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Early Childhood Impulsivity and Parenting Predict Trajectories of Externalizing Psychopathology

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Abstract

Parenting is a consistent predictor of child externalizing symptoms; however, the role of caregiving variability (i.e., variation in a caregiver's parenting behaviour) is poorly understood. We examined whether characteristic parenting style and parenting variability predicted externalizing symptoms in 409 children (M_{age} = 3.43 at baseline, 208 girls). We assessed parent positive affectivity (PPA), hostility, and parenting structure at child age three using three behavioural tasks designed to vary in context, examining variability by modeling a latent difference score reflecting the range for each dimension. We assessed children's symptoms at ages three, five, eight, and 11. Lower hostility predicted fewer age three symptoms for children with lower impulsivity. Higher PPA predicted a more decreasing slope and PPA variability predicted a less decreasing slope, both specifically for children with higher impulsivity. Results demonstrate the differential roles parenting style and variability play in the development of child externalizing psychopathology.

Keywords

Developmental psychopathology, externalizing symptoms, parenting, caregiving variability, latent difference score.

Summary for Lay Audience

Externalizing psychopathology is a term that describes a pattern of aggression, rule-breaking, disinhibition, attentional problems, and/or hyperactivity. The development of these problems depends on both the child's temperament (i.e., early features of personality), and the environment in which they grew up. One important aspect of a child's environment is the parenting they received.

In this study, we collected data from children and their parent when children were three, five, eight, and 11 years old. When children were three years old, we examined parent positive affectivity (i.e., expressions of positive emotions from the parent), hostility (e.g., harsh tone, blaming the child), and parenting structure (e.g., taking charge of the situation, providing directives), across three tasks. Specifically, we wanted to examine the impact of variability in these dimensions, in other words how much the parent varies in these behaviours across the different tasks. We also examined child temperament through 12 different behavioural tasks, focusing on child impulsivity (i.e., high responding to rewards and difficulty inhibiting behaviour). At each of the follow-up timepoints, parents completed a questionnaire on their child's externalizing symptoms.

We were interested in whether parenting variability was related to children's symptoms at age three, but also in the extent to which they increased or decreased in symptoms throughout childhood. On average, children tended to decrease in externalizing symptoms as they aged. We found that lower hostility was related to fewer symptoms at age three, specifically when children were naturally high in impulsivity. Higher positive affectivity, and variability in positive affectivity, were related to a less steep decrease in symptoms over time, specifically for children high in impulsivity. We did not find any relationships between parenting structure and externalizing symptoms.

These findings demonstrate that variability in parenting shows links to child externalizing symptoms, independent of the parent's overall parenting style. Specifically, it shows that when parents are inconsistent in their displays of positive emotions, this may be detrimental to children's development and lead to more problems later on.

Co-Authorship Statement

Emma Stewart contributed to study design and completed all analyses and written work for this thesis project. Dr. Elizabeth Hayden contributed to all aspects of this thesis project including the formulation of the research question, consultation with data analysis, interpretation, and editing of the written work.

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1 Introduction

Externalizing psychopathology is the term for a broad spectrum of overt, outwardly manifested symptoms such as disinhibition, antagonism, attentional problems, and hyperactivity (Ruggero et al., 2019). Although externalizing psychopathology shows homotypic continuity (e.g., Bufferd et al., 2012; Lahey et al., 2005), its expression changes across development. For children, externalizing symptoms typically include hyperactivity, aggression, and rule breaking at home or school (Achenbach & Edelbrock, 1991; Beauchaine et al., 2017). When such behaviours are persistent, cause impairment, and are developmentally excessive, diagnoses of Attention-Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), or Conduct Disorder (CD) may be warranted. Externalizing symptoms have serious implications for youth adjustment, given that they are linked to negative outcomes including lower educational attainment, teen parenthood, and incarceration (Beauchaine et al., 2017; Kessler et al., 1995, 1997). However, externalizing behaviour is, to some degree, virtually ubiquitous in childhood and oftentimes does not persist into adolescence or adulthood (Campbell et al., 2000; Lahey et al., 2016). Understanding which children are at greatest risk for persistent externalizing problems is crucial for early identification and intervention.

Both temperamental and environmental factors contribute to the persistence of externalizing symptoms through complex, interactive processes. Child impulsivity, which refers to immediate responsiveness to rewards and low inhibition (Ahadi & Rothbart, 1994; Eisenberg et al., 2002) is a heritable and stable aspect of temperament and personality (Achenbach & Edelbrock, 1991; Ahmad & Hinshaw, 2018; Tiego et al.,

2020). Individuals with high trait impulsivity often show a preference for immediate rewards over greater delayed rewards, act without forethought, have difficulty planning, and have low self-control (Beauchaine et al., 2017). Impulsivity is a highly heritable transdiagnostic vulnerability factor for externalizing psychopathology (Ahmad & Hinshaw, 2018; Wang et al., 2016). While it is also a hallmark feature of ADHD (APA, 2013), impulsivity renders individuals vulnerable to other externalizing psychopathology throughout the lifespan (Achenbach & Edelbrock, 1991); in fact, more than half of individuals with ADHD in early childhood go on to develop more severe externalizing problems (Campbell et al., 2000). Thus, impulsivity may play an important role in driving the widespread comorbidity found in externalizing disorders (Beauchaine et al., 2017).

Trait impulsivity arises in part from differences in neural activity, specifically deficient dopamine (DA) responding in mesolimbic regions (e.g., striatum), with chronically low tonic DA thought to produce feelings of discontentment or irritability which, in turn, promote underregulated reward-seeking behaviour (Beauchaine et al., 2017). Blunted phasic mesolimbic DA responding may also interfere with the synaptic plasticity needed for associative learning, resulting in the preference for immediate rewards over larger delayed rewards (Zisner & Beauchaine, 2015). These reward processing regions are regulated by top-down signals from cortical areas, such as the orbitofrontal and dorsolateral prefrontal cortices (Heatherton & Wagner, 2011), which show extensive reciprocal connections with the mesolimbic system.

While genetic influences shape the aforementioned neural structures that predispose to impulsivity (e.g., Elia et al., 2010), the development of these systems is also

impacted by the early environment, including experiences of abuse, neglect, or nutritional deficiencies (Campbell et al., 2000; Zisner & Beauchaine, 2015). While pronounced adversities such as these are important, even more typical early environmental exposures influence child development (Rutter, 2005). For example, early normative caregiving appears to impact the pruning of cortical areas, such as the prefrontal cortex, that are important for children's development of emotion regulation (e.g., Sagvolden et al., 2005). Poor self-regulation in childhood may render children more vulnerable to parents' displays of emotion during interactions with their children, which can serve to either exacerbate or mitigate children's endogenous tendencies toward dysregulation (e.g., Patterson, 2002), thereby shaping the ways in which children respond to conflict and engage with others as they age (e.g., Snyder et al., 1994).

Parenting affect (i.e., positive and negative affect, warmth, acceptance, rejection) and control (i.e., harshness, inconsistency, physical punishment) have been studied extensively in the context of developmental psychopathology research (Kiff et al., 2011; McLeod et al., 2007). Higher parent positive affectivity (PPA) is associated with lower externalizing psychopathology in offspring (Wang et al., 2016); this association is likely mediated by children's own emotion regulation (Eisenberg et al., 2003; Eisenberg, Losoya, et al., 2001; Eisenberg, Thomson Gershoff, et al., 2001). In contrast, higher parent negative affectivity is associated with children's concurrent and later externalizing symptoms (Eisenberg, Liew, et al., 2001; Orri et al., 2019; Ramsden & Hubbard, 2016); this association may reflect causal processes given that there is some evidence that improving parents' emotion regulation can reduce child externalizing symptoms (David et al., 2014), perhaps through the impact of parent emotion regulation on child self-

regulation. In addition to parent positive and negative affectivity, hostile, or harsh, parenting, as well as parenting that is unstructured, may have their own independent negative impacts on child outcomes; for example, Xu and colleagues (2009) observed that child proactive and reactive aggression were both associated with harsh parenting practices and unstructured caregiving is related to externalizing psychopathology as well (Jacobvitz et al., 2004; Kerig, 2014; Shaffer & Sroufe, 2014). Wiggins and colleagues (2015) observed that the pattern of harsh parenting throughout childhood also impacted trajectories of child externalizing problems over time; in particular, a higher and increasing pattern of harsh parenting predicted a high and stable trajectory of externalizing symptoms.

However, developmental psychopathology is characterized by dynamic interplay between endogenous and exogenous factors such that main effects of caregiving on children's externalizing symptom development are moderated by child characteristics, including impulsivity. Specifically, children high in impulsivity may be more vulnerable to the impact of negative parenting (Kiff et al., 2011). Patterson and colleagues (2000) found that children who were hyperactive, who also had caregivers who engaged in negative discipline (e.g., explosive, inconsistent, ineffective discipline), were more likely to go on to develop more severe externalizing symptoms than those who received more effective parenting. Morris and colleagues (2002) also observed that the impact of parental hostility may be especially impactful for children low in effortful control. Overall, research suggests that children who are impulsive, sensation-seeking, or who show low emotion regulation tend to benefit the most from parenting that is high in control (Rubin et al., 1998; Stice & Gonzales, 1998; Xu et al., 2009), but also sensitive

(Bakermans-Kranenburg & Van Ijzendoorn, 2006) and not harsh (Leve et al., 2005; Xu et al., 2009).

1.1 Parenting Variability as a Predictor of Externalizing Psychopathology

Thus, ample evidence supports the role of early caregiving in children's externalizing risk (e.g., Wang et al., 2016; Xu et al., 2009), particularly in the context of children with temperamental impulsivity (Kiff et al., 2011). However, most extant research on parenting and children's externalizing psychopathology has focused on average or "typical" parenting aggregated across different contexts, despite evidence that variable or inconsistent caregiving may also play an important role in child psychopathology, including externalizing psychopathology specifically (Barry et al., 2009; Li & Lansford, 2018). For example, inconsistent discipline (Patterson, 1986; Reid et al., 1980), which includes components of parental hostility (i.e., harsh discipline) and parenting structure (i.e., the extent to which parent-child roles remain clearly defined through the use of consistent rules and discipline), has shown links to child externalizing symptoms, including aggression and attention problems (Barry et al., 2009; Lengua et al., 2000).

These associations may be particularly strong for children with high impulsivity. Neural correlates of high impulsivity in childhood may increase children's vulnerability to externalizing disorders by laying the foundation for a narrower window for learning reward contingencies (Zisner & Beauchaine, 2015); as a result, highly impulsive children benefit from frequent feedback and immediate reinforcers (Sagvolden et al., 2005). Having caregiving that is consistent and structured (i.e., low variability in caregiving)

may therefore be particularly beneficial for these children. Patterson (1986) described a model through which ineffective discipline interacts with child temperament to produce negative parent-child interactions in which child externalizing behaviour is negatively reinforced. Parents of noncompliant children may show inconsistency in structure by threatening punishment but failing to follow through (Reid et al., 1980), resulting in children becoming more difficult to discipline. In addition, consistency in discipline is an effective component of interventions for children with ADHD (Wyatt Kaminski et al., 2008); however, measures of inconsistent discipline have often relied on self-report questionnaires that combine heterogenous aspects of caregiving (i.e., parent affect and caregiving structure), making it difficult to determine which aspects of early care are most important to the ontogeny of children's externalizing symptoms.

Studies of parenting variability have also varied widely in their methodology and findings. Li and Lansford (2018) used ecological momentary assessment (EMA) to examine how parental affect varied from day to day, finding that variability in parent positive affectivity was linked to child ADHD symptoms. Burgess and colleagues (2016) examined how often mothers changed their parenting style during an interaction with their child. They found that mothers tended to be less variable in their style when children were off-task; however, mothers with depression—a risk factor for child psychopathology—were less variable overall but more variable when the child was off-task. These findings suggest that variability in parenting may be beneficial or detrimental, depending on the context. There is also evidence that in some cases, low parenting variability (i.e., rigidity) may be detrimental, although this may depend on whether it is the mother or father interacting with the child (Lunkenheimer et al., 2019). These

inconsistencies in assessing parenting variability suggest that innovative methods of assessing caregiver variability may prove useful. Standardized behavioural tasks are particularly well-suited to assessing caregiving variability, due to their ability to elicit different forms of child behaviour in contexts that are standardized across participants. They also allow for assessment of caregiving dimensions via methods that do not rely on caregiver insight (e.g.. Zaslow et al., 2006). Finally, most work on typical caregiving and variability in caregiving (e.g., Barry et al., 2009; Burgess et al., 2016) has focused solely on caregiver behaviour and has not integrated child factors, such as impulsivity, that render some children more vulnerable to inconsistent caregiving than others.

1.2 Current Study and Hypotheses

We examined how child impulsivity and early parenting impacted the trajectory of children's externalizing symptoms in early and middle childhood, a time when children typically become more cooperative and compliant (Campbell et al., 2000; Hatoum et al., 2018; Lahey et al., 2016); children for whom this normative decrease is delayed may be at especially high risk for future, more serious externalizing psychopathology (Campbell et al., 2000). Based on previous findings, we formulated the following hypotheses:

1. Given past work implicating low PPA in children's externalizing problems (Eisenberg et al., 2003; Wang et al., 2016), we hypothesized that higher caregiver PPA would predict lower initial externalizing symptoms and a steeper decline in these symptoms during middle childhood.

2. Given findings on negative discipline and harsh parenting (Wiggins et al., 2015; Xu et al., 2009), we hypothesized that higher caregiver hostility would predict higher initial externalizing symptoms and a less steep decline in these symptoms during middle childhood.

3. Given past research on parenting structure (Jacobvitz et al., 2004; Kerig, 2014; Shaffer & Sroufe, 2014), we hypothesized that higher structure in caregiving would predict lower initial externalizing symptoms and a steeper decline in these symptoms during middle childhood.

4. Based on findings that children with high impulsivity or ADHD may be more sensitive than other children to the impacts of negative parenting (Kiff et al., 2011), and that these children benefit from parenting that is sensitive, structured, and not harsh (Bakermans-Kranenburg & Van Ijzendoorn, 2006; Rubin et al., 1998; Stice & Gonzales, 1998; Xu et al., 2009), we hypothesized that all of the previously described findings would be more pronounced for children higher in impulsivity.

5. There is less research on caregiver variability and its influence on children's externalizing symptoms. Due to the mixed findings on parenting variability in general (e.g., Burgess et al., 2016; Lunkenheimer et al., 2019), and the little research done on PPA variability in particular, we did not have specific hypotheses regarding the directions of these effects. However, given the studies showing that inconsistent discipline is associated with child externalizing symptoms (Barry et al., 2009; Patterson, 1986; Reid et al., 1980), we hypothesized that higher variability in caregiver hostility and parenting

structure would both predict higher initial externalizing symptoms and a less steep decline in these symptoms during middle childhood.

We tested these research questions using a large sample of preschool-aged children who were re-assessed at ages three, five, eight, and 11. We chose this age range because is it one that typically shows a normative decrease in externalizing symptoms before conduct problems increase in adolescence. While some individuals show externalizing symptoms that are limited to adolescence, others show a persistent pattern of externalizing problems beginning in childhood (Moffitt et al., 1996); therefore, individual differences in children's trajectories of externalizing symptoms during this time may reflect risk for chronic externalizing behaviour. Children's impulsivity was assessed observationally, given that lab-based measures of impulsivity have strong predictive validity for later externalizing behaviour (e.g., Olson et al., 1999). To examine "typical" (i.e., average) parenting and variability in parenting, we used three parent-child interactions, designed to elicit a range of caregiver and child behaviours, since studies suggest that observed caregiving is a greater and more consistent predictor of children's outcomes than questionnaire measures (e.g.. Zaslow et al., 2006). Additionally, these structured observational measures of parenting are well-suited to examining a variety of parenting dimensions, as well as examining a range in each, based on differing behaviour across the tasks. In comparison to past work, we examined caregiving across a wider range of domains with potential relevance to children's externalizing symptom development, including PPA (Eisenberg et al., 2003; Eisenberg, Losoya, et al., 2001; Eisenberg, Thomson Gershoff, et al., 2001; Wang et al., 2016), parent hostility (Wiggins et al., 2015; Xu et al., 2009), parenting structure (Jacobvitz et al., 2004; Kerig, 2014;

Shaffer & Sroufe, 2014), and variability on each of these dimensions (e.g., Barry et al., 2009; Li & Lansford, 2018).

2 Method

2.1 Participants

A sample of 409 children (208 girls, M_{age} = 3.43 at Time 1) and their primary caregivers (382 mothers, 93%) completed the study. We recruited participants through a university participant pool, online advertisements, and flyers placed in local daycares, preschools, and recreational facilities in the London, Ontario area. We screened children for cognitive ability using the Peabody Picture Vocabulary Test (Dunn & Dunn, 2007), and the sample showed typical performance. We excluded children who had serious medical or psychological conditions, as determined by a trained research assistant. Our sample of children was 51% girls and 93.4% White. Data were collected at four timepoints, when children were approximately three (N = 406), five (N = 380), eight (N = 365), and 11 (N = 250) years old. This study was approved by the Western University Nonmedical Research Ethics Board.

2.2 Measures

Child Behavior Checklist (Achenbach & Edelbrock, 1991). We assessed externalizing symptoms using the externalizing problems subscale of the Child Behaviour Checklist (CBCL) as reported by the primary caregiver (93% mothers). This is a 33-item subscale that asks caregivers to rate their child's aggressive and rule-breaking behaviours (e.g., cruel to animals; breaks rules at home, school, or elsewhere) on a 3-point scale (0 = absent, 1 = occurs sometimes, 2 = occurs often). Caregiver ratings of child externalizing

symptoms were obtained at each assessment time point. Internal consistency was excellent at Times 1, 3, and 4, and acceptable at Time 2 (T1 α = .97, T2 α = .72, T3 α = .94, T4 α = .93).

Observed Parenting. We assessed parenting through three separate caregiver-child interaction tasks at age three that were video recorded for future coding by trained raters. We derived parenting dimensions and scoring guidelines from manuals for rating caregiver-child interactions (Cox & Crnic, 2003; Egeland et al., 1995; Weinfield et al., 1997). Trainees underwent a training process in which their ratings were compared to experienced "master" coders on five children's videos until achieving intraclass correlations >/=.80. We assessed inter-rater reliability for a subset of videos (15%) as an ongoing reliability check to reduce coder drift (see Table 1 for a description of coding). Reliability for each task was high (calculated on 15% of videos; three bag ICC = .86; prohibition ICC = .87; teaching task ICC = .90).

Three-Bag Task. The naturalistic "three-bag" task was based on a protocol by the National Institute of Child and Human Development (1997) and modified by Ispa et al. (2004). In this task, the primary caregiver was instructed to play with their child with three bags of toys, for a total of approximately 10 minutes. The first bag contained a book, the second contained a set of toy kitchen items, and the third bag contained a farmhouse play set. This task was completed during a home visit.

Prohibition Task. The prohibition task was designed to elicit negative child behaviour. In this task, the primary caregiver and child were presented with two boxes of toys; one box contained fun and appealing toys (e.g., a toy electric guitar), while the other

contained toys that were broken, had pieces missing, or were boring and age-inappropriate (e.g., a plastic cone, pieces for Mr. Potato Head without the head). The caregiver was instructed to prevent the child from playing with the appealing toys (three minutes). After this time, the caregiver was instructed to allow the child to play with any of the toys (six minutes). Finally, the caregiver was to instruct the child to clean up (five minutes). The instructions were provided to the caregiver on printed instruction cards to make it appear that the instructions were coming from the caregiver. This task was completed during a home visit.

Teaching Task. The teaching task was based on the Teaching Tasks battery (Egeland et al., 1995). In this task, the caregiver and child were presented with a challenging puzzle to work on together (five minutes). The experimenter provided cards, showing six different ways the puzzle could be completed. Participants were instructed to place the cards for completed puzzles at the top corner of the desk, to show how many they had completed. This task was completed during a laboratory visit, approximately two weeks prior to the home visit.

Laboratory Assessment Battery. During a 2.5-hour laboratory visit, children completed 12 tasks drawn from the Laboratory Temperament Assessment Battery (Goldsmith et al., 1995). These tasks were video recorded and rated by trained coders in the lab using the same training procedures and reliability assurance as we did for the parenting task coding.

Risk Room. The experimenter let the child into a room containing novel and ambiguous objects: a small staircase, a mattress, a balance beam, a Halloween mask, a cloth tunnel, and a large, black cardboard box. The experimenter told the child to play

with the objects “however you like,” and then left the room for five minutes. Upon returning, she asked the child to interact with each of the objects.

Tower of Patience. The child took turns with the experimenter stacking blocks to build a tower. Each time it was her turn, the experimenter waited an increasing delay before stacking her block.

Puzzle with Parent (Teaching Task). See the description of the Teaching Task above.

Stranger Approach. The experimenter left the room after saying she had to retrieve a toy, and the child was left alone. An unfamiliar male research assistant entered the room and spoke to the child, following a script while moving closer at specified intervals. The research assistant asked the child four standardized questions and then left the room. The experimenter then returned. Finally, the male research assistant returned and the experimenter introduced him as her friend.

Car Go. The child and experimenter raced remote control cars. The experimenter allowed the child to win every time.

Transparent Box. The child chose a toy and the experimenter locked it in a transparent box. The child was given a set of keys, none of which were able to open the box, and the experimenter left for several minutes. The experimenter then returned with the correct key and the child was able to access the toy.

Pop-up Snakes. The experimenter gave the child a bag which appeared to contain potato chips but actually contained coiled spring snakes. The experimenter demonstrated the trick, and then encouraged the child to use it to surprise their caregiver.

Jumping Spider. The child and experimenter were seated at a table in the centre of the room. A research assistant brought in a terrarium containing a fuzzy, black, toy spider and placed it on the table. The experimenter showed the child the spider and encouraged the child to touch it. When the child's hand was close to the spider, the experimenter manipulated the spider using an attached wire, making the spider jump. This was repeated four times, with the experimenter encouraging the child to touch the spider each time. Afterwards, the experimenter showed the child that the spider was a toy.

Snack Delay. The child was told to wait until the experimenter rang a bell before eating a bite of a snack. The experimenter waited to ring the bell, based on a series of varied delays.

Impossibly Perfect Green Circles. The child was asked to draw a perfect green circle on a large piece of paper. After each attempt, the experimenter lightly criticized the circle. After two minutes of attempts, the experimenter praised the child's circles.

Popping Bubbles. The child and experimenter played with a bubble-shooting toy for several minutes. The experimenter was enthusiastic and encouraging throughout the task.

Box Empty. The child was given a gift-wrapped box and led to believe there was an appealing toy inside. The experimenter left the child alone for brief interval to discover the box was empty. The experimenter then returned with toys and told the child she forgot to place the toys inside.

Impulsivity Coding. For each Lab-TAB episode, child impulsivity was rated on a three-point scale (low, moderate, and high) based on the child's tendency to respond and/or act without reflection. This global rating was aggregated across episodes to derive a single impulsivity score based on child behavior across the entire lab visit. The impulsivity scale showed acceptable inter-rater reliability and moderate internal consistency (ICC = .74, N = 18; α = .76, N=12).

Table 1

Parent-Child Interactions Coding Description

Dimension	Scale Type	Description	Behavioural Examples
Positive Affectivity	3-Point Rating Scale	Frequency and intensity of the caregiver expression of positive emotion	Frequently animated in interaction, consistently smiling/laughing, bodily expression of positive emotions (e.g., hugging)
Hostility	5-Point Rating Scale	Expression of anger, frustration, annoyance, discounting, or rejecting of the child	Blames child for mistakes, emphasizes child failures, frequent use of harsh/negative tone, parroting or hurtful mimicking
Poor Parenting Structure	7-Point Rating Scale	Maintaining appropriate role relationships, boundaries of who is the parent and who is the child, control, comfort/confidence in roles	Taking charge of the situation, appearing comfortable in the role as parent, providing directives, setting limits, communicating expectations

2.3 Analyses

We performed initial analyses and data cleaning using RStudio, version 1.4.1106 (RStudio Team, 2020). We used multilevel models in MPlus (Muthén & Muthén, 1998-2021) to predict child externalizing symptoms, with child age nested within participant. We treated 'participant' as a random factor and handled missing data using the maximum likelihood estimation procedure. At the within-participants level, we regressed child externalizing symptoms on participant age. At the between-participants level, parenting and temperament variables were included as predictors of externalizing symptom intercepts and slopes.

We assessed variability in parenting by calculating a latent difference score for each parenting dimension, based on each parent's highest and lowest scores from the parenting tasks. The latent difference score was used as an error-free measure of the range of caregiver behaviour across each parenting dimension. To best conceptualize range across each dimension, we used highest and lowest scores regardless of the specific task from which they came. Most caregivers showed the highest PPA in the Three-bag Task and the lowest PPA during the Teaching Task. They showed the highest hostility in the Teaching Task and the lowest hostility in the Three-bag Task. Finally, they showed the highest instances of poor parenting structure in the Prohibition Task and the lowest instances of poor parenting structure in the Three-bag Task. The number of parents whose minimum and maximum scores came from each task are found in Table 2.

Table 2

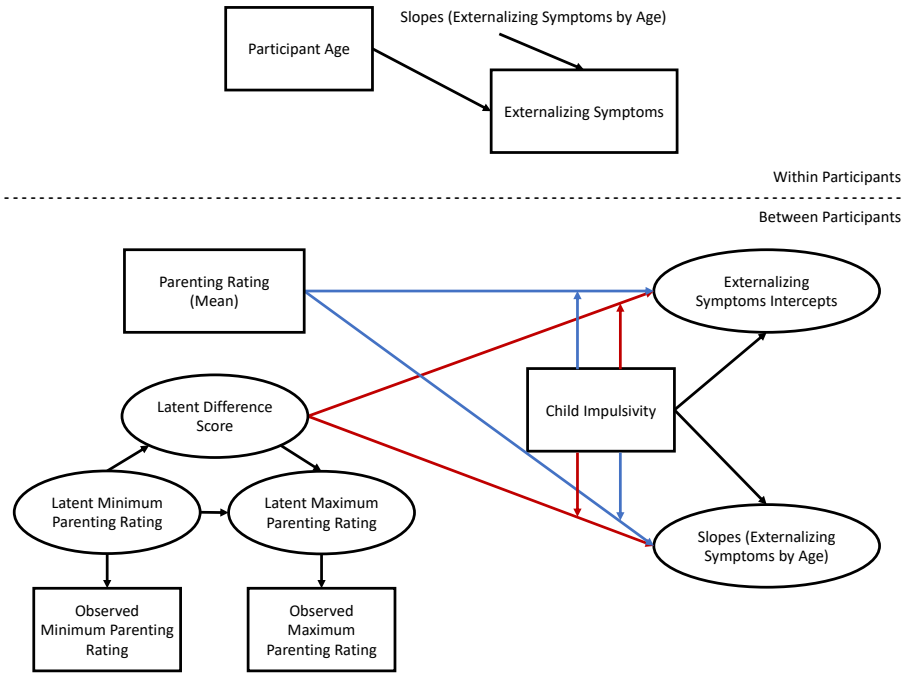
Number of Minimum and Maximum Ratings from Each Task

Parenting Dimension	Task	Caregiver Minimum Ratings from Task (N)	Caregiver Maximum Ratings from Task (N)
PPA	Three-bag Task	222	282
	Prohibition Task	228	278
	Teaching Task	307	207
Hostility	Three-bag Task	334	251
	Prohibition Task	320	267
	Teaching Task	283	308
Structure	Three-bag Task	288	198
	Prohibition Task	211	268
	Teaching Task	282	200

One child was excluded from analyses due to missing parenting ratings. One child was excluded due to the caregiver not completing the CBCL (Achenbach & Edelbrock, 1991) at any timepoint. Missing data (Time 1: N = 1; Time 2: N = 27; Time 3: N = 42; Time 4: N = 157) were due to the caregiver not completing the CBCL at one or more timepoints. We constructed multilevel models for each parenting dimension; each model included child impulsivity, the mean parenting rating on the relevant dimension, parenting variability on the relevant dimension, and the interactions between child impulsivity and each parenting measure (i.e., average and variability; Figure 1).

Figure 1

Model Testing Mean Parenting, Parenting Variability, Child Impulsivity, and their Interactions in Predicting Children's Externalizing Symptoms.



3 Results

To examine the impact of missing data, we used t-tests to compare participants who completed the CBCL at all waves of data collection to those who had missing data at one or more timepoints. These groups did not differ in child externalizing symptoms at any of the timepoints (all *p*s > .12). They also did not differ on any of the mean parenting scores, nor any of the parenting variability scores (all *p*s > .11). The groups did not differ in child age at Time 1, child sex, PPVT scores, nor child race (all *p*s > .09). Impulsivity was higher ($t(405) = 1.99$, $p = .05$) and family income was lower ($t(386) = -2.08$, $p = .04$) in those with missing data at one of more timepoints.

3.1 Correlations Between Study Variables

We first examined bivariate correlations between key study variables (Table 3).

Child externalizing symptoms at each timepoint were positively associated with all other timepoints. Impulsivity, mean parent hostility, and mean parenting structure were positively associated with child externalizing symptoms, with the exception of mean hostility and symptoms at Time 2. Parent hostility variability was associated with Time 1 symptoms only. Structure variability, child age at Time 1, PPVT score, and family income were all negatively associated with child externalizing symptoms, with the exceptions of child age at Time 1 and symptoms at Time 3, and PPVT score and symptoms at Time 2. Child impulsivity was positively associated with parent hostility, parenting structure, and hostility variability, and negatively associated with structure variability and child age at Time 1. It was also associated with child sex, with boys being higher in impulsivity than girls. Mean PPA was positively associated with PPA variability, PPVT score and family income, and negatively associated with mean parent hostility and hostility variability. Mean parent hostility was positively associated with mean structure and hostility variability, and negatively associated with PPA variability, parenting structure variability, child age at Time 1, PPVT score and family income. Mean parenting structure was positively associated with hostility variability, and negatively associated with structure variability, child age at Time 1, and PPVT score. PPA variability was positively associated with PPVT score and family income, and negatively associated with both parent hostility variability and parenting structure variability. Parent hostility variability was negatively associated with parenting structure variability, child age at Time 1, PPVT score, and family income. Finally, parenting structure variability was positively associated with child age at Time 1, PPVT score, and family income.

Table 3

Means, Standard Deviations, and Correlations Between Key Variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. CBCL EXT Time 1	7.50	5.78														
2. CBCL EXT Time 2	6.36	5.75	**.60****													
3. CBCL EXT Time 3	5.46	6.07	**.46****	**.62****												
4. CBCL EXT Time 4	5.42	6.15	**.47****	**.63****	**.70****											
5. Impulsivity	0.79	0.33	**.17****	**.24****	**.17****	**.22****										
6. PPA (Mean)	1.99	0.48	-.08	-.04	-.09	-.10	-.06									
7. Hostility (Mean)	1.38	0.54	**.18****	.07	**.12***	**.12***	**.26****	**-.34****								
8. Poor Structure (Mean)	1.84	0.83	**.19****	**.24****	**.19****	**.18****	**.32****	-.03	**.25****							
9. PPA (Variability)	0.81	0.13	-.09	.03	.08	.12	-.06	**.90****	**-.35****	.01						
10. Hostility (Variability)	0.76	0.92	**.11***	.08	.08	.11	**.26****	**-.33****	**.84****	**.19****	**-.33****					
11. Poor Structure (Variability)	1.49	0.05	**-.34****	**-.50****	**-.61****	**-.66****	**-.25****	.09	**-.21****	**-.81****	**-.12***	**-.16****				
12. Child Age Time 1	3.43	0.30	**-.12***	**-.21****	-.02	**-.17****	**-.11***	.01	**-.11***	**-.12***	-.01	**-.11***	**.13****			

13. Sex of Child	1.51	0.50	.03	-.07	-.06	-.07	**-.35****	-.00	-.05	-.09	.02	-.09	.09	.06		
14. PPVT	112.00	14.05	**-.10***	-.10	**-.11***	**-.23****	-.10	**.14****	**-.19****	**-.23****	**.12***	**-.14****	**.23****	.05	.06	
15. Family Income	3.73	1.14	**-.21****	**-.27****	**-.21****	**-.25****	-.02	**.20****	**-.19****	-.00	**.12***	**-.14****	.14**	.06	-.02	**.11***

Note. * $p < .05$, ** $p < .01$.

M and *SD* are used to represent mean and standard deviation, respectively.

CBCL = Child Behavior Checklist. EXT = externalizing subscale.

PPA = parent positive affectivity.

PPVT = Peabody Picture Vocabulary Test (Dunn & Dunn, 2007).

Sex was dummy coded (boys = 0, girls = 1).

Family income binned: 1 = "<$20,000," 2 = "20,000-40,000," 3 = "40,001-70,000," 4 = "70,001-100,000," 5 = ">100,000."

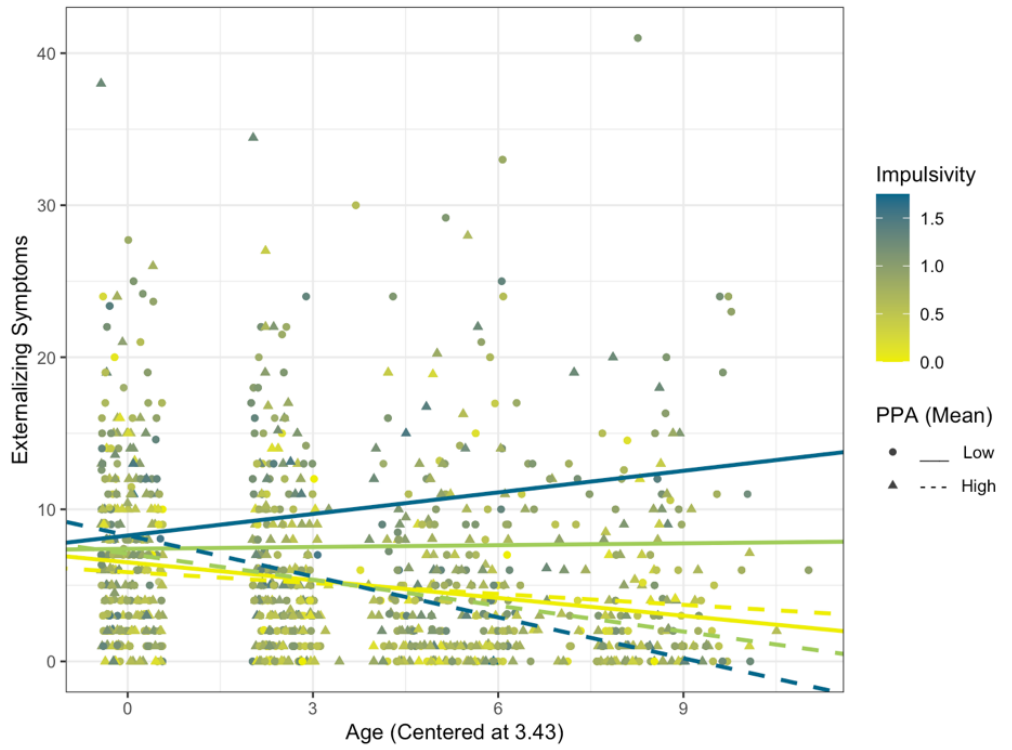
3.2 Multilevel Models

Results from the multilevel models are in Table 4.

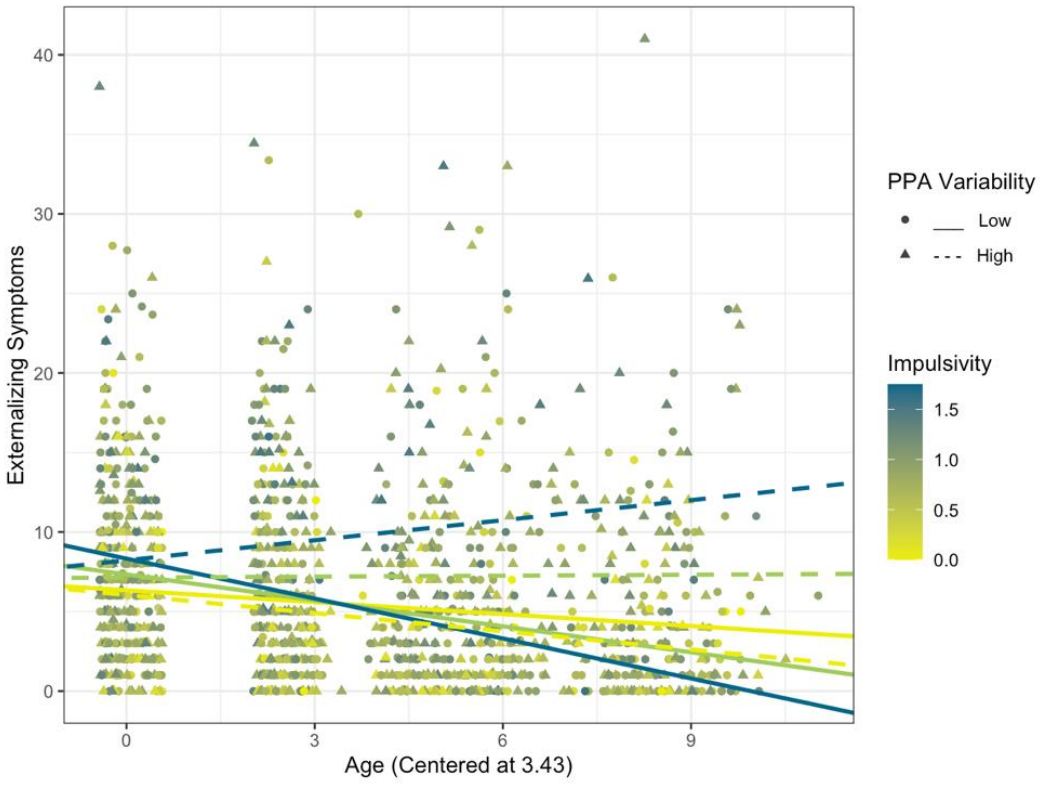
Parent Positive Affectivity. Child impulsivity did not predict child externalizing symptoms at age three, $B = 2.18$, $p = .83$, in the model with PPA. Neither mean PPA, $B = -0.34$, $p = .80$, nor its interaction with impulsivity, $B = 1.03$, $p = .79$, predicted child externalizing symptoms at age three. Finally, neither variability in PPA, $B = -0.75$, $p = .88$, nor its interaction with impulsivity, $B = 1.10$, $p = .94$, predicted child externalizing symptoms at age three. Child impulsivity predicted change in externalizing symptoms, $B = -6.24$, $p = .001$; the negative slope value indicates that children with higher impulsivity at age three showed a greater decrease in child externalizing symptoms over time. Both mean PPA, $B = -0.64$, $p = .001$, and its interaction with impulsivity, $B = -2.41$, $p < .001$, predicted change in child externalizing symptoms, such that mean PPA had a greater impact for children with higher impulsivity, with higher PPA predicting a more negative slope (Figure 2A). Finally, both variability in PPA, $B = 2.14$, $p = .006$, and its interaction with impulsivity, $B = 7.90$, $p = .001$, predicted change in child externalizing symptoms (Figure 2B). In this model, PPA variability had a greater impact for children with higher impulsivity, with lower variability predicting a more negative slope.

Figure 2

Mean PPA, PPA Variability, and Child Impulsivity Predict Child Externalizing Symptoms


Externalizing Symptoms
40
30
20
10
0
0
3
6
9
Age (Centered at 3.43)
Impulsivity
1.5
1.0
0.5
0.0
PPA (Mean)
Low
High

A


Externalizing Symptoms
40
30
20
10
0
0
3
6
9
Age (Centered at 3.43)
PPA Variability
Low
High
Impulsivity
1.5
1.0
0.5
0.0

B

Note. Mean PPA (A) and PPA variability (B) both interact with child impulsivity to predict the trajectory of child externalizing symptoms. Higher PPA and lower variability predicted a more negative slope, particularly for children with higher impulsivity.

Parent Hostility. Child impulsivity did not predict child externalizing symptoms at age three, $B = 0.78$, $p = .62$. Both mean hostility, $B = 2.79$, $p = .005$, and its interaction with impulsivity, $B = -6.89$, $p = .02$, predicted child externalizing symptoms at age three, with lower hostility predicting fewer symptoms, specifically for children with low to moderate impulsivity. Neither variability in parent hostility, $B = -1.01$, $p = .07$, nor its interaction with impulsivity, $B = 2.77$, $p = .10$, predicted child externalizing symptoms at age three. Child impulsivity did not predict change in externalizing symptoms, $B = 0.49$, $p = .05$. Neither mean hostility, $B = -0.24$, $p = .12$, nor its interaction with impulsivity, $B = 0.75$, $p = .13$, predicted change in child externalizing symptoms. Finally, neither variability in parent hostility, $B = 0.14$, $p = .12$, nor its interaction with impulsivity, $B = -0.47$, $p = .08$, predicted change in child externalizing symptoms.

Parenting Structure. Child impulsivity did not predict child externalizing symptoms at age three, $B = 4.11$, p = .07. Neither mean poor parenting structure, $B = -0.10$, $p = .89$, nor its interaction with impulsivity, $B = 3.12$, $p = .09$, predicted child externalizing symptoms at age three. Finally, neither variability in parenting structure, $B = 0.81$, $p = .08$, nor its interaction with impulsivity, $B = -1.23$, $p = .37$, predicted child externalizing symptoms at age three. Child impulsivity did not predict change in externalizing symptoms, $B = -0.02$, $p = .96$. Neither mean poor parenting structure, $B = 0.06$, $p = .56$, nor its interaction with impulsivity, $B = -0.12$, $p = .71$, predicted change in child symptoms. Finally, neither variability in parenting structure, $B = -0.07$, $p = .38$, nor

its interaction with impulsivity, $B = 0.10$, $p = .68$, predicted change in child externalizing symptoms.

Table 4

Mean Parenting, Parenting Variability, and Impulsivity Predict Child Externalizing Symptoms

Model Parameters	Positive Affectivity	Hostility	Poor Parenting Structure
Between-Subjects Fixed Effects: Coefficients (p-values)			
Impulsivity (γ_{11})	2.28 (.83)	0.78 (.62)	3.65 (.11)
Mean Parenting (γ_{01})	-0.34 (.80)	**2.79 (.005)****	0.27 (.69)
Mean Parenting x Impulsivity (γ_{21})	1.03 (.79)	**-6.89 (.02)***	2.47 (.18)
Parenting Difference Score (γ_{31})	-0.75 (.88)	-1.01 (.07)	0.56 (.23)
Parenting Difference Score x Impulsivity (γ_{41})	1.10 (.94)	2.77 (.10)	-0.92 (.50)
Impulsivity x Age (γ_{61})	**-6.24 (.001)****	0.49 (.05)	-0.02 (.97)
Mean Parenting x Age (γ_{51})	**-0.64 (.001)****	-0.24 (.12)	0.01 (.92)
Mean Parenting x Impulsivity x Age (γ_{71})	**-2.41 (.000)*****	0.75 (.13)	-0.02 (.96)
Parenting Difference Score x Age (γ_{81})	**2.14 (.006)****	0.14 (.12)	-0.02 (.77)
Parenting Difference Score x Impulsivity x Age (γ_{91})	**7.90 (.001)****	-0.47 (.08)	0.10 (.69)

Note. † p < .10, * p < .05, ** p < .01, *** p < .001

4 Discussion

Parenting variability, and its interactions with child temperament, may be important predictors of child outcomes (Barry et al., 2009; Lengua et al., 2000), in addition to "typical" or mean parenting. While links between parenting styles and children's externalizing psychopathology have been well-established (Beauchaine et al., 2010; Patterson, 1986), few studies have examined variability in parenting, and no study, to our knowledge, has examined the impact of variation in key parenting dimensions (positive affectivity, hostility, and parenting structure) on the trajectory of externalizing symptoms throughout childhood. In addition, few studies have examined how the impact of caregiving variability might differ for children who vary in impulsivity. We observed that parent hostility predicted concurrent child externalizing symptoms, particularly for children with low impulsivity. Additionally, both mean PPA and PPA variability predicted change in child externalizing symptoms over time, particularly for children high in impulsivity.

In the first model, we found that neither impulsivity, mean PPA, PPA variability, nor the interactions between each parenting variable and impulsivity predicted child externalizing symptoms at age three. The finding that mean PPA did not predict child symptoms was somewhat surprising, given that previous studies have found a link between parental affect and concurrent child externalizing symptoms (e.g., Lengua et al., 2000); however, many of these used a measure that combined both positive and negative parent affectivity, which may have impacted the findings. The finding that mean parenting PPA and its interaction with child impulsivity predicted change in children's symptoms over time is consistent with findings that parent positive affect (e.g., warmth

and acceptance) in early childhood predicts fewer child externalizing symptoms at later timepoints (e.g., Wang et al., 2016), and that children high in impulsivity benefit most from parenting that is sensitive (Bakermans-Kranenburg & Van Ijzendoorn, 2006). The current study adds to this literature by demonstrating that it is not only mean PPA, but also variability in PPA, that impacts the trajectory of symptoms throughout childhood.

In the second model, we found that mean parent hostility, and its interaction with impulsivity, predicted concurrent child externalizing symptoms. This is consistent with prior literature demonstrating that parental control, including harshness and physical punishment, has a negative impact on child outcomes (Kiff et al., 2011; McLeod et al., 2007). It was somewhat surprising that parent hostility had the greatest impact on children with low impulsivity, since previous research has demonstrated that children with high impulsivity in particular benefit from parenting that is less harsh (Leve et al., 2005; Xu et al., 2009); however, these studies first assessed children later than age three, so it is possible that the coercive interactions producing this interaction (Patterson, 1986) had not yet taken place at our first timepoint. Additionally, these studies did not account for hostility variability, so it is possible that parent hostility has the greatest impact on children with lower impulsivity when it is not confounded by the effect of variability.

In the third model, we did not observe any relationships between parenting structure and child externalizing symptoms. This was somewhat surprising, given the many findings that children, particularly those high in impulsivity, benefit from consistency in discipline (e.g., Barry et al., 2009; Lengua et al., 2000); however, it is possible that prior findings confounded hostility and inconsistency in discipline, such that harsh or hostile parenting was driving these effects. Overall, parenting structure did not

appear to influence child outcomes as much as PPA and hostility, regardless of child impulsivity.

Findings of this study contribute to the large literature establishing linkages between aggregate caregiving and child outcomes by demonstrating that parenting variability is a unique predictor of child externalizing symptoms. In addition, our findings indicate that certain dimensions (i.e., hostility) may have a greater impact on concurrent child symptoms, while others (i.e., PPA) may primarily impact symptom trajectories over time. These findings likely have important implications for determining targets of treatment in parent-focused interventions. It would be beneficial for future research to explore mediators through which these dimensions impact children's externalizing behaviour, such as child emotion regulation (Eisenberg et al., 2003; Eisenberg, Losoya, et al., 2001; Eisenberg, Thomson Gershoff, et al., 2001), child executive functioning and effortful control (Belsky et al., 2007; Sulik et al., 2015), or neural functioning associated with reward contingency learning (Sagvolden et al., 2005; Zisner & Beauchaine, 2015).

While most previous studies on parenting variability and child development have focused on discipline (e.g., Kaiser et al., 2011), our findings indicate that variability in parent emotionality is an important contributor to shaping children's development. These findings also show the importance of variability in positive dimensions of parenting in addition to consistency in harmful parenting practices. Future research should integrate examinations of other positive dimensions of parenting (e.g., warmth, sensitivity) which have shown links to externalizing symptoms (e.g., Bakermans-Kranenburg & Van Ijzendoorn, 2006) to determine whether variability in these behaviours is also protective against child externalizing problems.

In addition, future studies should examine the importance of parenting variability for other aspects of child psychopathology. While parenting is an important contributor to child externalizing psychopathology, it can also impact other outcomes; parent behaviour control (Caron et al., 2006), negative discipline and deficient monitoring (Burstein et al., 2006), maternal criticism and lack of warmth (Suor et al., 2021), and psychological aggression and greater use of discipline (Kuckertz et al., 2018) all show associations with child internalizing psychopathology. Therefore, variability in these behaviours may be unique predictors of child internalizing symptoms as well.

The current study focused on the child's primary caregiver, and the vast majority of primary caregivers in the study were mothers; however, different parenting practices may be beneficial depending on which parent is displaying them; there is some evidence that the impact of parenting variability also differs depending on whether it is displayed by mothers or fathers (Gryczkowski et al., 2010; Lunkenheimer et al., 2019). For example, Lunkenheimer and colleagues (2019) observed an interaction whereby positive affect and dyadic flexibility interacted to produce fewer child externalizing problems; however, the main effects differed, with only father flexibility being beneficial. This may also interact with the sex of the child. Gryczkowski and colleagues (2010) found that while parental involvement only had a significant impact for fathers and their sons, positive parenting only had an impact for mothers and their sons, poor monitoring only impacted girls but did not differ between parents, and inconsistent discipline only had an impact when exhibited by mothers. Therefore, it may be useful to examine different dimensions when assessing variability in fathers, such as paternal involvement and poor monitoring. Future work could use similar statistical methods (i.e., latent difference

score) to obtain an overall range of parenting behaviour the child is exposed to, for each parenting dimension.

While our findings indicate that early parenting variability predicts externalizing symptoms in later childhood, there are changes in the display of externalizing behaviours when an individual reaches adolescence; while aggression tends to decrease, status violations become more prevalent and diagnoses of conduct disorder increase (Bongers et al., 2004; Maughan et al., 2004). This is also a time of life when peer relationships become particularly important, and in many cases, externalizing psychopathology (e.g., conduct disorder) can be greatly influenced by an individual's peer relationships (e.g., Kendler et al., 2008). While some studies have shown that inconsistent discipline is related to externalizing behaviour in adolescents (Edens et al., 2008; Halgunseth et al., 2013), it may prove useful for future studies to examine a broader range of parenting variables to determine whether parenting variability is important in predicting adolescent externalizing behaviour.

4.1 Strengths and Weaknesses

This study had several strengths, most notably its longitudinal design with good retention across four waves of data collection. Most previous studies examining parenting have used concurrent measures or one follow-up timepoint (e.g., Lengua et al., 2000; Wang et al., 2016); however, the four waves of data collection allowed for a more precise measure of children's trajectories of child externalizing psychopathology. In particular, by using a multilevel model that included random intercepts and slopes, we were able to separately examine the impact of parenting on concurrent child externalizing symptoms, and the change in symptoms throughout childhood.

Another strength was the novel method for modelling parenting variability; we collected ratings for three different parent-child interaction tasks, to capture variability across time and context. We then took each parent's highest and lowest ratings across the tasks, on each parenting dimension. This allowed us to examine the overall range for each individual in each parenting dimension, even if the task from which the highest and lowest ratings came differed between dimensions. The use of a latent difference score in the models allowed for a measure of the range in parenting scores that is reliable and less likely to introduce bias (King et al., 2006). However, it would be beneficial for future work to include more parenting tasks for a more accurate measure of each parent's variability. In addition, it would be interesting to separate variability across time and across contexts, by having similar tasks performed at multiple timepoints.

Additionally, we used observational measures of parenting and child impulsivity, in the lab or at participants' homes. The use of independent, observational measures allowed for a more objective assessment of behaviour that not confounded by factors that may bias parent-report measures, such as parent mood state or history of psychopathology (Olino & Hayden, 2018). However, there is a possibility that parents and children behave differently when they know they are being observed and recorded such that their behaviour while under observation may differ from that in the home or other contexts.

Finally, while we conceptualized caregiving as an environmental variable in the current study, as have others (e.g., Bakermans-Kranenburg & Van Ijzendoorn, 2006; Morris et al., 2002; Wiggins et al., 2015; Xu et al., 2009), parents' own individual differences contribute to their caregiving, including parent impulsivity and self-control

(e.g., Latzman et al., 2009; Verhoeven et al., 2007); thus, a more complete model of relationships between caregiving and individual difference factors in families would need to account for person/parent-environment correlations.

4.2 Conclusions

The current study demonstrates the importance of caregiver consistency in predicting child psychopathology, in addition to average measures of parenting. In addition, the impact of parenting variability seems to depend on the parenting dimension examined. The current study indicates that both PPA and variability in PPA are particularly important predictors of the trajectory of externalizing symptoms throughout childhood. On the other hand, mean parent hostility impacts concurrent child externalizing symptoms. Therefore, parenting interventions that target caregiver displays of PPA and PPA variability may have particularly long-lasting effects on child externalizing psychopathology. This topic has many avenues for future research; these include examining other dimensions of parenting and other child outcomes, examining whether parenting variability continues to impact children in adolescence, and whether mother and father variability have differential impacts on child externalizing psychopathology.

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Appendices

Appendix A: Research Ethics and Approval Numbers

Western Research

Research Ethics

Western University Health Science Research Ethics Board
NMREB Annual Continuing Ethics Approval Notice

Date: May 31, 2015
Principal Investigator: Prof. Elizabeth Hayden
Department & Institution: Social Science\Psychology,Western University

NMREB File Number: 5246
Study Title: Gene-Environment Interplay and the Development of Child Temperament - 15121S
Sponsor: Canadian Institutes of Health Research

NMREB Renewal Due Date & NMREB Expiry Date:
Renewal Due -2016/05/31
Expiry Date -2016/06/11

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed the Continuing Ethics Review (CER) form and is re-issuing approval for the above noted study.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), Part 4 of the Natural Health Product Regulations, the Ontario Freedom of Information and Protection of Privacy Act (FIPPA, 1990), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Western Research

Research Ethics

Western University Non-Medical Research Ethics Board
NMREB Annual Continuing Ethics Approval Notice

Date: May 17, 2017
Principal Investigator: Prof. Elizabeth Hayden
Department & Institution: Social Science\Psychology,Western University

NMREB File Number: 5246
Study Title: Gene-Environment Interplay and the Development of Child Temperament - 15121S
Sponsor: Canadian Institutes of Health Research

NMREB Renewal Due Date & NMREB Expiry Date:
Renewal Due -2018/05/31
Expiry Date -2018/06/11

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed the Continuing Ethics Review (CER) form and is re-issuing approval for the above noted study.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), Part 4 of the Natural Health Product Regulations, the Ontario Freedom of Information and Protection of Privacy Act (FIPPA, 1990), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Western Research

Date: 1 June 2018

To: Prof. Elizabeth Hayden

Project ID: 5246

Study Title: Gene-Environment Interplay and the Development of Child Temperament - 15121S

Application Type: Continuing Ethics Review (CER) Form

Review Type: Delegated

Meeting Date: July 6, 2018

Date Approval Issued: 01/Jun/2018

REB Approval Expiry Date: 11/Jun/2019

Dear Prof. Elizabeth Hayden,

The Western University Research Ethics Board has reviewed the application. This study, including all currently approved documents, has been re-approved until the expiry date noted above.

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Daniel Wyzynski, Research Ethics Coordinator, on behalf of Prof. Randal Graham, NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Curriculum Vitae

Name: Emma Stewart

Post-secondary Education and Degrees:

Western University,
London, Ontario, Canada
2020-2022, M.Sc.,
Clinical Science and Psychopathology

Western University,
London, Ontario, Canada,
2018-2020, M.Sc.,
Neuroscience

McGill University,
Montreal, Quebec, Canada
2013-2017, H.B.Sc.,
Psychology

Honours and Awards:

Ontario Graduate Scholarship (2022-2023).
Social Science and Humanities Research Council of Canada (SSHRC) Canadian Graduate Scholarship, Master's (2021-2022).
Ralph S. Devereux Award in Psychology (2022).
Ontario Graduate Scholarship (2020-2021).

Related Work Experience

Graduate Teaching Assistant, Child Abnormal Psychology
Winter 2022
Graduate Teaching Assistant, Introduction to Psychology
Winter 2021
Graduate Teaching Assistant, Physiology of the Senses
Fall 2018, Fall 2019

Publications:

Stewart, E. K., Chen, V. V., Butler, B. E., & Mitchell, D. G. V. (in press). Emotional Distraction and Facilitation Across Sense and Time. *Emotion*. APA.

Stewart, E. K. (2020). Priming. In: Vonk, J. & Shackelford, T. (eds). *Encyclopedia of Animal Cognition and Behavior*. Springer, Cham.

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Ravary, A., **Stewart, E. K.**, & Baldwin, M. W. (2019). Insecurity About Getting Old: Age-Related Contingent Self-Worth, Attentional Bias, and Well-Being. *Aging & Mental Health*.