Can Fear Drive Problem Behaviors? An Examination of Temperamental and Environmental Precursors to Externalizing Problems

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Abstract

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Children are thought to be at greater relative risk for internalizing or externalizing disorders based on whether they are high in temperamental fear (inhibition behaviors) or frustration (activation behaviors). Yet, despite this, as many as 40-62% of children have lifetime comorbidities of both internalizing and externalizing disorders (Nock et al., 2007; Simonoff et al., 1997). Experiences of multiple or chronic stressors are known to increase vulnerability for developing these kinds of disorders. One possible developmental path for this type of comorbidity is that temperamentally fearful children, under conditions of high environmental stress, develop externalizing behaviors as a way of coping with heightened levels of fear.

This study examined whether age 3 levels of fear or frustration and externalizing were related as well as whether change in fear or frustration was associated with change in externalizing behaviors. Further, it tested whether or not the number of environmental stressors

experienced at age 3 moderated those relations controlling for child sex and child age 3 effortful control. The time specific effects of fear, frustration, stress, and externalizing behaviors were also assessed. Given well-known discrepancies between parent-report, youth-report, and observer rated measures of temperament and psychopathology, network analyses were also conducted to assess the extent to which youth and parent reported externalizing symptoms are related to each other and to observer rated temperamental fear.

The initial sample included 306 children (who were 3 years old at time 1) and their parents. Children's temperaments, externalizing psychopathology symptoms, and exposure to negative life events were evaluated 4 times (T1-T4) in 9-month periods. Two-hundred twenty-seven children and their parents participated in a follow-up assessment (T5) when children were 11 years old and reported on the youth's externalizing symptoms.

Results indicated that though children's age 3 levels of frustration predicts growth in externalizing, change in frustration does not predict change in externalizing across time. Regarding fear, the evidence suggests that, when children experience a greater number of stressors, more externalizing behaviors at age 3 predicts greater growth in fear during the preschool years. This growth in fear may be due to punishing experiences that children with more externalizing behaviors have that leave them subsequently fearful of future aversive experiences. Findings from network analyses showed that there were no relations between children's observed fearfulness in early childhood and their parent or self-reported symptoms of aggression or delinquency in late childhood. These analyses did, however, show that parents have a more integrated way of thinking of children's externalizing symptoms than youths and that youths more readily endorse isolated clusters of symptoms.

This study highlights the utility of examining constructs (i.e. negative reactivity, aggression, and delinquency) at a fine-grain level. Findings support the idea that temperamental frustration, but not fear, is predictive of later externalizing problems, thus providing added evidence to the vulnerability model of psychopathology. Findings also add support for the idea that the onset of anxiety is secondary to externalizing behaviors for children with this comorbidity. Finally, study findings speak to the importance of examining not only agreements, but disagreements across reporters to inform treatment targets.

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Children identified as having externalizing problems, often characterized by behaviors that include lying, stealing, destruction, and victimization of others (DSM; American Psychiatric Association, 2013), are thought to be fearless. However, 40-62% of children who engage in these types of behaviors also have clinically significant anxiety characterized by excessive worry (Nock et al., 2007; Simonoff et al., 1997). This comorbidity of externalizing behaviors and anxiety presents a critically important question about the etiology of externalizing disorders and whether they manifest because of fearlessness or fearfulness. Given this comorbid phenomenon, it is possible that there is a pathway to externalizing problems that stems from high levels of fearfulness. In other words, temperamentally fearful children might present with externalizing behaviors when they experience high levels of stress or perceived threat.

The temperament literature, which has close theoretical relations with the psychopathology literature, often focuses on contributions of child fearlessness (low fear) and high frustration to the development of children's externalizing problems. Though most of the evidence supports fearlessness and frustration as predictors of externalizing, studies have been remiss in assuming that fearfulness is entirely unrelated to externalizing. Contrary to this assumption, children who experience greater intensities, frequencies, and chronicity of threatening (and thus fear-inducing) situations are the same children who display more disruptive behaviors (Anderson et al., 2022). Indeed, the impacts of experiencing stress and threat reliably and positively predict increases in externalizing problems (Carliner et al., 2017; Coe et al., 2020; Dearing et al., 2006). Though the same stressors can lead to fear in some children and frustration in others, few studies examine whether child temperamental fearfulness predicts externalizing problems in the context of high levels of stress. This study will examine a possible, novel path from early childhood temperamental fearfulness to externalizing behaviors through 1) analyzing

whether or not growth in child fearfulness predicts growth in externalizing problems when moderated by stress, 2) testing the temporal impacts of fear and stressors on subsequent externalizing, and 3) evaluating similarities and dissimilarities across parent and child report of externalizing symptoms in late childhood and relations between those symptoms and observer rated child fear in early childhood.

Traditionally, researchers have looked to child temperament to predict who is likely to develop anxiety or externalizing problems. The literature has generally found that children who show higher levels of temperamental fearfulness and inhibited behaviors (avoidance-oriented behaviors) are at higher risk for anxiety and that children who exhibit higher levels of temperamental frustration and activated behaviors (e.g. approach-oriented behaviors) are at higher risk for externalizing problems (Gagne et al., 2011; Gartstein et al., 2012; Oldehinkel et al., 2007). These findings support Gray's Motivational Theory (Gray, 1970) which contends that individuals' actions are differentially informed by behavioral inhibition system (BIS) and behavioral activation system (BAS) activity. These categories of inhibition and activation are considered by some to be diametrically opposed, such that an individual high in inhibition is often thought to be low in activation, and vice versa (see Matthews & Gilliland, 1999). Given that children commonly experience both anxiety and externalizing problems, this current bifactor approach to temperament and psychopathology, unfortunately, does not appear accurately represent the developmental processes that contribute to the comorbidity between anxiety and externalizing problems.

In examination of the etiology underlying this comorbidity, researchers have proposed three possible developmental paths to externalizing: 1) children's externalizing behaviors result in more punishment from their environments which subsequently increases their anxiety about

future aversive experiences, 2) common underlying vulnerabilities simultaneously contribute to the development of externalizing and anxiety, and 3) children's fearfulness drives their externalizing behaviors. Among these three paths, the most perplexing is how children who are predisposed to avoiding conflict and threatening situations find themselves approaching and (in some cases) instigating those situations. Thus, this study aims to leverage empirical data to examine whether and how temperamental child fearfulness might drive the development of externalizing behaviors.

Development of Externalizing Problems

Externalizing disorders, characterized by constellations of symptoms including impulsive, disruptive, and harmful behaviors, are one of the most common reasons children engage in mental health services in early childhood (LoCurto et al., 2021). Recent estimates indicate that 10% to 24% of children meet criteria for an externalizing disorder (Danielson et al., 2021), with the most common being Attention-Deficit Hyperactivity Disorder (ADHD) and Oppositional Defiant Disorder (ODD). For a subset of children who have externalizing symptoms, these symptoms persist or increase across developmental periods (Wildeboer et al., 2015) and detract from children's abilities to develop self-regulation skills.

At the symptom level, there are specific behaviors that undermine children's abilities to build foundational competencies and social relationships. Children who exhibit more novelty-seeking, persistence, lower levels of effortful control, and higher negative emotionality are more likely to have reciprocally negative interactions with their environments resulting in lower peer acceptance, worse school readiness, and fewer socioemotional skills (Baer et al., 2015; Diaz et al., 2017; Oland & Shaw, 2005). These chronic experiences create positive feedback loops such that externalizing behaviors lead to rejection, lower self-esteem, poorer academic performance,

and subsequently worse externalizing (Leon et al., 2022; Zimmermann et al., 2013). These compounding negative effects impact children across multiple settings and cause significant distress and problems not only for the child, but also their support networks. Further, the earlier this pattern of behaviors and interactions start, the more entrenched the problems associated with externalizing become across developmental periods.

Temperament

Temperament is defined as biologically ingrained predispositions for consistent responses shaped by environmental pressures (Rothbart & Bates, 2006). As conceptualized by (Rothbart et al., 2000), temperament consists of two higher order components, reactivity and regulation. Temperamental reactivity is characterized by children's sensitivity and responsiveness to environmental stimuli. In temperament research, children's negative emotional reactivity often encapsulates measures of fearfulness and frustration. In contrast to reactivity, temperamental regulation encapsulates an individual's cognitive and behavioral capacities to override automatic responses in favor of more adaptive ones.

Temperament is considered to be intimately linked to children's likelihood of developing psychopathology (Schmitz et al., 1999). There are four predominant theories of how temperament informs children's susceptibility for mental health concerns (Nigg, 2006). The scar model presupposes that the same factors that contribute to psychopathology contribute to changes in temperament whereas the pathoplastic model contends that changes to temperament affects the development and maintenance of psychopathology. In contrast, both the spectrum model, which considers psychopathology as an extreme form of temperament, and vulnerability model, which posits that temperament acts as a risk for some forms of psychopathology and a buffer against others, focus on temperament as a predisposing factor. Predominantly, the

temperament literature finds support for the vulnerability model and specifically that higher reactivity and lower regulation confers greater risk for psychopathology (Laceulle et al., 2014; Slagt et al., 2016; Thöne et al., 2021).

Negative Reactivity and Externalizing

Temperamental negative reactivity is measured by evaluating the presence of negative emotions (e.g. fearfulness and frustration) and is a general risk factor for both internalizing and externalizing disorders (Olino et al., 2014). The prototypical representation of a child with externalizing problems is one that focuses on characterizations of fearlessness and high frustration. Indeed, most of the research on externalizing problems either evaluates a broad negative reactivity or frustration-only construct as a predictor of concurrent or prospective externalizing rather than including fine-grained measurements of both fear and frustration. When fear is measured, it is often-times found that low fear, but not high fear relates to externalizing (Boyd et al., 2022; Calkins et al., 2007; Colder et al., 2002).

Many theories and models have been used to explicate the potential causes of externalizing behaviors. Regarding proneness to frustration, Gray's Motivational Theory posits that children are more motivated by their behavioral activation system which is driven by reward seeking cognitions and results in approach behaviors (Gray, 1970). Similarly, at the neurocognitive level, Beauchaine & McNulty (2013) suggest that children who are more prone to approaching thrill-seeking situations or engaging in risky behaviors have a disordered functioning of mesolimbic dopamine (DA), which is responsible for heightened reward sensitivity. Taken together, these conceptualizations point to a sensitivity for reactively acting on goal-oriented behaviors which creates a vulnerability for experiencing more frustration when environmental factors preclude an individual from achieving their goal. Similarly, regarding low sensitivity to fear (i.e. high

fearlessness), Raine's (1997) fearlessness theory contends that, because some individuals experience physiological underarousal in response to fear, they engage in more extreme and threatening situations to heighten arousal levels.

The empirical evidence broadly supports these theories. Studies that examine the respective contributions of temperamental fearfulness and frustration to externalizing disorders find that children with low fear and high frustration are most at risk (Boyd et al., 2022; Jimenez-Camargo et al., 2017) due to potentially synergistic effects of low inhibition and high, frustration-related impulsivity. Additionally, fearlessness directly predicts externalizing problems. For example, it prospectively predicts externalizing in early childhood (Calkins et al., 2007; Gartstein et al., 2012), middle childhood (Boyd et al., 2022; Colder et al., 2002; Jimenez-Camargo et al., 2017), and adolescence (Dane & Marini, 2014).

Contradictorily, studies that span the temperament, psychopathology, and cognitive literatures have found evidence for a positive relation between high fearfulness and externalizing behaviors. Indeed, aggression research finds consistent biological, physiological, and emotional differences between youths who display reactive as opposed to proactive aggression (Gao et al., 2015; Raine et al., 2006, Scarpa & Raine, 1997). Specifically, youth who engage in reactive but not proactive aggression experience greater negative emotionality (Vitaro et al., 2006).

Within the temperament literature, studies have found that mothers' reports of their child's fearfulness is positively associated with father's reports of externalizing behaviors (Eisenberg et al., 2001). It may be that children's behavioral responses to fear look more stereotypical with mothers (e.g. avoidance behaviors) and manifest as externalizing with fathers (e.g. oppositionality). Similarly, others have found that mother report of child fear is associated with mother report of externalizing problems (Scheper et al., 2017; Schermerhorn et al., 2013)

and that child self-report of fear is associated with both child and parent report of externalizing (Visser et al., 2007). Thus, even within the temperament literature, there is support for high fearfulness being related to externalizing behaviors.

The psychopathology literature best exemplifies relations between temperamental fearfulness and specific externalizing outcomes. For example, children with high levels of conduct problems, but low levels of callous unemotional traits are reported as more fearful and have higher startle responses as compared to children with both high levels of conduct problems and high levels of callous unemotional traits (Fanti et al., 2016). Through work aimed at discerning whether there are two distinguishable types of conduct problems, Frick et al. (1999) found that "trait anxiety", a construct similar to temperamental fearfulness, is associated with conduct problems while fearlessness is not. These findings contrast with broad assumptions that children with conduct problems predominantly show low levels of fear. Indeed, Fonagy & Luyten (2018) propose that there are two distinct developmental paths to conduct problems; one that is characterized by low fear, logical perceptions, and instrumental aggression and another that is characterized by high fear, emotion-based perceptions, and reactive aggression. The fact that temperamentally different children develop similar symptoms points to a model of equifinality and exemplifies the importance of examining the varied potential pathways to externalizing problems.

The cognitive literature provides possible mediators of the association between fearful temperaments and externalizing behaviors. Davies et al. (2020) contend that, because children with high negative emotionality expend so many resources on addressing perceived threats to safety, they have fewer resources to expend on developing self-regulation skills. Additionally, parents of children with higher levels of negative affect have been found to utilize harsher and

more controlling parenting strategies (Barnett & Scaramella, 2015; Houtepen et al., 2019) which serves to both limit children's development of executive control and increase their use of problem behaviors.

In sum, these findings illustrate a possible path from temperamental fearfulness to externalizing behaviors that implicates the importance of cognitive mediators and environmental context. Contrary to popular assumption, there are relatively few studies that concurrently examine the specific contributions of child fear and frustration separately, effortful control, and stressors to the prospective development of externalizing problems. This study leverages evidence across literatures to inform hypotheses about the temporal precedence and subsequent impacts of temperament and stressors on externalizing.

Negative Reactivity and Effortful Control

Effortful control encompasses both executive control and delay abilities. Executive control encompasses working memory (maintaining information in memory while being able to manipulate it), cognitive flexibility (thinking about problems in different ways), and inhibitory control (inhibiting prepotent responses in favor of more adaptive ones). Delay ability captures how well individuals can inhibit seeking current rewards in favor of better rewards in the future.

Though there is limited empirical work on the mechanisms that explain relations between fearfulness and externalizing behaviors, possible causal models have been proposed. Specifically, Drabick et al. (2010) proposes a dual path model that considers how different levels of negative reactivity and effortful control differentially predict psychopathological outcomes. They contend that, for children with high anger, but low fear and effortful control, anxiety exacerbates co-occurring oppositional defiant disorder symptoms. In contrast, for children with low anger, but high fear and moderate effortful control, they posit that anxiety reduces

oppositional symptoms. Thus, they highlight the potential importance of examining fine-grained temperamental facets to better understand symptomology.

Possible Cognitive Precursors to Externalizing

Granic (2014) similarly considers children's cognitive abilities as a putative mediator of the relation between fearfulness and externalizing behaviors. She suggests that protracted experiences of anxiety have deleterious impacts on children's abilities to access the cognitive resources needed for self-regulation, therefore increasing risk of children using behavioral sources of regulation (like aggression) as a strategy to decrease emotion. In other words, children may engage in destructive and dangerous behaviors in an attempt to assert control in what they perceive as a threatening situation and thus reduce their level of anxiety. Additionally, she notes that perseveration, a noted symptom of anxiety, increases the likelihood of externalizing.

Indeed, one study by Davies et al. (2021) empirically tested pathways similar to those proposed. They found that unsupportive parenting predicted increases child negative emotionality which, in turn, predicted shorter attention to negatively valanced pictures and increases in externalizing. Similarly, Baskin-Sommers et al. (2012) examined potential cognitive contributors to the relation between emotionality and externalizing behaviors and found that perseverative attention to threat-related information best explains heightened behavioral responsivity to threat. Children who have externalizing problems are likely to both miss critical information about the relative safety of their situation because of their bias to turn away from threatening cues and to perseverate on the perceived danger. These findings suggest that, in the absence of behavioral modeling and functional support in the development of emotion regulation strategies, children may turn to maladaptive methods of managing stress that make them more susceptible to engaging in problematic behaviors. They also highlight the important ways in

which low effortful control may leave children particularly at risk for developing externalizing problems.

Stress x Temperament

An important and sometimes overlooked aspect of temperament is its mutability as shaped by environment and experience (Kagan et al., 2002). Many of the studies that do find relations between high child temperamental fearfulness and externalizing behaviors include a measure of stress and/or threat. Laceulle et al. (2012) examined the impact of stress on subsequent changes in temperament and found that greater exposure to stressful events is related to smaller decreases in fear and frustration and larger decreases in effortful control. Though fear and frustration were similarly impacted in this study, many find that they each have their own, unique trajectories of growth, which, respectively, lend support to Gray's Motivational Theory (Goldsmith et al., 2007; Putnam et al., 2008). In contrast to what Gray (1970) posits, however, there are children who are driven by both high BIS and BAS systems. These children who are high in both fear and frustration are at particular risks for developing externalizing behaviors as consequence of experiencing more frequent or chronic stressors (Schermerhorn et al., 2013).

Behavioral and cognitive distinctions between fear and frustration may not be as clearly defined as once thought. Surprisingly, fearful children have been found to have hostile attributions of others (Davies et al., 2020) which has been cited as a primary cognitive mechanism linking frustration to externalizing problems (Oland & Shaw, 2005). Similarly, in inpatient child psychiatric units, contrary to expectation, frustration does not predict the use of restraint and seclusion though fear does (Bridgett et al., 2012). It may be that fearful children adopt behaviors and cognitive patterns more similar to frustrative children when they are in what they perceive as highly threatening environments. The intensity of fear or pervasiveness of

stressors may be what delineates whether studies find an association between fear and externalizing problems. For example, externalizing problems are only predicted by children's experiences of stressful events for children with high (but not low or moderate) levels of fear in middle childhood (Schermerhorn et al., 2013). The current study will further explore possible moderation effects of stress on the relation of child temperamental fear and frustration to the development of externalizing problems.

Measurement Challenges

Methods for Assessing Temperament and Psychopathology

There are ubiquitous and challenging discrepancies between parent and youth reports of psychopathological symptoms that undermine healthcare professionals' abilities to efficiently and accurately come to diagnostic conclusions. Different relative weights are placed on youth as opposed to parent report depending on the types of symptoms (i.e. internalizing or externalizing) being reported on. Broadly, youth tend to underreport externalizing symptoms as compared to parents (Salbach-Andrae et al., 2009) whereas they overreport internalizing ones (Dirks et al., 2014). These findings, however, are also moderated by race such that nonwhite families tend to show greater discrepancies in parent and child report of internalizing symptoms (Dirks et al., 2014).

Most of the temperament literature is comprised of studies that utilize parents' report of child temperament as well as parent or teacher report of children's psychopathology. Unfortunately, one impact of these methodological choices is that results may be biased by halo effects wherein, if parents are rating their children as disruptive, they may be more likely to rate them as higher in frustration and potentially misattribute signs of fearfulness to a frustrative temperament. Further, due to these processes or other cognitive biases, parents' report of their

child's temperament may be influenced by their child's age (DiBartolo & Grills, 2006), their gestalt view of their child's temperament (Fields-Olivieri et al., 2017), and the impact of their own mental health (Durbin & Wilson, 2012). For example, parents may not be able to accurately distinguish whether their child's emotional reaction reflects fear, frustration, or another emotion altogether. As compared to parent and teacher reports, children's own report of their emotions (DiBartolo & Grills, 2006) and observational measures of child fearfulness (Zaslow et al., 2006) have been found to have better predictive validity for later psychopathology.

In line with Bird et al. (1992), many studies utilize an "or" logic to handle discrepancies between child and parent report. That is, if an item or symptom is endorsed by either a parent or child, it is considered as present. This approach helps to alleviate underreporting that may be due to parents or teachers limited abilities to detect children's true internal states as well as underreporting by children due to social desirability bias (Grills & Ollendick, 2002). However, rather than providing more specific targets for treatment, it creates a much noisier picture of how the child's cognitions, behaviors, and emotions relate to each other.

With the popularization of network analyses, untangling relations between these contributors to psychopathology has become much more accessible. Network analyses not only allow for estimates of how integrated symptoms are within reporter, but they can also clarify which symptoms are more or less agreed upon across reporters. Thus, utilization of this type of analysis is another method for reconciling discrepancies across reporters, but one that can help identify the most promising targets for treatment.

Current Study

The current study will evaluate how levels and growth in fear and frustration relate to levels and growth in externalizing. This will be done using separate models for each emotion

while controlling for the effects of effortful control and child biological sex and evaluating possible moderating effects of negative life events. This study will also examine the time-specific and cross-lagged effects of fear and negative life stressors on externalizing behaviors. Further, it will also evaluate how closely constellations of externalizing behaviors, as reported by youths and their parents, relate to each other and observed child temperamental fearfulness. Findings from this study may help inform 1) an improved understanding of the etiology of children's externalizing behaviors and 2) improved identification of treatment targets.

Aim 1: Initial levels and growth of temperamental fear and frustration will be used in different models (one model for each) to evaluate the effects of each of them and levels and growth of externalizing. Both models will be conditioned on effortful control and biological sex and the bivariate growth will be moderated by negative life events (stress).

Hypothesis 1: Initial levels of frustration will predict growth in externalizing.

Hypothesis 1a: Initial levels of frustration will predict initial levels of externalizing and growth.

Hypothesis 1b: The slope of frustration will predict initial levels of externalizing and growth.

Hypothesis 2: Initial levels of fear will predict growth in externalizing.

Hypothesis 2a: Initial levels and growth in fear will only predict externalizing when moderated by high levels of stress.

Aim 2: Examine cross-lagged impacts of stress on child fearfulness.

Hypothesis 1: Stress will predict subsequent increases in child fearfulness and externalizing behaviors

Hypothesis 2: Child fearfulness will predict subsequent increases in externalizing.

Exploratory: Since results differ when parents as opposed to children report on psychopathology symptoms, relations between parent or child reported symptoms and observed child temperament will be evaluated using a network analysis approach.

Method

Participants

This study was comprised of 306 children and their mothers. Children were first assessed when they were 3 years old (M = 3.06, SD = 0.07, Range = 2.96-3.36) and were reassessed 3 times at 9-month intervals until they were 5.25 years old. In an extension of the original study, the same sample was evaluated again when children were 11 years old (T5). At the time of this later data collection, 226 children from the original sample were available to participate. The reduction in the size of the sample is due to new exclusionary criteria that included: developmental disorders, psychosis, substance dependence, living out of state, and the child having an IQ of less than 80. Altogether, children were seen four times (T1-T4) during early childhood and again in late childhood (T5).

Families were recruited locally from hospitals as well as community organizations (e.g. charitable agencies, health clinics, libraries, and daycares). Mothers and their children had to posses enough English proficiency to understand the consent and assessment procedures to be eligible to participate in the study. Children with developmental delays were unable to participate due to exclusionary criteria. As a primary aim of the larger study was to examine effects of income on children's developing effortful control (EC), the sample was intentionally stratified based on income level (according to the 2009/2010 Federal HHS Poverty Guidelines), with an oversampling of lower income households. The original sample was comprised of families across income levels: 29% of families who were at or near poverty (at or below 150% of the

federal poverty threshold), 28% who were lower income (below the local median income of $58K), 25% who were middle- to upper income (between $58K and $100K), and 18% who were upper income (above $100K).

In the original sample, 50% of children were assigned female at birth. The sample demographics for child race and ethnicity were reflective of the community from which families were recruited and were as follows: 2% Native American, 3% Asian American, 9% African American, 10% Hispanic/Latino, 64% European American, and 12% other or multiple races/ethnicities. Among mothers, educational attainment was: 3% with some high school, 6% high school graduates, 34% with some college or trade school, 30% college graduates, 27% with postgraduate education. Eighty-one percent of mothers were in long-term relationships or married, 12% were never married, and 7% were divorced, separated, or widowed.

Procedure

All research assessments occurred on a university campus, with each of the first 4 assessments separated by 9 months. Children were 36-40, 45-49, 54-58, and 63-67 months old at each respective timepoint. Follow-up assessments also occurred when children were 11 (T5).

Parental consent and child assent were collected at the beginning of each assessment. Trained experimenters conducted assessments and administered neuropsychological, behavioral, and questionnaire measures. While children completed neuropsychological and behavioral measures of effortful control, mothers completed questionnaire measures in a different room. Families were compensated with $70 for their first assessment and compensation increased by $20 for each of the 3 following assessments (T2 – T4). Families were compensated $75 for completing the T5 assessment.

Measures

Effortful control. Effortful control was assessed using behavioral tasks across timepoints 1 (age 3) through 4 (age 5). Data from tasks measuring executive control and delay ability were utilized to create a composite effortful control measure.

Executive control. Executive control was measured using 6 tasks. Two NEPSY (Korkman et al., 1998) tasks were utilized. Children's inhibitory abilities were measured with the Inhibition subtest. In this task, children had to inhibit automatic responses (e.g. saying "circle" when shown a picture of a circle) in favor of a learned response (e.g. saying "square" when shown a picture of a circle and saying "circle" when shown a picture of a square). Children's sustained attention and set shifting abilities were evaluated with the Auditory Attention subtest. In this subtest, children were told to listen to a list of words and inhibit responses unless they heard a target word. Scores for both subset tasks of the NEPSY were based on the proportion of correct responses.

The Bear-Dragon task was used to assess children's behavioral inhibitory (Kochanska et al., 1996). In this task, children were taught to comply with commands given from a bear puppet, but to ignore commands given by a dragon puppet. Children's responses were given scores ranging from 0-3 for each bear trial which corresponded to: no movement, wrong movement, partial movement, or complete movement. Scores were reversed for dragon trials, such that no movement corresponded with 3 points and complete movement corresponded with 0 points. Scores for all trials (including both bear and dragon command trials) were summed and total points across all trials were compared to total points possible to create final proportion correct scores.

The Day-Night task (Gerstadt et al., 1994) was used to evaluate children's cognitive inhibitory control. In this task, children were told to say "day" when they saw a picture of moon/stars and "night' when they saw a picture of the sun. Children's responses were scored as

1 (correctly responding in the opposite way) or 0 (providing an incorrect response). Total scores were the proportion of correct responses.

The Dimensional Change Card Sort task (DCCS; Zelazo et al., 2003) was used to assess: inhibitory control, attention focusing, and set shifting. The card sort task has three levels of difficulty. In the first level, there are two rounds, each with 6 trials. In the first round, children are asked to sort cards into bins by the shape of black pictures on the card. In the second round, children were asked to sort them by card background color. In the second level of the task, children did the same thing, but used cards with blank backgrounds and colored foreground pictures. If children were able to sort > 50% of cards correctly, they were presented with a final level of the task (with 12 trials) in which they were asked to sort the cards by color if the card had a black border or to sort it by shape if the card did not have a black border. The child's total score was the proportion of correct trials out of all 36 possible trials.

The Head-Toes-Knees-Shoulders task (Ponitz et al., 2008) was used to evaluate children's attention and inhibitory control. Children were taught to touch their toes when told to touch their head, to touch their shoulders when told to touch their knees and vice versa. Child responses were scored as 0 = touched the directed or wrong body part, 1 = made a movement toward the wrong body part, but self-corrected, or 2 = made one smooth movement to correctly touched the opposite body part. Total scores were calculated as the summed score proportional to the total possible score.

Delay Ability. As delay ability is thought to capture "hot", approach-driven components of effortful control, it was measured separately from the battery of executive control tasks enumerated above. Delay ability was measured with the gift delay task (Kochanska et al., 1996). In this task, children were told by a research assistant that they would get a gift, but that they had

to wait until the gift was wrapped to receive it. The research assistant instructed children to face away from them and not to peek while they noisily wrapped the gift. Difficulty waiting (grimacing, tensing, fidgeting, and getting out of their seat) and peeking behaviors (degree, frequency, latency to peek, and latency to turn) and were coded by trained research assistants. Latencies and behavior scores were transformed into proportion scores out of total possible points and averaged. Independent recoding was conducted on 20% of all tasks to assess inter-rater reliability (ICCs=0.72-0.98).

For the purposes of analysis, a summary score of executive control will be used. This score is the proportion score mean of all individual executive control tasks across any given time point. The score was considered missing if >50% of the individual task scores were missing (α=0.67, ICC=0.83). A delay score was also calculated for each time point based on the proportion scores for difficulty waiting and peeking behaviors. This score was considered missing if >50% of the component scores were missing (α=0.77, ICC=0.91).

Observed Temperamental Fear. To assess temperamental fear, a fake, motorized spider was used and child expressions of fearfulness and the time it took for them to touch the spider were behaviorally coded. During this task, children were told up to 3 times by a research assistant to touch the remotely controlled spider (which jumped as the child approached it). Fear was operationalized by child facial expressions, body movements, and vocalizations and was coded on a rating scale for intensity from 0 (no observed response) to 2 (obvious, strong response). The time it took children to touch the spider was measured in seconds from the experimenter's prompt to when the child touched the spider. Latency scores ranged from ranged from 0 to 5 seconds. Average fear responses across the 3 prompts were combined with latency scores to create a composite fear score. At each time point Cronbach's alpha for the scale items

was T1=.91 & T4 = .92. The interrater intraclass correlation (ICC) was calculated based on double coding of 20 percent all cases for each time point (T1 = .98).

Observed Temperamental Frustration. To assess temperamental frustration, two tasks were used across different time points to reduce the likelihood of children acclimating to the task. At time 1 and time 3, a locked box task was used. In this task, children were shown a desirable toy in a transparent locked box. Children were instructed to work on opening the box for two minutes without help from the research assistant and were given nonfunctional keys. At times 2 & 4 a knotted sack task was used. In this task, children were presented with a knotted sack that had been sewn closed and told by the experimenter to work on opening it for 2.5 minutes without asking for help. They were told that, if they successfully opened it, they would receive a prize. Frustration was operationalized by child vocalizations, facial expressions, body movements, and other signs of annoyance with the research assistant. The intensity was coded for every 30-second epoch of the task and was rated on a scale of 0 (no observed response) to 2 (obvious, strong response). Child requests for the research assistant's help were also considered in calculating frustration scores. Average frustration ratings across all epochs were combined to create a composite frustration score. At each timepoint Cronbach's alpha for the scale items was T1=.83, T4 = .75. The interrater intraclass correlation (ICC) was calculated based on double coding of 20 percent all cases for each timepoint (T1 = .78).

Negative Life Events. Early life stressors were measured through the General Life Events Schedule for Children (GLESC; Sandler, Ramirez, & Reynolds, 1986). The measure assessed different types of stressful events (e.g. "You or your family had financial problems", "you had legal problems or were arrested") that had occurred within the last 9 months and asked

parents to indicate 1) whether the event happened or not and 2) how stressful the event was if it did occur (response options: “not stressful”, “a little stressful”, “very stressful”).

Externalizing Problems. Children’s externalizing symptoms were assessed via parent report at times 1-5 as well as via child report at time 5. Parent-report of symptoms was collected using the Child Behavior Checklist (CBCL, 4-18 years; Achenbach, 1991) and child report was collected using the youth self-report (YSR, 11-18; Achenbach & Rescorla, 2001).

Analytic Plan

Missing Data Analysis

Three-hundred six families were enrolled for the study during timepoints 1-4 when children were 3 – 5.5 years old. Patterns of missing data were assessed and are described here. There was no missing data for our negative life events measure, child biological sex variable, or for child effortful control at time 1. Missingness for all other variables was minimal with the highest percentage of missing observations for any variable being 11% (for time 2 observed fear and time 2 observed frustration). T-tests were conducted with Bonferroni corrections to evaluate differences between participants with complete data and participants with any missing data. When comparing children with missing data to those without missing data on demographic variables (i.e. sex, ethnicity/race, and income), there were no significant differences. Children with any missing data experienced fewer negative life events than those with complete data at timepoint 2 (Missing $M = 4.24$, $SD = 3.37$; Complete $M = 5.38$, $SD = -2.35$, $t(104) = 2.76$, $p = 0.02$), timepoint 3 (Missing $M = 4.19$, $SD = 3.35$; Complete $M = 5.58$, $SD = 2.55$, $t(109) = 3.34$, $p = 0.01$), and timepoint 4 (Missing $M = 4.59$, $SD = 3.07$; Complete $M = 5.71$, $SD = 2.40$, $t(111) = 2.95$, $p = .02$). Children with missing data were also rated as higher in frustration at timepoint 3 (Missing $M = 0.28$, $SD = 0.16$; Complete $M = 0.21$, $SD = 0.12$, $t(70) = -3.05$, $p = 0.02$) and

timepoint 4 (Missing $M = 0.31$, $SD = 0.17$; Complete $M = 0.24$, $SD = 0.15$, $t(76) = -2.59$, $p = 0.01$) and they scored lower in effortful control (Missing $M = 0.22$, $SD = 0.13$; Complete $M = 0.31$, $SD = 0.15$, $t(143) = 5.04$, $p < 0.01$) than children without any missing data. Correlations between missingness and each variable were relatively small. The average of these correlations was $r = 0.09$, and the range was 0.01 – 0.25 suggesting that there is minimal bias due to the effect of missingness (Collins, Schafer, & Kam, 2001).

Full information maximum likelihood estimation (FIMLE) was used to handle missing data for timepoints 1-4. FIMLE is one of the most common methods for addressing missing data that qualifies as missing completely at random (MCAR) or missing at random (MAR). As compared to pairwise or listwise deletion, FIMLE produces less biased results (Enders & Bandalos, 2001). In comparison to multiple imputation (MI), FIMLE has been shown to produce comparable estimates (Lee & Shi, 2021).

Two-hundred twenty-seven families participated at time 5. Of these families, only 1 parent-child dyad did not complete any of the CBCL or YSR questions for the aggression or delinquency subscales and 10 parents did not complete these CBCL subscales. Otherwise, there was minimal missing data. Given that the level of analysis was focused on individual item responses on a 3-point scale of "0 – Not True", "1 – Somewhat True", and "2 – Often True" on the CBCL for parents and YSR for youths, FIMLE was not an appropriate approach to handle missing data for the network analyses. As the missing data for this data was systematic, pair-wise deletion was used.

Latent Growth Models

Variations of structural equation models (SEMs) were used to evaluate relations between child temperament and stressors in the prediction of externalizing problems. Specifically,

bivariate (Figures 1 & 2) and autoregressive latent trajectory (ALT; Figure 6) growth curve models were used to evaluate within and between person effects of initial levels and growth of fear, frustration, and externalizing. Effects of fear and frustration were assessed in separate models, as a primary aim of the study is to evaluate the separate contributions of each to the development of externalizing problems. All primary analyses were carried out in R 4.1.0 (R Core Team, 2021) using the "lavaan" package (Rosseel, 2012).

For each model addressing a primary aim, I evaluated model fit using CFI, RMSEA, and SRMR. The Comparative Fit Index (CFI; Bentler, 1990) measures incremental fit of the stated model in comparison to a baseline model. Root mean square error of approximation (RMSEA; Steiger & Lind, 1980) and root mean squared residual (SRMR; Bentler, 1995), on the other hand, are absolute fit indices that represent the extent to which the model fits the data. Each of these indices reflect sensitivities to different forms of misspecification with RMSEA and CFI being more sensitive to misspecified factor loadings and SRMR being more sensitive to misspecified factor covariances.

Network Analysis

As applied to clinical psychology, network analyses have increased in popularity due to their ability to identify causal links between symptoms. In contrast to reductivist processes like latent factor analyses that presuppose an unobservable, underlying variable that explains commonalities among symptoms, network analyses allow for hypothesis testing at a more intricate level. In this study, network analyses were used to examine relations between parent and youth endorsements of externalizing symptoms and observer rated child temperamental fear. The exploratory aim of this study utilized time 1-4 child observed fear and time 5 child and parent report of child externalizing problems. Analyses were run using "bootnet" (Epskamp, Borsboom,

& Fried, 2018) and "qgraph" (Epskamp et al., 2012) packages in R. To assess network analysis results from models run for the exploratory aim, I utilized an adaptive LASSO (Zou, 2006) technique to reduce the possibility of spurious correlations. This approach is thought to produce better partial correlation estimates and to more accurately represent the underlying structural relations within the network (Costantini et al., 2015).

Results

Summary of Study Variable Correlations

Summary descriptives (means, standard deviations, and correlation coefficients) for all predictor and control variables for timepoints 1-4 are presented in Tables 1-3. Repeated measures for child observed fear and frustration, as well as for mother reported externalizing and negative life events were all unsurprisingly autocorrelated, except for a nonsignificant correlation between Time 1 frustration and Time 4 frustration. Child sex was associated with externalizing symptoms at all timepoints and with child frustration at timepoints 3 and 4, however it was not associated with child effortful control or ratings of children's fearfulness. Effortful control was only related child fearfulness at Time 2. Fearfulness at Time 1 correlated with externalizing behaviors at Time 1 & 2 and fearfulness at Time 2 correlated with child frustration at Time 4. Frustration at Times 1 & 2 correlated with child externalizing at times 3 and 4 and frustration at time 3 correlated with externalizing at Time 4. Frustration at time 4 was associated with negative life events at time 4. All timepoints of negative life events were associated with all timepoints of externalizing behaviors, which may indicate the importance of stressors/experiences of adversity in understanding the development of externalizing behaviors. Given positive associations between frustration and externalizing across timepoints, it is likely that initial levels and slopes of frustration will predict initial levels and growth in externalizing (Aim 1, Hypothesis 1). The

lack of significant correlations between temperamental fear and externalizing across Times 1-4 may indicate a possible moderation effect (Aim 1, Hypothesis 2b).

Table 4 lists descriptive means, standard deviations, correlations among child reported symptoms of aggression. Among the 20 symptom items that comprise this subscale of the CBCL, there were 190 possible correlations between items. One-hundred thirty correlations were significant. The following items had the most correlations with all other items: "mean", "screaming", "stubborn", "teasing others", having a "temper". Table 5 similarly displays means, standard deviations, and correlations for parent reported aggression symptoms. There were 165 correlations among parent reported symptoms of youth externalizing. The items with the fewest correlations with all other items were: "destroys own property", "disobeys at school", "gets in physical fights", and "screams". There were relatively fewer correlations between parent and youth reported symptoms, with only 95 of the 400 possible correlations being significant (Table 6). Across parent reported items, parent's reporting of the youth "disobeying at school", "arguing", "bragging", and "talking a lot" were correlated with the highest number of youth reported symptoms. Across child reported items, child reported "arguing", "disobeying parents", being "stubborn", and being "loud" were correlated with the most parent reported symptoms.

Table 7 lists descriptive means, standard deviations, and correlations for child reported delinquency symptoms. Across the 13 items, there were 65 possible correlations since all children endorsed "0 – Not True" for using drugs. Of the possible 65 correlations, 25 were significant, with "I hang around kids who get in trouble", "stealing from home", and "setting fires" having the most correlations with all other items. Table 8 provides the same information for parent reported child delinquency symptoms. Twenty-one correlations among parent reported symptoms were significant. Parent report of the youth "hanging out with children who get in

trouble" and "lying/cheating" were the items that had the highest number of correlations with all other items. Of the 121 possible parent-child cross-reported item correlations, only 20 were significant (Table 9). The parent rated items of "stealing from others" and "swearing" were associated with the highest number of youth reported items and the youth reported items of "stealing from others" and "hanging out with kids who get in trouble" were associated with the highest number of parent reported items.

Bivariate Growth

First, two unconditional bivariate latent growth curve models were estimated using data from timepoints 1 - 4. One model evaluated relations between frustration and externalizing and the other between fear and externalizing. Each model tested associations between average levels of children's negative reactivity and externalizing at time 1 (when children were 3 years old) as well as associations between those average levels and growth in their negative reactivity and externalizing. Additionally, relations between growth in negative reactivity and growth in externalizing were also assessed.

Latent growth curve analyses allow for the simultaneous estimation of within-person change as well as between-person comparisons of initial level and trajectories of change. Significant coefficients for the means of initial levels indicate that individuals, on average started either higher or lower than zero. Significant means for slope estimates denotes that the average trajectory of change for that variable across time is either positive or negative. Significant variances in intercept or slope indicate that there may be important differences between individuals in their initial level of that variable or in their degrees of change. All models were first evaluated for adequate fit using standard cut-offs. CFI values of .90 or higher and RMSEA and SRMR values of less than .08 were used to indicate acceptable fit (Hu & Bentler, 1999).

Frustration

Unconditional Model

Model Fit. The bivariate growth curve model for frustration and externalizing adequately fit the data as indicated by the comparative fit index (CFI) = 0.948 , root mean square error of approximation (RMSEA) = 0.70, and root mean squared residual (SRMR) = 0.057.

Frustration and Externalizing Levels & Slopes. Means for the intercept of externalizing (*M* = 0.242*, SE* = 0.008) and frustration (*M* = 5.956, *SE* = 0.195) as well as the slope of externalizing (*M = -0.244, SE = 0.072*) were significantly different from zero. However, the mean for growth in frustration (*M* = -0.003*, SE = 0.004*) was nonsignificant, meaning that there was not systemic, linear change in frustration across the 4 timepoints. Regarding between-individual analyses, results indicated that there was notable variation in initial levels of externalizing (*M* = 5.956*, SE* = 0.195*)* between children (*M* = 0.738*, SE* = 0.157), but not in initial levels of frustration (*M* = 0.003*, SE* = 0.002) nor growth in frustration (*M* = 0.001*, SE* = 0.001).

Covariance. Children's time 1 levels of frustration were associated with their growth in externalizing, (*β* =0.458, *p* = 0.035). No other significant associations between children's initial levels nor growth in externalizing and frustration were found.

Conditional Model

Model Fit. The model fit was adequate as indicated by the CFI = 0.951, RMSEA = 0.058, and SRMR = 0.050. Fit indices for the conditional model were slightly improved, thus suggesting that the effects of the added variables are significant (see Table 10).

Regressions. All latent variables (intercept and growth factors) for frustration and externalizing were conditioned on child biological sex and time 1 child effortful control. Of the 8

regressions, only child sex predicted time 1 intercept values such that, on average, boys had higher initial level of externalizing behaviors than girls (boys coded as 1, girls as 0; β =0.156, p = 0.017). Effortful control was not associated with the latent factors for frustration or externalizing intercept or slope.

Covariances. Similar to the unconditioned bivariate model, only time 1 levels of frustration were associated with growth in externalizing (β =0.459, p = 0.036). Time 1 levels of externalizing were not significantly related to growth in externalizing nor frustration. Neither of the initial levels or slopes of frustration or externalizing were related to each other.

Cross-group Bivariate Growth Model

Model Fit. The model fit was adequate as indicated by the CFI = 0.957, RMSEA = 0.058, and SRMR = 0.054.

Outcome. This model builds on the conditioned model described above, with the only distinction being that this model tested whether experiences of negative life events moderated relations between the intercepts and slopes of frustration and externalizing (Figures 3 & 4). The model was constructed using a median split to create "low" (less than 5 negative life events reported) and "high" (5 or more negative events reported) categories, which were used in two separate models (see Table 12).

Low Stress. For children who experienced fewer negative life events, there was no significant between-child variation in children's time 1 frustration or growth in frustration. There was also significant variability between children in their time 1 externalizing behaviors (M = 6.946, SE = 1.372) and in growth of externalizing (M = 0.439, SE = 0.200). Means of time 1 frustration (M = .210, SE = 0.028) and externalizing (M = 4.541, SE = 0.651) were significantly different than zero, however, slopes for each were nonsignificant, indicating that there was a lack

of systematic, linear change. Children's time 1 effortful control negatively predicted the slope of frustration (β = -0.666, p = 0.007). Specifically, this means that children with higher levels of effortful control had less growth in frustration. Similarly, for this group, boys showed higher average initial levels of externalizing problems than girls (β =0.384, p > 0.001). Children's frustration and externalizing at time 1 were positively associated (β = 0.082, p = 0.032), indicating that children who started higher in frustration also started higher in externalizing. There were no other significant associations between children's initial levels and slopes of frustration or externalizing.

High Stress. Children who experienced more negative life events had significant variability in between-person initial levels (M = 8.324, SE = 1.236) and slopes (M = .915, SE = 0.226) of externalizing. Means for initial levels of frustration (M = 0.252, SE = 0.027) and externalizing (M = 7.262, SE = 0.642) were significantly different from zero, however the slopes of each were not. Neither child sex nor effortful control had associations with level or slope of either frustration or externalizing when children experienced less stress. In contrast to children with fewer negative life, there was a trend for a positive association between initial levels of frustration and the slope of externalizing (β =0.918, p = 0.056). As this is a trend, it should be interpreted with caution. With that said, this relation indicates that children who start higher in frustration show greater growth in externalizing when they experience low levels of stress.

Fear

Unconditional Bivariate Model

Model Fit. The model fit adequately according to fit indices CFI = 0.928, RMSEA = 0.099, and SRMR = 0.058,.

Fear and Externalizing Levels & Slopes. Time 1 externalizing (*M* = 8.667*, SE* = 0.994) and fear (*M* = 0.024*, SE* = 0.006) scores varied significantly between children as did growth in externalizing (*M* = 0.720*, SE* = 0.157). There was a trend-level effect for between-child variances in the amount of growth in fear (*M* = 0.002*, SE* = 0.001). Both intercepts for fear (*M* = 0.379*, SE* = 0.015) and externalizing (*M* = 5.957*, SE* = 0.195) were significantly different from zero. The slopes of fear (*M* = 0.022*, SE* = 0.006) and externalizing (*M* = -0.246*, SE* = 0.072) were also significantly different from zero, indicating that, on average, scores changed linearly across time. Specifically, externalizing decreased as children grew older while fear increased.

Covariances. There was a trend in the relation of initial levels of fearfulness at time 1 and externalizing at time 1 (*ß* = -0.084, *p* = 0.095), but there were no other relations between initial levels and slopes for fear, externalizing, or across fear and externalizing.

Conditional Model

Model Fit. The model adequately as indicated by the CFI = 0.929, RMSEA = 0.084, and SRMR = 0.051 (see Table 11).

Regressions. All latent variables (intercept and growth) for fear and externalizing were conditioned on child biological sex and time 1 child effortful control. Of the 8 regressions, only child sex predicted time 1 intercept values such that, on average, boys had higher initial level of externalizing behaviors than girls.

Covariances. None of the four possible associations between initial levels or slopes of fear and externalizing were significant. Similarly, neither of the relations between the intercept of one factor and the slope of the other were significant.

Cross-group Bivariate Growth Model:

Model Fit. The model fit was adequate as indicated by the CFI = 0.939, RMSEA = 0.077, and SRMR = .057.

Outcome. This model builds on the conditioned model described above with the only distinction being that this model tests whether experiences of negative life events moderate the effects of the level and slope of fear on and the level and slope of externalizing (Figures 3 & 5). The model was constructed using a median split to create "low" (less than 5 negative life events reported) and "high" (5 or more negative events reported) categories, which were used in two separate models (see Table 12).

Low Stress. There was significant variability between-child time 1 externalizing behaviors (M = 6.955, SE = 1.374), growth in externalizing (M = 0.440, SE = 0.201), and time 1 levels of fear (M = 0.017, SE = 0.009). There was a trend for significant variation in children's growth in fear (M = 0.004, SE = 0.002). For children who experienced fewer negative life events, means of time 1 externalizing (M = 4.546, SE = 0.652) and fear (M =0.377, SE = 0.051) and as well as the slope of fear (M = 0.058, SE = 0.023) were all significantly different than zero. The slope of externalizing was, however, not significantly different than zero (M =-0.352, SE = 0.226). Only child sex, but not effortful control predicted initial values of fear (β = -0.086, p = 0.039) and externalizing (β = 2.186, p < 0.001). Specifically, boys had lower initial levels of fear and higher initial levels of externalizing as compared to girls. None of the latent factors for level or slope were significantly associated, meaning that initial levels of fear and externalizing were not related to change in those same constructs nor were they related to change in the other construct. The slopes of fear and externalizing were also unrelated to each other.

High Stress. There were significant between-person differences in initial levels (M = 8.213, SE = 1.227) and slopes (M = 0.888, SE = 0.225) of externalizing and initial levels (M =

0.025, *SE* = 0.008) of fear. There was no significant between-person variation in slopes of fear. Children who experienced more negative life events had means for initial externalizing (*M* = 7.275, *SE* = 0.643) and fear (*M* = 0.481, *SE* = 0.051) that were significantly different from zero, however, the means of the slopes for externalizing and fear were nonsignificant. Neither child sex nor effortful control had associations with level or slope of externalizing. In contrast to children with fewer negative life stressors, the initial level of externalizing was positively associated with growth in fear (β = 0.057, p = 0.031). No other relations between the levels and slopes of fear and externalizing were found.

Autoregressive Latent Trajectory Growth Model

Model Fit. The model fit was inadequate (RMSEA = 0.081, SRMR = 0.096, CFI = 0.917), thus, although we discuss the model results, the findings should be interpreted with caution. This model builds on the conditional model described above by also including autoregressive lags between T1-4 child fear, externalizing problems, and experiences of negative life events. In contrast to the bivariate growth model, using an autoregressive latent trajectory growth model allows for time-specific effects to be analyzed above and beyond autoregressive effects across time. For all three variables, autoregressive (n-1) associations were estimated, and simultaneously, the prospective effects of fear and negative life events on n+1 externalizing were estimated (see Figure 6).

Levels and Slopes. The slope of children's fear was nonsignificant. This could be because change in fear is not well summarized by a linear trajectory. A quadratic growth term was explored; however, its inclusion resulted in worse model fit and thus was not pursued further. There was significant between-child variability in time 1 levels of externalizing (*M* = 5.960, *SE* = 2.169) and fear (*M* = 0.421, *SE* = 0.041), though there was no significant variability

in the slopes of externalizing or fear. The average levels of time 1 child externalizing (M = 5.929, SE = 0.483) and fear (M = 0.421, SE = 0.041) were both significantly different from zero. Similarly, the average slope of externalizing (M = -2.956, SE = 0.525) was negative and significantly different from zero, suggesting that, on average, children decreased in externalizing problems from time 1 to time 4 (see Figure 7).

Regressions. Within this model, there was a trend for child sex predicting initial levels of externalizing such that boys had higher levels of externalizing than girls at time 1 (β = 1.363, p = 0.052). Child sex also predicted time 1 child fear (β = -0.083, p = 0.049) such that girls were rated as more fearful than boys. Effortful control was not associated with initial levels or slopes of fear or externalizing. Autoregressive effects were found for externalizing and negative life events at each timepoint; however, no autoregressive effects were found for child fear (see Table 12). Time 1 and time 2 negative life events positively predicted time 2 (β = 0.097, p = 0.021) and time 3 (β = 0.070, p = 0.033) externalizing respectively. Time 2 negative life events also negatively predicted time 3 child fear (β = -0.107, p = 0.009). Fear did not predict externalizing at any timepoint.

Covariances. The initial level and slope of externalizing were negatively and significantly associated (β = -1.523, p = 0.003), meaning that children who started higher in externalizing at time 1 had less growth in externalizing. There were no other significant relations between the initial levels and slopes of externalizing and fear except for a trend-level relation between initial levels of child fear and the slope of externalizing (β = 0.053, p = 0.068). This suggests that children who start higher in fear have more growth in externalizing.

Post-Hoc Bivariate Growth Analyses

To test whether the effects of child temperamental frustration accounts for the effects of child temperamental fearfulness on externalizing problems, additional, post-hoc analyses were conducted. First, the same conditioned bivariate growth model for fear and externalizing was run, but now with the addition of controlling for time 1 child frustration. Differences in estimates and model fit between the original model and post-hoc model are reported in Appendix A, Table A1. Only small changes were observed when frustration was added as a control variable and there were no changes in the overall pattern of significant effects for the means of the intercepts and slopes for fear and externalizing. Similarly, another model was run using frustration (instead of negative life events) as a moderator of the relation between growth in fear and growth in frustration. Differences in covariance estimates between when negative life events was used as a moderator and when frustration was used as a moderator are shown in Appendix A, Table 2. There were only two changes in effects across the two models. One was that the relation between the slope of fear and the intercept of frustration is significant in the stress model, but not in the frustration one. The other was that the relation between the externalizing intercept and slope was significant in the frustration moderated model whereas it was not in the stress moderated one. Overall, differences between the original and post hoc models demonstrate that we lack evidence that growth in observer rated fear is due to child temperamental frustration. There is, however, evidence that, for children who are low in frustration, there is a direct and positive relation between their initial levels of and growth in externalizing.

Network Analyses

Networks were comprised of partial correlations and represent relations between parent and youth reported externalizing symptoms at T5 as well as observer rated child fear at T1-T4. The following results are reported regarding common metrics that describe the organization of

the networks. Those metrics include: node strength, closeness, and betweenness (see Figures 10 & 11). Strength is calculated as the sum of absolute values for all partial correlation coefficients between one node and the rest. Closeness, by contrast, measures the shortest distance between nodes and thus represents how well nodes are indirectly related. The betweenness measure captures how many other nodes a given node connects and the average distance between the intermediary node and the two it connects. If a node has a higher betweenness value, it is relatively more important because of its centrality in linking other nodes to each other.

Observer Rated Fear and Parent and Youth Reported Aggression

Observer rated fear at times 1-4 were correlated with each other, but not with any youth or parent reported CBCL/YSR aggression symptoms. Youth reported stubbornness and physical attacking of others were also not related with any other items. There were far more associations among parent reported externalizing items than among youth reported items. The only cross-reporter items that were correlated were between youth reported "arguing", "disobeying parents", "disobeying at school", and parent reported "bragging", "arguing", "disobeying parents", and "disobeying at school" (see Figure 8).

On average, parent reported items had greater strength values than youth reported items. The parent reported items with the highest strength indices were: "cruelty, bullying, or meanness to others", "disobedient at home", and "temper tantrums or hot temper". Contrastingly, the items: "I try to get a lot of attention", "I tease others a lot", and "I threaten to hurt people" had the highest strength scores among all youth endorsed items. Regarding closeness, all parent reported items were relatively high in closeness, while only youth reported "disobeying at school" and "disobeying parents" were rated high in this metric. Betweenness scores were highest for parent reported youth "arguing" and youth reported "disobeying parents" and "being mean to others".

Observer Rated Fear and Parent and Youth Reported Delinquency

Data Reduction. Nine out of thirty items were removed from this network analysis due to either no variation in responses across participants (i.e. all participants endorsed 0 for their answers) or high kurtosis values from very few endorsements of responses other than 0. Items that were removed included youth reported "drug use", "running away from home", "stealing from others" and parent reported "running away", "stealing from others", "thinking about sex too much", "skipping school", and "doing drugs".

Youth and parent reported delinquency symptoms were not associated with any of the observer rated child temperamental fear scores, though measures of fear were correlated with each other across timepoints. Parent endorsements of "fire setting" behaviors and youth reports of "skipping school" and "not feeling guilty" were also unrelated to any other items. In contrast to symptoms reported on aggression, the network for delinquency depicts a closer and more integrated network between items reported by parents and youth. There were positive cross-reporter associations between parents' and youths' endorsements of the youth "swearing", hanging out with other teens who get in trouble", and "stealing at home".

Regarding centrality, both parent and youth reports of the "youth hanging out with other teens who get in trouble" had relatively high scores for node strength, closeness, and betweenness. Other items that had high node strength included: youth reports of "swearing", time 2-4 fear, and parent reported "lying and cheating". Parent and child reports of "lying and cheating" as well as "swearing" also had high closeness and betweenness values.

Discussion

This dissertation had two primary aims and one exploratory aim. For aim 1, I ran two separate models examining bivariate growth in frustration or fear and externalizing problems in

early childhood. For the model examining growth in frustration and externalizing, only one of my two hypotheses were supported. Specifically, initial levels of frustration did predict growth in externalizing, but were unrelated to initial levels of externalizing (Aim 1, Hypothesis 1a). Contrary to my hypothesis, the slope of frustration was also not associated with either the initial level of or growth in externalizing (Aim 1, Hypothesis 1b). Regarding fear and externalizing, for children with fewer experiences of negative life events, there were no associations between the levels or slopes of fear and externalizing. For children with more experiences of stressors, there was only evidence for an association between time 1 externalizing and growth in fear, but not between time 1 fear and growth in externalizing as was hypothesized (Aim 1, Hypothesis 2b). For aim 2, an autoregressive latent trajectory (ALT) growth model was used to simultaneously estimate the time specific effects of fear, stressors, and externalizing problems as well as the latent levels and slopes of fear and externalizing. This model fit inadequately, and thus findings should be interpreted with caution. Findings from this model partially support aim 2, hypothesis 1 in that earlier time points (times 1 and 2) of stress predicted later externalizing and as well as child fear, though these effects were not consistent across all four timepoints. Contrary to hypotheses, child fear did not predict externalizing at any timepoint (Aim 2, Hypothesis 2). Regarding Aim 3, network analyses were used to examine relations between parent and child report of externalizing problems as well as observer rated fear when children were ages 3 – 5.5 years old. These analyses were exploratory, and findings broadly showed a more integrated network of mother reported items (I.e. more partial correlations and higher centrality) than child reported ones.

Bivariate Growth

Frustration

Before any covariates were added, bivariate growth in frustration and externalizing was modeled and results supported an association between the initial level of frustration and growth in externalizing. This finding is consistent with the extant literature and vulnerability model, such that early temperamental frustration predisposes children to develop positive trajectories of externalizing. This association was maintained even after child sex and child effortful control were added as covariates. Also consistent with the literature, results showed that boys had higher initial levels of externalizing at age 3 than girls (Eme, 2016). Surprisingly, the intercept and slope of externalizing were unrelated, as were the intercept and slope of frustration. This may be due to distinct patterns of growth between different groups of children as categorized by their age 3 initial levels. Indeed, as has been consistently reported in latent analysis studies, there are multiple trajectories of growth in externalizing, especially during this period of expedited development of emotion regulation capacities (Kjeldsen et al., 2021). This may also be a function of unexamined moderation effects of parenting. Indeed, prior work has shown how parenting can shape change in children's negative affect (Pesonen et al., 2008). Still surprising, however, is the lack of association between intercept and growth in frustration as prior work has shown frustration to be relatively stable across development (Carranza et al., 2013). Similarly surprising is the finding that child effortful control at time 1, did not predict either level or slope for frustration or externalizing problems. As effortful control represents children's temperamental regulation, a negative association between it and these latent factors for negative reactivity and psychopathology symptoms would be expected (Putnam et al., 2008).

Fear

Contrary to what was hypothesized, there were no relations between children's initial levels of fear or externalizing and growth in those two variables, though averages of each were

all significantly different from zero. On average, there was a decline in externalizing behaviors across timepoints 1-4 and a small increase in fear. The lack of association between children's initial levels of fear and change in in it could be due to children learning to affectively show frustration instead of fear. This learning could be a function of differential parental responses to emotions. In fact, Barnett & Scaramella (2015) found that mothers of children higher in fearfulness increased in their displays of negative affect toward their child and in their use of intrusive behaviors. Thus, because of punishment from their environment for displaying fear, children may rely on other types of reactions to communicate their distress. Indeed, temperamental fear has been shown to be less consistent in change across development, though has been shown to predict later levels of frustration (Carranza et al., 2013). In the current literature, associations between fear and externalizing have been found at extremely high levels of fear (e.g. Bridgett et al., 2012) or in the context of interpersonal threat (e.g. Colder et al., 1997). Though the scary spider is a part of the well-established set of tasks to measure temperament (Laboratory Temperament Assessment Battery; Lab-TAB) that directly tests children's willingness to approach a potentially dangerous object, it may not evoke the same generalization of fear (and perhaps chronicity) as socially relevant situations. Indeed, though specific phobia is not predictive of externalizing disorders, generalized anxiety and social phobia are (Bittner et al., 2007). Furthermore, given the operational definition of fear that was used for coding, approach behaviors were coded as low fear. It is possible that some children approached because of high fear motivation (the "fight" in fight/flight/freeze) but were coded as low in fear instead of high. Therefore attacking behavior driven by fear could have been misconstrued. Thus, there may be a number of different reasons for why fear was unrelated to growth in externalizing.

Overall, it may be important for future studies to specifically examine fear in social situations and potentially measure whether children initially high in fear increase in their frustrative responses as a function of negative parenting behaviors or exposure to increased threat. Further, studying these changes in both clinical and subclinical samples may be additionally informative.

Moderation by Stress

Both bivariate cross-group growth models (one for fear and one for frustration) were conditioned on child biological sex and time 1 child effortful control. For children who experienced fewer stressors, the frustration model showed that child sex was associated with initial levels of externalizing such that boys had higher levels of externalizing at time 1 than girls. Child effortful control was also associated with the slope of frustration. Specifically, children who were higher in effortful control showed slower growth in externalizing than children who were lower. There were no effects of gender or effortful control on levels or slopes of frustration or externalizing for children who experienced more stressors. This may be because of greater heterogeneity in the trajectories of children who experienced more as compared to fewer stressors. One potential cause of this heterogeneity could be a moderating effect of parenting behaviors. Indeed, though effects of parenting were not evaluated in this study, qualities of parenting styles and behaviors have been robustly shown to impact change in children's temperament (see Scaramella & Leve, 2004 for a review) as well as the development of externalizing problems (Tung et al., 2019; Zubizarreta et al., 2019).

In the cross-group bivariate growth model of fear and externalizing, for children who experienced fewer stressors, child sex was related to child initial externalizing. Specifically, boys had greater initial levels of externalizing than girls. Boys were also rated as having lower initial

levels of fear as compared to girls. In contrast, in the high stress group, child sex was unrelated to the initial levels and slopes of fear and externalizing, though higher child effortful control was associated with lower initial levels of fear. It may be that, under higher levels of environmental stress, children show more similar patterns of fearfulness regardless of sex. Possible reasons for why higher effortful control is related to lower levels of fear are 1) children could be better at regulating their emotions overall and 2) children could be better at masking their emotions. In regard to the former possibility, prior work has shown that attentional regulation away from the stimuli provoking fear reduces the saliency of that emotion (Braungart-Rieker et al., 2010).

Levels and Slopes of Frustration & Fear

Across both models for cross-group bivariate growth in fear or frustration and externalizing, all intercepts across stress levels (low, high, and combined) were positive and significantly different from zero. Contrary to hypotheses, the slope of frustration was not significant at any level of stress (low, high, combined). This may be due to an averaging across different groups of trajectories (see figure 4). This may also be reflective of our use of a community as opposed to clinical or pre-clinical sample. For children who experienced fewer instances of life stress there was overall little change in externalizing and frustration across time. In contrast, however, children who experienced more stress were rated more similarly regarding their time 1 levels of frustration but showed more heterogeneity in trajectories of growth in frustration (see figure 4). This may be a function of learning such that, for some children, frustrative responses may be rewarded by caregivers, whereas for others, it may be punished. For instance, child negative reactivity predicts maternal intrusiveness which predicts increases in child negativity (Perry et al., 2018).

Children who experienced less stress showed growth in fear on average while children who experienced higher levels of stress showed no significant change in fear. In the low stress group, there appears to be two fairly distinctive groups – one larger group that increased in fear and a smaller group that decreased (see figure 5). Children in the high stress group seem to stay fairly consistent in their levels of fear across time.

Children who started higher in externalizing at time 1 also started higher in frustration, but only if they experienced lower levels of stress. There was a trend-level effect of children who experienced more stress having steeper increases in externalizing if they had higher initial frustration levels. In contrast with what was hypothesized, the intercept for externalizing was associated with the slope of fear (and not opposite). This means that children who had higher initial levels of externalizing had greater growth in fear. Rather than supporting a path from fearfulness to externalizing, this finding supports the idea that externalizing children experience more negative reactions from their environment and thus increase in fear in response to punishment (see Fraire & Ollendick, 2013). Broadly, findings align with prior work that shows that behaviors like aggression (a common symptom of externalizing disorders) are related to subsequent increases in negative emotionality (Atherton et al., 2017) and that externalizing problems likely precede the onset of anxiety in comorbid cases (Colder et al., 2002).

Temporal Effects of Fear and Stress on Externalizing

To simultaneously examine the temporal effects of change in fear, stress, and externalizing as well as overall growth in fear and externalizing, I ran an ALT growth model. I hypothesized that stress would predict subsequent levels of fear and externalizing and that fear would predict subsequent levels of externalizing. This hypothesis was partially supported. Stress at times 1 & 2 prospectively predicted externalizing at times 2 & 3 respectively. It may be that

earlier experiences of stress have the greatest subsequent impact on externalizing and that any later effects of stress are minimal in comparison. There was only a negative effect of time 2 stress on time 3 fear. Fear was not autocorrelated at any of the four timepoints, nor did it prospectively predict externalizing. The lack of relations between fear and externalizing might be due to the limited generalizability of our measure of fear (i.e. the Scary Spider Task) in adequately capturing aspects of fear salient to externalizing behaviors. Externalizing behaviors are often socially defined by nature (e.g. lying, cheating, threatening, hitting), and thus a more relevant measure of fear might have been one that assessed fear in social situations.

Multi-Reporter Differences in Externalizing and Observational Predictions

Overall, parents and youth demonstrated distinctly separate ways of conceptualizing the youth's constellation of externalizing behaviors. Regarding the aggressive subscale of the CBCL/YSR, parents had a much more integrated conceptualization of how each of the youth's behaviors related to each other (as demonstrated by higher closeness and strength indices). Contrastingly, youth-reported symptoms, though more sparsely associated, depicted clearer clusters of similar symptoms, specifically one regarding being the center of attention and the other regarding the victimization of others. These findings align with work done by Seneldir et al. (2024) which similarly found more connections across parent-reported symptoms than child-reported ones. They posit that, though parents may be aware of more symptoms than the youth, they have more difficulty identifying patterns across those symptoms. The youth-report subnetwork clusters of attention garnering symptoms and victimization symptoms (see figure 9) are supported in the existing literature. Specifically, studies on aggression show support for a positive relation between youth-reported narcissism and aggression (Hiemstra et al., 2020).

Findings from my study highlight that youths may have more insight into their own motives, but a more circumscribed and biased view of which behaviors are problematic and to what intensity.

Regarding the delinquency subscale of the CBCL/YSR, there were relatively more cross-reporter associations. Parents and youths tended to similarly rate the youth's behaviors of "stealing at home", "hanging out with kids who get in trouble", and "swearing". Due to the use of a community sample, there were many parent-reported and some child-reported items wherein responses for all youths were zero's ("Not True"). Thus, those items were removed from analyses. Though there was an approximately equal number of connections across youth-reported symptoms as there was across parent reported ones, the highest strength between nodes was observed between youth and parent reported items thus suggesting agreement of identified problems. This agreement may be due to the ease at which these behaviors are observed by both the youth and the parent. Greater cross-reporter reliability corresponds to higher response to treatment (Goolsby et al., 2018) and so the co-recognition of problematic behaviors may provide fruitful initial targets of treatment.

Observer rated early childhood temperamental fear was positively related at each timepoint, though showed no relations to either parent or youth reported aggressive or delinquent symptoms when youth were age 11. The lack of relations between temperamental fear and later externalizing problems may be reflective of true null associations or could be a function of our operalization of fear. It would be interesting to examine whether there would be relations among parent and youth reported externalizing and fear if fear was in response to social threat (for example, a child-appropriate version of the trier social stress test).

Strengths and Limitations

This study had many strengths. The study utilized an economically diverse and racially representative (to large metropolitan city in the Pacific Northwest) sample that increases confidence in generalizability of the findings. Analyses leveraged the use of multimethod, multi-reporter longitudinal data that allowed for the examination of developmental processes as well as inferences about relations between constructs. Further, this study is one of few to analyze the predictive effects of frustration and fear separately (accounting for effortful control and moderated by stress) on externalizing.

This study is also not without its limitations. Firstly, though the sample included a wide range of family incomes as well as individuals from diverse racial and ethnic backgrounds, it was a community sample (as opposed to a clinical one) and thus findings may not generalize to clinical populations. Indeed, within the literature, it is more common to find relations between fear and externalizing for individuals who already present with clinical-level psychopathologies. This may be because experiences of chronic stress lead to changes in temperament and/or increase susceptibility to psychopathology. It could also be that certain environments reward aggressive responses to stressful situations, thus creating a learned association between fear and externalizing behaviors. Secondly, though the study used a well-recognized temperamental task (the scary spider task) as well as trained, observational coders to measure fear, this measure may better capture children's phobic fear as opposed to broader measures of temperamental fear that have been associated with reactive aggression, one symptom of externalizing problems (Dane & Marini, 2014). Finally, children's exposure to stress was measured through a parent report of stressful negative life events that happened within the last 6 months prior to time 1. It is widely accepted that parents' stress often mediates how stressful events impact children (e.g. Ward &

Lee, 2020), however, there may have been different associations between stress and fear had we leveraged a more direct measure of child stress.

It is also worthwhile noting that these analyses did not include the possibility of complex 3- and 4-way interactions among fear, frustration, effortful control, and stress. Just as high levels of negative reactivity (i.e. fear and frustration) and low levels of temperamental regulation (i.e. effortful control) are thought to be risk factors for psychopathology (Laceulle et al., 2014; Slagt et al., 2016; Thöne et al., 2021) it may be that the added risk of experiencing a greater number of stressors uniquely exacerbates the severity of psychopathology or predisposes an individual to comorbidity.

Future Directions

Though this study was well-poised to answer developmental psychopathology questions due to its use of multi-reporter, multi-method and longitudinal data, findings may not generalize to clinical populations. Study findings highlight the persistent and harmful impacts of stress on the development of externalizing problems and provide some, limited evidence for relations between temperamental fearfulness and externalizing problems. Future studies should explore these same relations with a clinical population to evaluate whether there is support for the pathoplastic model of temperament and psychopathology. Specifically, the question of whether more extreme levels of stress change temperamental fear and subsequently increase the presence of externalizing behaviors should be addressed. Further, if there is support for such a cascading effect, possible cognitive mediators should also be tested. Regarding discrepancies between youth and parent reported externalizing symptom, study findings suggest that, though parents are aware of more of the youths' behaviors, youth may be more focused on patterns in their behaviors. Given prior work that suggests better treatment outcomes when parents and youths

agree on which symptoms are the most important to address (Goolsby et al., 2018), additional work using a network analysis approach and causal inferences should be used to ascertain whether or not this method of selecting treatment targets provides added clinical benefits.

Implications and Conclusions

This dissertation work sought to expand upon prior work and address some of the methodological issues present across the temperament, psychopathology, and aggression literatures. Specifically, as opposed to using a higher order "negative reactivity" construct that combines fear and frustration, this study leveraged the use of fine-grained temperamental facets to examine their separate contributions to externalizing behaviors. Further, in contrast to many psychopathology studies that use retrospective temperament measures, this study used prospective ones that are less affected by memory biases. Study hypotheses were informed by findings from the aggression literature and tested whether similar relations could be found for externalizing symptoms broadly.

Though study hypotheses were largely unsupported, hopefully this work "moves the needle" and inspires future studies that continue to explore different possible etiological paths to externalizing problems while doing so with compassion for those who are afflicted with them and their loved ones. Findings from this study do, however, point to stability in negative life events and externalizing from age 3 to age 5.25 that exemplifies how important it is to attend to early intervention and prevention strategies that can ameliorate if not redress the harms done by each. Further, study findings pertaining to parent-youth agreement on delinquency symptoms provide a possibly fruitful starting place for treatments focused on externalizing problems while insights into parent-youth disagreement point to possible barriers of treatment (i.e. difficulties in identifying the most important targets for treatment) that, once addressed, could improve

treatment engagement and completion. Overall, this study adds to the literature on both the etiology of externalizing problems and provides more detailed information about how parent's and youth's perspectives might each be used to inform tailored treatment approaches.

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Table 1

Means, standard deviations, and correlations of frustration and other variables

Variable	*M*	*SD*	1	2	3	4
1. T1 Frustration	0.27	0.16				
2. T2 Frustration	0.21	0.14	.12 [-.00, .24]			
3. T3 Frustration	0.22	0.13	.15* [.03, .26]	.22** [.10, .33]		
4. T4 Frustration	0.25	0.16	.07 [-.05, .18]	.13* [.01, .25]	.32** [.21, .43]	
5. Child Sex	0.50	0.50	.11 [-.01, .22]	.01 [-.11, .13]	.12* [.00, .23]	.14* [.02, .25]
6. T1 Effortful Control	0.29	0.15	-.02 [-.13, .10]	-.03 [-.15, .09]	-.05 [-.17, .06]	-.07 [-.19, .04]
7. T1 Externalizing	5.87	3.49	.06 [-.05, .18]	.10 [-.02, .22]	.12* [.01, .24]	.05 [-.07, .17]
8. T2 Externalizing	5.91	3.78	.05 [-.07, .17]	.11 [-.01, .23]	.05 [-.07, .17]	.06 [-.06, .17]
9. T3 Externalizing	5.56	3.69	.12* [.00, .24]	.16** [.04, .28]	.10 [-.02, .21]	.04 [-.08, .16]
10. T4 Externalizing	5.23	4.11	.14* [.02, .25]	.15* [.03, .27]	.14* [.02, .25]	.06 [-.06, .18]
11. T1 Stress	5.37	4.20	.03 [-.09, .14]	-.08 [-.19, .04]	.05 [-.07, .17]	.02 [-.10, .14]
12. T2 Stress	4.90	2.81	.05 [-.07, .16]	.11 [-.01, .22]	.00 [-.12, .12]	-.05 [-.16, .07]
13. T3 Stress	5.03	2.96	.02 [-.10, .13]	.11 [-.01, .23]	-.05 [-.16, .07]	-.02 [-.14, .09]
14. T4 Stress	5.22	2.78	.11 [-.01, .22]	.06 [-.06, .18]	-.06 [-.18, .06]	-.13* [-.25, -.02]

Note. M and *SD* are used to represent mean and standard deviation, respectively. T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 = age 5.25 Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Table 2

Means, standard deviations, and correlations of fear and other variables

Variable	*M*	*SD*	1	2	3	4
1. T1 Fear	0.36	0.29				
2. T2 Fear	0.46	0.27	.36** [.25, .46]			
3. T3 Fear	0.36	0.28	.38** [.27, .48]	.53** [.44, .61]		
4. T4 Fear	0.46	0.30	.36** [.25, .46]	.55** [.46, .63]	.65** [.57, .71]	
5. Child Sex	0.50	0.50	-.11 [-.22, .00]	-.00 [-.12, .12]	.01 [-.11, .12]	-.08 [-.20, .03]
6. T1 Effortful Control	0.29	0.15	-.01 [-.13, .10]	-.12* [-.24, -.00]	-.06 [-.18, .05]	-.11 [-.23, .00]
7. T1 Externalizing	5.87	3.49	-.12* [-.24, -.01]	.04 [-.08, .16]	-.01 [-.13, .10]	-.05 [-.17, .07]
8. T2 Externalizing	5.91	3.78	-.15* [-.27, -.03]	-.04 [-.16, .08]	-.03 [-.14, .09]	.00 [-.12, .12]
9. T3 Externalizing	5.56	3.69	-.12 [-.23, .00]	-.00 [-.12, .12]	-.05 [-.17, .06]	-.02 [-.14, .09]
10. T4 Externalizing	5.23	4.11	-.06 [-.18, .06]	.07 [-.05, .19]	-.03 [-.15, .09]	-.01 [-.12, .11]
11. T1 Stress	5.37	4.20	-.06 [-.18, .05]	.05 [-.07, .16]	.05 [-.07, .17]	-.02 [-.14, .10]
12. T2 Stress	4.90	2.81	-.00 [-.12, .11]	-.06 [-.18, .06]	-.03 [-.15, .08]	-.03 [-.14, .09]
13. T3 Stress	5.03	2.96	.04 [-.07, .16]	-.03 [-.14, .09]	-.01 [-.12, .11]	-.09 [-.21, .03]
14. T4 Stress	5.22	2.78	.06 [-.06, .17]	.01 [-.11, .12]	-.03 [-.15, .09]	-.08 [-.19, .04]

Note. M and *SD* are used to represent mean and standard deviation, respectively. T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 = age 5.25. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Table 3

Means, standard deviations, and correlations of covariate, moderator, and manifest variables

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Child Sex	0.50	0.50									
2. T1 Effortful Control	0.29	0.15	-.09 [-.20, .03]								
3. T1 Externalizing	5.87	3.49	.13* [.02, .24]	-.08 [-.19, .04]							
4. T2 Externalizing	5.91	3.78	.14* [.02, .25]	-.11 [-.22, .01]	.66** [.59, .72]						
5. T3 Externalizing	5.56	3.69	.17** [.06, .28]	-.05 [-.16, .07]	.56** [.47, .63]	.68** [.61, .74]					
6. T4 Externalizing	5.23	4.11	.13* [.01, .24]	-.06 [-.17, .06]	.54** [.46, .62]	.61** [.53, .68]	.74** [.68, .79]				
7. T1 Stress	5.37	4.20	-.01 [-.12, .11]	-.02 [-.13, .09]	.22** [.11, .32]	.23** [.12, .34]	.16** [.04, .27]	.23** [.12, .33]			
8. T2 Stress	4.90	2.81	-.09 [-.20, .02]	-.05 [-.16, .07]	.29** [.18, .39]	.29** [.18, .40]	.25** [.14, .36]	.27** [.16, .38]	.39** [.29, .48]		
9. T3 Stress	5.03	2.96	-.06 [-.17, .05]	.01 [-.10, .12]	.27** [.16, .37]	.21** [.09, .32]	.24** [.13, .34]	.20** [.09, .31]	.29** [.19, .39]	.64** [.56, .70]	
10. T4 Stress	5.22	2.78	-.07 [-.19, .04]	.01 [-.11, .12]	.24** [.13, .34]	.26** [.15, .37]	.29** [.18, .39]	.35** [.25, .45]	.39** [.29, .48]	.52** [.44, .60]	.54** [.46, .61]

Note. M and *SD* are used to represent mean and standard deviation, respectively. T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 = age 5.25. Values in square brackets indicate the 95% confidence interval for each correlation. *Indicates $p < .05$., **indicates $p < .01$.

Table 4

Means, standard deviations, and correlations of time 5 youth-reported YSR aggressive symptoms

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. y_argue	0.99	0.54																				
2. y_brag	0.50	0.52	.14* [.01, .27]																			
3. y_mean	0.19	0.41	.23** [.10, .35]	.19** [.06, .32]																		
4. y_get_attn	0.59	0.59	.22** [.10, .34]	.38** [.26, .48]	.17* [.04, .29]																	
5. y_destroy_own	0.14	0.35	.08 [-.05, .21]	.08 [-.05, .21]	.06 [-.08, .18]	.09 [-.04, .22]																
6. y_destroy_oth	0.04	0.19	.09 [-.04, .22]	.05 [-.08, .18]	.14* [.01, .27]	-.07 [-.20, .06]	.20** [.07, .32]															
7. y_disob_par	0.41	0.50	.28** [.15, .39]	.13 [-.00, .25]	.28** [.16, .40]	.15* [.02, .27]	.05 [-.08, .18]	.18** [.05, .30]														
8. y_disob_sch	0.15	0.37	.14* [.01, .27]	.03 [-.10, .16]	.25** [.12, .37]	.18** [.05, .31]	.11 [-.02, .24]	.12 [-.01, .24]	.34** [.22, .45]													
9. y_jealous	0.43	0.55	.21** [.08, .33]	.25** [.12, .37]	.18** [.05, .30]	.30** [.18, .42]	.08 [-.06, .20]	.02 [-.11, .15]	.17* [.04, .29]	.12 [-.01, .25]												
10. y_fights	0.12	0.37	.16* [.03, .28]	.14* [.01, .27]	.26** [.14, .38]	.05 [-.08, .18]	.01 [-.12, .14]	.20** [.07, .32]	.13 [-.00, .26]	.16* [.03, .29]	-.03 [-.16, .11]											
11. y_phys_attk	0.06	0.24	.04 [-.09, .17]	.14* [.01, .27]	.15* [.02, .27]	.09 [-.05, .21]	.11 [-.02, .23]	.15* [.02, .27]	.23** [.10, .35]	.19** [.06, .32]	.07 [-.06, .20]	.27** [.14, .38]										
12. y_scream	0.22	0.46	.24** [.11, .36]	.03 [-.10, .16]	.18** [.05, .30]	.00 [-.13, .13]	.22** [.09, .34]	.17* [.04, .29]	.19** [.06, .31]	.12 [-.01, .25]	.07 [-.06, .20]	.16* [.03, .29]	.24** [.11, .36]									
13. y_show_off	0.54	0.59	.17* [.04, .29]	.27** [.14, .39]	.10 [-.03, .22]	.42** [.31, .52]	.17* [.04, .29]	.07 [-.06, .20]	.14* [.01, .27]	.22** [.09, .34]	.16* [.03, .28]	-.00 [-.13, .13]	.05 [-.09, .17]	.19** [.06, .31]								
14. y_stubborn	0.66	0.63	.28** [.15, .40]	.21** [.09, .34]	.22** [.09, .34]	.20** [.07, .32]	.18** [.05, .30]	.18** [.05, .30]	.25** [.13, .37]	.10 [-.03, .23]	.18** [.05, .30]	.07 [-.06, .20]	.14* [.01, .26]	.19** [.06, .31]	.19** [.06, .32]							
15. y_mood_chg	0.58	0.66	.19** [.06, .31]	.12 [-.01, .24]	.25** [.13, .37]	.15* [.02, .27]	.16* [.03, .29]	.09 [-.05, .21]	.09 [-.04, .22]	.13* [.00, .26]	.14* [.01, .27]	.18** [.05, .30]	.11 [-.02, .23]	.21** [.08, .33]	.08 [-.05, .21]	.25** [.12, .37]						
16. y_talk_alot	0.93	0.71	.25** [.13, .37]	.17** [.04, .30]	.08 [-.06, .20]	.38** [.26, .49]	.15* [.01, .27]	-.02 [-.15, .11]	.08 [-.06, .20]	.19** [.06, .31]	.19** [.06, .31]	.16* [.03, .29]	.05 [-.08, .18]	.21** [.08, .33]	.28** [.15, .39]	.18** [.05, .30]	.18** [.05, .30]					
17. y_tease_oth	0.12	0.33	.23** [.10, .35]	.18** [.05, .31]	.46** [.35, .55]	.17** [.04, .30]	.09 [-.04, .22]	.22** [.09, .34]	.22** [.10, .34]	.26** [.13, .37]	.12 [-.01, .24]	.18** [.05, .30]	.19** [.06, .31]	.21** [.08, .33]	.13* [.00, .26]	.14* [.01, .27]	.28** [.16, .40]	.20** [.07, .33]				
18. y_temper	0.42	0.60	.19** [.06, .31]	.08 [-.05, .21]	.32** [.20, .43]	.10 [-.03, .23]	.18** [.05, .30]	.07 [-.07, .19]	.15* [.02, .28]	.21** [.09, .34]	.08 [-.05, .21]	.20** [.07, .32]	.22** [.09, .34]	.33** [.20, .44]	.20** [.07, .32]	.22** [.10, .34]	.30** [.18, .41]	.27** [.15, .39]	.16* [.03, .28]			
19. y_thrtn_oth	0.03	0.19	.00 [-.13, .13]	.14* [.01, .26]	.40** [.28, .50]	.02 [-.11, .15]	.08 [-.05, .21]	.36** [.24, .47]	.17* [.04, .29]	.13* [.00, .26]	-.03 [-.16, .11]	.40** [.29, .51]	.26** [.13, .38]	.29** [.17, .41]	.07 [-.06, .20]	.11 [-.02, .24]	.16* [.03, .29]	.12 [-.01, .25]	.52** [.42, .61]	.22** [.09, .34]		
20. y_louder	0.63	0.73	.18** [.05, .31]	.25** [.13, .37]	.16* [.03, .28]	.28** [.16, .40]	.17** [.04, .30]	-.00 [-.13, .13]	.03 [-.10, .16]	.23** [.10, .35]	.12 [-.01, .25]	.23** [.10, .35]	.03 [-.10, .16]	.20** [.07, .32]	.38** [.26, .48]	.27** [.14, .39]	.15* [.02, .28]	.50** [.40, .60]	.18** [.05, .30]	.27** [.14, .39]	.11 [-.02, .23]	

Note. M and *SD* are used to represent mean and standard deviation, respectively. T5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation. *Indicates $p < .05$, **Indicates $p < .01$.

Table 5

Means, standard deviations, and correlations of time 5 parent-reported CBCL aggressive symptoms

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. p_argue	0.84	0.73																			
2. p_brag	0.55	0.64	.38** [.26, .49]																		
3. p_mean	0.15	0.39	.35** [.22, .46]	.36** [.24, .47]																	
4. p_get_attn	0.52	0.64	.41** [.30, .52]	.35** [.23, .47]	.32** [.19, .43]																
5. p_destroy_own	0.11	0.35	.23** [.10, .35]	.07 [-.07, .20]	.26** [.13, .38]	.15* [.01, .27]															
6. p_destroy_oth	0.13	0.39	.29** [.16, .40]	.18** [.04, .30]	.48** [.37, .58]	.21** [.08, .34]	.58** [.49, .66]														
7. p_disob_par	0.53	0.56	.50** [.39, .59]	.35** [.22, .46]	.41** [.29, .51]	.29** [.17, .41]	.21** [.08, .33]	.30** [.18, .42]													
8. p_disob_sch	0.16	0.38	.31** [.19, .43]	.32** [.19, .43]	.26** [.13, .38]	.19** [.06, .31]	.11 [-.02, .24]	.12 [-.02, .24]	.34** [.22, .45]												
9. p_jealous	0.39	0.58	.40** [.28, .50]	.26** [.13, .38]	.34** [.21, .45]	.37** [.25, .48]	.36** [.24, .47]	.35** [.23, .46]	.24** [.12, .37]	.13 [-.00, .26]											
10. p_fights	0.08	0.27	.23** [.10, .35]	.26** [.13, .38]	.16* [.03, .29]	.11 [-.02, .24]	.16* [.02, .28]	.17* [.04, .30]	.12 [-.01, .25]	.28** [.15, .40]	.25** [.12, .37]										
11. p_phys_attk	0.12	0.35	.24** [.11, .36]	.20** [.06, .32]	.44** [.32, .54]	.19** [.06, .32]	.12 [-.01, .25]	.36** [.24, .47]	.36** [.24, .47]	.10 [-.03, .23]	.20** [.07, .32]	.29** [.16, .41]									
12. p_scream	0.10	0.35	.19** [.06, .32]	.14* [.01, .27]	.37** [.24, .48]	.26** [.13, .38]	.10 [-.03, .23]	.32** [.19, .43]	.34** [.22, .46]	-.12 [-.25, .01]	.22** [.08, .34]	.01 [-.12, .15]	.39** [.27, .50]								
13. p_show_off	0.56	0.66	.27** [.14, .39]	.52** [.41, .61]	.24** [.11, .36]	.30** [.18, .42]	.10 [-.03, .23]	.20** [.07, .33]	.26** [.13, .38]	.36** [.24, .47]	.15* [.01, .27]	.14* [.01, .27]	.17* [.03, .29]	.09 [-.04, .22]							
14. p_stubborn	0.54	0.58	.44** [.33, .54]	.23** [.10, .35]	.28** [.15, .40]	.25** [.13, .38]	.19** [.06, .32]	.28** [.15, .40]	.47** [.35, .56]	.19** [.06, .31]	.28** [.15, .40]	.17* [.04, .30]	.36** [.23, .47]	.28** [.15, .39]	.22** [.09, .35]						
15. p_mood_chg	0.37	0.53	.36** [.24, .47]	.18** [.05, .31]	.25** [.12, .37]	.24** [.11, .36]	.25** [.12, .37]	.24** [.11, .36]	.40** [.28, .50]	.07 [-.06, .20]	.28** [.15, .40]	.10 [-.03, .23]	.13 [-.00, .26]	.26** [.13, .38]	.16* [.03, .29]	.51** [.40, .60]					
16. p_talk_alot	0.40	0.62	.34** [.22, .45]	.38** [.26, .49]	.35** [.22, .46]	.38** [.26, .49]	.12 [-.01, .25]	.17* [.04, .29]	.19** [.06, .31]	.19** [.06, .32]	.24** [.11, .36]	.03 [-.10, .17]	.14* [.01, .27]	.07 [-.07, .20]	.36** [.24, .47]	.17* [.04, .30]	.17* [.04, .30]				
17. p_tease_oth	0.21	0.45	.31** [.19, .43]	.32** [.20, .44]	.40** [.28, .51]	.20** [.07, .33]	.21** [.08, .34]	.40** [.29, .51]	.32** [.19, .43]	.19** [.05, .31]	.34** [.22, .45]	.25** [.12, .37]	.25** [.12, .37]	.13 [-.00, .26]	.29** [.17, .41]	.31** [.18, .42]	.26** [.13, .38]	.33** [.21, .44]			
18. p_temper	0.38	0.58	.47** [.36, .57]	.25** [.12, .37]	.39** [.27, .50]	.25** [.12, .37]	.34** [.22, .46]	.42** [.30, .52]	.57** [.47, .65]	.12 [-.02, .25]	.38** [.26, .49]	.04 [-.09, .18]	.32** [.19, .43]	.43** [.31, .53]	.16* [.03, .29]	.55** [.44, .63]	.48** [.37, .58]	.24** [.11, .36]	.42** [.30, .52]		
19. p_thrtn_oth	0.06	0.23	.22** [.09, .34]	.17* [.04, .29]	.32** [.19, .44]	.21** [.08, .34]	.21** [.08, .34]	.28** [.16, .40]	.28** [.15, .40]	.07 [-.07, .20]	.15* [.02, .28]	.30** [.18, .42]	.55** [.45, .63]	.28** [.15, .40]	.16* [.03, .29]	.19** [.06, .31]	.24** [.11, .36]	.14* [.00, .26]	.25** [.12, .37]	.26** [.13, .38]	
20. p_louder	0.20	0.44	.23** [.10, .35]	.29** [.16, .41]	.23** [.10, .36]	.28** [.16, .40]	.10 [-.03, .23]	.20** [.07, .33]	.38** [.26, .48]	.23** [.10, .35]	.18** [.05, .30]	-.02 [-.15, .12]	.17* [.04, .30]	.26** [.13, .38]	.25** [.12, .37]	.16* [.03, .29]	.21** [.08, .34]	.31** [.19, .43]	.19** [.05, .31]	.28** [.15, .39]	.26** [.13, .38]

Note. M and *SD* are used to represent mean and standard deviation, respectively. T5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation. *Indicates $p < .05$, **indicates $p < .01$.

Table 6

Correlations of time 5 youth-reported YRS and parent-reported CBCL aggressive symptoms

Variable	1. y_argue	2. y_brag	3. y_mean	4. y_get_ attn	5. y_destroy own	6. y_destroy oth	7. y_disob_ par	8. y_disob_ sch	9. y_jealous	10. y_fights	11. y_phys_ attk	12. y_scream	13. y_show_ off	14. y_stubbor n	15. y_mood_ chg	16. y_talk_al ot	17. y_tease_ oth	18. y_temper	19. y_thrtn_ oth	20. y_louder
1. p_argue	.28** [.16, .40]	.08 [-.05, .21]	.15* [.02, .28]	.15* [.02, .28]	.10 [-.03, .23]	.04 [-.09, .17]	.34** [.21, .45]	.24** [.11, .36]	.05 [-.08, .18]	.05 [-.08, .18]	.03 [-.11, .16]	.10 [-.03, .23]	.11 [-.02, .24]	.27** [.14, .39]	.07 [-.06, .21]	.10 [-.03, .23]	.02 [-.11, .15]	.22** [.09, .34]	-.10 [-.23, .03]	.22** [.09, .34]
2. p_brag	.30** [.17, .42]	.18** [.05, .30]	.05 [-.09, .18]	.19** [.05, .31]	.17* [.04, .29]	.06 [-.07, .19]	.12 [-.01, .25]	.10 [-.03, .23]	.01 [-.13, .14]	.09 [-.05, .22]	-.04 [-.17, .10]	.08 [-.06, .21]	.18** [.04, .30]	.03 [-.11, .16]	.04 [-.10, .17]	.16* [.03, .29]	.06 [-.08, .19]	.12 [-.02, .25]	-.05 [-.18, .08]	.19** [.06, .32]
3. p_mean	.13* [.00, .26]	.10 [-.03, .23]	.21** [.08, .34]	.05 [-.09, .18]	-.01 [-.14, .12]	.05 [-.08, .18]	.17* [.04, .30]	.07 [-.06, .20]	-.06 [-.19, .08]	.14* [.01, .27]	-.05 [-.18, .09]	.03 [-.10, .16]	.06 [-.08, .19]	.15* [.01, .27]	.08 [-.06, .21]	.03 [-.10, .17]	.12 [-.02, .25]	.23** [.10, .35]	.07 [-.07, .20]	.12 [-.01, .25]
4. p_get_attn	.14* [.01, .27]	.12 [-.02, .24]	.07 [-.06, .20]	.20** [.07, .33]	.08 [-.05, .21]	-.04 [-.18, .09]	.22** [.09, .34]	.14* [.01, .27]	.11 [-.02, .24]	-.01 [-.14, .12]	.01 [-.13, .14]	.02 [-.11, .16]	.11 [-.02, .24]	.16* [.03, .29]	.06 [-.07, .19]	.08 [-.05, .22]	-.01 [-.14, .12]	.13 [-.00, .26]	-.12 [-.25, .01]	.18** [.05, .30]
5. p_destroy_own	.10 [-.03, .23]	.07 [-.07, .20]	.07 [-.06, .21]	-.04 [-.17, .10]	.15* [.02, .28]	-.06 [-.19, .07]	.16* [.02, .28]	.02 [-.11, .15]	.03 [-.11, .16]	.04 [-.09, .18]	-.02 [-.15, .11]	.11 [-.02, .24]	.08 [-.05, .21]	.10 [-.03, .23]	-.01 [-.14, .13]	.04 [-.09, .17]	-.03 [-.16, .10]	.07 [-.06, .21]	.03 [-.11, .16]	.02 [-.11, .15]
6. p_destroy_oth	.20** [.07, .32]	.10 [-.04, .23]	.10 [-.04, .23]	.01 [-.12, .14]	.11 [-.02, .24]	-.00 [-.14, .13]	.19** [.06, .31]	.13 [-.01, .25]	.02 [-.11, .15]	.05 [-.08, .18]	.07 [-.07, .20]	-.03 [-.16, .11]	-.02 [-.16, .11]	.16* [.03, .29]	.03 [-.10, .16]	-.01 [-.14, .13]	.02 [-.11, .16]	.11 [-.03, .24]	-.05 [-.18, .09]	.08 [-.05, .21]
7. p_disob_par	.24** [.11, .36]	.06 [-.07, .19]	.22** [.09, .34]	.08 [-.05, .21]	.04 [-.09, .17]	.12 [-.01, .25]	.33** [.20, .44]	.16* [.03, .29]	.00 [-.13, .14]	.12 [-.02, .25]	-.03 [-.16, .10]	.02 [-.11, .16]	.12 [-.01, .25]	.20** [.07, .33]	.10 [-.04, .23]	-.02 [-.15, .11]	.06 [-.08, .19]	.20** [.06, .32]	-.01 [-.14, .13]	.10 [-.03, .24]
8. p_disob_sch	.07 [-.06, .20]	.04 [-.09, .17]	.14* [.01, .27]	.19** [.06, .32]	.12 [-.02, .25]	-.02 [-.15, .11]	.08 [-.06, .21]	.33** [.21, .45]	-.06 [-.20, .07]	.19** [.05, .31]	.10 [-.04, .23]	-.02 [-.15, .12]	.15* [.01, .27]	.11 [-.02, .24]	.14* [.01, .27]	.14* [.00, .26]	.10 [-.03, .23]	.21** [.08, .34]	.00 [-.13, .14]	.14* [.01, .27]
9. p_jealous	.14* [.01, .27]	.11 [-.03, .24]	.05 [-.08, .18]	.16* [.03, .29]	.04 [-.10, .17]	-.09 [-.22, .04]	.15* [.01, .28]	-.01 [-.14, .12]	.18** [.05, .31]	.10 [-.03, .23]	.03 [-.10, .16]	.08 [-.06, .21]	.08 [-.05, .21]	.16* [.03, .29]	.03 [-.10, .16]	.11 [-.03, .24]	-.03 [-.16, .11]	.18** [.05, .30]	-.10 [-.23, .04]	.06 [-.08, .19]
10. p_fights	.04 [-.10, .17]	.02 [-.11, .15]	.02 [-.11, .16]	.06 [-.08, .19]	.04 [-.10, .17]	.03 [-.10, .17]	-.03 [-.16, .11]	.07 [-.06, .20]	.02 [-.11, .16]	.18** [.05, .31]	-.00 [-.13, .13]	.01 [-.12, .14]	.05 [-.08, .19]	.10 [-.03, .23]	-.02 [-.16, .11]	.10 [-.04, .23]	-.00 [-.14, .13]	.11 [-.02, .24]	-.04 [-.17, .09]	.14* [.01, .27]
11. p_phys_attk	.12 [-.01, .25]	.03 [-.10, .16]	-.01 [-.14, .12]	.06 [-.07, .19]	.02 [-.11, .15]	.14* [.01, .27]	.12 [-.01, .25]	.04 [-.09, .17]	-.03 [-.16, .11]	.07 [-.07, .20]	-.09 [-.22, .05]	-.07 [-.21, .06]	-.05 [-.18, .09]	.20** [.07, .33]	-.00 [-.14, .13]	-.03 [-.16, .11]	-.08 [-.21, .05]	.07 [-.07, .20]	-.05 [-.18, .08]	.02 [-.11, .16]
12. p_scream	.13 [-.01, .26]	.03 [-.10, .16]	-.01 [-.15, .12]	-.02 [-.16, .11]	.00 [-.13, .14]	.01 [-.12, .15]	.11 [-.02, .24]	.03 [-.11, .16]	-.06 [-.19, .07]	.01 [-.12, .15]	-.02 [-.15, .12]	.09 [-.04, .22]	.00 [-.13, .14]	.09 [-.04, .22]	-.08 [-.21, .06]	-.03 [-.17, .10]	-.03 [-.16, .11]	.11 [-.03, .24]	-.04 [-.17, .09]	.05 [-.08, .18]
13. p_show_off	.18** [.05, .31]	.11 [-.03, .24]	.07 [-.06, .20]	.20** [.07, .33]	.12 [-.02, .25]	-.06 [-.19, .08]	.12 [-.01, .25]	.23** [.10, .35]	-.00 [-.14, .13]	.03 [-.11, .16]	-.04 [-.17, .09]	.01 [-.12, .14]	.26** [.13, .38]	.01 [-.12, .14]	.14* [.01, .27]	.10 [-.04, .23]	.05 [-.08, .18]	.02 [-.11, .15]	-.09 [-.22, .05]	.21** [.08, .34]
14. p_stubborn	.14* [.01, .27]	.12 [-.01, .25]	.02 [-.11, .15]	-.01 [-.14, .13]	.03 [-.11, .16]	.15* [.02, .28]	.21** [.08, .33]	.10 [-.03, .23]	.08 [-.06, .21]	.08 [-.05, .21]	.03 [-.10, .16]	-.03 [-.16, .11]	.02 [-.11, .15]	.20** [.07, .32]	.03 [-.10, .16]	-.05 [-.18, .08]	.07 [-.07, .20]	.13 [-.01, .26]	-.01 [-.14, .12]	.07 [-.06, .20]
15. p_mood_chg	.16* [.02, .28]	.08 [-.06, .21]	.08 [-.06, .21]	.11 [-.02, .24]	-.01 [-.14, .12]	-.03 [-.16, .10]	.17* [.04, .30]	.01 [-.12, .14]	.11 [-.03, .24]	.01 [-.13, .14]	-.07 [-.20, .07]	-.10 [-.23, .04]	.02 [-.11, .16]	.08 [-.06, .21]	.01 [-.12, .15]	.01 [-.12, .15]	.02 [-.12, .15]	.07 [-.07, .20]	-.06 [-.19, .08]	.09 [-.05, .22]
16. p_talk_alot	.17* [.04, .30]	.13 [-.00, .26]	.01 [-.13, .14]	.16* [.03, .29]	-.08 [-.21, .05]	-.09 [-.22, .05]	.13 [-.01, .26]	.18** [.05, .31]	.05 [-.08, .18]	-.01 [-.14, .13]	-.13 [-.26, .00]	-.01 [-.15, .12]	.24** [.11, .36]	.16* [.02, .28]	-.01 [-.14, .13]	.27** [.14, .39]	-.01 [-.14, .12]	.01 [-.13, .14]	-.05 [-.19, .08]	.26** [.14, .38]
17. p_tease_oth	.18** [.04, .30]	.19** [.06, .32]	.07 [-.06, .20]	.13 [-.00, .26]	-.12 [-.25, .01]	.07 [-.06, .20]	.19** [.06, .31]	.15* [.02, .28]	.11 [-.03, .24]	.02 [-.12, .15]	-.07 [-.20, .06]	-.08 [-.21, .05]	.15* [.02, .28]	.13* [.00, .26]	.01 [-.12, .15]	-.04 [-.17, .10]	.11 [-.02, .24]	.07 [-.06, .20]	.04 [-.09, .17]	.13 [-.01, .26]
18. p_temper	.18** [.05, .31]	.10 [-.04, .23]	.05 [-.09, .18]	.02 [-.11, .16]	.07 [-.07, .20]	.17* [.03, .29]	.28** [.15, .40]	.10 [-.03, .23]	.04 [-.10, .17]	.02 [-.11, .15]	.10 [-.03, .23]	.11 [-.03, .24]	.06 [-.08, .19]	.24** [.11, .36]	-.01 [-.15, .12]	-.01 [-.14, .12]	.05 [-.09, .18]	.19** [.06, .32]	.03 [-.10, .16]	.12 [-.01, .25]
19. p_thrtn_oth	.15* [.02, .28]	.04 [-.09, .17]	.03 [-.11, .16]	.07 [-.07, .20]	-.04 [-.17, .10]	-.05 [-.18, .09]	.09 [-.04, .22]	.01 [-.12, .15]	.03 [-.10, .16]	.08 [-.05, .21]	-.06 [-.19, .07]	.06 [-.07, .19]	-.02 [-.15, .12]	.20** [.06, .32]	.00 [-.13, .13]	.08 [-.06, .21]	.03 [-.10, .17]	.13* [.00, .26]	-.04 [-.17, .10]	.17* [.04, .30]
20. p_louder	.24** [.11, .36]	.11 [-.03, .24]	.05 [-.08, .19]	.09 [-.04, .22]	-.06 [-.19, .08]	-.09 [-.22, .04]	.14* [.01, .27]	.13 [-.00, .26]	-.02 [-.15, .12]	-.01 [-.14, .13]	-.12 [-.25, .02]	.12 [-.01, .25]	.06 [-.07, .19]	.13 [-.00, .26]	.06 [-.08, .19]	.17* [.04, .30]	.09 [-.05, .22]	.19** [.06, .31]	-.07 [-.20, .07]	.18** [.05, .31]

Note. M and *SD* are used to represent mean and standard deviation, respectively. p = parent reported, y = youth reported. T5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation.
*Indicates $p < .05$, **indicates $p < .01$.

Table 7

Means, standard deviations, and correlations of time 5 youth-reported YSR delinquency symptoms

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. y_no_gulit	0.21	0.50											
2. y_hang_trble	0.32	0.52	.05 [-.08, .18]										
3. y_lie_cheat	0.27	0.45	.13 [-.00, .25]	.32** [.20, .43]									
4. y_hang_older	0.42	0.59	.02 [-.11, .15]	.23** [.10, .35]	.10 [-.03, .23]								
5. y_run_away	0.01	0.09	.05 [-.08, .18]	.12 [-.01, .25]	.05 [-.08, .18]	-.07 [-.20, .06]							
6. y_fires	0.04	0.21	.08 [-.05, .21]	.32** [.20, .44]	.21** [.08, .33]	.14* [.01, .27]	-.02 [-.15, .11]						
7. y_steal_home	0.08	0.26	.05 [-.08, .18]	.18** [.05, .30]	.24** [.11, .36]	.08 [-.05, .21]	-.03 [-.16, .10]	.26** [.14, .38]					
8. y_steal_oth	0.01	0.09	-.04 [-.17, .09]	.12 [-.01, .25]	.05 [-.08, .18]	.01 [-.12, .14]	-.01 [-.14, .12]	-.02 [-.15, .11]	.15* [.02, .28]				
9. y_swear	0.19	0.42	.11 [-.02, .23]	.38** [.26, .48]	.21** [.08, .33]	.09 [-.04, .22]	.07 [-.06, .20]	.21** [.08, .33]	.19** [.06, .32]	.07 [-.06, .20]			
10. y_thk_sex	0.02	0.15	.06 [-.07, .19]	.14* [.01, .26]	.24** [.12, .36]	.15* [.02, .27]	-.01 [-.14, .12]	.26** [.13, .38]	.19** [.06, .31]	-.01 [-.14, .12]	.15* [.02, .27]		
11. y_skip_sch	0.02	0.13	-.06 [-.18, .08]	.05 [-.08, .18]	.07 [-.06, .20]	-.04 [-.17, .09]	-.01 [-.14, .12]	.13* [.00, .26]	.09 [-.04, .22]	-.01 [-.14, .12]	.02 [-.11, .15]	-.02 [-.15, .11]	
12. y_drugs	0.00	0.00	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Time 5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation.
*Indicates $p < .05$, **indicates $p < .01$.

Table 8

Means, standard deviations, and correlations of time 5 parent-reported CBCL delinquency symptoms

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. p_no_guilt	0.21	0.46											
2. p_hang_w_trbl	0.15	0.39	.27** [.14, .39]										
3. p_lie_cheat	0.31	0.53	.38** [.26, .49]	.36** [.24, .47]									
4. p_hang_older	0.41	0.62	.15* [.02, .28]	.19** [.06, .31]	.25** [.12, .37]								
5. p_run_away	0.01	0.10	.27** [.14, .39]	-.04 [-.17, .10]	.03 [-.10, .17]	.01 [-.12, .15]							
6. p_fires	0.02	0.13	.09 [-.05, .22]	-.05 [-.18, .08]	.05 [-.08, .18]	.02 [-.11, .15]	-.01 [-.15, .12]						
7. p_steal_home	0.05	0.24	.07 [-.06, .20]	.12 [-.02, .25]	.31** [.19, .43]	.05 [-.09, .18]	.18** [.05, .31]	-.03 [-.16, .10]					
8. p_steal_oth	0.01	0.15	-.04 [-.17, .09]	.20** [.07, .32]	.24** [.11, .36]	.14* [.00, .27]	-.01 [-.14, .12]	-.01 [-.15, .12]	.62** [.53, .69]				
9. p_swear	0.16	0.39	.08 [-.05, .21]	.30** [.18, .42]	.19** [.06, .32]	.12 [-.02, .25]	-.04 [-.17, .09]	.03 [-.10, .17]	.26** [.13, .38]	.36** [.23, .47]			
10. p_thk_sex	0.00	0.07	.12 [-.02, .25]	.32** [.20, .44]	.09 [-.04, .22]	.07 [-.07, .20]	-.01 [-.14, .13]	-.01 [-.14, .12]	-.01 [-.15, .12]	-.01 [-.14, .13]	.15* [.01, .28]		
11. p_skip_sch	0.00	0.07	.12 [-.02, .25]	.15* [.01, .28]	.09 [-.04, .22]	.18** [.04, .30]	-.01 [-.14, .13]	-.01 [-.14, .12]	-.01 [-.15, .12]	-.01 [-.14, .13]	-.03 [-.16, .11]	-.00 [-.14, .13]	
12. p_drugs	0.00	0.00	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Time 5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation.
*Indicates $p < .05$, **indicates $p < .01$.

Table 9

Correlations of time 5 youth-reported YRS and parent-reported CBCL delinquency symptoms

Variable	1. y_no_ guilt	2. y_hang_ trbl	3. y_lie_ cheat	4. y_hang_ older	5. y_run_ away	6. y_fires	7. y_steal_ home	8. y_steal_ oth	9. y_swear	10. y_thk_ sex	11. y_skip_ sch	12. y_drugs
1. p_no_guilt	-.03 [-.16, .11]	.05 [-.09, .18]	-.03 [-.16, .11]	-.14* [-.27, -.01]	-.04 [-.18, .09]	-.00 [-.14, .13]	.06 [-.07, .20]	-.04 [-.18, .09]	.05 [-.08, .19]	-.00 [-.14, .13]	.01 [-.12, .15]	NA [NA, NA]
2. p_hang_w_trbl	.05 [-.08, .19]	.38** [.25, .48]	.09 [-.05, .22]	.06 [-.07, .20]	.09 [-.05, .22]	.03 [-.10, .16]	.16* [.03, .29]	.09 [-.05, .22]	.17* [.04, .30]	-.06 [-.19, .08]	-.05 [-.18, .08]	NA [NA, NA]
3. p_lie_cheat	-.03 [-.17, .10]	.12 [-.01, .25]	.21** [.08, .34]	.09 [-.04, .22]	.03 [-.10, .17]	.08 [-.05, .21]	.10 [-.03, .23]	.22** [.09, .34]	.09 [-.05, .22]	-.03 [-.16, .10]	-.02 [-.15, .12]	NA [NA, NA]
4. p_hang_older	-.07 [-.20, .07]	.03 [-.10, .17]	.01 [-.12, .15]	.13* [.00, .26]	.09 [-.04, .22]	-.00 [-.14, .13]	.07 [-.06, .20]	.25** [.12, .37]	-.02 [-.16, .11]	-.05 [-.18, .08]	.08 [-.06, .21]	NA [NA, NA]
5. p_run_away	-.04 [-.17, .09]	-.06 [-.19, .07]	-.06 [-.19, .08]	-.07 [-.20, .07]	-.01 [-.14, .12]	-.02 [-.15, .11]	-.03 [-.16, .11]	-.01 [-.14, .12]	-.04 [-.18, .09]	-.01 [-.15, .12]	-.01 [-.15, .12]	NA [NA, NA]
6. p_fires	-.06 [-.19, .08]	.05 [-.09, .18]	.07 [-.07, .20]	.02 [-.11, .16]	-.01 [-.15, .12]	.13* [.00, .26]	.09 [-.04, .22]	-.01 [-.15, .12]	.10 [-.03, .23]	-.02 [-.15, .11]	-.02 [-.15, .11]	NA [NA, NA]
7. p_steal_home	-.01 [-.14, .12]	.16* [.03, .29]	.13 [-.01, .26]	.05 [-.08, .18]	-.02 [-.15, .11]	.05 [-.09, .18]	.46** [.34, .56]	.38** [.26, .49]	.13 [-.00, .26]	-.03 [-.16, .10]	.11 [-.02, .24]	NA [NA, NA]
8. p_steal_oth	.02 [-.11, .16]	.18** [.04, .30]	.01 [-.12, .15]	.04 [-.09, .17]	-.01 [-.14, .12]	-.02 [-.15, .11]	.32** [.20, .44]	.63** [.54, .70]	.18** [.04, .30]	-.01 [-.15, .12]	-.01 [-.15, .12]	NA [NA, NA]
9. p_swear	.04 [-.09, .18]	.27** [.14, .39]	.04 [-.09, .18]	.09 [-.05, .22]	-.04 [-.17, .09]	.02 [-.11, .16]	.20** [.07, .33]	.21** [.08, .34]	.49** [.39, .59]	-.06 [-.19, .07]	.12 [-.01, .25]	NA [NA, NA]
10. p_thk_sex	-.03 [-.16, .11]	.09 [-.05, .22]	-.04 [-.17, .09]	-.05 [-.18, .09]	-.01 [-.14, .13]	-.01 [-.15, .12]	-.02 [-.15, .11]	-.01 [-.14, .13]	.13 [-.00, .26]	-.01 [-.14, .12]	-.01 [-.14, .12]	NA [NA, NA]
11. p_skip_sch	-.03 [-.16, .11]	-.04 [-.17, .09]	-.04 [-.17, .09]	-.05 [-.18, .09]	-.01 [-.14, .13]	-.02 [-.15, .12]	-.02 [-.15, .11]	-.01 [-.14, .13]	-.03 [-.16, .10]	-.01 [-.14, .12]	-.01 [-.14, .12]	NA [NA, NA]
12. p_drugs	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]	NA [NA, NA]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Time 5 = age 11. Values in square brackets indicate the 95% confidence interval for each correlation. *Indicates $p < .05$, **indicates $p < .01$.

Table 10

Conditioned frustration growth model means, (standard errors), and model fit indices

	Frustration Growth		Externalizing Growth		Model Fit Indices		
	Intercept	Slope	Intercept	Slope	CFI	RMSEA	SRSM
All Stress	0.234**	0.000	6.014**	-0.379*	0.951	0.058	0.050
Levels	(0.020)	(0.010)	(0.474)	(0.179)			
Low Stress	0.210**	0.024[t]	4.541**	-0.355	0.957	0.058	0.054
	(0.028)	(0.014)	(0.651)	(0.227)			
High Stress	0.252**	-0.021	7.262**	-0.420			
	(0.027)	(0.015)	(0.642)	(0.263)			

Note. Fit indices are the same for the low and high group model. Models were conditioned on time 1 child effortful control and child biological sex. [t]Trending < 0.10, *p < 0.05, **p < 0.01.

Table 11

Conditioned fear growth model means, (standard errors), and model fit indices

	Fear Growth		Externalizing Growth		Model Fit Indices		
	Intercept	Slope	Intercept	Slope	CFI	RMSEA	SRSM
All Stress Levels	0.431**	0.032*	6.022**	-0.378*	0.929	0.084	0.051
	(0.037)	(0.016)	(0.474)	(0.179)			
Low Stress	0.377**	0.058*	4.546**	-0.352	0.939	0.077	0.057
	(0.051)	(0.023)	(0.652)	(0.226)			
High Stress	0.481**	0.007	7.275**	-0.424			
	(0.051)	(0.021)	(0.637)	(0.264)			

Note. Fit indices are the same for the low and high group model. Models were conditioned on time 1 child effortful control and child biological sex. *p < 0.05, **p < 0.01

Table 12

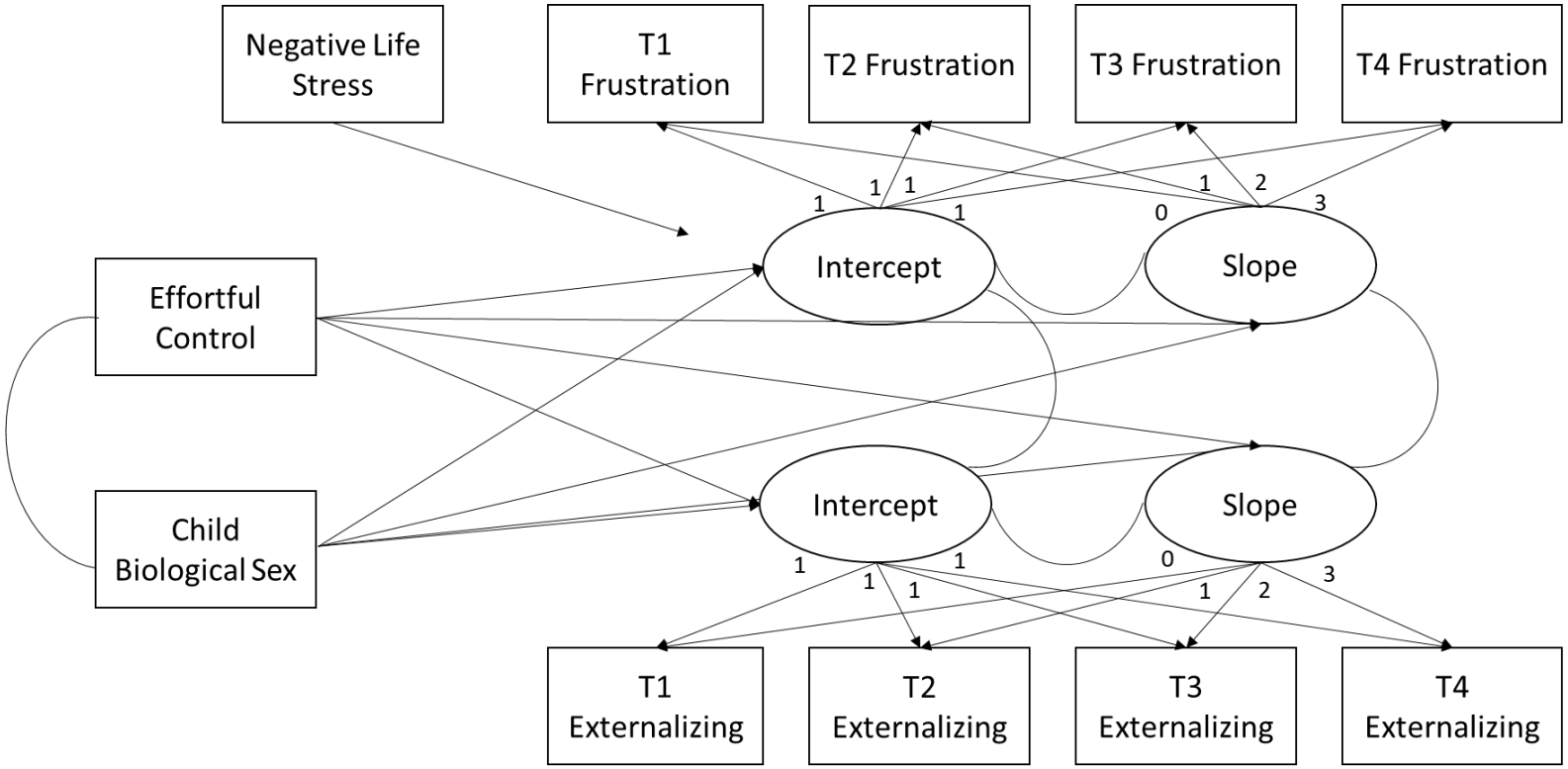
Level and slope covariances of frustration, fear, and externalizing moderated by negative life events

	Frustration				Fear			
	Low Stress		High Stress		Low Stress		High Stress	
Externalizing	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Intercept	0.082*	-0.014	-0.009	0.016	-0.035	-0.013	-0.095	0.057*
	(0.038)	(0.019)	(0.032)	(0.018)	(0.069)	(0.030)	(0.063)	(0.026)
Slope	0.013	-0.006	0.025[t]	-0.010	0.005	-0.009	0.013	0.005
	(0.013)	(0.006)	(0.013)	(0.007)	(0.023)	(0.010)	(0.025)	(0.010)

	Low Stress	High Stress	Low Stress	High Stress
Fru Intercept - Slope	-0.000	-0.000		
	(0.001)	(0.001)		
Ext Intercept – Slope	-0.077	-0.552		
(Fru model)	(0.400)	(0.419)		
Fear Intercept -			0.003	0.004
Slope			(0.003)	(0.003)
Ext Intercept – Slope			-0.075	-0.500
(Fear Model)			(0.399)	(0.414)

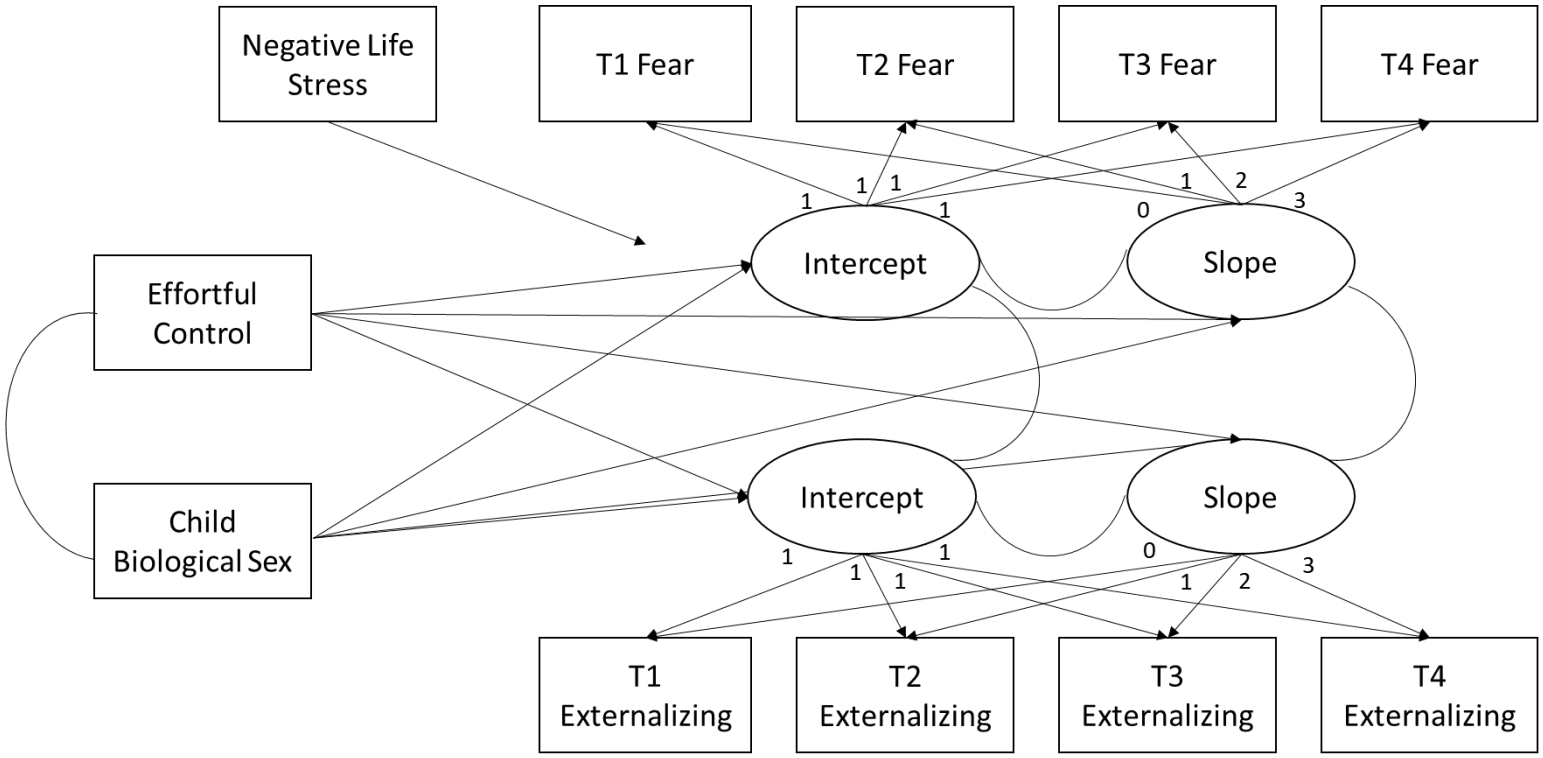
Note. [t]Trending < 0.10, *p < 0.05, **p < 0.01. Fru = frustration, Ext = externalizing, Intercept – Slope = variance.

Figure 1. Proposed model for Aim 1, Hypothesis 1 (growth in frustration and externalizing moderated by stress).



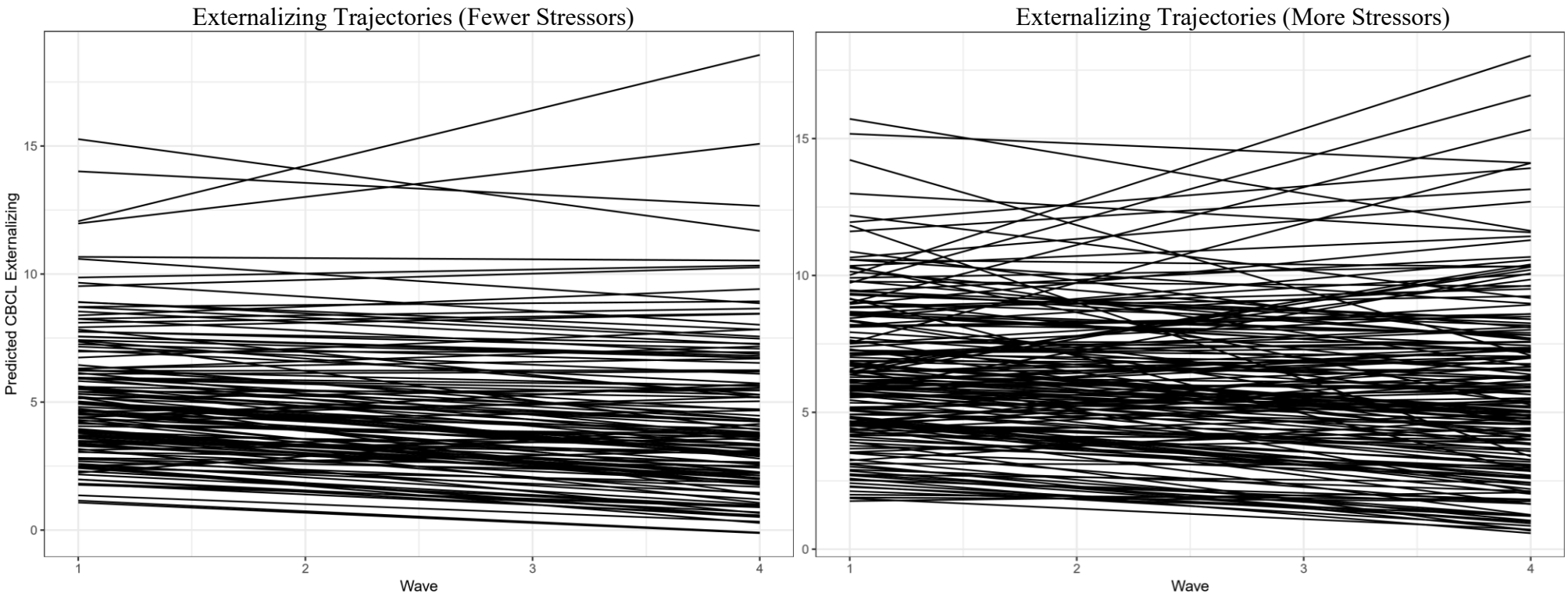
Note: T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 =age 5.25.

Figure 2. Proposed model for Aim 1, Hypothesis 2 (growth in fear and externalizing moderated by stress).



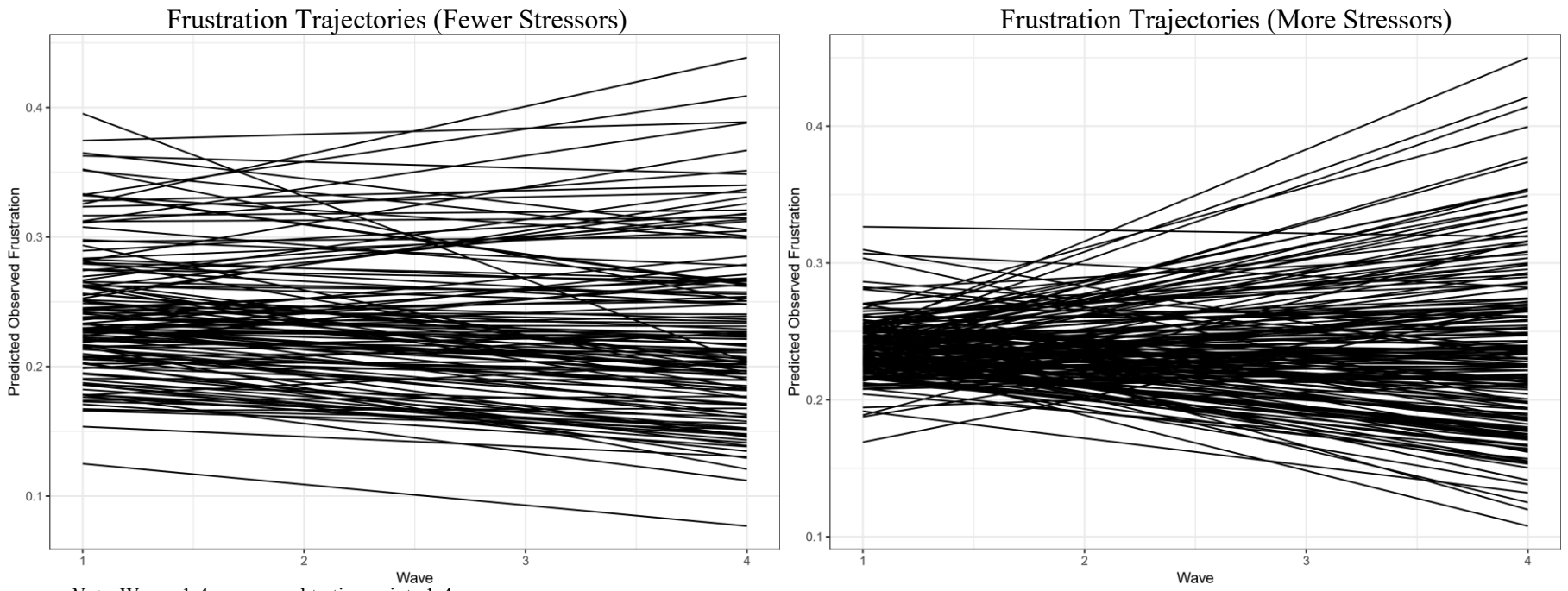
Note: T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 =age 5.25.

Figure 3. Predicted individual growth trajectories of externalizing moderated by negative life events.



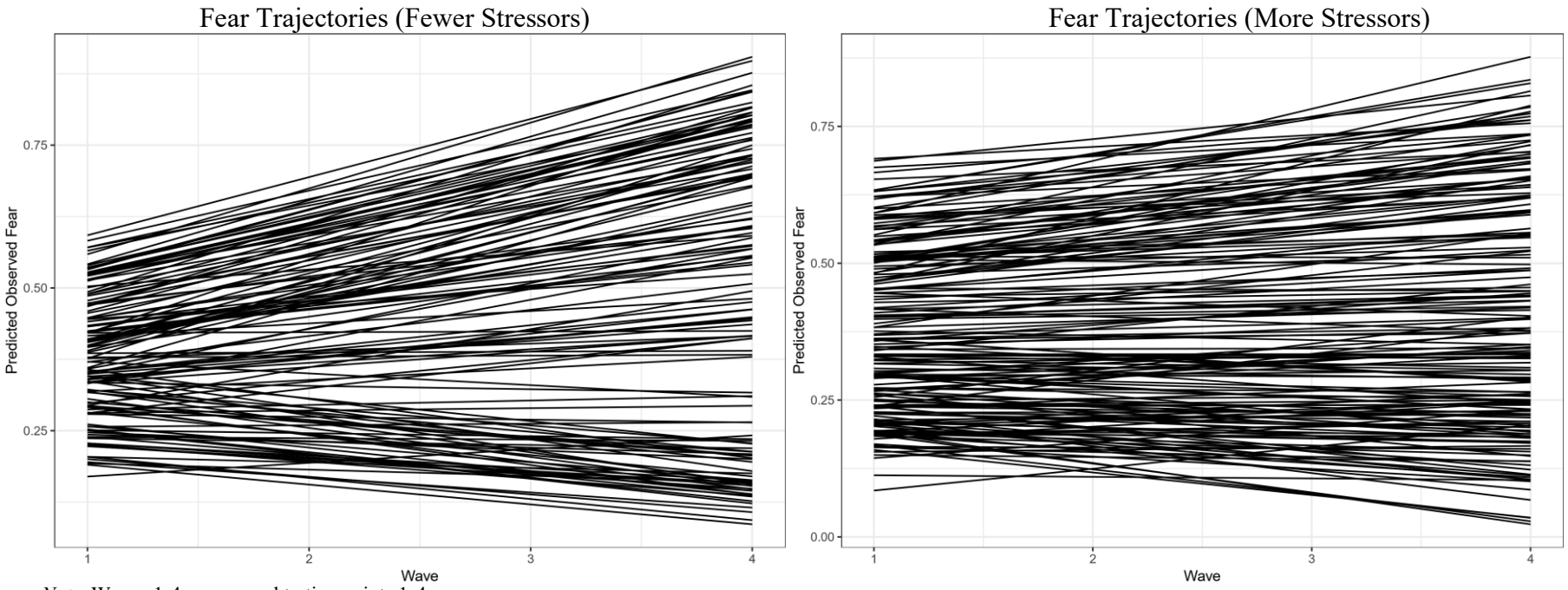
Note. Waves 1-4 correspond to timepoints 1-4.

Figure 4. Predicted individual growth trajectories of frustration moderated by negative life events.



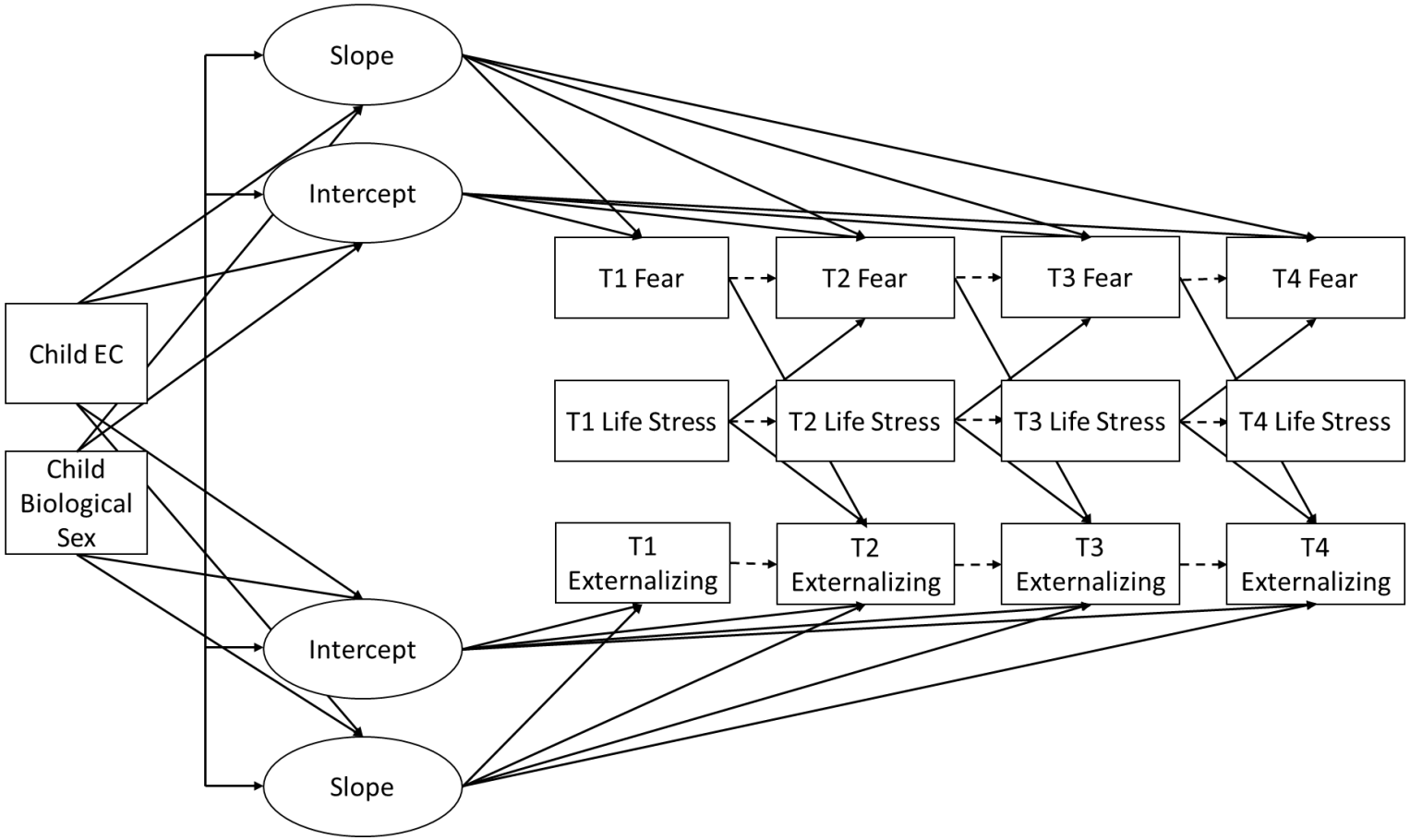
Note. Waves 1-4 correspond to timepoints 1-4.

Figure 5. Predicted individual growth trajectories of fear moderated by negative life events.



Note. Waves 1-4 correspond to timepoints 1-4.

Figure 6. Proposed model for Aim 3 (autoregressive latent trajectory model).



Note: EC = effortful control, T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 =age 5.25. Dashed lines represent autoregressive associations.

Table 13

Autoregressive Latent Trajectory Regression Estimates

Regressions	Unstandardized Estimate (B)	SE	Standardized Beta (*β*)	p
Fear Intercept				
Child Sex	0.015	0.038	0.049	0.687
Time 1 EC	-0.167	0.121	-0.157	0.167
Fear Slope				
Child Sex	-0.019	0.016	-0.239	0.221
Time 1 EC	-0.016	0.050	-0.059	0.749
Externalizing Intercept				
Child Sex	1.363[t]	0.702	0.267	0.052
Time 1 EC	-2.010	2.044	-0.116	0.325
Externalizing Slope				
Child Sex	-0.635[t]	0.364	-0.351	0.082
Time 1 EC	1.034	1.048	0.169	0.324
Time 1 Fear				
Child Sex	-0.083*	0.042	-0.143	0.049
Time 1 EC	0.086	0.124	0.044	0.489
Time 1 Externalizing				
Child Sex	-0.511	0.707	-0.073	0.470
Time 1 EC	0.356	1.988	0.015	0.858
Time 1 Negative Life Events				
Child Sex	-0.074	0.474	-0.009	0.876
Time 1 EC	-0.655	1.606	-0.023	0.683
Autoregressions				
T2 ~ T1 Fear	0.046	0.074	0.049	0.532
T3 ~ T2 Fear	-0.032	0.081	-0.032	0.693
T4 ~ T3 Fear	0.092	0.154	0.083	0.550
T2 ~ T1 Stress	0.214**	0.035	0.330	<0.001
T3 ~ T2 Stress	0.620**	0.049	0.587	<0.001

T4 ~ T3 Stress	0.438**	0.047	0.473	<0.001
T2 ~ T1 Externalizing	0.432**	0.121	0.403	<0.001
T3 ~ T2 Externalizing	0.825**	0.144	0.837	<0.001
T4 ~ T3 Externalizing	1.557**	0.281	1.431	<0.001
Regressions				
T2 Fear				
T1 Stress	0.005	0.003	0.071	0.108
T3 Fear				
T2 Stress	-0.011**	0.004	-0.107	0.009
T4 Fear				
T3 Stress	-0.008	0.005	-0.073	0.107
T2 Externalizing				
T1 Fear	-0.652	0.666	-0.051	0.328
T1 Stress	0.087*	0.038	0.097	0.021
T3 Externalizing				
T2 Fear	0.177	0.749	0.013	0.813
T2 Stress	0.096*	0.045	0.070	0.033
T4 Externalizing				
T3 Fear	-1.036	1.047	-0.071	0.323
T3 Stress	-0.025	0.064	-0.018	0.700

Note. [t]Trending *p < 0.05, **p < 0.01

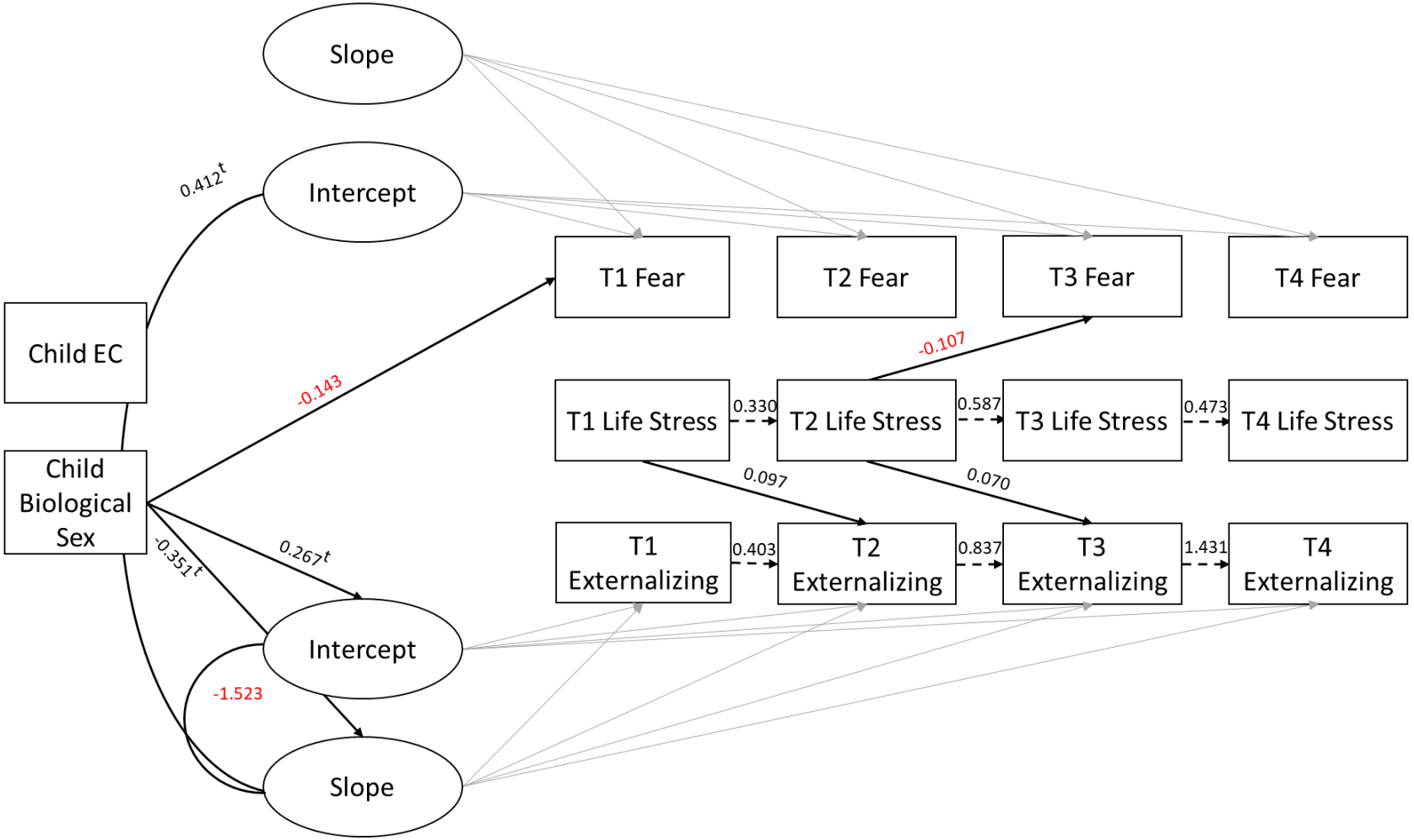
Table 14

ALT model level and slope means, variances, and covariances of fear and externalizing and model fit indices

	Fear Growth		Externalizing Growth		Model Fit Indices		
	Intercept	Slope	Intercept	Slope	CFI	RMSEA	SRSM
Mean	0.421**	0.044	5.929**	-2.956*	0.917	0.081	0.096
(SE)	(0.041)	(0.028)	(0.483)	(0.525)			
(Co)variances							
Fear Intercept	------	0.003	-0.072	0.053[t]			
		(0.003)	(0.050)	(0.029)			
Fear Slope	------	------	0.028	-0.016			
			(0.020)	(0.011)			
Ext Intercept	------	------	------	-3.099**			
				(1.041)			
Ext Slope	------	------	------	------			

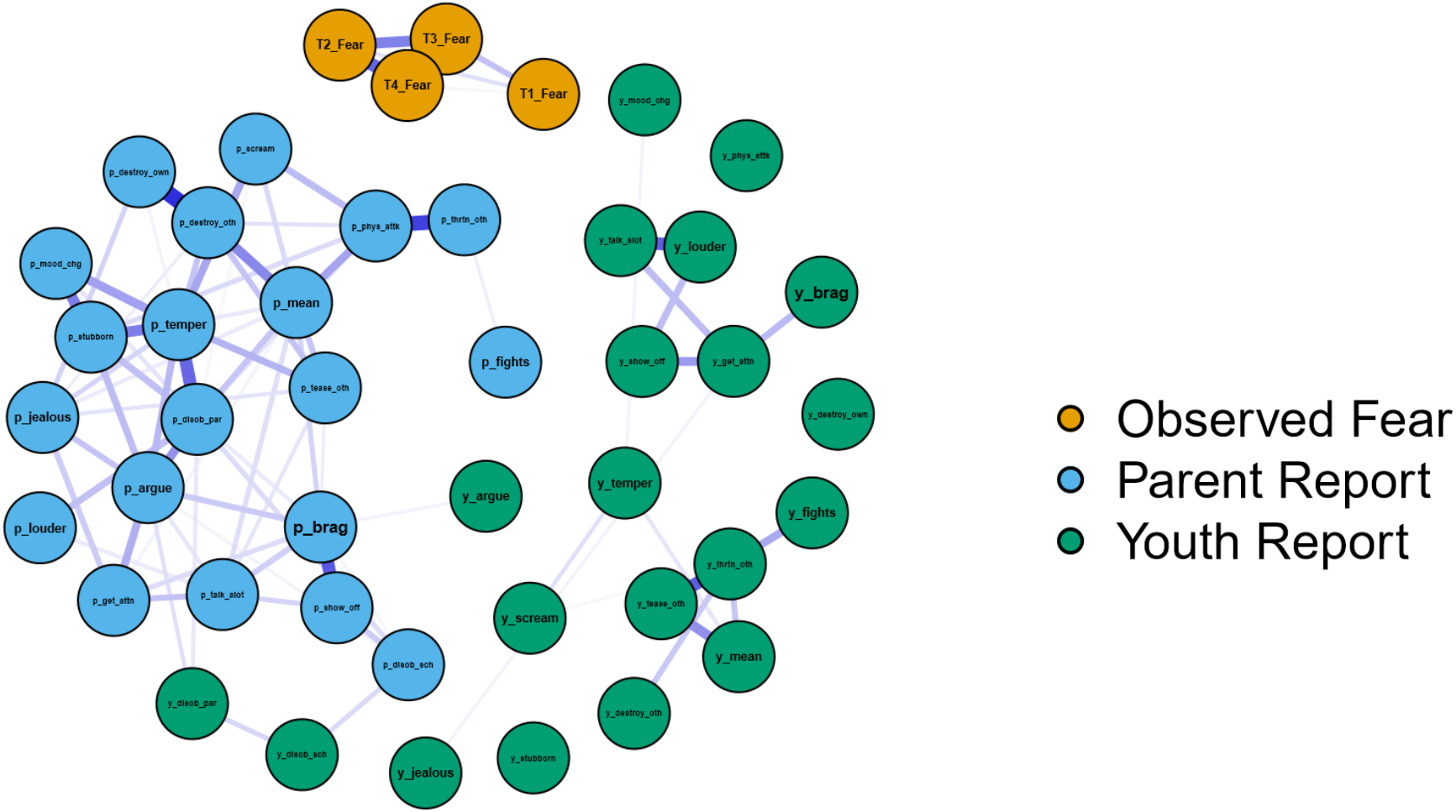
Note. [t]Trending < 0.10, *p < 0.05, **p < 0.01. Ext = externalizing.

Figure 7. Autoregressive latent trajectory growth model.



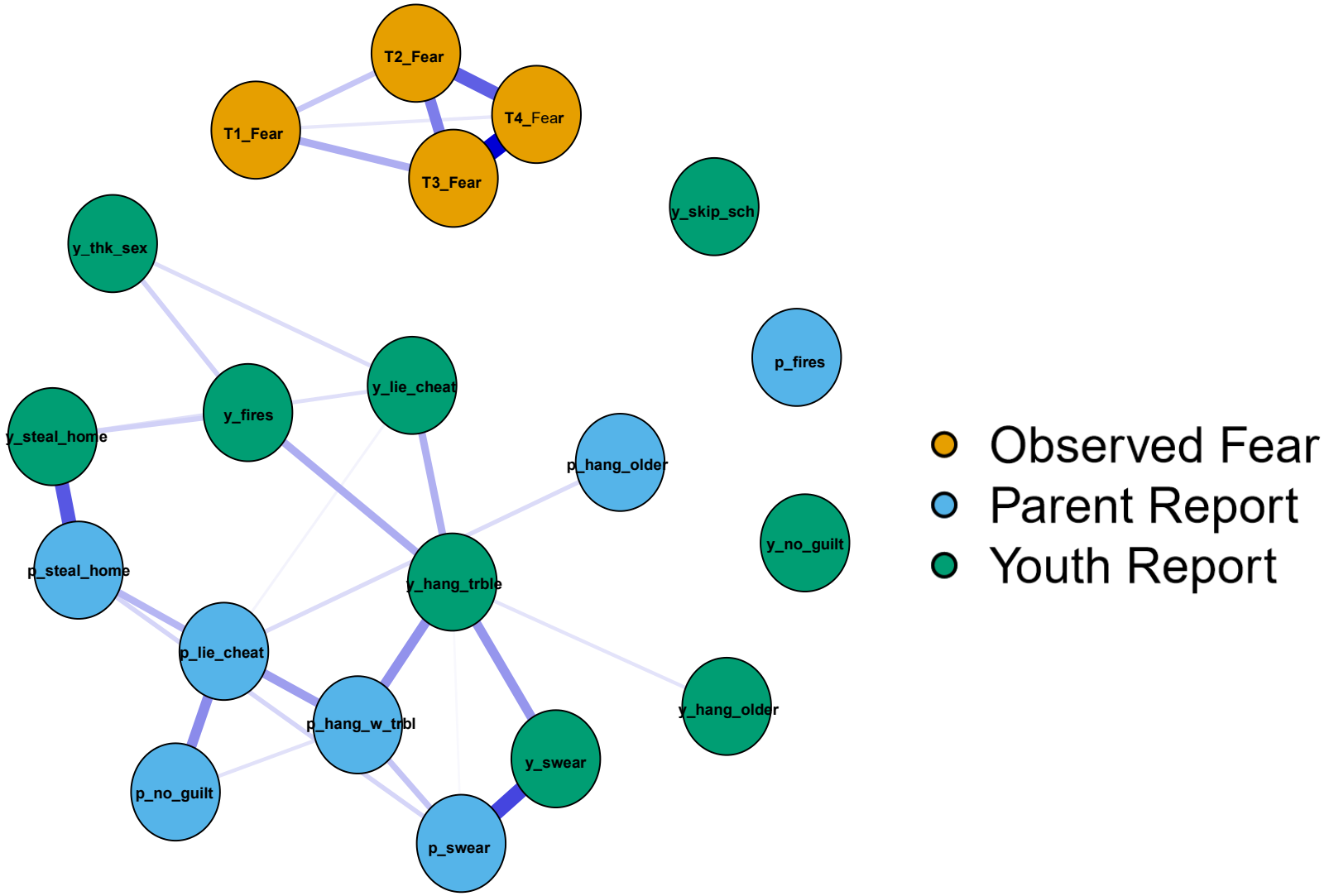
Note: EC = effortful control, T1 = age 3, T2 = age 3.75, T3 = age 4.5, T4 =age 5.25. Dashed lines represent autoregressive associations. To increase interpretability, grey lines represent relations between manifest and latent variables and black lines indicate significant relations at $p < .05$. tTrending indicates $p < .10$. Nonsignificant associations are not shown. Red text indicates negative standardized beta values and black text represents positive standardized beta values.

Figure 8. Aggression symptoms: Network analysis of observed fearfulness and parent and youth reported CBCL/YSR items



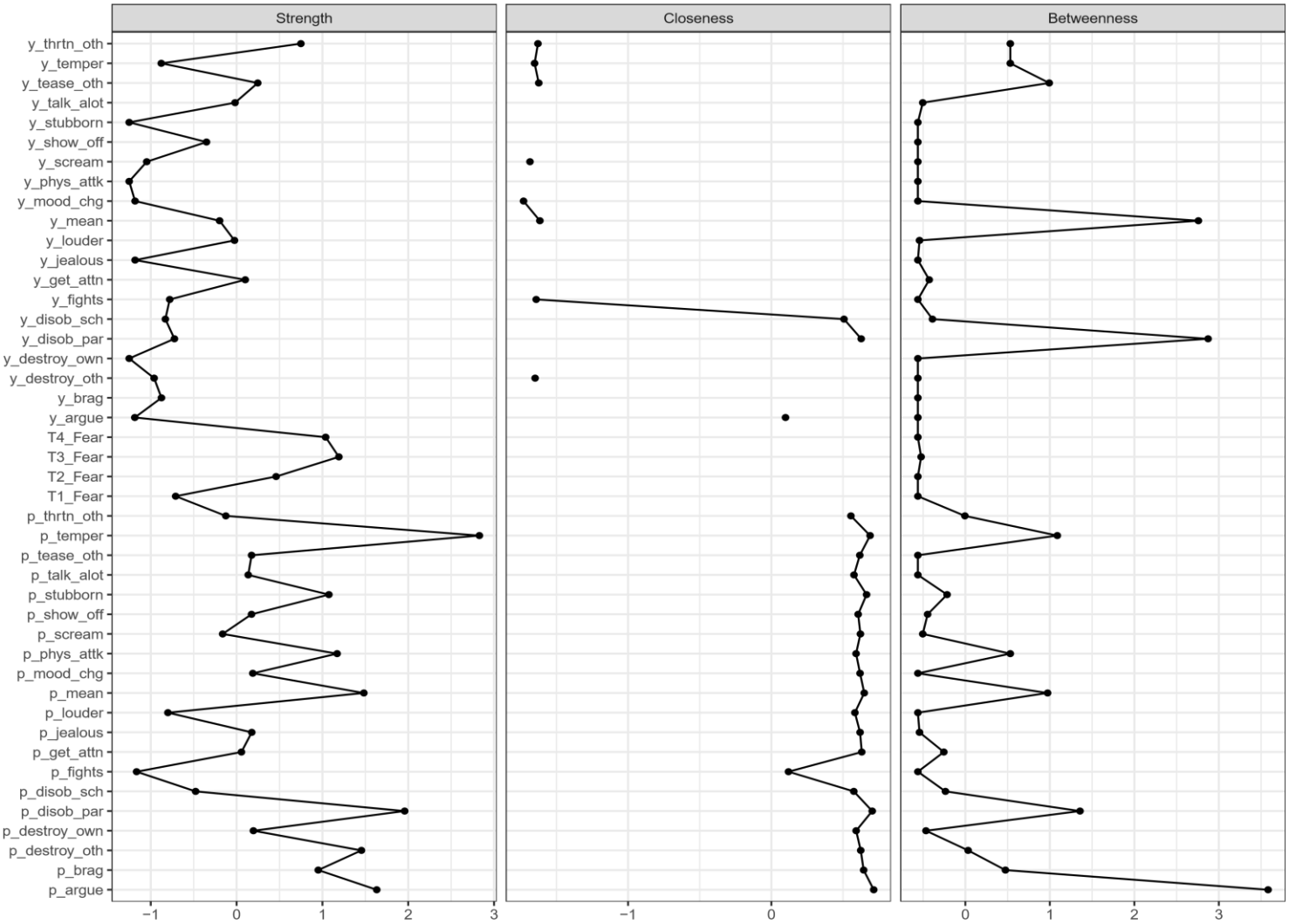
Note. Purple lines ("edges") represent positive partial correlations between items ("nodes"). The darker and thicker the lines, the greater the strength of association between items. Degree centrality is depicted as the number of direct connections an item has with other items. Closeness centrality is the distance between one item and all other items and betweenness centrality is shown as the intermediate distance one item lies in the middle of two other items.

Figure 9. Delinquency symptoms: Network analysis of observed fearfulness and parent and youth reported CBCL/YSR items



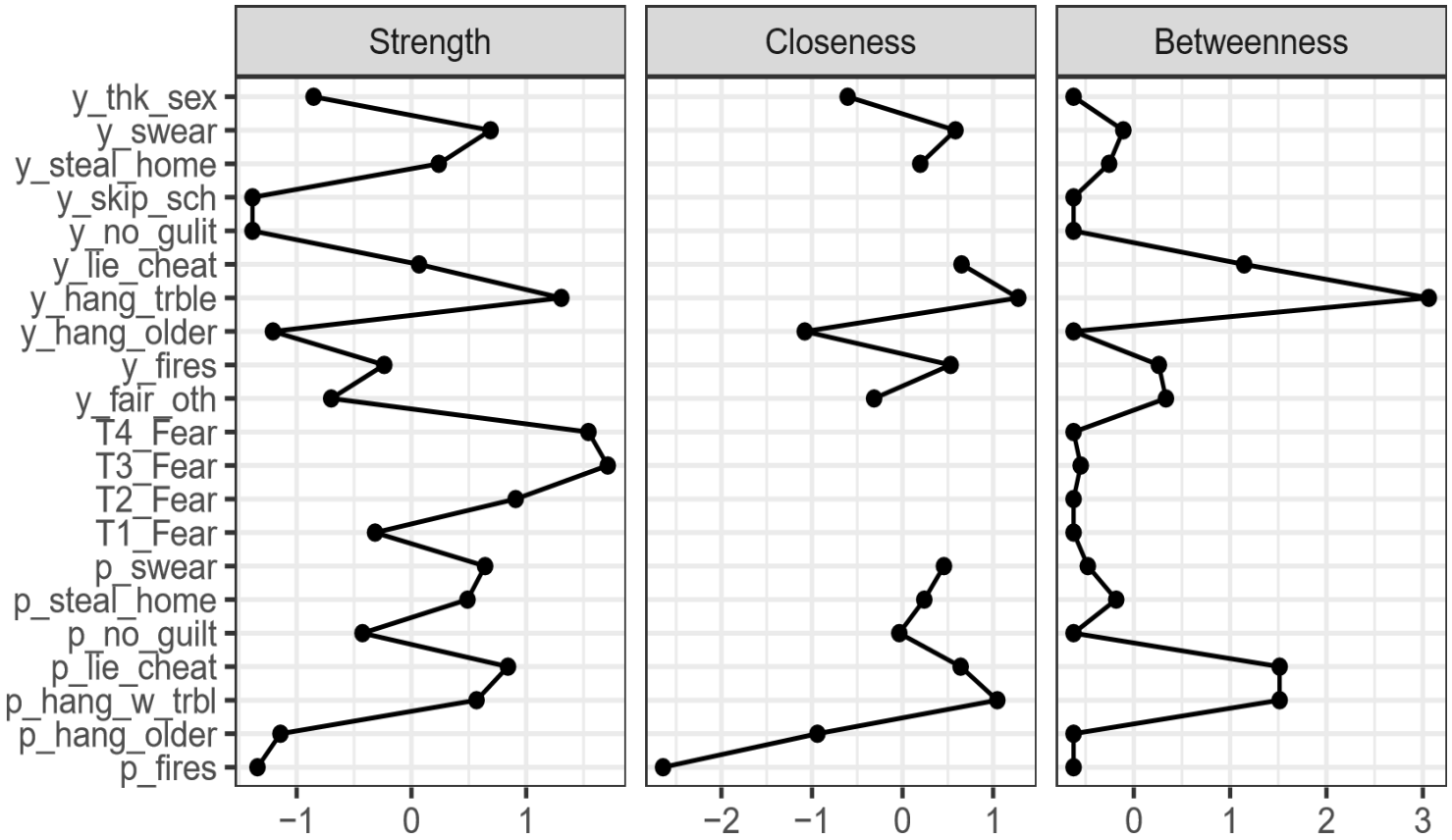
Note. Purple lines ("edges") represent positive partial correlations between items ("nodes"). The darker and thicker the lines, the greater the strength of association between items. Degree centrality is depicted as the number of direct connections an item has with other items. Closeness centrality is the distance between one item and all other items and betweenness centrality is shown as the intermediate distance one item lies in the middle of two other items.

Figure 10. Aggression symptoms: Observed fearfulness and parent and youth reported node strength, closeness, and betweenness



Note. y_ = youth reported, T1-T4 fear = observer rated, p_ = parent reported. Strength centrality is depicted as the average of the strength of associations one item has with other items. Closeness centrality is the distance between one item and all other items and betweenness centrality is shown as the intermediate distance one item lies in the middle of two other items.

Figure 11. Delinquency symptoms: Observed fearfulness and parent and youth reported node strength, closeness, and betweenness



Note. y_ = youth reported, T1-T4 fear = observer rated, p_ = parent reported. Strength centrality is depicted as the average of the strength of associations one item has with other items. Closeness centrality is the distance between one item and all other items and betweenness centrality is shown as the intermediate distance one item lies in the middle of two other items.

Appendix A

Table A1.

Conditioned fear and externalizing bivariate growth means, (standard deviations), and model fit indices controlling for or moderating by frustration

	Fear Growth				Externalizing Growth				Model Fit Indices (Change in Fit)		
	Intercept (SE)	Change (SE)	Slope (SE)	Change (SE)	Intercept (SE)	Change (SE)	Slope (SE)	Change (SE)	CFI	RMSEA	SRSM
Effects before and after controlling for frustration	0.431** (0.037)	-0.032 (+0.007)	0.032* (0.016)	+0.006 (+0.003)	6.022** (0.474)	-0.203 (+0.100)	-0.378* (0.179)	-0.221 (+0.038)	0.929 (0.000)	0.084 (-0.006)	0.051 (-0.002)
Low Frustration	0.451** (0.050)		0.016 (0.023)		5.636** (0.688)		-0.470^{t} (0.269)		.939 (-0.018)	0.077 (+0.012)	0.057 (+0.007)
High Frustration	0.369** (0.059)		0.036 (0.024)		7.133** (0.769)		-0.298 (0.279)				

Note. Red text indicates the change in estimates, standard errors, and model fit indices after controlling for frustration. Fit indices are the same for the low and high frustration group models. All models were conditioned on time 1 child effortful control and child biological sex. ^{t}Trending $p < .10$, *$p < 0.05$, **$p < 0.01$.

Table A2.

Level and slope covariances of frustration, fear, and externalizing moderated by frustration

					Fear			
	Low Frust				High Frust			
Externalizing	Intercept	Change	Slope	Change	Intercept	Change	Slope	Change
Intercept	-0.035	-0.022	-0.013	+0.046	-0.095	+0.020	0.057*	-0.028*
	(0.069)	(+0.001)	(0.030)	(+0.012)	(0.063)	(+.010)	(0.026)	(+0.003)
Slope	0.005	-0.001	-0.009	-0.002	0.013	(+0.012)	0.005	(0.000)
	(0.023)	(+0.002)	(0.010)	(+0.001)	(0.025)	(0.000)	(0.010)	(0.000)

	Low Frust	Change	High Frust	Change
Fear Intercept -	0.003	+0.002	0.004	+0.001
Slope	(0.003)	(+0.002)	(0.003)	(0.000)
Ext Intercept –	-0.075	-0.941*	-0.500	+0.877
Slope	(0.399)	(+0.077)	(0.414)	(-0.013)

Note. Change = difference in estimates when frustration is the moderator as compared to when negative life events is. * = covariance was nonsignificant in the model using frustration as the moderator. [t]Trending < 0.10, *p < 0.05, **p < 0.01. Frust = frustration, Ext = externalizing, Intercept – Slope = variance.