LONGITUDINAL RELATIONS BETWEEN INFANT TEMPERAMENT AND CHILD INTERNALIZING AND EXTERNALIZING SYMPTOMS: THE ROLE OF PARENTAL CONFLICT TACTICS AND INTIMATE PARTNER VIOLENCE

A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

In Partial Fulfillment

of the Requirements for the Degree of

Master of Arts

By

Abigail E. Hanna

December, 2018

LONGITUDINAL RELATIONS BETWEEN INFANT TEMPERAMENT AND CHILD INTERNALIZING AND EXTERNALIZING SYMPTOMS:
THE ROLE OF PARENTAL CONFLICT TACTICS AND INTIMATE PARTNER VIOLENCE

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ABSTRACT

Background: The present longitudinal investigation examined direct and indirect effects of parental conflict tactics and intimate partner violence (IPV) in the relation between infant temperament and internalizing and externalizing (I/E) symptom trajectories in a diverse sample of children at risk for maltreatment. **Method:** Participants included 499 mother (36.1% White; 44.3% single; 34.1% employed) and child (51.1% female; 31.7% White) dyads from the LONGitudinal Studies of Child Abuse and Neglect (LONGSCAN; Runyan et al., 1998) dataset. Mothers completed a measure of child temperament between infancy and the child's fourth birthday and a checklist of I/E symptoms when the child was 6, 8, 10, and 12 years old, respectively. Children completed a self-report measure of IPV exposure at age 6, and mothers reported on parental use of aggressive conflict tactics when the child was 8 years old. **Results**: Multi-level modeling revealed a significant main effect of temperament on the cubic trajectory of internalizing symptoms. Post-hoc slope probing revealed that children with higher levels of difficult temperament evinced a sharper growth in internalizing symptoms during the study period. Finally, multilevel modeling of externalizing (but not internalizing) symptoms revealed a significant temperament*IPV*linear time interaction, such that low difficult temperament/high IPV children evinced the most pronounced growth in externalizing symptoms over the course of the investigation. Surprisingly, both the high difficult temperament/high IPV and high difficult temperament/low IPV groups experienced sharp decreases in externalizing symptoms over the study period. **Conclusion**: Findings underscore the role of difficult temperament and IPV on the trajectory of I/E symptoms, yet also highlight the need for a more comprehensive assessment of temperament and a multimethod approach to IPV to more clearly delineate the specific role of these variables above and beyond relevant covariates.

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Introduction

Childhood mental health problems consistently rank high in the World Health Organization's estimates of the global burden of disease (Costello, Egger, & Agnold, 2005). Epidemiological studies suggest that approximately 20 -33% of children will meet criteria for a mental health condition before reaching adulthood (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Merikangas et al., 2010). Internalizing symptoms (e.g., anxious and/or depressive feelings of sorrow, withdrawal, fear, or worry; Madigan, Atkinson, Laurin, & Benoit, 2013) represent the most common form of childhood psychopathology, with lifetime prevalence rates as high as 32% (Kasper, 2009; Merikangas et al., 2010). Externalizing symptoms (e.g., excessive anger, hostility, and dysregulated behaviors that may be harmful to others) are likewise exceedingly common, with lifetime rates as high as 20% (Merikangas et al., 2010). Childhood internalizing and externalizing symptoms (hereafter referred to as I/E symptoms) can also emerge early and follow a chronic course, placing children at risk for various academic, familial, and social adversities (Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003; Merikangas et al., 2010). As a result, increased understanding of the development of I/E symptoms remains a public health priority.

Childhood I/E symptoms have unique temperamental underpinnings (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Crawford, Schrock, & Woodruff-Borden, 2011). For example, biologically-based differences in emotional reactivity predict childhood I/E symptoms (Caspi et al., 1995; Eisenberg, Hernández, & Spinrad, 2017; Nigg, 2006), and *difficult temperament* in particular (i.e., slow adaptability, high intensity in affect expression, and negative mood; Bates, 1980), even when assessed during infancy, has been found to predict the onset of I/E symptoms (Miner & Clarke-Stewart, 2008; Oberklaid, Sanson, Pedlow, & Prior, 1993). Yet, not all children with a difficult temperament develop I/E symptoms, underscoring the need for research on

moderator variables that may explicate which children are most at risk.

In this vein, the parenting environment is a good candidate, given its robust role in the development of I/E symptoms (Cummings, Goeke-Morey, & Papp, 2003; Jaffee, Moffitt, Caspi, Taylor, & Arseneault, 2002). More specifically, research on intimate partner violence (IPV; i.e., physical or sexual violence, threat of physical or sexual violence, or psychological/emotional abuse between partners; Saltzman, Fanslow, McMahon, & Shelley, 1999) and parental use of violent conflict tactics has found these constructs to be related to child temperament and I/E symptoms, respectively (Carlson, 2000; Keefe, 1994; Cummings, 2003). However, no study to date has examined whether these constructs moderate temperament-I/E symptom associations in the context of a longitudinal design. The present investigation fills this void by examining the effects of IPV exposure and parental violent conflict tactics within the home on longitudinal associations between infant difficult temperament and childhood I/E symptoms using a large and publicly available dataset from a multisite longitudinal project examining the antecedents and consequences of child maltreatment (LONGSCAN; Runyan et al., 1998, 2011).

The following sections begin with an introduction to the temperament literature, with a specific focus on its relation to childhood I/E symptoms. A review of the effects of IPV exposure and conflict tactics follows, highlighting the role of these constructs in the emergence and maintenance of childhood I/E symptoms. Finally, support for synergistic associations between childhood temperament, IPV and parental conflict tactics is reviewed before presenting specific aims, wherein IPV exposure and partner conflict tactics are expected to moderate relations between childhood difficult temperament and I/E symptoms over time.

Infant Temperament Relations to Internalizing/Externalizing Symptoms

Temperament refers to heritable and moderately stable infant traits that serve as the "building blocks" for adult personality (Auerbach et al., 2008; Rothbart et al., 1981). Indeed,

infant temperament is a robust predictor of later personality traits (e.g., impulsivity, extraversion; Rothbart, Ahadi, & Evans, 2000) even after accounting for gender, birth order, and socioeconomic status (Bornstein et al., 2015). Infant temperament also demonstrates moderate stability and continuity into middle childhood (Carey & McDevitt, 1978; Rothbart, Derryberry, & Hershey, 2000), and its role in the emergence and trajectories of I/E symptoms has been the subject of considerable scientific interest for decades (Goldsmith & Campos, 1982; Shiner et al., 2012).

This body of work has reported on specific early temperamental characteristics that predict the emergence and overall severity of I/E symptoms over time (Merikangas, Swendsen, Preisig, & Chazan, 1998; Rettew, Copeland, Stanger, & Hudziak, 2004). For example, frequent crying, rigidity, fussiness, and/or excessive irritability — traits ascribed to children with a *difficult temperament* (Bates, 1980) — at age five predict the presence and severity of I/E symptoms at age ten (Leve, Kim, & Peers, 2005). Other temperamental traits such as negative emotionality, impulsivity, and neuroticism are also longitudinally related to the emergence of I/E symptoms (Rhee et al., 2007). For example, infants with lower emotional reactivity (e.g., no smiling) during parent-child interactions exhibited more externalizing behaviors as toddlers (Moore, Cohn, & Campbell, 2001), yet infants who exhibit heightened fear and distress to unknown situations were more likely to demonstrate internalizing problems throughout childhood (Kagan & Snidman, 2004; Putnam & Stifter, 2005; cf. Edwards & Hans, 2015).

Although limited in number, extant studies with high-risk samples (e.g., children at risk for maltreatment, such as those in the LONGSCAN project) have found that difficult temperament is also related to childhood I/E symptoms in this population. One study found that infant regulatory problems (i.e., meal refusal, sleep latency, self-soothing difficulties) predicted concurrent I/E symptoms (Sidor, Fischer, & Cierpka, 2017). Specifically, fussiness and

unpredictability at meal times predicted pure internalizing symptoms, yet a global classification of difficult temperament accounted for 18% and 13% of the variance in internalizing and externalizing symptoms, respectively, at 36 months (Sidor et al., 2017). Likewise, among high-risk, low-income mother-child dyads, difficult temperament and aggression at 12-24 months was related to I/E symptoms at 36 and 60 months, respectively (Keenan, Shaw, Delliquadri, Giovannelli, & Walsh, 1998).

Taken together, the above results provide compelling empirical evidence of significant associations between childhood temperament and I/E symptoms, yet longitudinal studies examining these relations beyond the early childhood period are clearly needed for a better understanding of the trajectory of I/E symptoms among at-risk youth. Moreover, the role and quality of the parenting environment and its interaction with infant temperament in relation to I/E symptoms remain understudied. This work is clinically important because it may lead to the identification of malleable family processes (e.g., IPV, parental conflict tactics) that can be targeted among at-risk families with temperamentally difficult children.

IPV, Conflict Tactics, and Childhood Internalizing/Externalizing Symptoms

Witnessing IPV (physical or sexual violence, threat of physical or sexual violence, or psychological/emotional abuse between partners; Saltzman et al., 1999) is an important factor in the development of childhood I/E symptoms (Cummings & Davies, 2002; Evans, Davies, & DeLillo, 2008; Wood & Sommers, 2011; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). Children exposed to IPV are 3.7 times more likely than children without a history of IPV exposure to develop I/E symptoms over time (Martinez-Torteya, Bogat, Von Eye, & Levendosky, 2009). Chronic IPV exposure also demonstrates significant associations to parental depression and difficult child temperament (Martinez-Torteya et al., 2009), and is related to high irritability and excessive crying (Alessi & Hearn, 1984), posttraumatic symptoms (Bogat,

DeJonghe, Levendosky, Davidson, & von Eye, 2006), and disproportionate reactivity to adults' expression of anger (DeJonghe, Bogat, Levendosky, von Eye, & Davidson, 2005) among infants and young children.

Indirect mechanism theories of IPV propose that its effect on child outcomes is exerted indirectly through compromised parenting techniques (Crockenberg, Leerkes, & Lekka, 2007; Samuelson & Cashman, 2009). For instance, IPV is related to diminished parental sensitivity, which, in turn, is associated with child externalizing behaviors (Levendosky & Graham Bermann, 2000, 2001; Levondosky, Leahy, Bogat, Davidson, & von Eye, 2006; Margolin, Gordis, Medina, & Oliver, 2003). In contrast, the direct mechanism theory of IPV postulates that it directly compromises emotional and behavioral functioning (Davies, Harold, Goeke-Morey, & Cummings, 2002). In line with this view, a longitudinal investigation of children exposed to IPV found that they were significantly more likely than children without a history of IPV exposure to develop I/E symptoms (Martinez-Torteya et al., 2009). Of note, developmental differences in cognitive growth and behavioral sophistication impact how young (vs. older) children respond to IPV (Bogat, DeJonghe, Levendosky, & Von Eye, 2006; Fantuzzo, Boruch, Beriama, Atkins, & Marcus, 1997), yet research on the effects of IPV exposure prior to age 7 is sparse. Moreover, much remains to be known with respect to the moderating role of IPV in the association between infant difficult temperament and child I/E symptoms over time.

In addition to IPV, exposure to everyday parental conflict within the home (Grych & Fincham, 1990) has been identified as a highly relevant process in childhood I/E symptoms (Cummings et al., 2003). For instance, parental displays of threat, personal insult, verbal hostility, defensiveness, nonverbal hostility, marital withdrawal, and physical distress have been found to relate to higher levels of child emotional negativity (Cummings et al., 2003). However, the effects of parental conflict tactics used within the context of marital discord on I/E symptoms

have not been examined (Crockenberg & Langrock, 2001; Cummings et al., 2003). Indeed, researchers have noted that conflict tactics are frequently assessed in studies of marital discord (Gottman, 1994; Notarius & Markman, 1993), yet its effects on children are rarely studied (Cummings et al., 2003). Finally, the lack of investigations examining the effects of parental conflict tactics in the longitudinal relationship between temperament and I/E symptoms suggests that this is an area ripe for further study.

The literature reviewed above provides ample evidence that children exposed to IPV are at risk for I/E outcomes (Feldman & Eidelman, 2007; Rothbaum & Weisz, 1994; Teti & Gelfand, 1991). Sparse research on everyday parental conflict tactics also highlights their detrimental effects on children's developmental trajectories (Cummings et al., 2003). Finally, although evidence for synergistic (interactive) relations between childhood temperament and maladaptive parenting factors (e.g., IPV, parental conflict tactics) is beginning to emerge (Martinez-Torteya et al., 2009), there is a clear need for additional study of these effects in relation to childhood I/E symptoms over time. Importantly, this work has the potential to clarify which temperamentally difficult children may be most at risk for I/E symptoms. Research suggesting potential interactive relations between childhood temperament, IPV and parental conflict tactics is discussed in greater detail in the next section prior to outlining the specific aims of the present investigation.

Childhood Temperament, IPV Exposure, and Parental Conflict Tactics

Although research examining *interactions* between childhood temperament, IPV exposure and/or conflict tactics is limited (e.g., Burke, Lee, & O'Campo, 2008), bivariate associations between problematic temperamental profiles, negative parenting behaviors, and children's adjustment difficulties have been reported. For example, children high in temperamental traits such as frustration and impulsivity, yet low in effortful control, are more vulnerable to the adverse effects of negative parenting (Kiff, Lengua, & Zalewski, 2011), and

elicit parental responses that reinforce such traits (Kiff et al., 2011). Research has also found that among children with difficult temperament profiles characterized by high reactivity and negative emotionality, adaptive behavioral development depends, in part, on their experiences with caregivers (Wachs, 2000). For instance, children with high negative emotionality are more likely to exhibit elevated levels of internalizing problems if their mothers react with disproportionately high warmth and sensitivity to their child's behaviors (Davis, Votruba-Drzal, & Silk, 2015). Likewise, parental overprotection and overcontrol is associated with increased child internalizing problems (McLeod, Wood, & Weisz, 2007) among youth with high behavioral inhibition (a temperamental trait characterized by fear and apprehension in novel situations; Degnan, Henderson, Fox, & Rubin, 2008). Similar relations are found in the context of oversensitive maternal warmth (van der Bruggen, Stams, Bogels, & Paulussen-Hoogeboom, 2010). Together, these investigations suggest synergistic relations between broad maladaptive parenting behaviors and child temperamental profiles in relation to childhood I/E symptoms, yet a clear need for further study of interactive effects between IPV, conflict tactics, and infant difficult temperament in relation to I/E symptoms is specifically needed.

Indeed, only a handful of studies have examined associations between IPV and child temperamental traits. Burke and colleaugues (2008) found that maternal reports of IPV were significantly associated with increased odds of difficult temperament, and a recent study of 150 parent-child dyads found that endorsement of past IPV within the home was associated with difficult infant temperament and lower parenting competence (Gibson, Callands, Magriples, Divney, & Kershaw, 2015). Conversely, greater equity between partners was related to more favorable infant temperament (Gibson et al., 2015). A separate study found that temperamental fear and shyness during the preteen years predicted internalizing symptoms in adolescents, yet this relation was strengthened when parents used harsh discipline in the home (Leve et al., 2005).

Although informative, these studies did not explore whether children directly witnessed perpetration of the abuse (Burke et al., 2008), and received confounding reported rates of physical violence due to the use of different questions at baseline and follow-up (Burke et al., 2008). Finally, Gibson and colleagues (2015) did not assess for associations of IPV and difficult temperament to I/E symptoms specifically. Examining interactive effects between IPV and parental conflict tactics, respectively, and infant difficult temperament in relation to the longitudinal trajectory of I/E symptoms may help to identify malleable family processes (e.g., IPV, parental conflict tactics) that can be targeted among at-risk families with temperamentally vulnerable children.

The Present Study

The present investigation relied on a novel and scientifically rigorous design to examine associations between child difficult temperament (measured at baseline, when children were between the ages of 0 and 4) and the trajectory of I/E symptoms across four time points (ages 6, 8, 10 and 12) in a diverse and high-risk sample of children from the LONGSCAN dataset. The moderating role of parental conflict tactics and IPV in the relation between difficult infant temperament and I/E symptom severity was also examined. The specific aims and hypotheses for the present study were as follows:

Aim 1: To test longitudinal associations between difficult infant temperament and I/E symptoms.

Hypothesis 1: Difficult infant temperament at baseline (ages 0-4) was hypothesized to be associated with the trajectory of I/E symptoms over the four subsequent assessment time points (ages 6, 8, 10, and 12).

Aim 2: To test associations between parental conflict tactics/ IPV exposure and I/E symptoms.

Hypothesis 2: It was also hypothesized that higher IPV exposure and higher use of conflict tactics would be associated with the trajectory of I/E symptoms over the four assessment time points (ages 6, 8, 10, and 12).

Aim 3: To test the moderating role of parental conflict tactics/ IPV exposure in the relation between difficult infant temperament and I/E symptoms.

Hypothesis 3: Parental conflict tactics and IPV exposure were expected to moderate the longitudinal association between difficult infant temperament and I/E symptoms. Specifically, the relation between difficult infant temperament and the trajectory of I/E symptoms was predicted to be stronger among children with higher (vs. lower) exposure to parental conflict tactics and IPV, respectively.

Consistent with theoretical and empirical work, hypothesized relations were expected over and above the effects of the following covariates: gender (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999), race (McLaughlin, Hilt, & Nolen-Hoeksema, 2007), parental depression (Foster, Garber, & Durlak, 2008), parental problem drinking (Chassin, Rogosch, & Barrera, 1991; Chassin, Pitts, DeLucia, & Todd, 1999), and parental marital status (Katz & Gottman, 1993).

Method

Participants

Data for this investigation were derived from a multisite longitudinal research project designed to examine the antecedents and consequences of child maltreatment: the LONGitudinal Studies of Child Abuse and Neglect (LONGSCAN). Parents tended to be the child's biological mothers at each of the sites; however, the Northwest site reported a higher percentage of

grandmothers, foster mothers, and/or a male as the primary caregiver (see Table 1).

The LONGSCAN addressed limitations of previous cross-sectional maltreatment studies by prioritizing the previously neglected areas of socialization, family systems, and child development in relation to child maltreatment (Runyan et al., 1998; Runyan et al., 2011). In concordance with the ecological-developmental model, which underscores reciprocal transactions between the child and his or her environment (National Research Council, 1993), LONGSCAN investigators designed developmentally-appropriate measures, with multiple informants, to examine risk and protective factors within the individual (child), parent, family system, societal, and cultural levels. Families (N = 1,354) were recruited from five sites across the United States (Northwest, Midwest, Eastern, Southern, and Southwestern regions), which shared common measures for data collection and study management when possible. Child and parent participation began when the child was 4 years old or younger; dyads were contacted for follow-up evaluations biannually until the child reached age 20. Given the focus of the present investigation on infant temperament's relation to I/E symptom trajectories during childhood and preadolescence, the following five waves of data prior to children reaching adolescence were used: Wave 0 (ages 0-4), Wave 1 (age 6), Wave 2 (age 8), Wave 3 (age 10), and Wave 4 (age 12).

Inclusion criteria for the present investigation included parental completion of the Infant Temperament Questionnaire (ICQ-6; Bates, Freeland, & Lounsbury, 1979, see Measures) and joining the study prior to the child's fifth birthday. Only the Northwest and Midwest sites administered the ICQ-6 and were thus included in the study (N = 499). Children from the Eastern, Southern, and Southwestern sites were excluded (N = 855).

The final sample consisted of 499 children (51.1% female, 36.3% Black, $M_{\text{age at Wave 0}}$ = 10.10 months [SD = 12.00], 71.3% had at least 1 lifetime CPS allegation filed) and their

maternal parents (N = 499, $M_{\text{age at Wave 0}}$ = 29.21 years [SD = 8.13], $M_{\text{years of education}}$ = 11.80 [SD = 2.15], 44.3% Single) who enrolled in the study prior to age 4 and were enrolled in either the Northwest or Midwest LONGSCAN sites (see Table 2 for child demographic characteristics).

Measures

Demographic questionnaire. At the initial interview (Wave 0), parents responded to sociodemographic questions pertaining to their child's age, sex, race, native first language, and other physical health status questions. During the same visit, parents responded to sociodemographic and SES questions about themselves (Table 1), as well as about their spouse and the family or household in general. Parent demographics questionnaires assessed for the parent's age, race, marital status, years of education, highest degree earned, and current employment (or student) status (including whether more than one job is held). Parents responded to similar questions pertaining to their spouse's highest level of education and current employment status. Finally, during Wave 0, the primary parent provided responses to questions pertaining to total family income, number of dependents in the household, and primary source(s) of income.

Infant Characteristics Questionnaire - 6 Months Form (ICQ-6; Bates et al., 1979). The ICQ-6 is a measure designed to assess difficult temperament (e.g., fussy, unadaptable) in 6-month-old infants, as perceived by the parent. The parent is asked to rank 24 items on a 7-point Likert scale (1 = *very easy* through 7 = *very difficult*), with higher scores indicating a higher level of perceived difficulty in dealing with the given infant behavior. Due to differences in children's ages at the time of recruitment, ICQ-6 data collection, which took place during Wave 0, included a range of participant ages (between 1 month and 35 months of age; $M_{\text{age at completion}}$ = 11.47 months [SD = 7.19]). For dyads who joined the LONGSCAN consortium after their child reached 6 months of age, the parent was asked to recall his or her infant's behaviors at age 6

months. In this study, the total ICQ-6 score was used as an index of difficult temperament (α = .82).

Revised Conflict Tactics Scale – Partner to Partner (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). The CTS-2 measures the type and severity of conflict tactics used between the child's maternal parent and their partner during the past year (or lifetime). It is considered the gold-standard measure in domestic violence research when assessing for conflict tactics use between partners (Straus, 1990a, 1990b; Tiwari et al., 2007). The CTS-2 contains 78 items (39 behaviors or experiences, each asked once for respondent and once for partner), assessing the use of behaviors such as negotiation, psychological aggression, physical assault, physical injury, and sexual coercion. Parents rated the items on a 7-point Likert scale to indicate the frequency that specified behaviors or tactics were used during conflict with a partner *in the past year*, ranging from 1 (*never*) to 7 (*20 or more times*). Two response options account for lifetime experience of negative conflict tactics ("*Never in the last year, but it did happen before that*," and "*This has never happened*"). A composite score is created by summing the responses to each question, with higher scores indicating more use of the specified tactic or domain of tactics. This measure was completed by parents at Wave 2 (age 8). The CTS-2 has demonstrated good internal consistency and test-retest reliability (Straus, 1990a, 1990b; Straus et al., 1996; Vega & O'Leary, 2007). In the present study, the total CTS-2 score was used as an index of parental conflict tactics (α = .78).

Things I Have Seen and Heard (Richters & Martinez, 1992). The present study utilized a child-report measure of witnessed IPV. The Things I Have Seen and Heard (Richters & Martinez, 1992) scale was developed for children in Grades 1 and 2, and contains 20 items that assess for young children's exposure to violence or violence-related events (e.g., seeing adults in the home yelling at each other, seeing someone arrested). A pictorial format is used to facilitate

comprehension of scenarios depicted. Additionally, children are provided with pictorial representations to indicate how often the item has applied to them. On the response form, five stacks of balls are depicted below each description of violence, ranging from no balls (an empty circle, indicating "I have not experienced this") to four balls (representing "this has happened many times").

In the present study, and consistent with previous studies (Cromer & Villodas, 2017; West, 2014), child-reported exposure to IPV was assessed using three items from the scale inquiring about IPV. Specifically, the three items assess (a) seeing adults in the home yelling at each other, (b) seeing adults in the home hitting each other, and (c) seeing a parent being attacked with a weapon or physical force in the home. Responses to these three IPV-related items were summed (*range* = 0 -12) to yield a variable identifying exposure to IPV via child-report at Wave 1 (age 6; $\alpha = .36$).

Child Behavior Checklist - Ages 4 through 18 (CBCL/4-18; Achenbach, 1991). The CBCL is an empirically validated, multi-axial checklist assessing I/E symptoms in children (Achenbach, 1991). The parent is asked to rate on a scale ranging from 0 (*none*) to 2 (*a lot*) the extent to which 113 behaviors apply to the child. The CBCL Internalizing Problems and Externalizing Problems broadband scales were used to assess I/E symptoms. The Internalizing Problems scale combines the Social Withdrawal, Somatic Complaints, and Anxiety/Depression subscales, while the Externalizing Problems scale combines the Delinquent Behavior and Aggressive Behavior subscales (Achenbach, 1991). The parent completed the CBCL at Wave 1 (age 6), Wave 2 (age 8), Wave 3 (age 10), and Wave 4 (age 12). The Internalizing ($\alpha = .87$) and Externalizing ($\alpha = .91$) scales demonstrated good internal consistency.

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item self-report questionnaire designed to assess frequency and overall severity of

depressive symptoms in adults "during the past week" (Radloff, 1977; Hunter et al., 2003). The CES-D was completed by parents and administered at baseline (Wave 0) in the present study. Items pertain to depressed mood, feelings of guilt, worthlessness, and hopelessness, and adverse mood-related changes such as sleep disturbance and appetite loss. Item responses are weighted based on symptom frequency and range from 0 to 3, with 3 reflecting greater frequency, and summed to yield a total score. Summed scores range from 0 to 60 with higher scores reflecting greater severity. Good test-retest reliability (r = 0.57) and validity have been demonstrated on the CES-D (Radloff, 1977). In this study, the internal consistency of the CES-D was $\alpha = 0.78$.

CAGE Questionnaire (CAGE; Ewing, 1984). Parental problem drinking was assessed using the CAGE (Ewing, 1984) questionnaire, administered at the age 4 interview. CAGE is an acronym representing the measure's four questions about drinking behavior, which focus specifically on cutting down ("have you ever felt you ought to cut down on your drinking?), annoyance by criticism ("have you ever felt annoyed by people criticizing your drinking?), guilty feeling (have you ever felt bad or guilty about drinking?), and eye-openers (or morning drinking; "have you ever had a drink first thing in the morning?"). Affirmative responses are coded as a score of 1 and summed (*range* = 0 - 4), with higher scores indicating more problematic drinking behaviors. The CAGE has demonstrated sensitivity and specificity in discriminating alcoholics from non-alcoholics (King, 1986). In this study, the internal consistency of the CAGE was $\alpha = 0.77$.

Procedures

All original study procedures were approved by the Institutional Review Board at each LONGSCAN site. Informed, written consent was obtained from the child's parent. Due to the young participant age at the initial interview (age 0-4), children's assent was not obtained during the visit. At this initial visit, mothers participated in an interview to assess demographic

information, family structure, parental functioning (i.e., problem drinking, general physical health), and children's temperament.

The present study extends to the middle childhood and pre-adolescent period (ages 6, 8, 10, and 12), when I/E symptoms and family violence measures were assessed. At Wave 1 (age 6), parents and children participated in face-to-face interviews conducted by trained interviewers that included a combination of standardized and project-developed measures. At Wave 2 (age 8) and Wave 3 (age 10), participants and their mothers completed paper and pencil measures. At Wave 4 (age 12), interviews began to be administered using audio-computer-assisted self-interviews (and some paper and pencil measures). Computer-assisted interviews were selected to offer participants sufficient privacy in responding to highly sensitive items (LONGSCAN, 2009). In an effort to decrease attrition, telephone contacts were initiated by researchers annually. The LONGSCAN Coordinating Center at the University of North Carolina designed and implemented a common data entry system across sites; data was entered and coded locally at each site. Randomly selected interviews (approximately 10%) were re-entered and re-coded by study personnel to verify data entry procedures and coding.

The present study consisted of a secondary data analysis of the LONGSCAN dataset. Researchers contacted the National Data Archive on Child Abuse and Neglect (NDACAN) in December 2016 and provided a study proposal. The NDACAN team at Cornell University reviews research proposals and requests for data regularly, and provides data to approved researchers. Data for the present study were obtained in January 2017. The University of Houston IRB approved the current project under the Exempt Research category.

Data Analytic Strategy

The present study examined the main and interactive effects of temperament, exposure to IPV, and parental conflict tactics in relation to the trajectory of I/E symptoms across four time

points (ages 6, 8, 10, and 12). Sample descriptive statistics were first calculated using the PROC CONTENTS and PROC CORR procedures in SAS Version 9.4 software (SAS Institute, 2013). I/E data were each plotted visually using SPSS (IBM Corp, 2012) to confirm the data shape over time (see Figures 1-2).

Next, one-way analysis of variance (ANOVA) followed by Tukey's post-hoc comparisons were conducted to detect group differences in demographic variables, including sex, race, and age, and parental marital status in relation to IPV exposure, conflict tactics in the home, difficult temperament, and I/E symptoms. Bivariate Pearson correlations were calculated to examine associations between covariates (parental depression and problem drinking) and IPV exposure, conflict tactics, difficult temperament, and I/E symptoms.

Finally, multilevel modeling using the SAS PROC MIXED procedure (SAS Institute, 2013) was used to examine the effects difficult temperament, child-reported exposure to IPV, and parent report of child exposure to violent conflict tactics on the trajectories of I/E symptoms. Time was included as a repeated factor. Predictors included infant difficult temperament, exposure to IPV, and violent parental conflict tactics. As noted earlier, covariates included gender (Leadbeater et al., 1999), race (McLaughlin et al., 2007), parental depression (Foster et al., 2008), parental problem drinking (Chassin et al., 1991; Chassin, et al., 1999), and parental marital status (Katz & Gottman, 1993). Linear, quadratic, and cubic time; time-by-gender; time-by-race; time-by-difficult temperament; time-by-IPV exposure; time-by- parental conflict tactics; time-by parental problem drinking; time-by-parental depression; and time-by-parental marital status were also included.

Six multilevel models were used to examine change in I/E symptoms individually, from age-6 to age-12 assessments. The six models pertaining to internalizing symptom outcomes are labeled with the suffix -a., while the six models assessing externalizing symptom outcomes are

labeled with the suffix -b. (e.g., Model 1a, 1b, 2a, 2b and so on). All outcomes were dimensional (CBCL-I and -E scores, respectively). The PROC MIXED procedure accounts for the nesting nature of repeated measures in longitudinal studies with four or more assessment points automatically; no additions to the code are necessary. This particular procedure is also able to use data from participants with missing data on one or two time points, utilizing estimation procedures automatically in place (Singer & Willett, 2003). Specifically, the estimation of unknown parameters in the models is accounted for based on the restricted maximum-likelihood estimation. The models included two levels, where repeated assessments across time (Level 1; variables included time) were nested within participants (Level 2; variables included exposure to IPV, parental conflict tactics, gender, race, parental marital status, parental problem drinking, parental depression, and data collection site [Northwest vs. Midwest]).

Assessment waves were spaced fairly evenly in terms of the number of years between each wave (ages 6, 8, 10, and 12). However, to account for time irregularity between Wave 0 (baseline) and Wave 1, a time-structured predictor was included. This time interval variable included values corresponding with the actual time spaces (in years) between each follow-up assessment (Singer & Willett, 2003).

Two fully unconditional models (Model 1a; 1b) were used to estimate the intraclass correlation and design effect (Muthén, & Satorra, 1995) for internalizing and externalizing outcomes, respectively. The magnitude of the intraclass correlation and the size of the design effect in the current study (i.e., design effect 1+ [Average cluster size -1] * Interclass correlation) were used to confirm that the use of multilevel modeling was the best analytic approach for each of the symptom groups. Second, unconditional linear multilevel models for internalizing and externalizing symptoms, respectively (Model 2a; 2b), examined difficult temperament (intercept) and linear changes in I/E symptoms (slopes) to examine whether change of I/E symptoms were

adequately represented by a straight line in the current study population. Third, two unconditional quadratic growth models (Model 3a; 3b) were used to examine whether changes in I/E symptoms were better determined by a curved (quadratic) line. Specifically, Model 3 examined difficult temperament scores (intercept) and both linear and quadratic changes in I/E symptoms (slopes) individually. Fourth, unconditional cubic growth models (Model 4a; 4b) were used to determine whether changes in I/E symptoms were better represented by a cubic line. This model examined temperament scores (intercept) and linear, quadratic, and cubic changes in I/E symptoms (slopes) individually. Finally, a conditional model with Level 2 predictors (Model 5a; 5b) was used to predict difficult temperament (intercept) and change in I/E symptoms (slopes) with IPV and exposure to parental violent conflict tactics. Lastly, Model 5 also examined these predictors' interactions.

Notably, a two-step process was used to fit Model 5: (1) the main-effects model, where predictors were simultaneously entered in the model and the main effects of each predictor were examined, and (2) the interactive-effects model, where the interaction terms that included IPV and parental conflict tactics were added into the main-effects model. Finally, a conditional model with Level 2 predictors and Level 2 covariates (Model 6a; 6b) was used to examine whether individual characteristics from Model 5 significantly predicted growth over and above the effects of covariates.

Intercept and slopes in the models were considered as random to account for intraindividual variability of I/E symptoms. The unstructured covariance matrix was specified in SAS for the Random statement to allow for separate estimation of variances and covariances for variables with no expected pattern (i.e., random variables; Raudenbush & Bryk, 2002). In contrast, for the Repeated Statement, the first-order autoregressive covariance matrix was used to allow for correlation among residuals as they were closer in time (i.e., the first assessments

generally have higher correlations; Gibbons et al., 1993). Consistent with past multilevel modeling work predicting I/E outcomes (e.g., Delgado et al., 2011; Jouriles, Vu, & McDonald, 2014), Satterthwaite approximation was specified in the SAS code to calculate the degrees of freedom (Cohen, Cohen, West, & Aiken, 2013; Satterthwaite et al., 1946). Finally, using prototypical values (1 *SD* above and below mean of each predictor), we ran post hoc slope analyses of significant interactions (Raudenbush, Brennan, & Barnett, 1995; Singer & Willett, 2003).

Results

Preliminary Analyses

Means and standard deviations among variables of interest are presented in Table 3. Pearson correlations between variables are presented in Table 4.

Difficult temperament. Racial and gender differences were found in terms of parent reports of difficult temperament. Specifically, African American (M = 46.72, SD = 13.90), Mixed Race (M = 42.64, SD = 11.51), and White (M = 42.75, SD = 13.57) children were reported to have significantly more difficult temperaments compared to their Hispanic (M = 35.80, SD = 8.87) counterparts, F (4, 387) = 6.30, $p < .001$. In terms of gender differences, girls (M = 45.83, SD = 13.86) were rated as having more difficult temperament that boys (M = 41.79, SD = 12.28), F [1, 387] = 9.72, $p < .001$. Child difficult temperament was significantly related to parental problem drinking (r = 0.15, $p < .0001$) but not to parental depression (r = .03, p = .32).

Difficult temperament at Wave 0 (age 0-4) was significantly correlated with externalizing symptoms at Wave 2 (age 8; r = .13, $p < .05$) and Wave 3 (age 10; r = .15, $p < .05$). There were no significant bivariate associations between difficult temperament and internalizing problems, IPV exposure, or conflict tactic measures (Table 4).

Intimate partner violence (IPV). Children's self-reports of witnessing IPV revealed that

42.7% of children endorsed hearing parents argue in the home "*many times,"* 13.5% of children endorsed witnessing adults in the home hit each other "*many times,"* and 10.7% of children reported witnessing an adult being attacked with a weapon in the home at least one time (Table 5). Taken together, 62.7% of children in the sample had been exposed to IPV by endorsing at least one of the IPV indicators.

Children who identified as Mixed race reported witnessing higher amounts of IPV (M = 4.63, SD = 2.27) than African American (M = 3.47, SD = 2.65) and Hispanic (M= 1.67, SD = 1.68) children (F [4, 387] = 11.01, p <.0001), while White (M = 4.33, SD = 3.08) and African American children reported significantly higher IPV scores than Hispanic children (F [4, 387] = 11.01, p <.0001). In terms of gender differences, boys (M = 4.14, SD = 2.71) witnessed significantly more IPV than girls (M = 3.39, SD = 2.72), F [1, 387] = 9.72, p < .01.

Children of divorced (M = 5.70, SD = 2.74) parents reported significantly more accounts of witnessing IPV than children of married (M = 3.64, SD = 3.11) or single (M = 3.51, SD = 2.59) parents, F [3, 230] = 7.12, p < .0001. In addition, witnessed IPV was significantly negatively correlated with parental depression (r = -0.08, p < .01). Parental problem drinking was not significantly correlated with IPV exposure (r = 0.01, p = .76). Finally, child-reported IPV was not significantly related to I/E symptoms.

Parental conflict tactics. 71.1% of parents indicated at least one lifetime instance of verbally aggressive conflicts tactic use, and 8.2% of parents reported one or more instances of physically aggressive or violent conflict tactics toward the partner. Additionally, 2.8% percent of parents reporting three of more instances of physically violent conflict tactics in the past year. Overall, 71.3% of parents indicated at least one significant instance of verbal aggression and/or physical violence between the respondent and their partner in the past year.

White children (M = 5.93, SD = 5.25) witnessed significantly more conflict tactics than

their Hispanic (M = 1.98, SD = 2.64) and Mixed race (M = 3.48, SD = 4.30) counterparts, F (4, 387) = 6.61, p <.0001. African American (M = 4.95, SD = 5.22) children also witnessed significantly more conflict tactics than Hispanic children, F (4, 387) = 6.61, p <.0001. No significant differences were found between boys and girls in their exposure to conflict tactics, F (1, 397) = 0.13, p = .72. Parents who were separated (M = 16.00, SD = .001) from their partner at the baseline assessment reported significantly more use of violent and aggressive conflict tactics in the home than single (M = 5.08, SD = 5.13), married (M = 4.63, SD = 5.63), and divorced (M = 3.42, SD = 3.22) parents, F (3, 202) = 11.50, p < .0001. No associations were found between parental conflict tactics use and parental depression or problem drinking.

Parental reports of violent and aggressive conflict tactics were significantly related to internalizing symptoms at ages 6 (r = .25. p < .01), age 8 (r = .21, p < .05), age 10 (r = .27, p < .01), and age 12 *(*r = .27, p < .01). Likewise, conflict tactics were significantly related to externalizing symptoms at age 6 (r = .25. p < .01), age 8 (r = .27, p < .01), age 10 (r = .23, p < .01), and age 12 *(*r = .22, p < .05).

Internalizing/externalizing symptoms. No significant differences in baseline internalizing symptoms were found as a function of child race, gender, or age. No significant correlations were found between parental depression or problem drinking and baseline child internalizing symptoms. However, parents who were separated (M = 17.00, SD = 5.75) from their partners reported significantly higher baseline child internalizing symptoms compared to married (M = 5.85, SD = 5.20), single (M = 7.27, SD = 6.36), and divorced (M = 4.03, SD = 5.28) parents, (F [3, 230] = 9.87, p < .0001).

Children who identified as Mixed race (M = 15.23, SD = 9.73) had higher parent-reported externalizing symptoms than African American (M = 10.98, SD = 8.09), White (M = 10.85, SD = 6.88), and Hispanic (M = 9.61, SD = 6.40) children, F (4, 387) = 6.80, p < .0001.

No significant gender differences in externalizing symptom severity were detected. Parents who were single (M = 14.70, SD = 10.01) endorsed higher baseline externalizing symptomatology for their children compared to divorced (M = 8.90, SD = 6.79) parents (F [3, 230] = 5.02, p = .002). Neither parental depression nor problem drinking were related to parental reports of child externalizing problems.

Multilevel Models

The intraclass correlation was calculated for internalizing and externalizing symptoms separately. Specifically, two separate fully unconditional models were run to determine the suitability of multilevel modeling for the present study design (Models 1a, 1b). Results indicated that 55.5% of the total variance in internalizing symptoms was due to intraindividual differences, and 44.5% was due to interindividual differences (Model 1a). For externalizing symptoms, results indicated that 65.1% of the total variance in externalizing symptoms was due to intraindividual differences, with 34.9% of the total variance attributable to interindividual differences (Model 1b). The magnitude of intraclass correlation and the size of the design effect indicated significant variability at both within- and between-individual levels, which supports the use of multilevel modeling (Krull & Mackinnon, 2001).

Fixed effects for internalizing symptoms. Internalizing symptom score means (CBCL; Achenbach, 1990) at each assessment point were first plotted to examine the shape of the data visually, before proceeding to model testing (Bates, Machler, Bolker, & Walker, 2015). Visual examination of internalizing symptom means over time revealed a nonlinear shape (Figure 1). Table 6 presents the fixed effects of predictors for all internalizing symptom models. Comparisons of Models 2a, 3a and 4a on the Akaike Information Criterion (AIC; lowest AIC suggests best model fit; Koehler & Murphree, 1988; Wagenmakers & Farrell, 2004) suggested that a cubic shape (Model 4a) fit children's internalizing symptoms best. Specifically,

internalizing symptoms increased from ages 6 to 8, followed by a decline at age 10, followed by another symptom increase from age 10 to age 12 (see Figure 1).

For the conditional main effects of temperament of Model 5a, the results suggested that difficult temperament predicted higher levels of internalizing symptoms in the linear (β = 0.07, *SE* = .017, *p* < .001, 95% CI [0.04, 0.11]) and cubic trajectories (β = 0.02, *SE* = .003, *p* <.001, 95% CI [0.01, 0.24]) of internalizing symptoms over time. Post-hoc slope analyses revealed a sharper linear growth in internalizing symptoms among children with higher (vs. lower) difficult temperament (see Figure 2).

For the conditional main effects of the two proposed moderator variables in Model 5a, the results suggested that child-reported IPV exposure did not significantly predict higher levels of internalizing symptoms at either the intercept or the linear, quadratic, or cubic trajectories (Table 6). Exposure to conflict tactics significantly predicted internalizing symptoms at the intercept only (β = 0.29, *SE* = 0.09, *p* <.001, 95% CI [0.11, 0.47]).

The interaction between temperament and IPV did not significantly predict internalizing symptoms at either the intercept or the linear, quadratic, and cubic time trajectories (see Table 6). The interaction between temperament and conflict tactics was a significant predictor of internalizing symptoms at the intercept (β = 0.007, *SE* = 0.001, *p* < .001, 95% CI [0.003, 0.01]), but did not predict any of the modeled longitudinal trajectories of internalizing symptoms.

In Model 6a, after introducing the covariates gender, child race, parental marital status, parental depression at baseline, and parental problem drinking into the model, the general pattern of the results remained consistent except for the main effects of temperament, such that temperament became a stronger, but still nonsignificant, predictor of internalizing at the intercept, and lost significance as a main effect over the cubic trajectory (see Table 6).

Introduction of theoretically relevant covariates in Model 6a also revealed a significant main effect of parental depression levels at the intercept (β = 0.17, *SE* = 0.07, $p < .05$, 95% CI [0.025, 0.32]), as well as a significant main effect of parent problem drinking on the linear trajectory of internalizing symptoms (β = 2.89, *SE* = 1.29, $p < .05$, 95% CI [0.027, 5.46]; see Figure 3).

Finally, in the conditional interactive effects with covariates in Model 6a, interaction terms between temperament and IPV exposure (Things I Have Seen and Heard; Ritchers & Martinez, 1992), and temperament and exposure to conflict tactics (CTS-2; Straus et al., 1996) were not significant at either the intercept or any of the modeled trajectories over time.

Fixed effects for externalizing symptoms. Externalizing symptom score means (CBCL; Achenbach, 1990) at each assessment point were again plotted to examine the shape of the data visually, before proceeding to model testing for externalizing data (Bates et al., 2015). Visual examination of externalizing symptom means over time revealed a nonlinear shape (Figure 4). Next, five additional models were run to determine the best fit over time, main effects, and interactive effects. Table 7 presents the fixed effects of predictors for all models for externalizing symptom data.

For Model 2b, the results suggested that the externalizing symptom data fit a linear pattern ($p < .001$). Given the observed shape of the data over time (Figure 4), a third and fourth model were created to test fit with quadratic and cubic shapes (Models 3b and 4b, respectively). AIC comparisons for each of the models suggested that a cubic shape fit externalizing symptom severity scores best ($p = .01$). Specifically, average child externalizing symptoms declined from ages 6 to 10, then increased from age 10 to age 12.

For the conditional main effects of temperament in Model 5b, the results suggested that difficult temperament predicted higher levels of externalizing symptoms at the intercept only ($\beta = 0.08$, $SE = .037$, $p = .03$, 95% CI [0.01, 0.15]).

Model 5b also examined the main effects of each proposed moderator variable. Results indicated that IPV exposure and parental violent conflicts predicted higher levels of externalizing symptoms at the intercept ($\beta_{\text{IPV Exposure}} = 0.78$, $SE = .23$, $p < .001$, 95% CI [0.31, 1.25]; $\beta_{\text{Conflict Tactics}} = 0.42$, $SE = .13$, $p = .003$, 95% CI [0.15, 0.69]). No other significant main effects of IPV or conflict tactics were evident.

For the interactive effects of Model 5b, results suggested that the Temperament*IPV and Temperament*Conflict Tactics interaction terms were statistically significant predictors of externalizing at the intercept, but not for linear, quadratic, or cubic models. Finally, after introducing the covariates in Model 6b, the general pattern of the results remained fairly consistent, although the IPV exposure*linear time and the 3-way interaction of IPV*temperament*linear time became significant predictors ($\beta_{\text{time*IPV}} = -1.69$, $SE = .76$, $p < .05$, 95% CI [-3.19, -0.19]); $\beta_{\text{time*IPV*temperament}} = -0.03$, $SE = .02$, $p < .05$, 95% CI [-0.063, -0.001]); see Table 7).

Post-hoc slope analyses of these interactions were conducted using four prototypical subgroups: (a) high difficult temperament/high IPV, (b) high difficult temperament/low IPV, (c) low difficult temperament/high IPV, and (d) low difficult temperament/low IPV. Analyses revealed that the high difficult temperament/low IPV group experienced the greatest growth in externalizing symptomatology over time, while the high difficult temperament/high IPV group had the greatest decrease in externalizing symptomatology over time. There was also a decreasing, but less pronounced, downwards trend for the low difficult temperament/high IPV group. Finally, results revealed a fairly stable trend in externalizing symptoms for the low

difficult temperament/low IPV group over time (see Figure 5).

Discussion

The present investigation examined the role of difficult temperament and its interaction with IPV exposure and parental conflict tactics in relation to the trajectory of I/E symptoms over time in a diverse and nationally representative sample of children at high risk for abuse. The hypothesis that difficult temperament would be significantly associated with the trajectory of I/E symptoms over the four assessment time points was partially supported. Specifically, results from the conditional main effects models revealed that difficult temperament predicted the cubic trajectory of internalizing symptoms. Additional post-hoc probing analyses revealed that children with higher levels of difficult temperament evinced a sharper growth in internalizing symptoms from Wave 1 to Wave 4 (Figure 2).

Notably, this interaction became nonsignificant after the inclusion of covariates (Model 6a), a finding that may be due to several possibilities. First, the selected covariates (e.g., child gender, parental depression, parental problem drinking) have reliable associations with the development and maintenance of I/E symptoms (Chassin et al., 1999; Foster et al., 2008; Leadbeater et al., 1999), which may have diminished the influence of difficult temperament on the trajectory of I/E symptoms. Another possibility is that the ICQ-6 measures temperamental behaviors (e.g., "How many times per day is your baby fussy?", "How easily upset is the baby?" and "How loudly does your baby cry?") more strongly associated with externalizing versus internalizing symptoms (Rothbart & Ahadi, 1994; Rothbart, Ahadi, & Hershey, 1994; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006; Wolke, Rizzo, & Woods, 2002). Thus, the instrument may have failed to capture the temperamental dimensions (e.g., behavioral inhibition, neuroticism) that are most predictive of internalizing symptoms (Griffith et al., 2010; Hairston, Solnik-Menilo, Deviri, & Handelzalts, 2016; Kagan & Snidman, 2004).

The hypothesis that higher use of conflict tactics and higher IPV exposure would be associated with the trajectory of I/E symptoms over the four assessment time points was also partially supported. Specifically, bivariate correlations revealed significant associations between higher use of parental conflict tactics (but not child-reported IPV) and *both* internalizing and externalizing symptoms at each wave, yet multilevel modeling revealed that parental conflict tactics significantly predicted internalizing symptoms at the intercept only. These findings are consistent with Lang and Stover (2008), who found that youth trauma history, and specifically exposure to parental aggression, predicted I/E symptoms as indexed by the CBCL.

It is unclear why parental conflict tactics did not predict the *trajectory* of I/E symptoms over time. That said, previous investigations have found that the severity of internalizing and externalizing symptoms in the LONGSCAN sample is lower than what would be expected given the sample's at-risk status and presence of multiple risk factors. This fairly low symptom rate also extends to I/E *trajectories*—the LONGSCAN sample's I/E levels show very limited variability over time compared to other samples (Hunter et al., 2003), which may impact the ability to statistically model growth in I/E symptoms as a function of the selected constructs.

Contrary to predictions, no associations were found between IPV exposure and I/E symptoms at either the bivariate level or in multilevel models. These findings are inconsistent with several investigations showing that children exposed (vs. not exposed) to IPV are significantly more likely to develop I/E symptoms (Martinez-Torteya et al., 2009). For example, Levendosky and colleagues (2013) found that approximately half of children exposed to IPV developed PTSD-related symptoms, and a separate study found a significant association between frequency of IPV exposure during ages 0-3 and heightened aggression (Holmes, 2013). Notably, these studies examined the role of IPV exposure on children's I/E symptom trajectories using shorter time intervals and younger samples (e.g., Holmes, 2013; Martinez-Torteya et al., 2009),

which may explain the differing results. Although successfully utilized in previous work (Cromer & Villodas, 2017; Edleson, Shin, & Armendariz, 2008), the present study also utilized a three-item child (vs. parent) measure of IPV exposure with low internal consistency, thereby yielding a limited assessment of the IPV experiences that children may have witnessed. For instance, items did not assess for psychological battering (i.e., disempowerment, enforcing unreasonable curfews, or otherwise limiting freedom; Coker, Smith, McKeown, & King, 2000) or any possible knowledge children may have had with regards to sexual violence between partners (Kelly & Johnson, 2008). It is possible that assessing for the full spectrum of child-witnessed IPV, or including a parent-completed measure of IPV, may have yielded a more comprehensive picture and different pattern of results.

Finally, the relation between difficult infant temperament and the trajectory of I/E symptoms was predicted to be stronger among children with higher (vs. lower) exposure to parental conflict tactics and IPV. This hypothesis was also partially supported. Specifically, multilevel modeling of externalizing (but not internalizing) symptoms revealed a significant temperament*IPV*linear time interaction that was subsequently probed using four prototypical groups. Findings revealed that low difficult temperament/high IPV children evinced the most pronounced growth in externalizing symptoms over the course of the investigation, a result that is consistent with several investigations documenting the role of IPV in externalizing outcomes among youth (Graham-Bermann, Gruber, Howell, & Girz, 2009; Lang & Stover, 2008). The trajectory of externalizing symptoms for low difficult temperament/low IPV children remained fairly stable over time, suggesting that low levels of risk on these two constructs is likely to offer protection against the development of externalizing symptoms (Martinez-Torteya et al., 2009). Interestingly, both the high difficult temperament/high IPV and high difficult temperament/low IPV groups experienced a decrease in externalizing symptoms over the study period. Although

the reason for this result remains unclear, it is possible that parents of these temperamentally difficult children sought out treatment to address their children's externalizing problems (e.g., aggression, defiance, oppositional behavior), which may have resulted in reductions in externalizing behavior. Specifically, although temperament is considered a stable character trait, the use of effective behavior management strategies may have successfully curtailed patterns of externalizing behaviors exhibited by children in these groups (Figge, Martinez-Torteya, & Weeks, 2018; van Zeijl et al., 2007). It is also possible that those in the high difficult temperament/low IPV group were exposed to more effective familial processes (i.e., shared power between partners, collaborative problem-solving) that, over time, led to reductions in externalizing behaviors (Gibson et al., 2015).

In terms of the high difficult temperament/high IPV group trajectory, child cognitive appraisals of IPV (e.g., perceived threat, self-blame, coping efficacy have been found to mediate the association between IPV exposure and I/E symptom outcomes (Fosco, DeBoard, & Grych, 2007). Although the participants in this group were exposed to negative parenting practices associated with violence exposure, it is possible that protective factors, such as strong parent-child relationships and adaptive cognitions for coping, influenced this group's externalizing symptom trajectory. These hypotheses await further study.

Although not the primary focus of the current investigation, there are several additional findings worth noting. First, in terms of the overall trajectory of I/E symptoms over time, a cubic trajectory fit both internalizing and externalizing symptoms best. With respect to internalizing problems, such trajectory is consistent with the increase in anxious and depressive symptomatology typically seen in middle childhood followed by a subsequent increase in preadolescence and adolescence (e.g., Kim, McHale, Crouter, & Osgood, 2007). The cubic trajectory of externalizing symptoms is also consistent with symptom reductions as children

attain better self-control during early childhood (Leve et al., 2005), followed by an increase in these symptoms as a result of changes in developmental needs (e.g., need for independence) during the pre-adolescent and adolescent period. Second, analyses of racial differences revealed that Hispanic children were rated lowest in terms of difficult temperament, and reported the lowest levels of exposure to IPV and parental conflict tactics. These findings are in line with investigations showing that Hispanic origin may be a protective factor in terms of abuse and neglect (Renner & Slack, 2006). Indeed, past work has identified Hispanics as endorsing the lowest amounts of abuse and neglect relative to other ethnic groups (Lauderdale et al., 1980; Zayas, 1992). Research also shows that Hispanics (vs. other ethnic groups) may have a higher threshold for what constitutes abuse (Giovannoni & Becerra, 1979; Zayas, 1992), which may explain, in part, the lower ratings provided by Hispanics in the present study.

In terms of difficult temperament, the present study findings are also consistent with previous work highlighting temperamental protective factors among Hispanic youth (Knight, Cota, & Bernal, 1993). Temperament varies widely between children, and is thought to be influenced heavily by cultural norms and characteristic child-rearing practices (Axia, Prior, & Carelli, 1992). The greater value placed on individualism, and competitiveness for White versus Hispanic children (Knight et al., 1993) may discourage behavioral inhibition, and could encourage impulsivity and other temperamental traits associated with higher risk for externalizing (Peterson & Stern, 1997). Conversely, values in traditional Hispanic child rearing practices may serve as a protective function against difficult temperament by placing value on children's cooperation and compliance by limiting the amount of noncompliant and/or fussy characteristics these children are permitted to display. Indeed, emotion dysregulation is typically seen as a key characteristic of difficult temperament (Calkins & Keane, 2009), and Hispanic youth are commonly encouraged to dismiss or passively express negative expressions of emotion

(Barona & Santos de Barona, 2003).

Third, and not surprisingly, children of divorced parents reported significantly more accounts of witnessing IPV than children with married or single parents. Indeed, previous investigations have found that IPV is one of the main reasons for couples seeking divorce (Amato & Previti, 2003; Anderson, 2010), and more than half of divorcees entering mediation in court report having experienced IPV (e.g., Ballard et al., 2011; Beck et al., 2009; Ellis & Stuckless, 2006). Notably, parents who were separated from their partner reported significantly more use of conflict tactics in the home than single, married, and divorced parents. This may be explained by the turmoil that occurs in the immediate aftermath of a separation (Radovanovic, 1993; Clarke-Stewart, Vandell, McCartney, Owen, & Booth, 2000), which may no longer be experienced by parents with finalized divorces. Finally, maternal problem drinking behavior was associated with a higher rate of growth in internalizing symptoms over the course of the study period, a finding that is consistent with numerous investigations documenting the role of parental substance use behaviors in childhood internalizing problems (Bountress & Chassin, 2015; Chassin, Pillow, Curran, Molina, & Barrera, 1993; Cicchetti & Rogosch, 1999).

Limitations

The results of the present study should be interpreted in light of several limitations. As noted earlier, the ICQ-6 provides a limited assessment of temperamental traits and focuses primarily on those traits associated with externalizing (vs. internalizing) problems. Further, in most cases temperament data relied on parental recalling of their child's temperament when the child was 6 months old. Such reports are subject to recall bias and may be confounded by recalling of circumstantial behaviors evinced by the child which are not representative of their overall temperamental predisposition (Hassan, 2006). Future studies would benefit from utilizing a measure of temperament that incorporates temperamental dimensions and specific behaviors

associated with both internalizing and externalizing symptomatology. For example, such a measure would include items that assess for behavioral inhibition in infants and young children (Rothbart & Ahadi, 1994; Williams et al., 2009). Future work should also include observational assessment of temperament, which provides a more objective classification of children's temperamental profiles (Goldsmith & Campos, 1982; Rothbart, 1981; Rothbart et al., 2000a).

In addition, the LONGSCAN sample was recruited with unique eligibility criteria. For example, participants at the Midwest site were recruited from the Child Protective Services database of children on "watch." These unique circumstances are likely not generalizable to the general population of parents and their children. The present study's measurement of child-reported IPV is also a limitation. As noted by Thompson and colleagues (2007), the reliability of IPV assessments—including those that rely on Things I Have Seen and Heard scale—among young children is limited. Indeed, the internal consistency of the three items used in the present investigation to assess child-reported IPV exposure was low ($\alpha = .36$). Therefore, future research should not rely solely on this instrument to asses IPV exposure; rather, a multi-method approach to IPV assessment is recommended (Thompson et al., 2007).

With these limitations in mind, the present investigation expanded the literature in several ways. First, the vast majority of investigations in this area have focused on low-risk, community samples with low base rates of I/E symptoms and temperamental risk (e.g., Colder et al., 2017; Lengua, 2003; Lengua & Kovacs, 2005), and despite documented variation in I/E symptoms over time (Gilliom & Shaw, 2004), most studies have assessed temperament-I/E symptom relations in middle/late (vs. early) childhood (Propper et al., 2007; Kerr, Lopez, Olson, & Sameroff, 2004; Rothbart, 2007). This study specifically investigated a high-risk sample with early assessment of temperament, IPV, and I/E symptoms. Second, the majority of existing studies examined associations between temperament and behavior problems in cross-sectional designs or using

short assessment intervals (cf. Bates, Dodge, Pettit, & Ridge, 1998). The present investigation relied on a longitudinal design with five assessment time points. Finally, studies examining interactive effects between difficult temperament, IPV, and parental conflict tactics in relation to I/E symptoms are virtually non-existent (Williams et al., 2009). This is unfortunate, given that outcomes among temperamentally difficult children are strongly influenced by their experience with caregivers (Wachs, 2000). To the extent that such experiences include exposure to IPV and maladaptive conflict tactics, the behavioral and socioemotional functioning of children at-risk of abuse may be further compromised. This study therefore drew needed scientific attention to the role of violent parental conflict tactics and IPV exposure in the [longitudinal] relationship between difficult temperament and childhood I/E symptoms among children at risk of maltreatment.

Conclusions

Findings from the present investigation revealed a clinically meaningful main effect of difficult infant temperament on the cubic trajectory of internalizing symptoms among a large a diverse sample of children at risk of abuse. Post-hoc slope probing revealed that children with higher (vs. lower) levels of difficult temperament evinced a sharper growth in internalizing symptoms over a 6-year period. Results also revealed that low difficult temperament/high IPV children evinced the most pronounced growth in externalizing symptoms over the 6-year period. Surprisingly, both the high difficult temperament/high IPV and high difficult temperament/low IPV groups experienced sharp decreases in externalizing symptoms, a finding that may be attributable to parents seeking treatment for their [temperamentally difficult] children's externalizing behaviors. Findings also highlight the need for a more comprehensive assessment of temperament and a multimethod approach to IPV to more clearly delineate the specific role of these variables above and beyond relevant covariates.

Table 1

Parental Demographic Characteristics at Baseline (Wave 0).

Parent Characteristic	Midwest % (*N* = 245)	Northwest % (*N* = 254)	Total Sample (*N* = 499)
Relationship to Child			
Biological Mother	99%	73%	85.7%
Adoptive Mother	-	1%	.5%
Grandmother	-	7%	3.6%
Other Female/Kin	0.3%	4%	2.2%
Foster Mother	0.3%	7%	3.7%
Other Female/Non-Kin	-	0.4%	0.2%
Male Primary Caregiver	0.6%	7%	3.9%
Race			
Black	53%	22%	37.2%
White	23%	63%	43.4%
Hispanic	15%	2%	8.4%
Multiracial	7%	8%	7.3%
Other	3%	5%	4.0%
Education			
< 11 Years	61%	39%	42.4%
12 Years	26%	30%	28.3%
>12 Years	18%	31%	24.6%
Marital Status			
Single/Never Married	19%	31%	25.1%
Married	69%	38%	53.2%
Separated/Divorced	11%	31%	21.2%
Widowed	1%	0.4%	0.5%
Welfare Support			
Receiving Medicaid	80%	63%	70.5%
Receiving AFDC	80%	70%	74.9%

Table 2

Child Demographic Characteristics by Site

Characteristic	Midwest (N = 245)	Northwest (N = 254)	Total Sample (N = 499)
Age at Recruitment	0-4 years old	0-4 years old	
Cohort Birth Year	1991–94	1988–94	
Geographic Location	Urban	Urban Rural	
Sex			
Male	49%	51%	50%
Female	51%	49%	50%
Race			
Black	53.3%	20.5%	36.6%
White	13.1%	50.0%	31.9%
Hispanic	13.9%	2.8%	8.5%
Multiracial	17.1%	24.0%	20.6%
Other	2.4%	2.8%	2.5%

Table 3

Variables' Descriptive Statistics by Age

Outcome (range)	Age 0-4 (Baseline)	Age 6 Mean(*SD*)	Age 8 Mean(*SD*)	Age 10 Mean(*SD*)	Age 12 Mean(*SD*)
Internalizing Symptoms (0-62)	-	6.29(5.47)	7.17(6.38)	6.29(6.54)	7.23(6.41)
Externalizing Symptoms (0-66)	-	13.01(9.67)	12.30(8.74)	10.93(8.64)	11.44(9.06)
Child-Reported IPV (0-12)	-	3.42(2.71)	-	-	-
Total Conflict Tactics (0-38)	-	-	4.67(5.57)	-	-
Parental Depression (0-54)	17.24(10.62)	-	-	-	-
Parental Problem Drinking (0-4)	0.81(1.26)	-	-	-	-

Note. Internalizing Symptoms = Total Internalizing Scale Score on the Child Behavior Checklist (Achenbach, 2001); Externalizing Symptoms = Total Externalizing Scale Score on the Child Behavior Checklist (Achenbach, 2001); Child-Reported IPV = 3-Item violence composite from the Things I Have Seen and Heard Scale (Richters & Martinez, 1992); Total Conflict Tactics = Revised Conflicts Tactics Scale score (Straus et al., 1996); Parental Depression = Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977); Parental Problem Drinking = CAGE Questionnaire (CAGE; Ewing, 1984).

Table 4

Bivariate correlations between study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.Gender	1															
2. Child Race	-.03															
3. Difficult Temperament	**.13***	-.05														
4. Child-Reported IPV	-.10	-.02	.05													
5. Parental Marital Status	.01	.03	.07	.01												
6. Conflict Tactics	-.06	-.07	**.17***	.07	.02											
7. Parental Problem Drinking	-.05	-.09	**.15***	-.09	.05	.07										
8. Parental Depression	.06	.02	.03	**-.08***	**.14***	.02	**.09***									
9.Internalizing Age 6	.06	.02	.08	-.04	.02	**.25****	.05	**.07****								
10.Externalizing Age 6	**-.10***	-.01	**.12***	.03	.08	**.25****	.02	.03	**.61****							
11.Internalizing Age 8	.01	.01	.09	.01	-.09	**.27****	**.14***	.07	**.61****	**.46****						
12.Externalizing Age 8	**-.12***	.02	**.13***	.04	.03	**.22****	.06	.09	**.44****	**.69****	**.65****					
13.Internalizing Age 10	.01	.02	.07	.01	-.04	**.27****	.05	.04	**.51****	**.40****	**.55****	**.48****				
14.Externalizing Age 10	**-.14****	-.01	**.15***	.10	.02	**.25****	.02	**.12***	**.35****	**.53****	**.45****	**.68****	**.67****			
15.Internalizing Age 12	.03	.01	.03	.05	-.05	**.27****	**.20****	.05	**.46****	**.39****	**.56****	**.47****	**.69****	**.47****		
16.Externalizing Age 12	**-.13***	.04	**.13***	.09	.06	**.28****	.07	.07	**.34****	**.57****	**.40****	**.68****	**.51****	**.75****	**.62****	1

Note. Difficult Temperament = Infant Temperament Questionnaire - 6 Months Form (ICQ-6; Bates et al., 1979); Child-Reported IPV = 3-Item violence composite from the Things I Have Seen and Heard Scale (Richters & Martinez, 1992); Conflict Tactics = Revised Conflicts Tactics Scale (Straus et al., 1996); Parental Problem Drinking = CAGE Questionnaire (CAGE; Ewing, 1984); Parental Depression = Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977); Internalizing Symptoms = Total Internalizing Scale Score on the Child Behavior Checklist (Achenbach, 2001); Externalizing Symptoms = Total Externalizing Scale Score on the Child Behavior Checklist (Achenbach, 2001).

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5

Frequencies of Child's Exposure to Violence by Total Sample and Study Site at Age 6

	Total Sample *N* = 393	Northwest *N* = 217			Midwest *N* = 176		
Things I Have Seen and Heard Item	Mean (*SD*)	Never %	1-3 Times %	4 Or More Times %	Never %	1-3 Times %	4 Or More Times %
1.Heard guns shot	1.76 (1.68)	46.5	35.9	17.5	38.6	30.1	31.3
2.Seen somebody arrested	1.41 (1.45)	50.5	41.7	7.8	32.2	46.9	20.9
4. Seen drug deals	1.30 (1.70)	70.6	15.1	14.2	46.2	25.4	28.3
5. Seen somebody beaten up	1.58 (1.64)	48.2	30.3	21.6	33.5	36.4	30.1
6. Heard adults yelling at each other at home	2.03 (1.74)	28.1	32.7	39.7	25.6	29.6	44.9
7. Seen someone get stabbed	0.40 (0.99)	86.2	11.9	1.8	67.6	23.3	9.1
8. Seen somebody get shot	0.57 (1.17)	84.5	12.3	3.2	69.7	22.3	8.0
9. Seen a gun in own home	0.56 (1.21)	78.4	10.6	11.0	76.1	15.9	8.0
11. Seen grownups hitting each other	0.86 (1.47)	73.3	16.1	10.6	59.4	22.9	17.7
13. Seen dead body in neighborhood	0.24 (0.74)	90.8	7.8	1.6	80.2	16.3	3.5
14. Seen gangs in neighborhood	0.95 (1.56)	71.2	13.7	15.1	56.9	17.4	25.8
15. Seen gun pulled on someone	0.39 (1.01)	87.0	11.6	1.4	73.1	18.7	8.2
16. Seen somebody in the home get shot or stabbed	0.21 (0.74)	94.5	4.6	0.9	83.6	11.7	4.7
17. House has been broken into							

	0.23 (0.70)	86.2	12.4	1.4	82.6	15.7	1.7
18. Seen knife pulled on someone	0.32 (0.91)	89.9	8.3	1.8	81.3	13.5	5.3
19. Seen someone stealing	0.90 (1.38)	64.1	25.4	10.6	53.5	31.4	15.1

Note. Bolded items = items included in the present study's child-reported IPV score. Absent items (3, 10, and 20) do not assess for violence.

Table 6.

Internalizing Symptoms

Fixed Effects of Time and Covariates Across Models

Analytic Parameters	Estimate	SE	Pr > t	Lower CI	Upper CI	AIC Value
Model 1a. (Fully Unconditional Model - Internalizing)						
Effect						
Intercept	6.70	.23	<.001	6.24	7.16	
Model 2a. (Unconditional linear growth model - Internalizing)						
Effect						
Intercept	6.47	.25	<.001	5.97	6.97	
Time	0.17	.11	0.11	-0.04	0.37	
Model 3a. (Unconditional quadratic growth model - Internalizing)						
Effect						
Intercept	6.46	.27	<.001	5.93	6.99	
Time	0.19	.30	0.52	-0.40	0.78	
Time^2	-.0089	.10	0.92	-0.20	0.18	
Model 4a. (Unconditional cubic growth model - Internalizing)						
Effect						
Intercept	6.28	0.273	<.001	5.74	6.82	10327.2
time	3.16	0.707	<.001	1.77	4.55	10298.8
Time^2	-2.87	0.627	<.001	-4.10	-1.64	10301.7
Time^3	0.64	0.139	<.001	0.37	0.91	10282.7
Model 5a. (Conditional Main Effect of Temperament Model - Internalizing)						
Effect						
Intercept	5.18	0.93	<.001	3.33	7.23	
Temperament	0.013	0.02	0.504	-0.03	0.057	
Temperament*time	0.08	0.02	<.001	0.04	0.11	
Temperament*time^2	-0.08	0.02	<.001	-0.11	-0.05	
Temp*time^3	0.02	0.003	<.001	0.01	0.025	
Model 5a. (Conditional Main Effect of IPV and Conflict Tactics Model - Internalizing)						
Effect						
IPV Exposure	0.16	0.16	0.29	-0.14	0.47	
IPV*time	0.35	0.35	0.32	-0.33	1.03	
IPV*time^2	-0.32	0.31	0.30	-0.93	0.28	
IPV*time^3	0.07	0.07	0.28	-0.06	0.21	

Conflict Tactics	0.29	0.09	<0.001	0.11	0.48
Conflict Tactics*time	0.25	0.24	0.30	-0.23	0.73
Conflict Tactics*time^2	-0.31	0.22	0.15	-0.74	0.11
Conflict Tactics *time^3	0.07	0.05	0.12	-0.02	0.17
Model 5a. (Conditional Interactive Effect Model - Internalizing)					
Effect					
Temperament*IPV	0.005	0.003	0.10	-0.001	0.012
Temperament*IPV*time	0.008	0.008	0.301	-0.007	0.023
Temperament*IPV*time^2	-0.008	0.007	0.27	-0.021	0.006
Temperament*IPV*time^3	0.002	0.002	0.24	-0.0012	0.005
Temp*Conflict Tactics	0.007	0.002	0.0005	0.003	0.0104
Temp*Conflict Tactics*time	0.006	0.005	0.25	-0.004	0.015
Temp*Conflict Tactics*time^2	-0.007	0.004	0.111	-0.02	0.002
Temp*Conflict Tactics*time^3	0.002	0.001	0.098	-0.0003	0.004
Model 6a. (Conditional Main Effect Model with Covariates - Internalizing)					
Effect					
Intercept	-0.99	4.01	0.81	-9.06	7.08
time	8.94	9.29	0.34	-9.59	27.47
time^2	-10.19	8.29	0.22	-26.73	6.36
time^3	2.48	1.84	0.18	-1.20	6.15
Gender	-0.39	1.54	0.80	-3.48	2.70
Gender*time	-1.69	3.55	0.64	-8.76	5.39
Gender*time^2	2.52	3.17	0.43	-3.80	8.84
Gender*time^3	-0.61	0.70	0.39	-2.02	0.79
Child Race	0.09	0.38	0.82	-0.68	0.85
Child Race*time	1.48	0.89	0.10	-0.29	3.25
Child Race*time^2	-0.98	0.80	0.22	-2.57	0.60
Child Race*time^3	0.16	0.18	0.38	-0.20	0.51
Martial Status (Baseline)	-0.66	0.78	0.40	-2.24	0.91
Marital Status*time	-0.06	1.82	0.98	-3.69	3.58
Marital Status*time^2	0.25	1.63	0.88	-3.01	3.51
Marital Status*time^3	-0.10	0.36	0.78	-0.83	0.62
Baseline Parental Depression	0.17	0.07	0.02	0.03	0.32
Depression*time	-0.17	0.17	0.32	-0.52	0.17
Depression*time^2	0.14	0.16	0.37	-0.17	0.46

Depression*time^3	-0.03	0.04	0.47	-0.10	0.04
Parental Problem Drinking	-0.09	0.56	0.88	-1.21	1.04
Problem Drinking*time	2.89	1.29	0.03	0.33	5.46
Problem Drinking*time^2	-2.24	1.15	0.06	-4.54	0.05
Problem Drinking*time^3	0.42	0.25	0.10	-0.09	0.93
Temperament	0.09	0.05	0.11	-0.02	0.20
Temperament*time	-0.13	0.12	0.29	-0.37	0.11
Temperament*time^2	0.08	0.11	0.47	-0.14	0.29
Temperament*time^3	-0.01	0.02	0.55	-0.06	0.03
IPV Exposure - Age 6	0.15	0.25	0.57	-0.36	0.65
IPV*time	-0.10	0.58	0.86	-1.27	1.06
IPV*time^2	0.32	0.52	0.54	-0.71	1.35
IPV*time^3	-0.09	0.11	0.46	-0.31	0.14
Aggressive/Violent Conflict Tactics-Age 8	0.23	0.14	0.10	-0.04	0.51
Conflict Tactics*time	0.35	0.32	0.27	-0.28	0.99
Conflict Tactics*time^2	-0.34	0.28	0.24	-0.91	0.23
Conflict Tactics *time^3	0.07	0.06	0.26	-0.05	0.20
Model 6a. (Conditional Interactive Effect Model with Covariates - Internalizing)					
Effect					
Temperament*IPV	0.02	1.33	0.99	-2.61	2.65
Temperament*IPV*time	0.003	0.01	0.85	-0.03	0.03
Temperament*IPV*time^2	0.002	0.01	0.86	-0.02	0.02
Temperament*IPV*time^3	-0.0007	0.0024	0.77	-0.01	0.004
Temp*Conflict Tactics	0.014	0.92	0.99	-1.80	1.82
Temp*Conflict Tactics*time	0.0077	0.01	0.34	-0.01	0.024
Temp*Conflict Tactics*time^2	-0.01	0.01	0.22	-0.02	0.005
Temp*Conflict Tactics*time^3	0.002	0.001	0.25	-0.0012	0.004

Note. Temperament = Infant Temperament Questionnaire - 6 Months Form (ICQ-6; Bates et al., 1979); IPV Exposure = 3-Item composite from the Things I Have Seen and Heard Scale (Richters & Martinez, 1992); Conflict Tactics = Revised Conflicts Tactics Scale (Straus et al., 1996); Parental Problem Drinking = CAGE Questionnaire (CAGE; Ewing, 1984); Parental Depression = Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977).

Table 7.

Externalizing Symptoms

Fixed Effects of Time and Covariates Across Models

Analytic Parameters	Estimate	SE	Pr > t	Lower CI	Upper CI	AIC Value
Model 1b. (Externalizing Fully Unconditional Model)						
Effect						
Intercept	12.05	0.351	<.0001	11.36	12.75	
Model 2b. (Externalizing Unconditional linear growth model)						
Effect						
Intercept	12.87	0.385	<.0001	12.11	13.62	
Time	-0.606	0.136	<.0001	-0.87	-0.34	
Model 3b. (Externalizing Unconditional quadratic growth model)						
Effect						
Intercept	13.13	0.40	<.0001	12.34	13.91	
Time	-1.42	0.369	0.0001	-2.15	-0.70	
$Time^2$	0.28	0.118	0.017	0.049	0.51	
Model 4b. (Externalizing Unconditional cubic growth model)						
Effect						
Intercept	13.00	0.402	<.0001	12.21	13.80	11272.7
time	0.60	0.872	0.487	-1.11	2.32	11217.8
$Time^2$	-1.68	0.771	0.03	-3.19	-0.16	11214.6
$Time^3$	0.44	0.170	0.01	0.11	0.77	11209.7
Model 5b. (Externalizing Conditional Main Effect of Temperament Model)						
Effect						
Intercept	8.44	1.61	<.0001	5.26	11.63	
Temperament	0.08	0.04	0.03	0.01	0.16	
Temperament*time	0.00	0.02	0.84	-0.05	0.04	
Temperament*$time^2$	-0.02	0.02	0.22	-0.06	0.01	
Temp*$time^3$	0.01	0.001	0.11	0.001	0.02	
Model 5b. (Externalizing Conditional Main Effect of IPV and Conflict Tactics Model)						
Effect						
Intercept	7.99	1.14	<.0001	5.73	10.25	
IPV	0.79	0.24	0.001	0.32	1.25	
IPV*time	-0.40	0.38	0.29	-1.14	0.34	

IPV*time^2	0.08	0.33	0.81	-0.58	0.73
IPV*time^3	0.01	0.07	0.92	-0.14	0.15
Conflict Tactics	0.42	0.14	0.001	0.15	0.69
Conflict Tactics*time	0.40	0.26	0.13	-0.12	0.92
Conflict Tactics*time^2	-0.40	0.23	0.09	-0.86	0.07
Conflict Tactics *time^3	0.08	0.05	0.12	-0.02	0.18
Model 5b. (Externalizing Conditional Interactive Effect Model)					
Effect					
Intercept	8.06	1.02	<.0001	6.03	10.09
Temperament*IPV	0.02	0.01	0.0001	0.01	0.03
Temperament*IPV*time	-0.01	0.01	0.27	-0.03	0.01
Temperament*IPV*time^2	0.001	0.01	0.89	-0.01	0.02
Temperament*IPV*time^3	0.0004	0.002	0.79	-0.003	0.004
Temp*Conflict Tactics	0.01	0.003	0.0001	0.003	0.01
Temp*Conflict Tactics*time	0.01	0.01	0.13	-0.002	0.02
Temp*Conflict Tactics*time^2	-0.01	0.005	0.12	-0.02	0.002
Temp*Conflict Tactics*time^3	0.002	0.001	0.16	-0.0006	0.004
Model 6b. (Externalizing Conditional Main Effect Model with Covariates)					
Effect					
Intercept	10.20	5.80	0.10	-2.11	22.52
time	4.06	12.11	0.74	-19.86	27.99
time^2	-1.74	10.82	0.87	-23.12	19.64
time^3	0.11	2.40	0.96	-4.63	4.85
Gender	-2.30	2.24	0.31	-6.78	2.17
Gender*time	4.57	4.62	0.32	-4.56	13.71
Gender*time^2	-4.05	4.14	0.33	-12.22	4.12
Gender*time^3	0.87	0.92	0.34	-0.94	2.68
Child Race	0.50	0.55	0.37	-0.59	1.59
Child Race*time	1.19	1.16	0.31	-1.10	3.48
Child Race*time^2	-0.63	1.04	0.55	-2.68	1.43
Child Race*time^3	0.07	0.23	0.75	-0.38	0.53
Parental Martial Status (Baseline)	-1.77	1.12	0.12	-3.99	0.46
Marital Status*time	4.60	2.38	0.05	-0.09	9.29
Marital Status*time^2	-3.98	2.13	0.06	-8.20	0.23
Marital Status*time^3	0.84	0.47	0.08	-0.10	1.77
Baseline Parental (CG) Depression	0.13	0.10	0.20	-0.07	0.34

CG Depression*time	-0.13	0.23	0.57	-0.58	0.32
CG Depression*time^2	0.09	0.21	0.66	-0.32	0.50
CG Depression*time^3	-0.01	0.05	0.80	-0.10	0.08
CG Problem Drinking	-0.29	0.81	0.72	-1.92	1.33
CG Problem Drinking*time	0.61	1.68	0.72	-2.70	3.93
CG Problem Drinking*time^2	-0.13	1.50	0.93	-3.10	2.83
CG Problem Drinking*time^3	-0.05	0.33	0.88	-0.71	0.61
Temperament	0.05	0.08	0.58	-0.13	0.22
Temperament*time	-0.26	0.16	0.10	-0.57	0.05
Temperament*time^2	0.17	0.14	0.22	-0.10	0.45
Temperament*time^3	-0.03	0.03	0.33	-0.09	0.03
IPV Exposure Indicator- Age 6	0.62	0.36	0.09	-0.11	1.34
IPV*time	-1.69	0.76	0.03	-3.19	-0.19
IPV*time^2	1.25	0.67	0.07	-0.09	2.58
IPV*time^3	-0.24	0.15	0.11	-0.53	0.06
Aggressive/Violent Conflict Tactics-Age 8	0.35	0.20	0.08	-0.05	0.75
Conflict Tactics*time	0.14	0.41	0.73	-0.68	0.96
Conflict Tactics*time^2	-0.17	0.37	0.64	-0.91	0.56
Conflict Tactics *time^3	0.03	0.08	0.68	-0.13	0.20
Model 6b. (Externalizing Conditional Interactive Effect Model with Covariates)					
Effect					
Temperament*IPV	0.033	0.03	0.26	-0.026	0.092
Temperament*IPV*time	-0.032	0.02	0.04	-0.063	-0.001
Temperament*IPV*time^2	0.022	0.014	0.12	-0.005	0.05
Temperament*IPV*time^3	-0.004	0.003	0.19	-0.01	0.002
Temp*Conflict Tactics	0.015	0.02	0.46	-0.027	0.058
Temp*Conflict Tactics*time	0.002	0.009	0.79	-0.015	0.02
Temp*Conflict Tactics*time^2	-0.003	0.008	0.74	-0.018	0.013
Temp*Conflict Tactics*time^3	0.0004	0.002	0.81	-0.003	0.004

Note. Temperament = Infant Temperament Questionnaire - 6 Months Form (ICQ-6; Bates et al., 1979); IPV Exposure = 3-Item composite from the Things I Have Seen and Heard Scale (Richters & Martinez, 1992); Conflict Tactics = Revised Conflicts Tactics Scale (Straus et al., 1996); Parental Problem Drinking = CAGE Questionnaire (CAGE; Ewing, 1984); Parental Depression = Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977)

Figures

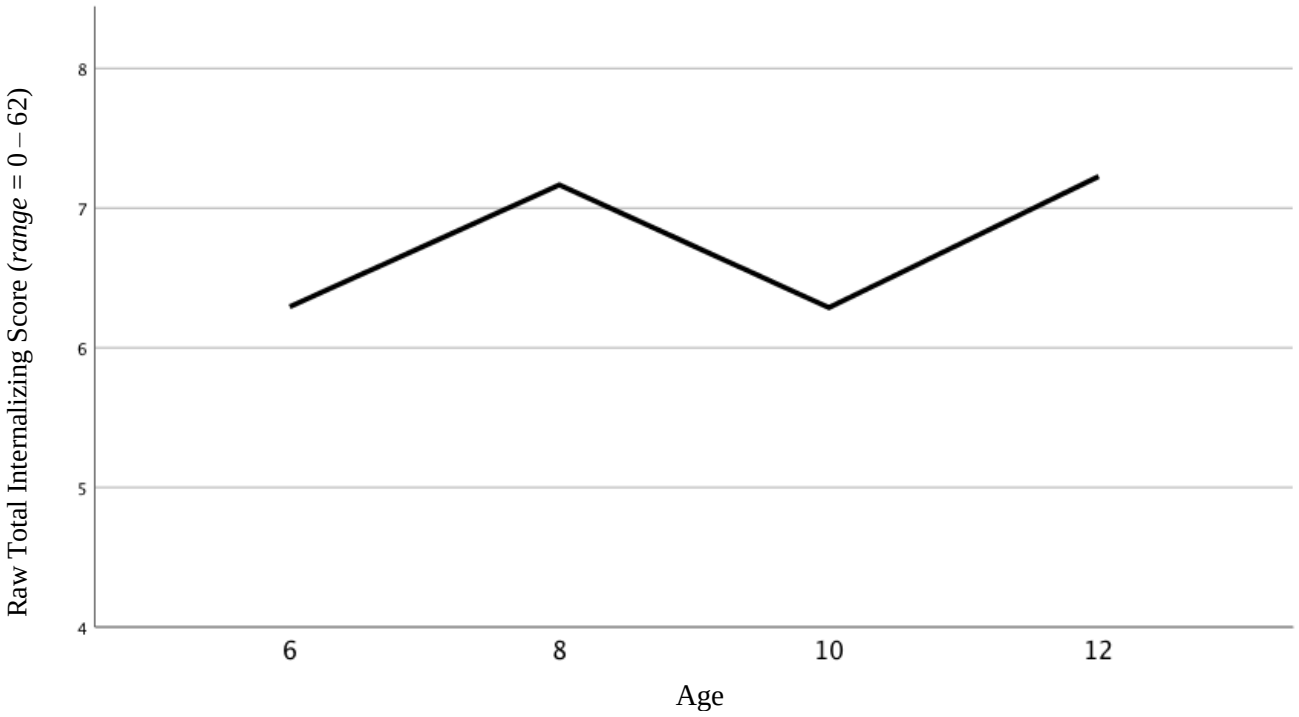

Figure 1. Mean internalizing symptom severity over time.

Note. Internalizing scores derived from Child Behavior Checklist (CBCL; see Measures) raw total internalizing scores.

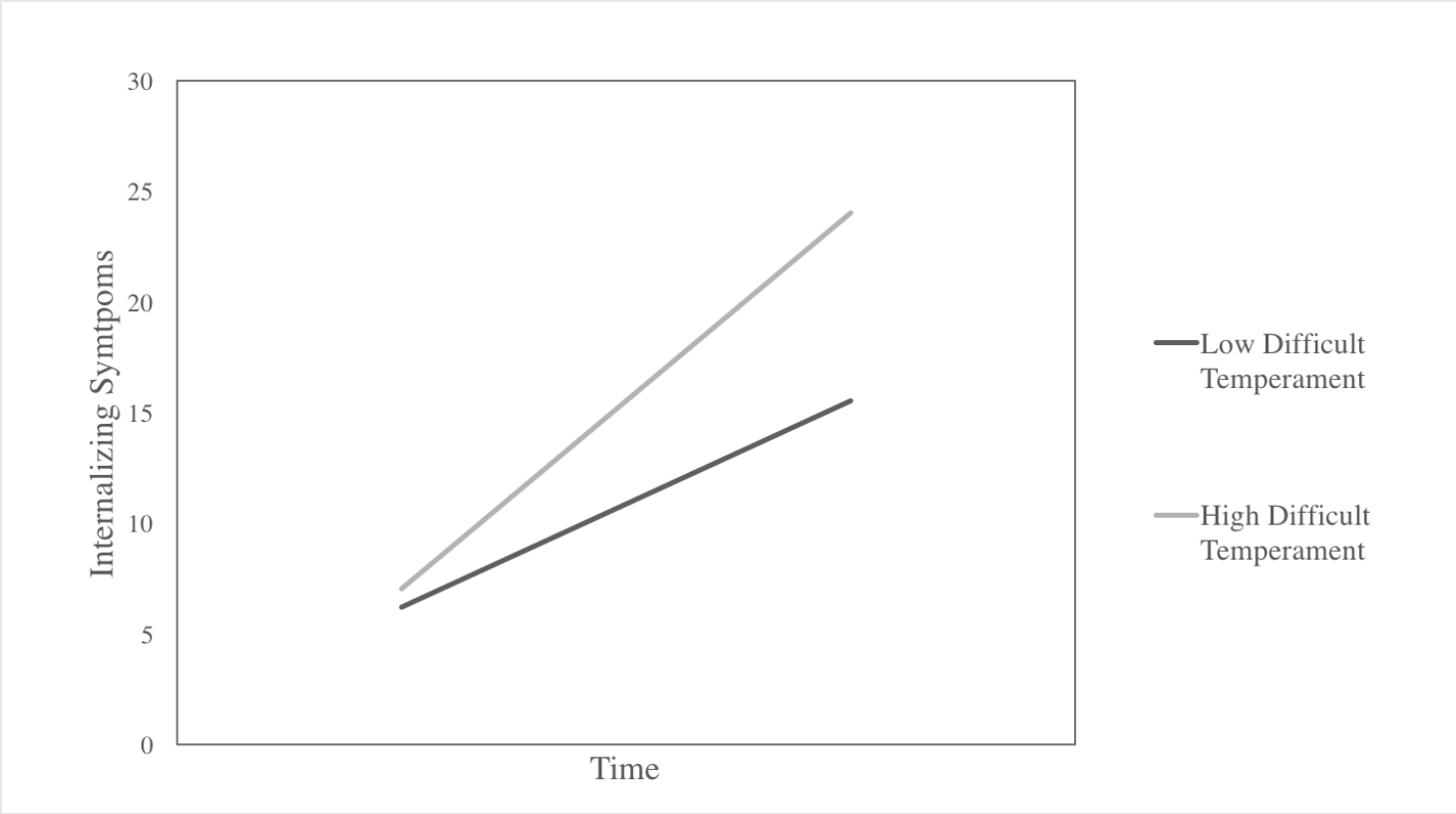

Figure 2. High difficult temperament predicted higher internalizing symptoms over time.

Note. Internalizing symptom scores derived from Child Behavior Checklist (CBCL; see Measures) raw total internalizing scores; Difficult Temperament scores derived from the Infant Characteristic Questionnaire – 6 Month Form (ICQ-6; see Measures).

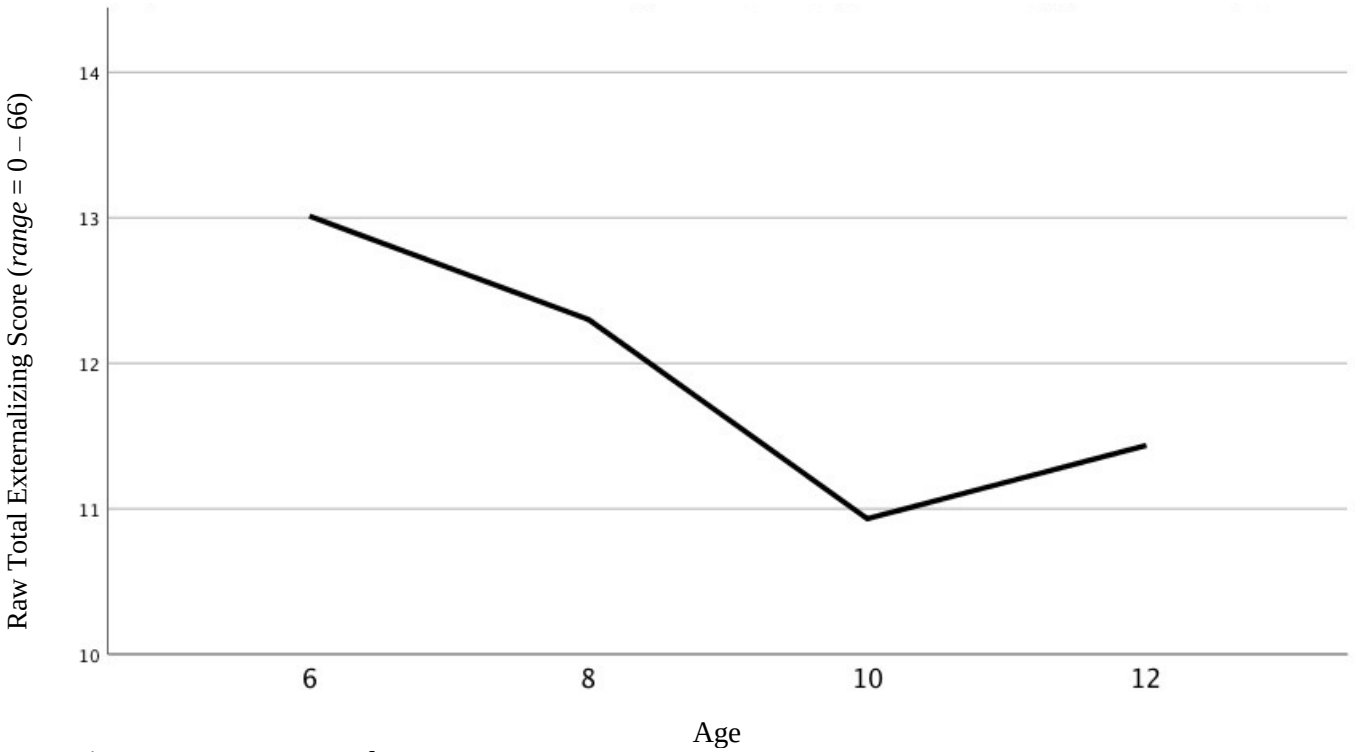

Figure 3. Mean externalizing symptom severity over time.

Note. Externalizing scores derived from Child Behavior Checklist (CBCL; see Measures) raw total externalizing scores.

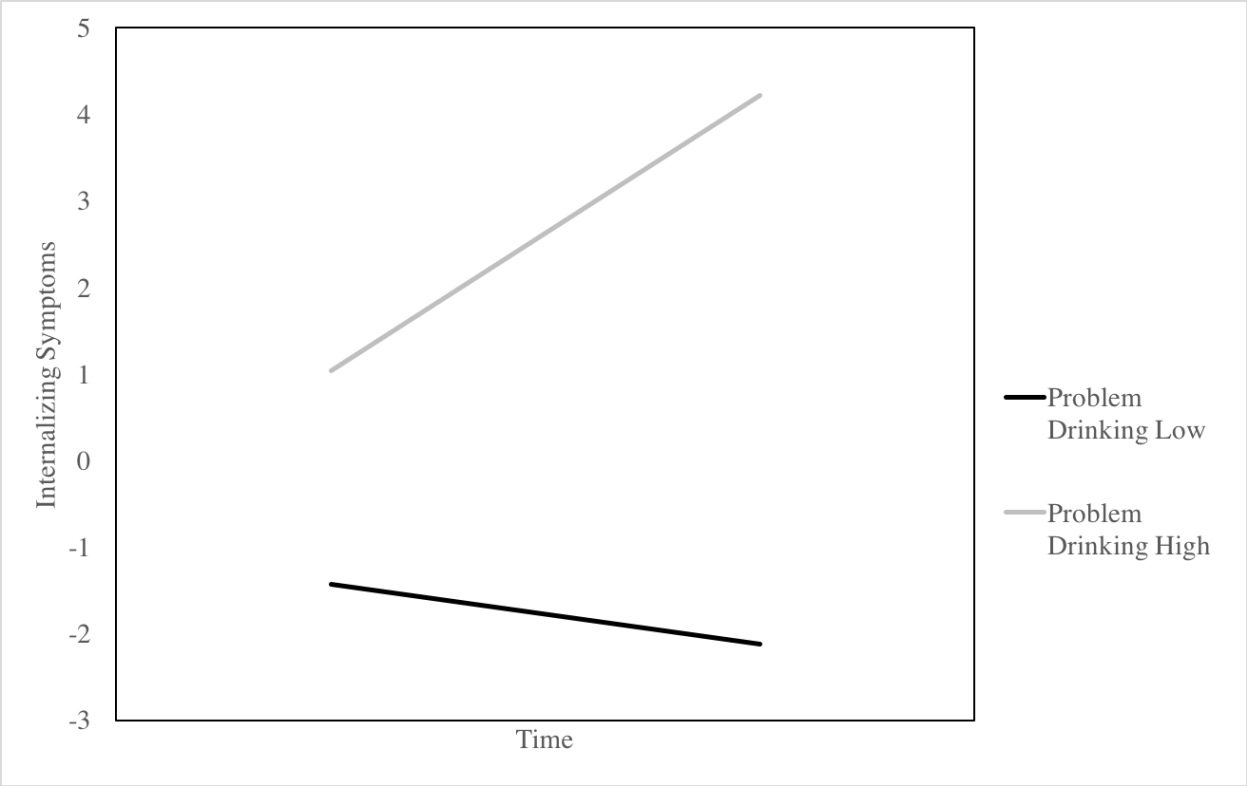

Figure 4. High levels of problem drinking predicts higher increases internalizing symptoms over time.

Note. Internalizing symptom scores derived from Child Behavior Checklist (CBCL; see Measures) raw total internalizing scores; Parental Problem Drinking scores derived from the CAGE Questionnaire; see Measures.

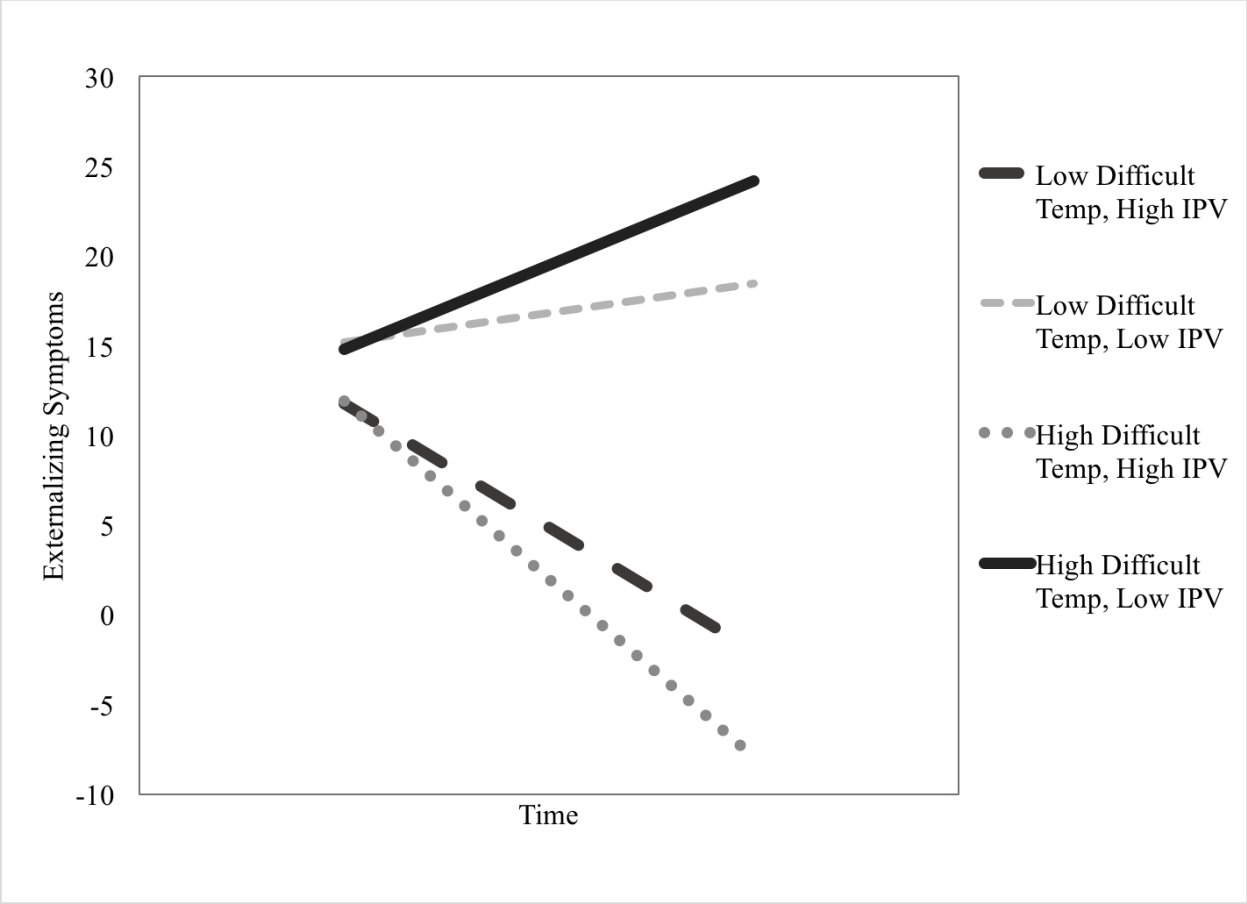

Figure 5. Difficult temperament and IPV interact to predict externalizing symptoms over time.

Note. Externalizing scores derived from Child Behavior Checklist (CBCL; see Measures) raw total externalizing scores; Difficult Temperament scores derived from the Infant Characteristic Questionnaire – 6 Month Form (ICQ-6; see Measures); IPV composite scores derived from the Things I've Seen and Heard Questionnaire (see Measures).

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