict.

Aim two findings also confirmed that timing of exposure to IPV within early childhood contributed to differences in emotion regulation (not reactivity). As predicted, groups with high levels of IPV exposure later in early childhood, including the stable high and increasing IPV groups, had elevated or blunted use of emotion regulation strategies. Early exposure alone, as in the decreasing IPV group, or low levels of exposure, did not predict differences among groups in emotion regulation strategy use. Reactivity, in contrast, did not differ by group membership. Compared to reactivity, emotion regulation may be more sensitive to IPV exposure that occurs later in early childhood due to a potential sensitive period for emotion regulation development. Regulation is a skill that increases over time as children learn independent use of different

strategies and exert more self-control over emotions (Thompson, 2013). Exposure in the preschool years, in particular, may be especially pernicious in delaying the development of emotion regulation, or fostering overreliance on maladaptive strategies.

Findings also indicated that behavior problems were related to group membership. All groups with high levels of IPV at one or more time points in early childhood (increasing, decreasing, and chronic high) had higher levels of externalizing problems at age seven compared to the no/low IPV group. Results provide longitudinal evidence of the harmful effects of IPV and a potential "sleeper effect" for IPV exposure. Interestingly, the timing groups in the current study differed on externalizing psychopathology at age seven but not at age four. Holmes (2013) similarly measured IPV exposure in early childhood (ages 1-3) and found that the effects of IPV exposure were delayed until school age (age 8). Another study documented a lagged effect of exposure at age 2-3 on aggressive behavior at age 4-5 (Holmes, Yoon, & Berg, 2017). Our results corroborate findings on this so-called sleeper effect and indicate that early intervention may be needed for children exposed to IPV even before symptoms develop.

Associations with internalizing psychopathology differed slightly such that membership in the increasing and decreasing (not stable high) IPV groups was associated with internalizing behavior problems at age seven. This is a novel finding and may contradict dose-response theories indicating that greater cumulative exposure to IPV confers greater risk for maladaptive outcomes, including internalizing behavior problems. For instance, Graham-Bermann and Perkins (2010) found that estimated cumulative exposure was a better predictor of internalizing behavior problems for school-aged children than age at first exposure. However, their study used past-year exposure multiplied by the child's age as an estimate of cumulative exposure, a measure that is not sensitive to potential changes in severity of IPV over time within or across parental

romantic relationships. The current findings may indicate that either increasing or decreasing levels of IPV expose children to unpredictability in the family system, leaving children to withdraw from conflict and leading to internalizing problems. While EST makes predictions about types of family environments that contribute to child adjustment problems, future research should consider findings from the present study which suggest that an unpredictable course of IPV exposure is an important feature of pathogenic environments.

Aim Three Findings

While aim one path models tested reactivity as well as two emotion regulation variables in separate models (first withdrawal, then intervention), the nature of emotional responses is more complex; thus, aim three introduced a person-oriented approach to explore *patterns* of emotional functioning. Four profiles were identified: withdrawers with high withdrawal and low attempts to intervene, non-responders with low reactivity and high distraction, diverse strategy users with moderate levels of most strategies, and interveners, who used a combination of intervention and withdrawal. Two profiles were particularly relevant to those predicted by EST. Findings contribute to an understanding of unique patterns of functioning and multifinality of outcomes in children exposed to IPV, with emotion regulation strategies as an early marker of problematic coping and potential psychopathology.

First, a potential *mobilizing* group was identified characterized by high reactivity, high withdrawal, and frequent attempts to intervene. Children in this group appeared distressed by the interadult conflict task and made frequent comments indicating a wish to approach the conflict and influence the outcome. The combination of intervention *and* withdrawal indicates a high level of overall engagement with the task, for example, in children who made attempts to intervene but ultimately withdrew when not able to change the situation due to the constraints of

the task. This was a group of particular interest because according to EST, this mobilizing pattern of responding may predispose children to take on undue responsibility in the family system and "hold significant stakes in vigorously managing interparental difficulties" (Davies & Martin, 2013, p.1442). While such a vulnerable and concerned presentation may elicit sympathy from parents, thereby helping children access social resources, EST predicts that children with a mobilizing profile will be at risk for internalizing psychopathology due to increased reactivity and increased exposure to violence following overinvolvement in interparental conflict, followed by frustration when efforts to intervene are ineffective. In a test of distinct sequalae of the mobilizing profile, Davies, Martin, Sturge-Apple, and Cicchetti (2016) found that a mobilizing profile observed in preschoolers was indeed associated with internalizing and externalizing problems, problems with self-regulation, and extraversion. In contrast, membership in the mobilizing group was *not* associated with internalizing or externalizing problems in the current study.

One main difference between the Davies et al. (2016) study on EST profiles and the current study is in how the groups were identified. The current study used data-driven methods to identify group membership based on the coding of emotion reactivity and regulation. These variables were the only indicators used to explore the presence of internally homogenous subgroups of children differing in their emotional reaction to the conflict task. However, in the study by Davies and colleagues (2016), experimenters coded specifically for pre-defined characteristics of the four different proposed EST groups, including expressive reactivity but extending to "coy, ingratiating, or overenthusiastic behaviors that co-occur with anxiety, apprehension, and awkwardness (e.g., sudden, unexplainable intense smiling; reverting to "baby talk)" (p. 1650). That is, Davies et al. (2016) rated the degree to which childrens' behavior

matched each of the four hypothesized profiles of secure, dominant, mobilizing and demobilizing emotional security.

While their coding scheme may have also considered reactivity, withdrawal, and attempts to intervene, the Davies and colleagues (2016) study assessed a greater range of behaviors, including some more indicative of behavior problems (e.g., regression to baby talk). It follows that problematic behavior coded in their study produced groups with increased incidence of behavior problems. The mobilizing group identified in the present study, however, may highlight benefits of some features of the mobilizing approach, namely seeking to address the situation directly through proactive problem-solving, coded here as intervention. As in findings linking chronic IPV to *less* intervention (aim two), children who approach the interparental conflict task may be less at risk for behavior problems because intervention and proactive problem solving is a normative response in preschoolers.

Second, and most consistent with aim two findings, a *demobilizing* group emerged, characterized by high reactivity, high withdrawal, and low intervention. Children with a demobilizing profile are thought to "lay low" and shirk away from conflict, even as they express distress (Davies & Martin, 2014). This group was associated with the highest levels of IPV, as hypothesized. While no differences in externalizing psychopathology emerged, children in the demobilizing group had higher internalizing scores than the other three groups. Findings fit with predictions of EST, which defines the demobilizing profile as likely to develop following high levels of IPV in the family home, and place children at risk for internalizing or externalizing psychopathology due to disengagement from coherent emotion regulation strategies. Further, findings are consistent with Davies and colleagues (2016) empirical study of EST hypothesized

profiles, as membership in the demobilizing group was associated with internalizing problems in particular.

In sum, findings related to aim three indicated that there are likely subgroups of children who develop different responses to conflict in their family system, influenced by their individual history of IPV exposure, and associated with distinct developmental outcomes. This is the first study to use empirically derived subgroups matched to EST profiles rather than coding for characteristics specific to these profiles *a priori* (cf. Davies et al., 2016). The different groups that emerged help illustrate how different patterns of reactivity and regulation may be obscured in variable-centered analyses. For instance, three LPA groups were characterized by high emotion reactivity, but it is the group that also demonstrated high withdrawal and low intervention that was associated with IPV and risk for internalizing behavior problems. High reactivity in the "diverse strategy use" subgroup, in contrast, may actually indicate a degree of emotional security because this reactivity is accompanied by more moderate levels of all the emotion regulation strategies measured. That is, reactivity coupled with effective and flexible regulation can be considered a sign of psychological health. In addition, high reactivity and withdrawal in the mobilizing subgroup was not associated with behavior problems, indicating that intervention in conflict may be an adaptive response in some children.

Integration

The current study found evidence for meaningful variations in how children react to the simulated adult conflict task in a laboratory setting. Variable- and person-centered methods explored how these differences related to children's history of IPV exposure and risk for psychopathology. Person-centered approaches, in particular, allowed for a rich understanding of

individual characteristics of children exposed to IPV, thus, providing a good test of the pattern-based predictions of emotional functioning proposed in EST.

Analyses in all three aims identified features of the demobilizing profile proposed in EST (Davies & Martin, 2014). However, only aims two and three identified a history of IPV exposure as contributing to emotional functioning observed at age four. Of note, the method of path analysis in aim one aggregated variable-variable relationships across all individuals, which may have obscured important individual differences in IPV exposure and emotion regulation strategy use. First, the cumulative IPV score used in this aim was a rough estimate of overall exposure but did not consider individual differences in the timing of exposure. Second, the co-occurrence of different emotion regulation strategies was not accounted for in path analysis models, nor were the unique patterns of reactivity and regulation that comprise an individual child's response to distressing stimuli.

In contrast, person-centered analyses employed in aims two and three allowed us to ask whether subgroups of children with different patterns of IPV exposure differed in emotional functioning, and whether childrens' patterns of emotional expression were differentially related to adaptation to family conflict. For example, in study hypotheses derived from EST, children with high levels of intervention AND high emotion reactivity were expected to be classified in the 'mobilizing' group (children who upregulate distress and ingratiate themselves to parents), while children with high levels of intervention but low emotion reactivity were expected to be classified in the 'dominant' group (children who suppress displays of vulnerability but aggressively posture). Using person-oriented analyses, it was possible to identify empirically derived homogenous subgroups that clarified specific within-group patterns of association and describe how features of emotional expression come together as a whole (von Eye & Bergman, 2003).

This is the first study validating EST profiles in relation to childrens' histories of exposure to interparental conflict or IPV more specifically. Further, findings were sensitive to the timing of such exposure, and future research should consider the danger of chronic and increasing IPV exposure on emotion regulation and resulting emotional security in young children. This is also the first study validating EST profiles using data-driven methods rather than *a priori* indicators of emotional dysfunction. While study results involving the group of children who had high levels of intervention were surprising, findings contribute to EST by encouraging us to consider possible benefits of intervention in conflict (at least in preschool-aged children) from an emotion regulation perspective. Integrating the emotion regulation literature with EST predictions allowed for an unbiased, developmentally-tailored observation of emotional functioning that nonetheless identified children at risk for behavior problems. This approach supports the need for developmental screening of emotion reactivity and regulation that is broad enough to apply to all children but still sensitive to specific problems evident in IPV-exposed subgroups.

Limitations and Future Directions

Limitations to the current study should also be acknowledged. First, a novel coding system was developed to code emotion reactivity and regulation, and inter-rater reliability with undergraduate research assistants was only sufficient after extensive training. Difficulty achieving agreement between coders may indicate that the coding scheme was overly complicated or depended too heavily on prior specialty knowledge of subtle variations in child behavior. To address coding disagreements, the coding scheme was adjusted for clarity after initial reliability checks, and disagreements were discussed in regular coding meetings. However, final inter-rater reliability for each of the behavioral codes ranged from .71 to .93, consistent with norms in the literature. For instance, Cohen suggested that kappa statistics between .61 and .8 indicate

substantial agreement and between .81 and 1.00 indicate almost perfect agreement (Hallgren, 2012).

Second, some regulation variables occurred infrequently, resulting in low variance (see Table 4). For instance, intervention in conflict was a low frequency variable, which may have limited the ability to differentiate groups based on this emotion regulation strategy. One EST profile hypothesized to exist but not identified in the present study is the "dominant" profile. This dominant subgroup, composed of children with low expressed reactivity and high efforts to intervene in conflict, would be an important subgroup to track into middle childhood given its proposed association with externalizing problems (Davies et al., 2016).

Limited attempts to intervene in the interadult conflict task could be due to the subtly of the task, in that children heard but did not witness the simulated argument, and the argument took place in a laboratory setting. Intervention may be more likely to occur when children directly witness naturally occurring conflict and violence at home (Davies et al., 2015; Mueller et al., 2015), or when laboratory tasks use parents' own voices in recordings to increase ecological validity (Du Rocher Schudlich et al., 2011, Knafo et al., 2013). However, our study was specific to IPV, whereas other studies assessed milder forms of interparental conflict. In our study, participation of a woman's partner may have posed a risk to our participants if partners became privy to women's disclosure of violent incidents.

Another reason for differences in rates of intervention might be that other studies use self-report methods. In a meta-analysis of involvement in conflict and child adjustment problems, most of the 33 articles measuring intervention used questionnaires that children completed themselves (Rhoades, 2008). While school-aged children can self-report on their history of intervention in parental conflict, this method is not developmentally appropriate for the preschool

age-group. Limits in cognitive and linguistic functioning may prevent young children from remembering and accurately describing past events and how they responded to parental conflict. In addition, high rates of violence in the home among participants in the present sample raises concerns about potential retraumatization if young children were asked to recount these incidents. As such, the simulated adult anger task used in this study was helpful in approximating experiences of exposure to conflict at home. Similar tasks have been used to elicit reactivity successfully in other studies (e.g., El-Sheikh, 2005). In future research on preschoolers' emotional security patterns, researchers may wish to increase the intensity of simulated conflict to elicit dominant responses in this age group.

Finally, limited attempts to intervene could also be due to the age of the children in this study. Research demonstrates that older children are more likely to become involved in parental conflict (Cummings, Ballard, & El-Sheikh, 1991; Davies, Myers, Cummings, & Heindel, 1999), with the highest levels of intervention occurring in adolescence. Additionally, while intervention may be a low base rate behavior in this age group, it is important to identify these children, regardless that few of them engage in such a behavior at a young age. Indeed, while some of the preschoolers in our study did ignore the task, variation in reactivity and regulation strategy use was still captured.

Clinical Implications

Research on patterns of emotion regulation and emotional security has the potential to guide prevention, assessment, and intervention efforts for children at risk for psychological distress and psychopathology following exposure to IPV. As discussed, children who are exposed to IPV in early childhood and learn to withdraw from subsequent exposure to violence or limit attempts to intervene may be at particular risk for the development of internalizing and

externalizing behavior problems. Withdrawal as an emotion regulation strategy can be directly observed when children hear adults in conflict (in this case, a simulated lab task), and this profile may appear in clinical contexts. Increasing parent and child awareness of a child's reactions to interadult conflict will help all understand lingering effects of IPV exposure. Interventions may be needed to target how and when children use emotion regulation strategies, with a focus on increasing the breadth of strategies and flexibility of use. As children increase their repertoire of emotion regulation strategies, overreliance on withdrawal in response to conflict may decrease.

Conclusion

The current prospective longitudinal study is the first to explore emotion regulation strategies as indicators of emotional security in preschool children exposed to IPV, identifying a new profile of risk in this young age group . Methods were novel in directly observing preschooler's reactions to simulated interadult conflict and empirically deriving subgroups from children's emotional responses. Variable- and person-centered data analyses were used, allowing us to identify relationships among variation at the population level and within hypothesized subgroups of individuals as proposed by recent research on diverse presentations and outcomes among children exposed to IPV.

Notably, results confirm the importance of considering unique profiles of IPV exposure over time, as IPV exposure that increased or remained consistent through the preschool years was found to influence emotion regulation, a skill rapidly developing in these same years. No extant research has investigated the timing of IPV within early childhood as it relates to preschool emotion reactivity and emotion regulation, and current findings indicate that emotion regulation is sensitive to environmental influence of IPV later in early childhood as independent emotion regulation increases.

Similarly, considering patterns of emotional regulation, rather than assessing individual emotion regulation behaviors, led to the identification of subgroups of individual children at particular risk for psychopathology. For example, children responding with high reactivity, high withdrawal, and low intervention constituted a subgroup with heightened IPV exposure and risk for internalizing behavior problems. This is the first time such a subgroup has been identified in preschoolers through examination of emotion reactivity and regulation strategies alone. This practice holds promise for the assessment of preschoolers who are not able to self-report on their typical reaction to past events, and for whom early assessment is critical. The current approach of considering how individual children differ in the overall pattern of IPV, emotion reactivity, and emotion regulation may allow researchers and clinicians to narrow their focus to specific profiles of risk and understand diverse reactions to the stress of IPV exposure.

APPENDICES

APPENDIX A

Tables

Table 1.

Aim Three: Proposed Latent Profiles

LPA Variable Type		Secure	Mobilizing	Dominant	Demobilizing
Predictor	IPV	No violence or aggression	Minimal to modest violence	Little to mild violence	Severe IPV; coerciveness and volatility
Indicator	Emotion Reactivity	Moderate	High	Low	Low - Moderate
Indicator	Emotion Regulation Goals and Predicted Strategies	Efficient ER strategy use tied to signs of clear, direct threat • **Information Gathering**	Actively manage threat and social ties • **Help-seeking** • **Attempts to intervene**	Defeat threat through aggressive posturing • Suppression of fear, up-regulation of anger • **Attempts to intervene**	Lay low to reduce salience as a target of hostility • Lack of coherent strategies • **Distraction** • **Withdrawal**
Distal Outcome	Risk for Psychopathology	Low risk	Internalizing Behavior Problems	Externalizing Behavior Problems	Internalizing and Externalizing Behavior Problems

Note. All emotion regulation strategies (bolded) will be explored in aim three.

Table 2.

Ethogram of Emotion Reactivity Coding

Emotion Reactivity Stream

Rate the level of **negative facial or verbal affect.** Facial affect is indexed by changes in the brows/eyes, cheeks, and mouth as follows:

> Anger: Brows are pulled in and down, eyelids are tensed, and/or eyes are narrowed. Mouth is open and squared or lips are pressed tightly and tensed.
> Sadness: Brows are pulled in and up, eyes droop at outside corners. Mouth is pulled down and lower lip positioned in a pout.
> Fear: Brows are raised but not pulled together, lids are raised, and eyes are widened. Lips are pulled back straight, often pulling checks back but neither up nor down.

Verbal cues of negative affect include whines, yells or statements of distress (e.g.: "I'm scared").

Name of Code	Code	Definition
No distress	0	Lack of negative facial or verbal affect. Positive affect may or may not be present.
Mild distress	1	**Frequency:** 1 isolated negative facial or vocal affect cue occurs OR **Intensity:** Mouth is closed. No verbal statements occur. OR **Duration:** Lasts less than 3 seconds
Moderate distress	2	**Frequency**: Negative facial or verbal affect cues occurs 2 or 3 times. OR **Intensity**: Mouth is closed. Statement of negative affect is conversational. OR **Duration**: Distress longer than 3 seconds, less than 10 seconds per instance
High distress	3	**Frequency**: Negative facial or verbal affect cues occur > 4 times. OR **Intensity**: Mouth is open. Statement is yelled. Urgency is apparent. OR **Duration**: Distress present for longer than 10 seconds per instance
Cannot be coded	X	Facial or vocal cues cannot be assessed (e.g., child is not in frame, other technical problem). Record reason below.

Table 3.

Ethogram of Emotion Regulation Coding

Intervention Stream

Rate the level of **intervention** attempted. Intervention is coded when the child asks to or otherwise indicates a wish to approach the argument. Examples include:

"Let's go check on them."
"I want to see what that is."
"Can we go see?"
Child physically tries to leave the room with clear intent to approach conflict (level 3)

Note: Intervention is not coded if child requests to get a third party involved without going themselves (see help-seeking), or asks a general question (see information gathering).

Name of Code	Code	Definition
No intervention	0	Child makes no attempts to approach the argument or intervene. Child ignores recording or uses another emotion regulation strategy.
Mild levels of intervention	1	**Frequency**: Only 1 request is made OR **Intensity**: Requests are at a conversational volume and no protests are made when told they need to stay in the room. Child stays seated and does not move towards door.
Moderate levels of intervention	2	**Frequency**: Child makes two or three requests. OR **Intensity**: Requests are at a conversational volume and no protests are made when told they need to stay in the room. Child stays seated and does not move towards door.
High levels of intervention	3	**Frequency**: 4 or more requests are made. OR **Intensity**: Requests are made urgently or loudly. Or, child protests and insists that he wants to approach argument. Or, after stating that they want to intervene, child stands up or moves toward the door.
Cannot be coded	X	Intervention cannot be assessed. Record reason below.

Table 3 (cont'd)

Withdrawal Stream

Record the level of **withdrawal** attempted. Withdrawal includes:
- Covering the ears, eyes, or mouth
- Otherwise "shielding" self from exposure to argument
- Turning towards the wall
- Retreating to the perimeter
- Hiding head in arms
- Moving to a protected place in the room (under a table)
- Attempts to leave the room/ approach the door
  - Note: Attempts to leave are coded as withdrawal only if the child does NOT mention that they want to approach the argument or go to their mom. For example, "I want to go home" is withdrawal because mom is not explicitly mentioned.

Name of Code	Code	Definition
No withdrawal	0	No withdrawal occurs. Child ignores recording or uses another emotion regulation strategy.
Mild withdrawal	1	**Frequency**: 1 incident of withdrawal occurs OR **Intensity**: Seated or subtle withdrawal attempts occur, such as covering face OR **Duration**: Withdrawal lasts less than 3 seconds
Moderate withdrawal	2	**Frequency**: 2 to 4 withdrawal attempts occur OR **Intensity**: Seated or subtle withdrawal attempts occur, such as covering face. Or, child is already standing and moves to the perimeter of the room, but not the door. OR **Duration**: Withdrawal is more than 3 seconds and less than 10 seconds.
High withdrawal	3	**Frequency**: More than 5 withdrawal attempts occur OR **Intensity**: Child gets out of seat and changes positioning in the room in attempt to withdraw. Or, child asks to go home or touches the door in attempt to leave the room. OR **Duration**: Withdrawal attempts last more than 10 seconds.
Cannot be coded	X	Withdrawal cannot be assessed. Record reason below.

Table 3 (cont'd)

Distraction Stream

Rate the level of **distraction** attempted: Distraction is coded when child attempts to color or engage in a different activity instead of focusing on the argument or disengaging in any play. Self-talk or talking with the experimenter is coded as distraction ONLY if the child does not reference the recording or ask to see their mom/leave the room. Humming to self is also distraction.

Name of Code	Code	Definition
No distraction	0	Child focuses mostly on the recording OR does not engage in coloring or some other activity (e.g., walks around and doesn't settle anywhere)
Mild distraction	1	**Duration**: Distraction attempts are **< 2 minutes**. Child makes attempts to color or engage in a different activity before disengaging or turning attention to recording.
Moderate distraction	2	**Duration**: Distraction attempts last for **more than 2 minutes** but do not last the entire task. Child is playing or otherwise engaged during most but not all of the task.
High distraction	3	**Duration**: Child is continuously engaged in play or another activity for the **entire duration of the task.**
Cannot be coded	X	Distraction cannot be assessed. Record reason below

Information Gathering Stream

Rate the level of **information gathering** attempted: Information gathering includes any questions about the recording but NOT requests to intervene, seek help, find their mom, or investigate the argument.

"Where is that coming from?"
"What are they doing?"
"Is that your friend?"

Name of Code	Code	Definition
No information gathering	0	Child does not ask about the recording. Child ignores recording or uses another emotion regulation strategy.
Mild information gathering	1	**Frequency**: Child asks about the recording one time OR **Intensity**: Child calmly asks question at conversational volume

Table 3 (cont'd)

Moderate information gathering	2	**Frequency**: Child asks 2-3 questions about the recording. OR **Intensity**: Child calmly asks question at conversational volume.
High information gathering	3	**Frequency**: Child asks 4 or more questions about the recording OR **Intensity**: Child is urgent in asking questions loudly or in quick succession (repeats question or asks follow-up questions)
Cannot be coded	X	Information gathering cannot be assessed. Record reason below.

Help-seeking Stream

Rate the level of **help-seeking** attempted: Child makes a reference to someone else intervening in the argument (e.g., experimenter, mother, police). Or, child asks to see his mother or asks about where she is.

"Can you tell them to stop?"
"Call the police."
"I want to go to my mom"
"Where is my mom?"
"Go help them."

Note: "Let's go help them" would be Intervention because the child themselves will approach the argument.

Name of Code	**Code**	**Definition**
No help-seeking	0	No help-seeking occurs. Child ignores recording or uses another emotion regulation strategy.
Mild help-seeking	1	**Frequency**: Uses one statement or question to get a someone involved in the argument OR **Intensity**: Request is calm and conversational
Moderate help-seeking	2	**Frequency**: Child mentions someone helping 2-3 times OR **Intensity**: Requests are firm but conversational
High help-seeking	3	**Frequency**: Child persists in asking for help more than 3 times. OR **Intensity**: Asks for help or insists to see mother loudly or with urgency
Cannot be coded	X	Help-seeking cannot be assessed. Record reason below.

Table 4.

Descriptive Statistics

	Minimum	Maximum	Mean	SD
Risk composite	0.00	4.39	1.74	1.30
Difficult Temperament	2.14	4.66	3.54	0.47
Age one IPV	0.00	4.47	0.81	1.20
Age two IPV	0.00	4.36	0.86	1.12
Age three IPV	0.00	4.20	0.68	1.04
Age four IPV	0.00	4.20	0.59	0.94
Age seven IPV	0.00	4.13	0.56	0.96
Emotion reactivity	0.00	3.26	1.95	0.87
Withdrawal	0.00	3.26	1.49	1.05
Distraction	0.00	3.45	2.30	0.69
Intervention	0.00	3.00	0.22	0.64
Information gathering	0.00	3.00	0.82	0.80
Help-seeking	0.00	3.00	0.44	0.78
Age four internalizing problems	0.00	16.00	2.20	2.42
Age four externalizing problems	0.00	34.00	8.33	5.84
Age seven internalizing problems	0.00	22.00	3.69	4.04
Age seven externalizing problems	0.00	30.00	7.56	6.27

Table 5.

Bivariate Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Risk composite																
2. Difficult Temperament	.14															
3. Age one IPV	.25*	.04														
4. Age two IPV	.23*	.02	.54*													
5. Age three IPV	.25*	.11	.43*	.48*												
6. Age four IPV	.17*	.08	.30*	.38*	.54*											
7. Age seven IPV	.17*	.00	.27*	.36*	.29*	.42*										
8. Emotion reactivity	.02	.09	-.03	.09	.05	.03	.11									
9. Withdrawal	.06	.10	.10	.00	.02	.19*	.10	.30*								
10. Distraction	.09	-.06	-.01	.04	.08	.00	-.07	-.39*	-.50*							
11. Intervention	-.11	.04	-.08	-.16	-.02	-.04	.06	.18*	.17*	-.34*						
12. Information gathering	-.04	-.02	-.03	.02	-.03	.10	-.07	.34*	-.04	-.20*	.14					
13. Help-seeking	.06	.11	-.12	.12	.01	.07	.02	.09	.20*	-.34*	.14	.03				
14. Age four internalizing problems	.10	.10	-.01	.05	.08	.02	.08	.16*	-.13	.10	-.03	.09	.00			
15. Age four externalizing problems	.31*	.24*	.17*	.21*	.22*	.06	.10	.12	-.07	.11	-.03	.01	.09	.62*		
16. Age seven internalizing problems	.36*	.10	.26*	.18*	.19*	.09	.16*	.15*	.02	.02	-.12	-.07	-.06	.40*	.47*	
17.Age seven externalizing problems	.39*	.21*	.23*	.31*	.27*	.14	.08	.02	-.02	.03	-.08	-.02	.10	.32*	.58*	.65*

Note. * = $p < .05$.

Table 6.

GMM Fit Statistics

	N	AIC	BIC	Adj BIC	Entropy
1 Class	192	2116.60	2142.66	2117.32	
2 Classes	1=149 2=43	2005.39	2044.48	2006.46	0.96
3 Classes	1=18 2=142 3=32	1959.86	2008.72	1962.20	0.96
4 Classes	1=127 2=24 3=23 4=18	1911.24	1962.20	1912.86	0.96
5 Classes	1=14 2=18 3=31 4=109 5=20	1869.45	1937.85	1871.33	0.96

Table 7.

Standardized Mean Scores for the Four-Group GMM Model

	Class 1	Class 2	Class 3	Class 4
	Stable Low	Decreasing IPV	Increasing IPV	Stable High
Age 1	0.26	2.84	0.38	2.69
Age 2	0.22	1.94	0.92	2.59
Age 3	0.18	1.05	1.47	2.49
Age 4	0.14	0.16	2.01	2.38

Table 8.

Latent Profile Analysis Model Fit Statistics for Three-Variable Model

	N	AIC	BIC	Adj BIC	Entropy
1 Latent Profile	192				
2 Latent Profiles	LP1=182 LP2=10	1097.56	1130.14	1098.46	1.00
3 Latent Profiles	LP1=168 LP2=14 LP3=10	1007.92	1053.52	1009.18	.98
4 Latent Profiles	LP1=164 LP2=18 LP3=2 LP4=8	891.73	950.36	893.34	.99
5 Latent Profiles	LP1=9 LP2=156 LP3=17 LP4=2 LP5=8	749.84	821.50	751.81	.99

Table 9.

Latent Profile Analysis Model Fit Statistics for Five-Variable Model

	N	AIC	BIC	Adj BIC	Entropy
1 Latent Profile	192	2116.60	2142.66	2117.32	
2 Latent Profiles	LP1=182 LP2=10	1949.01	1992.13	1941.45	1
3 Latent Profiles	LP1=168 LP2=14 LP3=10	1854.11	1925.25	1856.09	.98
4 Latent Profiles	**LP1=98 LP2=70 LP3=14 LP4=10**	**1783.20**	**1874.41**	**1785.71**	**.85**
5 Latent Profiles	LP1=94 LP2=69 LP3=19 LP4=2 LP5=8	1663.64	1774.40	1666.70	.89

Table 10.

Posterior Probabilities for Five-Variable Model

Profile	N	1	2	3	4
1	98	**0.91**	0.09	0.01	0.00
2	70	0.11	**0.89**	0.01	0.00
3	14	0.03	0.01	**0.96**	0.00
4	10	0.00	0.00	0.00	**1.00**

Table 11.

Standardized Mean Scores for the Four-Group LPA Model

	LP1	LP2	LP3	LP4
N	98	70	14	10
Reactivity	2.48	1.12	2.09	2.60
Withdrawal	1.76	0.99	1.57	2.20
Distraction	2.11	2.71	2.34	1.30
Intervention	0.03	0.02	0.67	2.80
Information Seeking	1.05	0.43	0.88	1.30

APPENDIX B

Figures

Figure 1.

Proposed Structural Models for Aim One

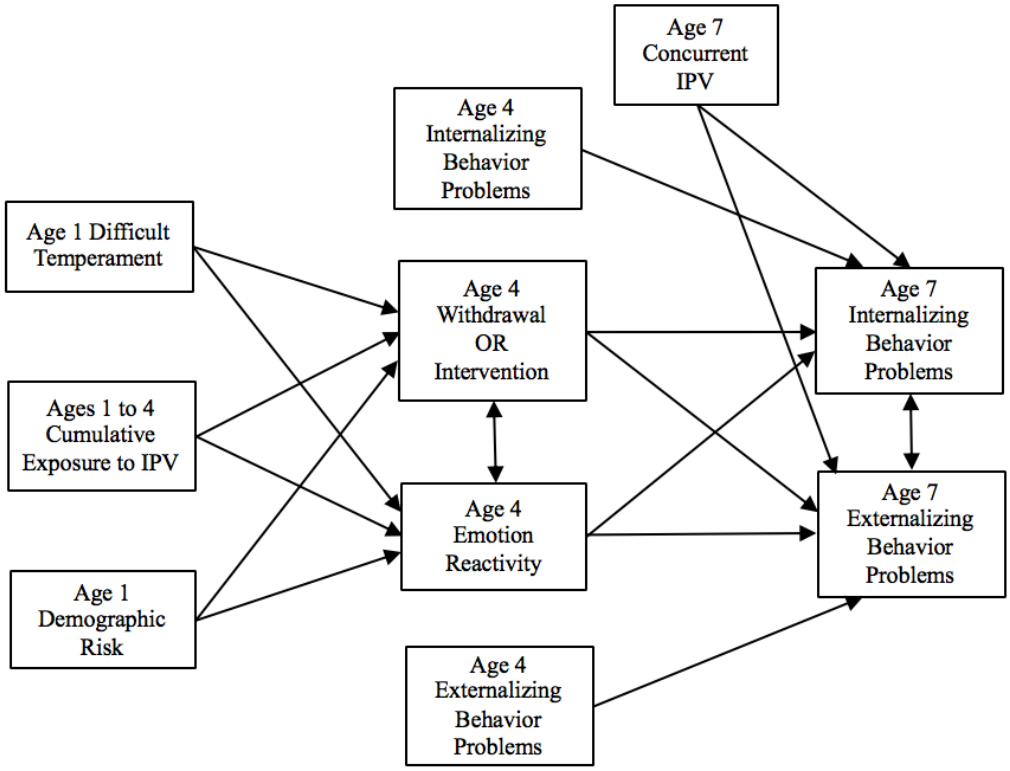


Figure 2.

Sequence of Simulated Interadult Conflict Task

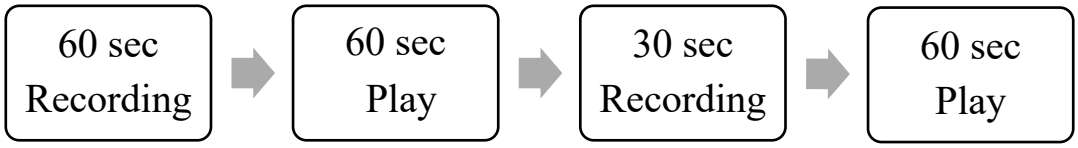
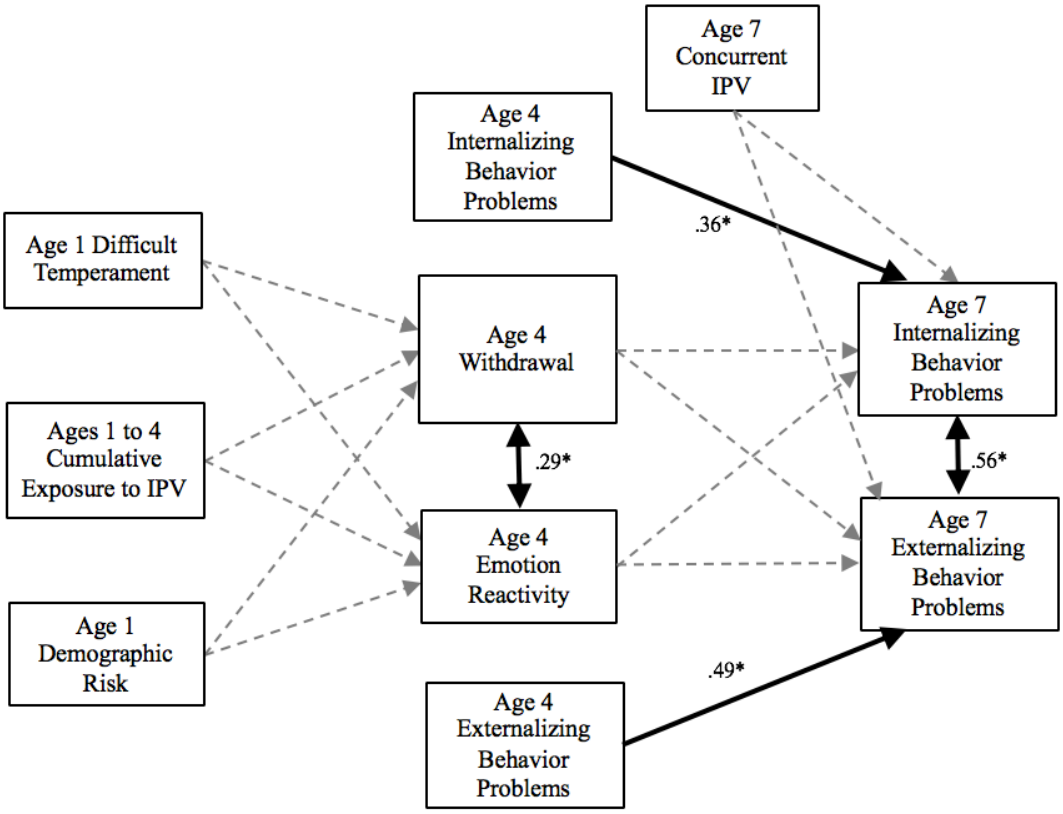


Figure 3.

Full Model for Withdrawal as Emotion Regulation Variable



Note. For all path analysis models, standardized coefficients listed in model; * $p < .05$.

Figure 4.

Full Model for Intervention as Emotion Regulation Variable

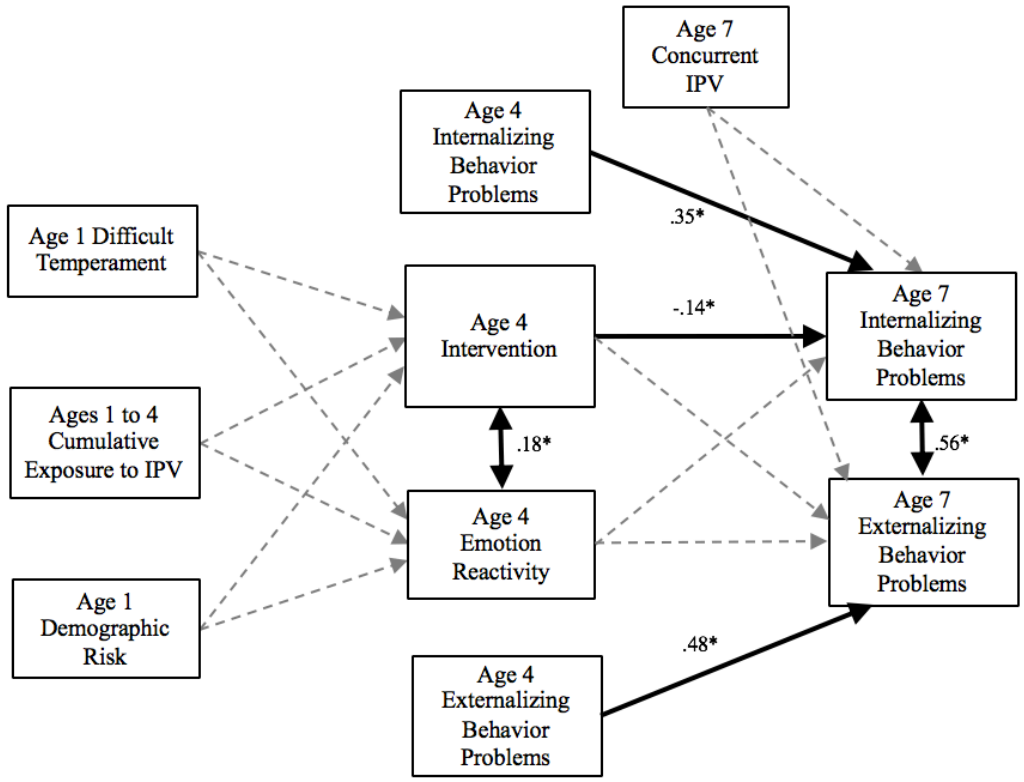


Figure 5.

Final Model for Internalizing Psychopathology and Age Four Reactivity and Intervention in Conflict

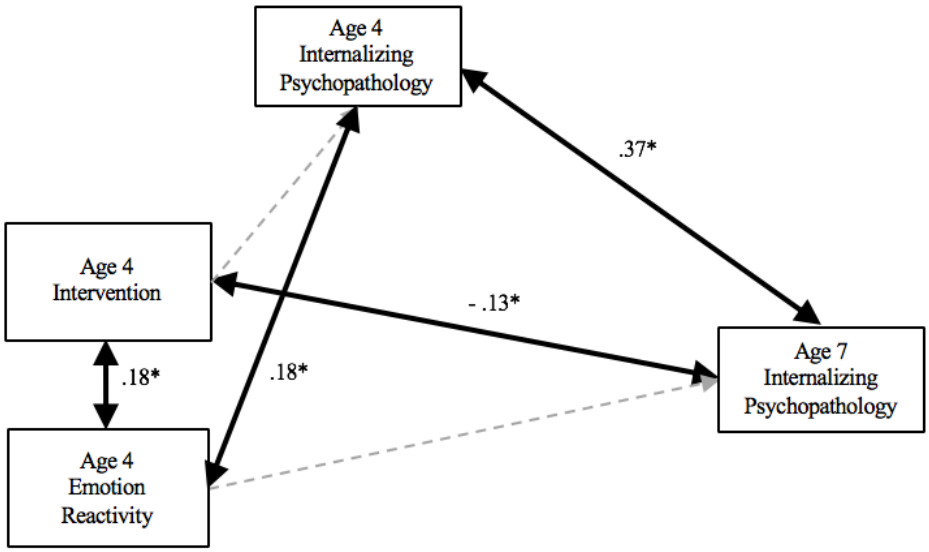


Figure 6.

Four-Class Growth Mixture Model

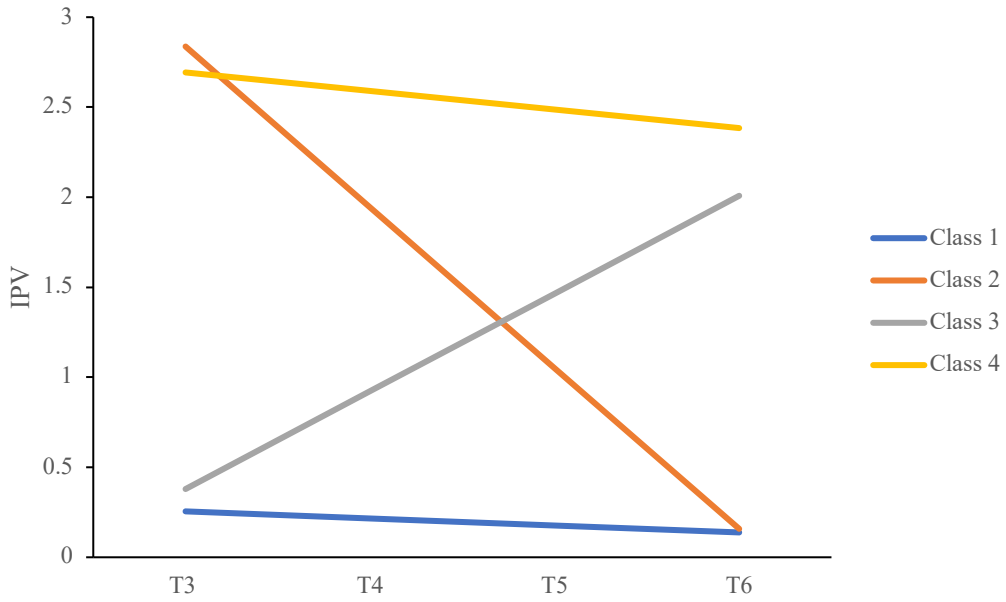
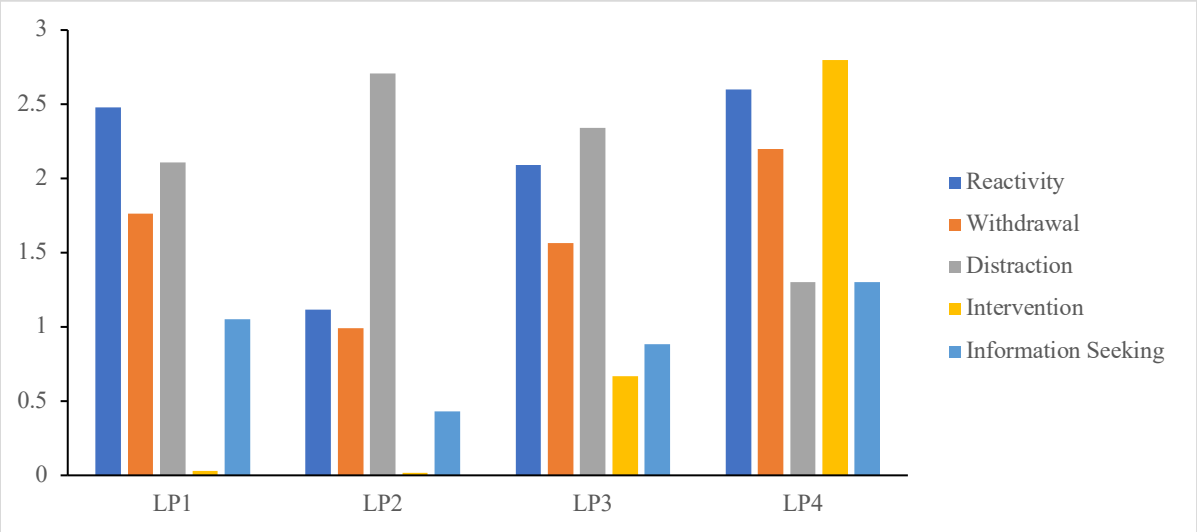


Figure 7.

Latent Profile Analysis Variable Means for Final Model



APPENDIX C

Post-hoc Analyses

Table 12.

Descriptive Statistics for Post-hoc Analyses

	Minimum	Maximum	Mean	SD
Prenatal IPV	1.00	2.00	1.48	0.50
Gender	0.00	4.28	1.14	1.24
Age six nurturing parenting	30.00	63.00	38.91	7.24
Age six discipline in parenting	33.00	80.00	62.76	8.80

Note. Four additional variables (pre-natal IPV, gender, nurturing parenting, and discipline) were considered in post-hoc analyses given potential relevance to emotion reactivity and emotion regulation variables. Prenatal IPV was measured with the Severity of Violence Against Women Scales (SVAWS; Marshall, 1992). Nurturing parenting and discipline were indexed by two subscales of the Parent Behavior Checklist (PBC; Fox, 1994).

Figure 8.

Path Analysis for Withdrawal with Prenatal IPV and Gender

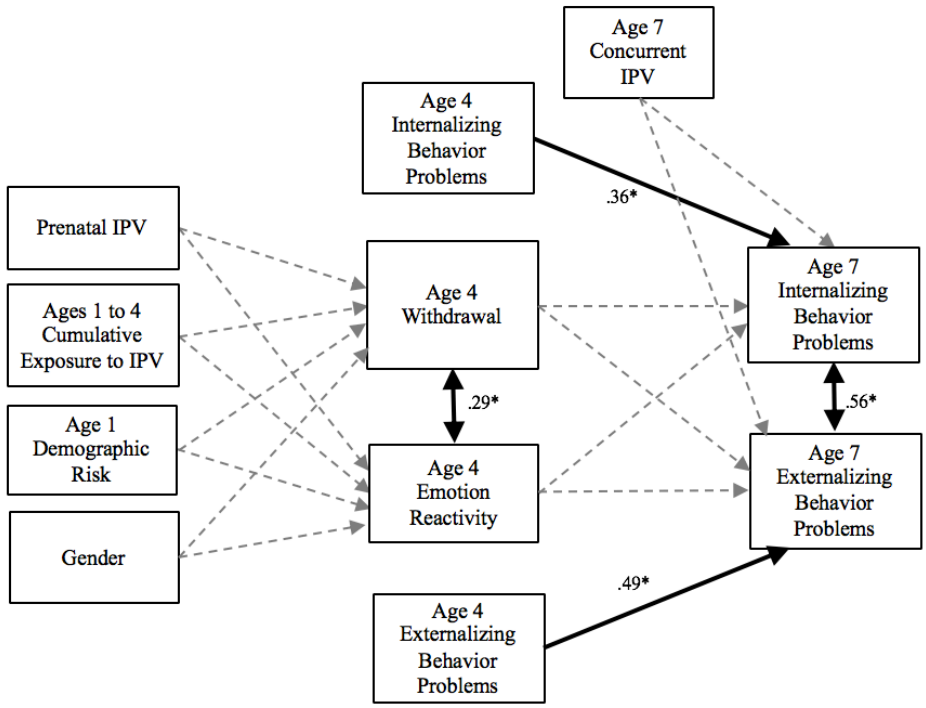


Figure 9.

Path Analysis for Withdrawal with Nurturing Parenting

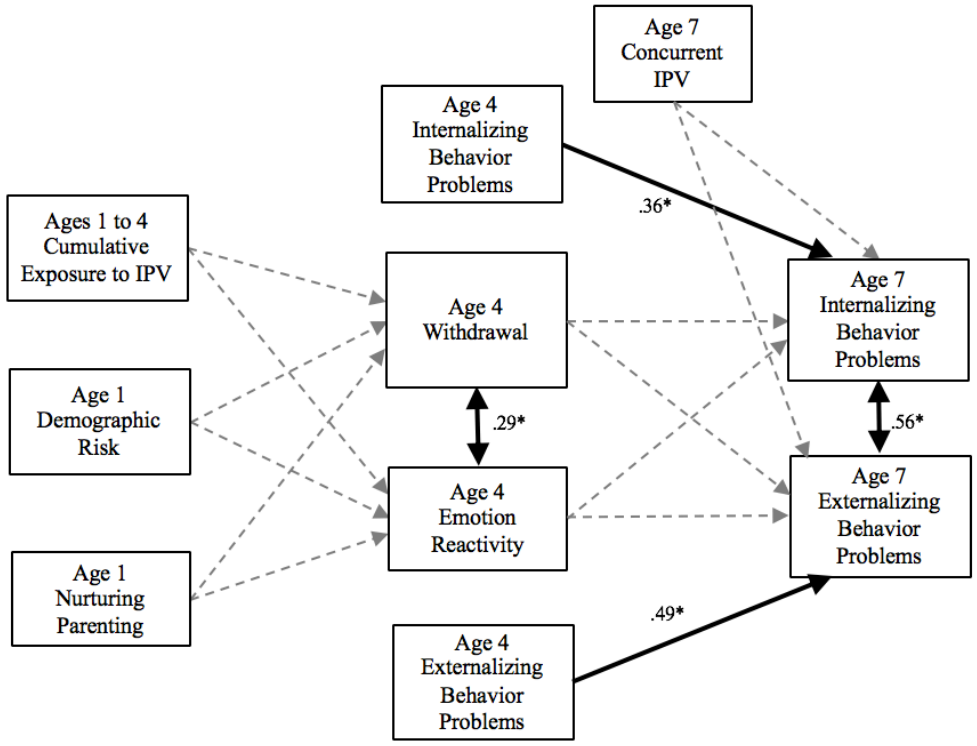


Figure 10.

Path Analysis for Withdrawal with Discipline

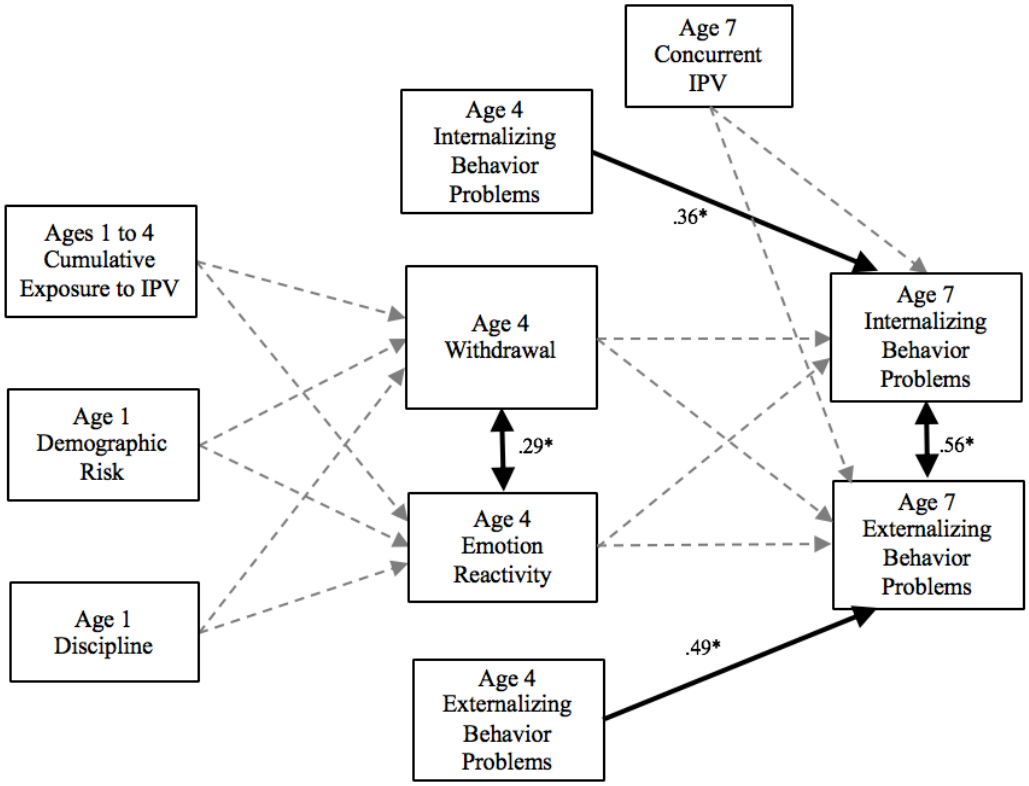


Figure 11.

Path Analysis for Intervention with Prenatal IPV and Gender

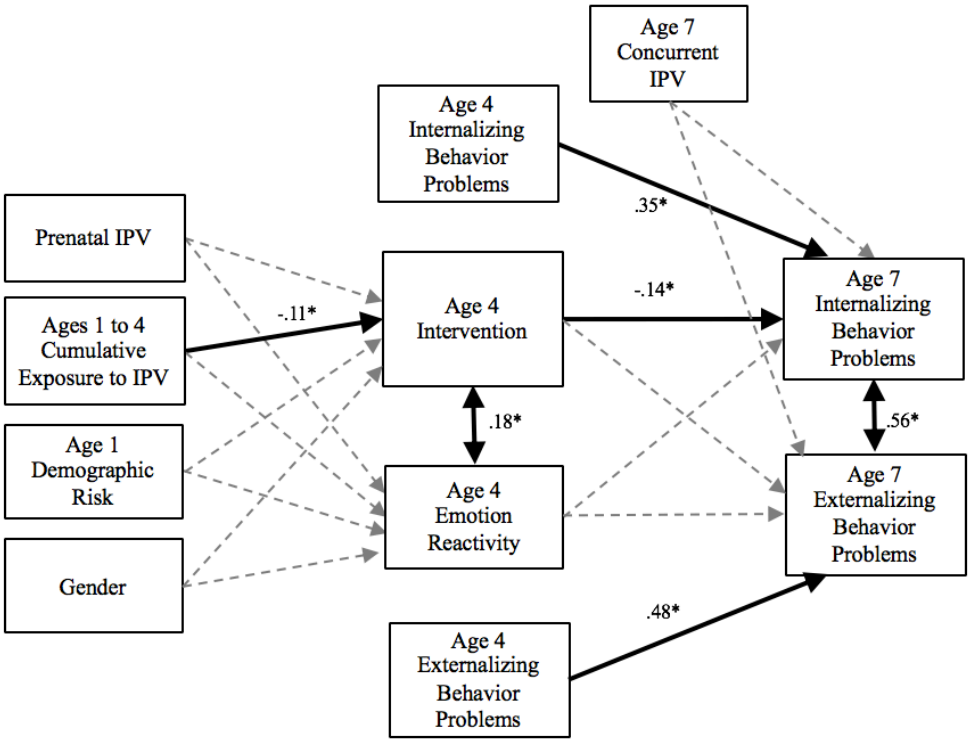


Figure 12.

Path Analysis for Intervention with Nurturing Parenting

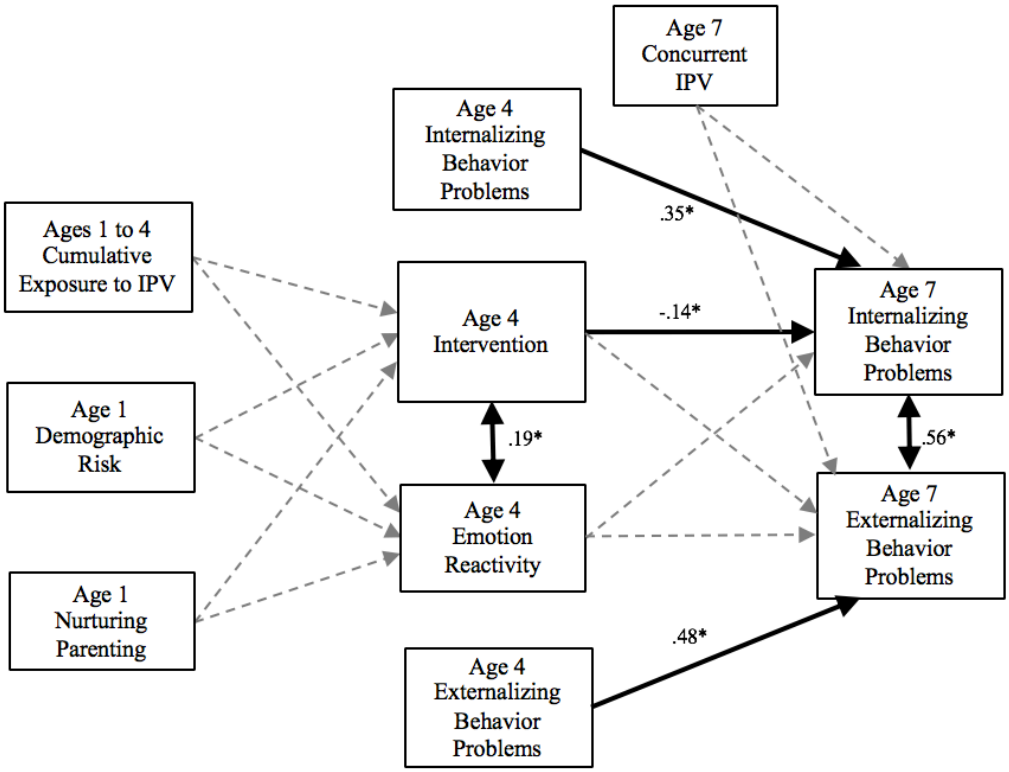
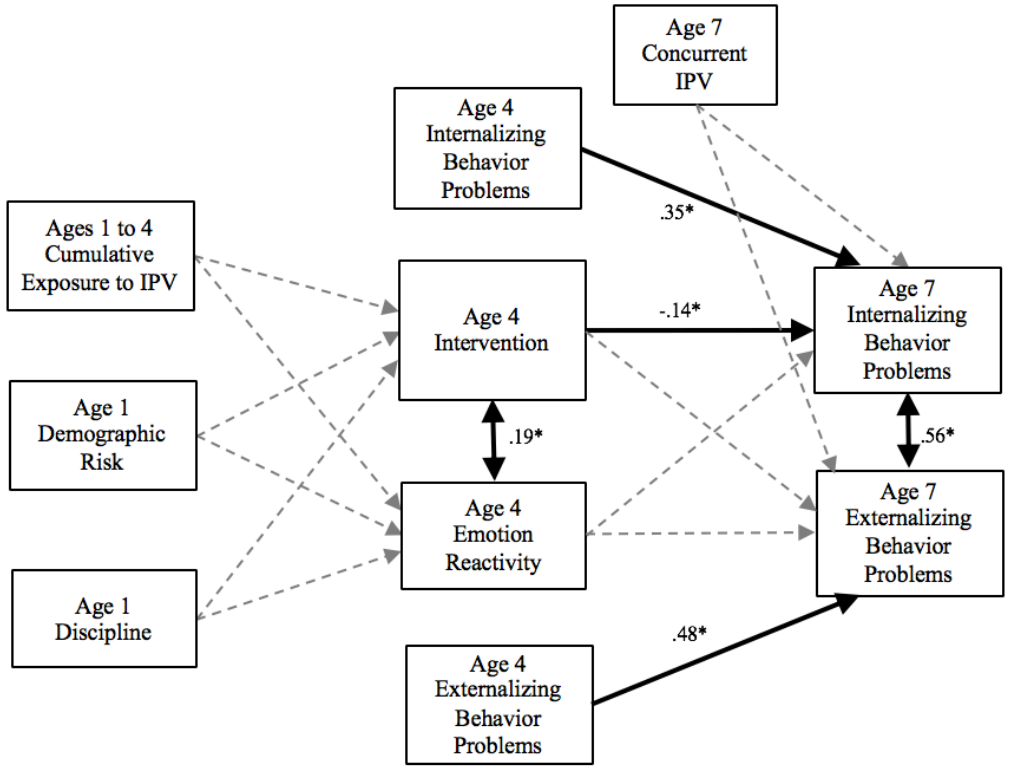


Figure 13.

Path Analysis for Intervention with Discipline



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