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Youth-Perceived Variability in Harsh Parenting from 8-14 Years as a Predictor of Internalizing and Externalizing Symptoms at 15 Years

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YOUTH-PERCEIVED VARIABILITY IN HARSH PARENTING FROM 8-14 YEARS
AS A PREDICTOR OF INTERNALIZING AND EXTERNALIZING SYMPTOMS AT
15 YEARS

A Thesis Presented

by

ANN E. FOLKER

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ABSTRACT

YOUTH-PERCEIVED VARIABILITY IN HARSH PARENTING FROM 8-14 YEARS AS A PREDICTOR OF INTERNALIZING AND EXTERNALIZING SYMPTOMS AT 15 YEARS

SEPTEMBER 2022

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Harsh parenting behaviors have been shown to predict internalizing and externalizing symptoms in children. These symptoms of psychopathology can persist into adolescence, which can negatively impact social, academic, and emotional functioning. Most studies, however, focus on between-person differences in average harsh parenting, rather than within-person changes in harsh parenting over time. This variability in harsh parenting has a potentially unique impact on the development of adolescent psychopathology. The present study aims to understand if child/adolescent-perceived variability in harsh parenting over time (intraindividual variability; IIV) predicts higher levels of internalizing and externalizing symptoms in mid-adolescence, while controlling for average levels of harsh parenting. IIV in child/adolescent-perceived harsh parenting was quantified using the coefficient of variation. Path analysis results indicated that IIV in child-perceived harsh parenting from ages 8-14 was a reliable construct, rather than random error. Further, more IIV in child-perceived mother harsh parenting predicted higher externalizing, but not internalizing, symptoms in adolescence (at age 15). Results were replicated using Residual Dynamic Structural Equation Modeling (RDSEM), a new

method that models variability around one's predicted slope within the model.

Implications of this work include a novel way to conceptualize and measure aspects of the parent-child/adolescent relationship that predict individual differences in symptoms of psychopathology in mid-adolescence.

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CHAPTER 1

INTRODUCTION

Overview

Previous research has highlighted the relationship between negative parenting behaviors and child and adolescent psychopathology. Specifically, harsh parenting - which refers to parenting behaviors that lack warmth, are hostile, aggressive, or neglectful - is related to both internalizing and externalizing symptoms in children and adolescents (Duprey et al., 2020; La Buissonnière-Ariza et al., 2019; Ugarte et al., 2020; Wu, 2007). There is also evidence that inconsistent parenting (e.g., do parents' punishments depend on their mood? Can children "talk their parents out of" a punishment?) is related to suboptimal child social and emotional outcomes (Essau et al., 2006; Lengua & Kovacs, 2005; Reid et al., 2015). Inconsistent parenting has traditionally been measured using parent-reported questionnaires (Essau et al., 2006; Lengua & Kovacs, 2005; Reid et al., 2015), and some have used observational data to examine inconsistencies in parent-child interactions over a few hours or days (Scott et al., 2020). Although short-term observational data and average scores on questionnaires provide us with useful information about the parent-child relationship, examining the variability in harsh parenting across annual waves of data may also hold some unique predictive value, as this variability may be indicative of a distinct parenting behavior that is not captured well by average scores over time on questionnaires. Further, understanding within-person variability in child-perceived parenting behaviors may be useful for clinicians in identifying family processes that contribute to risk for psychopathology.

The overall goal of the current study is to quantify the variability in child-reported harsh parenting and establish if the variability is reliable and has predictive validity with respect to its association with adolescent adjustment outcomes. A central question is: what should this latent construct be named if it is found to be reliable and predictive of adolescent outcomes? The proposed study's findings about the reliability and predictive validity of the variability, as well as previous research and theory, will guide the answer to the question regarding what to call this variability. It may make sense to label this "inconsistency" (see the subsequent literature review pertaining to this concept), or there may be some other term that will be more appropriate. Therefore, until reliability and predictive validity are established, I will refer to the latent construct of child-reported variability in harsh parenting as "intraindividual variability" (IIV) in harsh parenting.

Adolescent Development and Parenting

Adolescence is a time when many biological and social changes are occurring, including hormonal changes that occur during puberty, changes in the parent-child relationship, increased autonomy, increased time spent with peers/romantic partners, and less time spent with the family (Furman & Collins, 2009; Honess et al., 1997; Laible et al., 2000; Steinberg, 2014). Previous research has highlighted that during adolescence, conflict with parents becomes more intense (Laursen et al., 1998), while friendships and romantic relationships become more important (Harris, 1995; Laible et al., 2000). Additionally, adolescence is a time when many individuals are being diagnosed with a mental disorder for the first time (Caspi et al., 2020), which makes it an important time for intervention.

These changes are not occurring in isolation; family systems theory and family life cycle theory (Cox & Paley, 2003; McGoldrick & Shibusawa, 2012) emphasize that adolescence is a period of change for the family system, not just the individual adolescent. These theories also underscore that stress during transitional periods affects multiple levels and individuals within the family system, and that the family moves through these changes together. Therefore, during the adolescent transition, there are changes in the relationships between family members, which may influence adolescent social and emotional outcomes. Variability in parenting or the parent-child relationship during the transition to adolescence may be indicative of the family struggling with this transition (Lippold et al., 2016), which makes it an important construct to measure and be aware of. Given the many changes occurring within the individual and family during the transition to adolescence, it is important to examine how fluctuations in parenting throughout childhood and during the adolescent transition may relate to the development of psychopathology.

Research on “lability” in parenting behaviors and the parent-child relationship underscores the importance of measuring variability over time in parenting. Lability is defined as how much parents fluctuate in warmth, knowledge, or other parenting dimensions over the course of months or years; lability scores can be estimated and examined using a linear growth model (Lippold et al., 2016). Notably, research in this area has found that lability in parental warmth, hostility, the quality of the parent-child relationship, and parental knowledge have all been associated with higher levels of internalizing symptoms and delinquent behaviors as children transition into adolescence (Fosco et al., 2019; Lippold et al., 2016, 2018; Marceau et al., 2015; Zheng & McMahon,

2019). These findings are consistent when assessing lability across months and years, as well as across shorter time periods such as daily diary reports. However, findings are mixed depending on child gender, informant of parenting and child/adolescent outcomes, and externalizing versus internalizing symptoms as outcome (Lippold et al., 2018; Zheng & McMahon, 2019). Overall, findings suggest that lability in parenting has predictive value over and above average parenting scores, but more research is needed.

Although many studies have examined the association between harsh parenting and child/adolescent outcomes, and inconsistent parenting and child/adolescent outcomes, fewer studies have examined how variability across time in harsh parenting (i.e., harsh *and* inconsistent parenting) might uniquely relate to child and adolescent developmental outcomes. Understanding IIV in harsh parenting is particularly important during adolescence, as this is a developmental period when there are many changes occurring in the child/adolescent, and in the parent-child relationship (Laursen et al., 1998; Steinberg, 2014). Furthermore, the effects of internalizing and externalizing symptoms can be long-lasting, and have negative effects into adulthood (Johnson et al., 2018), so it is important to identify specifically what parenting practices or behaviors contribute to the development of these symptoms. Doing so may allow for more targeted, family-based interventions that could reduce the risk for adverse outcomes in children and adolescents.

The current study aims to identify if child-perceived variability in harsh parenting over the course of five waves of data is reliable and predictive. In other words, I will examine if the variability in harsh parenting can be conceptualized as its own construct. This approach to operationalizing harsh parenting will allow me to understand if

variability over time in harsh parenting predicts adolescent internalizing and externalizing symptoms while controlling for average levels of harsh parenting.

Harsh Parenting and Child/Adolescent Internalizing and Externalizing Symptoms

It is well established that harsh parenting relates to the development of externalizing and internalizing symptoms in childhood, and that harsh parenting has lasting effects as children transition into adolescence (Kingsbury et al., 2020; Schwartz et al., 2014; Ugarte et al., 2020; Wiggins et al., 2015). There are several mechanisms through which harsh parenting is thought to impact the development of child internalizing and externalizing symptoms. Stress and stressful life events prospectively predict internalizing symptoms, and although the exact mechanisms through which this occurs are unknown, the expanded stress theory proposes that rumination, and anticipatory stress (conceptualized as perseverative cognition) are key mediators that explain the association between stress and physical and mental health outcomes (Brosschot et al., 2005; Grant et al., 2004). The link between stress and internalizing symptoms is further supported by research that has shown that repeated stressful events can lead to dysregulated physiological responses, which then lead to increased likelihood of depression and anxiety (Duprey et al., 2020; Juster et al., 2011; Repetti et al., 2002; Taylor et al., 1997).

Turning to externalizing behavior problems, social learning theory emphasizes that most complex behaviors are learned through observation and example (Bandura, 1977). Therefore, in the context of parenting, when children are in an environment where harsh and aggressive parenting behaviors are frequently occurring, they are more likely to repeat those behaviors themselves. Additionally, there is theory and evidence to suggest

that intermittent reinforcement increases aggressive behaviors in children (Deur & Parke, 1970; Long et al., 1958).

Why Might Variability in Harsh Parenting Matter?

The present study raises the question: what might be different about *variability* (across time) in harsh parenting (IIV) compared to *average* (across time) levels of harsh parenting? Based on the perseverative cognition expansion of stress theory, it is plausible that IIV in harsh parenting would relate to higher levels of internalizing symptoms, over and above the effects of mean levels of harsh parenting, because children would be less likely to be able to predict how their parents may react in a situation or in response to a behavior, thus increasing stress, which in turn may then lead to higher levels of internalizing symptoms. (Brosschot et al., 2005; Grant et al., 2004).

For externalizing symptoms, If IIV in harsh parenting is a valid and reliable construct, it could represent inconsistency in parenting behaviors. Therefore, given that social learning theory and operant conditioning theorize that intermittent reinforcement of children's aggressive behaviors increases those behaviors, higher IIV may relate to higher levels of externalizing symptoms (Bandura, 1977; Gardner, 1989; Long et al., 1958). When behaviors are being sporadically and inconsistently modeled or reinforced in the home environment, it is plausible that children will show higher levels of externalizing behaviors in response to this intermittent reinforcement and modeling. Thus, higher IIV in harsh parenting may relate to higher levels of externalizing behaviors.

Previous Conceptualizations of Inconsistent Parenting

Inconsistent Parenting/Discipline

There have been several ways in which inconsistent parenting has been operationalized in previous research. For example, inconsistent discipline is a parenting behavior that has been linked to child emotional and behavioral problems (Burlaka et al., 2017; Cheung et al., 2018). As previously mentioned, this construct has primarily been measured with questionnaires that ask about behaviors such as follow-through with punishment (Essau et al., 2006). Although capturing inconsistency in this way has valuable predictive validity (Burlaka et al., 2017; Cheung et al., 2018; Halgunseth et al., 2013), there is also the possibility of error due to desirability reporting, recall bias that may occur from having to retrospectively report, and measurement error.

Additionally, most conceptualizations of inconsistent parenting refer to inconsistent discipline, or simply inconsistency more broadly, and does not consider the broader range of parenting behaviors such as warmth, control, and hostility (Liang et al., 2021; Reid et al., 2015). This operationalization may preclude us from understanding how parenting behaviors – such as harsh parenting – differentially predict child outcomes if they are not consistent.

Lability

Another methodological approach has focused on lability in parenting, which is defined as the magnitude of fluctuations in parenting behavior over time and has found associations between lability in parenting and child and adolescent outcomes. Longitudinal studies utilizing 3 to 5 waves of data have found that greater lability in parenting behaviors (i.e., parental knowledge, warmth, hostility) relates to greater adolescent internalizing and externalizing symptoms (Branje et al., 2010; Fosco et al., 2019; Lippold et al., 2016, 2018; Marceau et al., 2015; Zheng & McMahon, 2019). These

findings suggest that there is value in examining how much parenting behaviors vary over time as a predictor of adolescent social and emotional outcomes. Thus, although overall developmental trajectories of parenting relate to child/adolescent outcomes, it is clearly also important to understand how within-person variation in parenting predict outcomes in adolescence.

Conceptualization of Variability in Parenting in the Current Study

The present study aims to extend previous research by operationalizing IIV in harsh parenting using the coefficient of variation. The coefficient of variation is a well-established measure of variability, that has been used in a variety of contexts (Brown, 1998; Tian, 2005). The coefficient of variation is calculated by dividing an individual's standard deviation across multiple time points by their mean. As such, a larger coefficient of variation would indicate more variability over time. In the present study, the coefficient of variation for child-reported harsh parenting will be used to measure IIV. This operationalization of harsh parenting is distinct from previous inconsistent parenting work in that IIV will be capturing year-to-year fluctuations in child-perceived harsh parenting behaviors, whereas inconsistent parenting typically focuses on shorter time periods, and self-report questionnaire measures. Additionally, to my knowledge, no work has examined the variability in longitudinal child-reported parenting data as a reliable and predictive construct. As such, IIV may be measuring something distinct, that cannot be labeled "inconsistency". Determining what IIV in harsh parenting is will depend on the findings of the current study, as well as theory.

Using five waves of child/adolescent-reported questionnaire data from ages 8, 9, 10, 12, and 14 years of age, I will calculate a coefficient of variation for each participant,

which will then be used as a predictor of internalizing and externalizing symptoms in mid-adolescence at age 15 years.

Gaps to be Addressed in Current Literature

Although the link between parenting and child outcomes is clear, there are several limitations in the current literature. First, longitudinal parenting research has primarily focused on between-person differences in average levels of parenting behaviors, or on between-person differences in stable trajectories in parenting over time, at the expense of measuring how perceived parenting changes within a child and adolescent over time (Kim et al., 2010; Lindhiem et al., 2011; Mabbe et al., 2018). For example, growth curve modeling (LGM) has been used to identify different trajectories of parenting behaviors (Kim et al., 2010; Lipscomb et al., 2011; Marceau et al., 2015; Wu, 2007). LGM is useful in helping us understand how parenting behaviors and the parent-child relationship evolve over time, what the between-person differences are in parenting behaviors and has also identified distinct groups of parenting trajectories that co-vary with or predict child outcomes. For example, Wu (2007) found that trajectories of maternal harsh parenting aligned with trajectories of adolescent depressive symptoms. In younger children, fluctuations in negative emotionality have been shown to be associated with fluctuations in maternal efficacy and maternal over reactivity (Lipscomb et al., 2011). LGM provides valuable insight into the complex associations between parenting behaviors and child/adolescent emotional development and supports the idea that harsher or more negative parenting experiences relate to suboptimal outcomes as children and adolescents develop. Further, this provides evidence that parenting behaviors in childhood have lasting effects into adolescence.

LGM, however, does not directly estimate and test within-person variability in parenting. For example, it is plausible that two caregivers who have the same average trajectory and mean harsh parenting score over the course of several years, differ in how much they vary from year to year. Figure 1 shows an example of this with hypothetical data. The current study addresses this limitation in prior LGM research by expanding upon growth curve modeling and other methods previously used in parenting research by examining within-person fluctuations in parenting year to year, rather than focusing solely on between-person differences in systematic changes in parenting over time (e.g., linear increases versus decreases over time).

Another limitation in parenting research is the focus on mothers as the primary parent (Parent et al., 2017). This is an important gap to address, as fathers' and other caregivers' behaviors toward and interactions with the child also have an impact on their development (Fagan et al., 2014; Kane & Garber, 2004). The present study addresses this by including child-report of their mother and father (if present) behaviors, as well as mother and father (if present) self-report of their parenting. This will allow for analysis of both caregivers, and any differences between the two.

Present Study

The overall goal of the present study includes two primary aims: 1) Quantify and describe the distribution of child perceived IIV in harsh parenting over time, and 2) examine if IIV in harsh parenting between ages 8-14 predicts internalizing and externalizing symptoms in adolescence at age 15. I hypothesize that IIV in harsh parenting will be a reliable construct, and that higher levels of IIV in harsh parenting from ages 8-14 will predict higher internalizing and externalizing symptoms at age 15.

The child-reported coefficient of variation, as described above, will be used as a measure of IIV.

The novel methodological approach of using the coefficient of variation in the context of parenting provides a framework for thinking about IIV in harsh parenting across years as a predictive construct. Further, using child/adolescent-reports for how children/adolescents perceive both mother and father behavior fills the gap of the exclusion of fathers in parenting research. Although children/adolescents are the primary informants for this study, another strength is that mother and father reports of parenting are also available, which will allow for testing the inter-rater reliability of the child and parent reports of IIV in harsh parenting.

CHAPTER 2

METHOD

Participants

Participants included 280 children (47.9% female), and their mothers and fathers across seven waves of data from the United States (US) sample of the ongoing, longitudinal Parenting Across Cultures (PAC) study. Children were $M = 8.09$ years old at wave 1 ($SD = 0.59$), $M = 9.10$ years old at wave 2 ($SD = 0.60$), $M = 10.12$ years old at wave 3 ($SD = 0.62$), $M = 12.94$ years old at wave 4 ($SD = 0.66$), $M = 13.32$ years old at wave 5 ($SD = 0.69$), $M = 14.46$ years old at wave 6 ($SD = 0.67$), and $M = 15.15$ years old at wave 7 ($SD = 0.73$). Data on harsh parenting was not collected at age 12, so data from that time point could not be included in the analysis. Of the 280 families, 33.9% identified as Black/African American ($N = 95$), 36.4% identified as White/European American ($N = 102$), and 29.6% identified as Hispanic/Latinx ($N = 83$) at the first time point of the study.

Parents were recruited to participate through letters sent to schools. For the United States sample, members of the research team brought recruitment letters to the schools, and teachers sent the letters home with the children, who then returned the form with their contact information if the parent wanted to hear more about the study. For more details, see Lansford et al. (2014). Economic diversity in the sample was ensured by sampling from private and public schools, and including high-to low-income families, in representative proportions for each area.

Procedures

Children and their parents completed the measures used in this analysis at each time point via face-to-face interviews (either in the participant's home or at the research site), telephone interviews, or by written questionnaires. The procedures were approved by the Institutional Review Board. Parents and children provided consent/assent and completed measures/were interviewed separately to ensure privacy.

Measures

Harsh Parenting

The Parental Acceptance-Rejection/Control Questionnaire-Short Form (PARC-Q) (Rohner, 2005) was used to assess harsh parenting. Children/adolescents completed it twice – once answering the questions about their mother, and once about their father. Each parent completed it once about their child/adolescent. This questionnaire asks about the frequency of parent behaviors, and participants respond on a modified four-point scale (1 = almost never, 2 = once a month, 3 = once a week, 4 = every day). The original response options are “almost always true” to “almost never true” on a four-point scale but were modified for the PAC study to be more comparable across cultural groups. The items make up 5 subscales – parental warmth-affection, hostility-aggression, neglect-indifference, rejection, and control. The warmth-affection subscale consists of 8 items, such as “My mother/father says nice things about me. The control subscale consists of 5 items, such as “My mother/father is always telling me how to behave”. The hostility-aggression subscale consists of 6 items, such as “My mother/father hits me, even when I do not deserve it”. The neglect-indifference subscale consists of 6 items, such as “My mother/father is too busy to answer my questions”. The rejection subscale consists of 4

items, such as “My mother/father is always telling me how I should behave”. Higher scores indicate higher harshness, with possible scores ranging from 1 – 4. A harsh parenting composite was created by reverse-scoring the warmth-affection subscale, and then averaging scores on all five subscales. Thus, the possible range of scores is 1-4, with a higher score indicating higher levels of harsh parenting behaviors.

The PARC-Q has been validated in a range of countries/cultures, and a meta-analysis indicated that the internal consistency (α) was .89 for the Child PARC-Q, and .84 for the Parent PARC-Q (Khaleque & Rohner, 2002). Additionally, effect sizes have been shown to be homogenous across groups, and convergent, discriminant, and construct validity have been demonstrated (Rohner, 2005). In the present sample, reliability (α) across scales and waves ranged from .84 - .89 (Lansford et al., 2018).

IIV in Harsh Parenting. The coefficient of variation was used to operationalize intraindividual variability in harsh parenting (IIV) for each participant. For child-report, two were calculated – one for child-report about their mother, and one for child-report about their father. The coefficient of variation is a well-established measure of variability (Brown, 1998; Tian, 2005), and is calculated by dividing everyone’s standard deviation across multiple time points by their mean score across those same time points. Therefore, each person’s standard deviation across time is scaled relative to their mean. As such, a larger coefficient of variation indicates more variability around their own mean score over time.

Internalizing Symptoms

Children completed the Youth Self Report (YSR) at age 15, and parents completed the Child Behavior Checklist (CBCL) about their children at age 15

(Achenbach, 1991). Parent and child report of internalizing symptoms were significantly correlated to each other ($r = .26 - .36, p < .01$), so a composite internalizing symptoms score was used to operationalize internalizing symptoms. The internalizing subscale consists of 29 items, which capture anxious/depressed mood, somatic complaints, and withdrawn behaviors. Example items include: “I feel dizzy”, “I feel that I have to be perfect”, and “I am secretive or keep things to myself”. Response options are “Not True” (0), “Somewhat or Sometimes True” (1), or “Very True or Often True” (2). Items from the internalizing subscale are summed to create an internalizing score. The CBCL/YSR is a widely used and accepted measure of internalizing symptoms and has been validated cross-culturally (Weisz et al., 1987). In the current sample, reliability (α) for internalizing items across waves ranged from .84 - .87 (Lansford et al., 2018).

Externalizing Symptoms

Children completed the Youth Self Report (YSR) at age 15, and parents completed the Child Behavior Checklist (CBCL) about their children at age 15 (Achenbach, 1991). Parent and child report of externalizing symptoms were significantly correlated to each other ($r = .19 - .29, p < .01$), so a composite internalizing symptoms score was used to operationalize externalizing symptoms in the current study. The externalizing subscale consists of 30 items, which ask about delinquent or aggressive behaviors. Example items include: “I don’t feel guilty after doing something I shouldn’t” and “I destroy my things”. Response options are “Not True” (0), “Somewhat or Sometimes True” (1), or “Very True or Often True” (2). Responses to these items are summed to create an overall externalizing score. The CBCL/YSR is a widely used and accepted measure of externalizing symptoms, has been validated cross-culturally (Weisz,

Suwanlert, Chaiyasit, & Walter, 1987). In the current sample, reliability (α) for externalizing items across waves ranged from .84 - .88 (Lansford et al., 2018).

Covariates

Race/Ethnicity

Due to the variability in race/ethnicity in the sample, race/ethnicity was included in the models as a covariate. Parents reported on their own and their child's race/ethnicity during the screening visit at the beginning of the study. Response options were "White", "Hispanic", or "Black", and only one response was allowed (groups were mutually exclusive). To control for race/ethnicity, the three groups were dummy coded into two variables in the model, with "Black" as the reference group compared to White or Hispanic youth as the two dummy coded variables.

Pubertal Status

Because children's perception of their parents' parenting behaviors may change as they develop physically, pubertal status at age 10 and 13 were included as covariates. I chose these ages because puberty is a developmental transition, so including two time points captures individual differences in pubertal timing as well as the initial rate of pubertal change. Additionally, these time points correspond with two of the times the PARC-Q was collected.

The Pubertal Development Scale (PDS) was used to measure children/adolescents' pubertal status (Petersen et al., 1988). This widely used measure of pubertal development correlates with physical measures of pubertal development. There is a male and female version of the questionnaire. Children/adolescents respond to questions about body hair, growth spurts, breast development, voice changes, and skin

changes. Responses are on a four-point scale (1 = no development, 4 = completed development). The female version also asks a yes/no question about the onset of menarche. For this question, 1 = no, and 4 = yes. An average score was then created for physical pubertal maturation.

Data Analysis Plan

SPSS version 26.0 was used for all descriptive statistics and data preparation. MPlus v8.1 was used for Full Information Maximum Likelihood (FIML) imputation, path analyses, and multilevel modeling (Muthén & Muthén, 2018).

Descriptive Statistics

To evaluate for normality of the data, and identify any outliers, means, standard deviations, and skewness/kurtosis were computed for harsh parenting, internalizing, and externalizing symptoms. Additionally, after calculating each participant's IIV score, the distributions of IIV in harsh parenting were assessed for normality. Because three data points are needed to compute a coefficient of variation, families with less than three time points of PARC-Q data were excluded from the analysis. Families with less than three complete time points were compared to families with three or more complete time points to test for significant differences between these groups on any sociodemographic variables. There were no statistically significant differences between these groups in parent education, race/ethnicity, family income, initial levels of child internalizing/externalizing symptoms, or initial levels of harsh parenting (mother, father, or child report). Full Information Maximum Likelihood (FIML) was used to impute missing data for the 280 families included in the analysis.

Power Analysis

A power analysis was run to determine what effect size I was able to detect in the analysis, given the sample size. Because there is not currently any basis for estimating the effect size for IIV in harsh parenting in the literature, I conducted the power analysis to understand what effect size I would be able to detect with a power of .8 and the sample size of 280. The power analysis indicated that with alpha of .05, I could detect a very small univariate effect size of .05.

Primary Analysis

The first hypothesis was that child-reported IIV in mother and father harsh parenting would be a reliable construct. This was assessed using test-retest reliability and interrater reliability. For test-retest reliability, the coefficient of variation computed from time points 1-3 for mother-report, father-report, and child-report about each parent were correlated with the coefficient of variation from time points 3-5 for mother-report, father-report, and child-report about each parent. I expected that each respondents' coefficient of variation from waves 1-3 would be significantly and positively associated with their coefficient of variation from waves 3-5, providing evidence that IIV is reliable, and not random measurement error.

Interrater reliability was assessed by correlating each respondent's coefficient of variation from the five time points with each other (i.e., correlated child-report about mother coefficient of variation with mother-report coefficient of variation). Again, I expected positive, significant associations between respondents' coefficient of variation.

The second hypothesis was that higher child-perceived mother and father IIV in harsh parenting from age 8-14 (i.e., more year-to-year fluctuations) would be related to

higher levels of externalizing and internalizing symptoms at age 15, while controlling for average levels of harsh parenting across those years. To my knowledge, there is currently no standard way of using variability as a predictor. As such, I explored two methods to answer this question.

Path Analysis. The primary approach that was used to assess the predictive validity of IIV in harsh parenting was using path analysis with internalizing and externalizing symptoms at age 15 as simultaneous outcomes, and child-reported average harsh parenting (about mother and about father) and child-reported IIV in harsh parenting (about mother and about father), quantified using the coefficient of variation as predictors. This approach allowed me to assess the association between IIV in harsh parenting, and internalizing/externalizing symptoms while controlling for average levels of harsh parenting. The path diagram for this model is shown in Figure 2. The first model (Model 1) included only average harsh parenting and IIV in harsh parenting as predictors. I then added initial levels of internalizing and externalizing symptoms (assessed when children were 8 years old) to the model in Model 2 to assess if IIV in harsh parenting predicted changes in psychopathology symptoms. Finally, Model 3 included pubertal status at age 10 and 13, and race/ethnicity (dummy coded) as covariates. The absolute fit of each model was assessed using four fit indices: RMSEA, CFI, SRMR, and model chi-square (χ^2_M). The thresholds for good, adequate, and poor model fit outlined by Kline (2016) were used to determine the absolute fit of the model. Based on these guidelines, good fit is evident with $RMSEA \leq .05$, $SRMR < .10$, $CFI \geq .90$, and a non-significant χ^2_M ($p > .05$).

In all models, only child-report of parenting (for mother and father) were included, as the child's perception of parenting behaviors is the primary focus of the present study. Although simple, using path analysis does not account for changes over time in harsh parenting, as the method described in the following section does.

Residual Dynamic Structural Equation Modeling. An alternate approach to calculating IIV as a coefficient of variation is to estimate within-person variability within the predictive model itself (Dixon-Gordon & Laws, 2021; Lippold et al., 2016). This method, termed residual dynamic structural equation modeling (RDSEM), consists of a measurement model to create the latent "variability" estimate, and a structural model which then uses the variability estimate as a predictor. RDSEM combines multilevel modeling (MLM) and structural equation modeling (SEM) to simultaneously estimate within-person variability and between-person effects (Asparouhov & Muthen, 2020). In this method, using two-level Bayesian-estimated multi-level models, each person's slope was estimated, and the person-specific slope residuals were allowed to vary, which provided an estimate of variability around everyone's predicted slope (measurement model). Then, that variability around one's predicted slope was used as a predictor in a multiple regression analysis (structural model). Of note, MPlus log-transforms this variability estimate, in order to meet the assumption of normality when it is used as a predictor in the structural model. Both the log-transformed estimate, and back-transformed estimate are reported in the results section. Unlike the coefficient of variation method, the RDSEM method allows me to control for expected changes over time in harsh parenting (slope). Additionally, RDSEM reduces measurement error by modeling and isolating random error variability within the model.

This is a new model that has not been used widely yet, whereas the previously mentioned method using the coefficient of variation has been used for several decades to quantify variability in a variety of contexts (i.e., cognitive performance). There is no standard practice for reporting model fit when using RDSEM. R^2 for the model including the variability estimate, and with the variability path estimate constrained at zero are reported to assess the proportion of variance explained in the outcome in each model.

Analyses were first run using path analysis with the coefficient of variation variables. I then tested if significant findings from the path analysis replicated using the mixed modeling RDSEM approach. I expected that: 1) IIV in harsh parenting across time will be a reliable and predictive construct, and 2) that higher levels of IIV in harsh parenting throughout childhood will predict higher levels of adolescent internalizing and externalizing symptoms. This effect is predicted to be present even when controlling for mean levels of harsh parenting (in the path analysis) and predicted changes over time in harsh parenting (in the RDSEM analysis).

Post Hoc Exploratory Analyses. I ran exploratory analyses to test for an average harsh parenting-by- IIV in harsh parenting interaction effect for any significant findings. This allowed for a more nuanced understanding of what the IIV construct is capturing and assessed if it is the interactive combination of IIV in parenting and the overall average level of harsh parenting that best predicts worse psychopathology symptoms during adolescence. For example, it may be that chronic harsh parenting (high average, low IIV) is associated with worse outcomes than variable harsh parenting (high average, high IIV). These exploratory analyses allowed me to better understand how IIV in harsh parenting is operating, and what it is capturing.

CHAPTER 3

RESULTS

Descriptive Statistics

280 children/adolescents and their parents were included in the analyses. Average harsh parenting across the five time points was 1.56 ($SD = 0.16$) for mother-report, 1.57 ($SD = 0.16$) for father-report, 1.60 ($SD = 0.20$) for child-report about their mother, and 1.57 ($SD = 0.21$) for child-report about their father. Average internalizing symptoms for children/adolescents were 11.00 ($SD = 5.40$) at age 8, and 9.03 ($SD = 6.95$) at age 15. Average externalizing symptoms for children/adolescents were 8.98 ($SD = 5.64$) at age 8, and 6.33 ($SD = 5.14$) at age 15. Table 1 presents all descriptive statistics for all predictor, outcome, and covariates.

Primary Analyses

Describing the Distribution of IIV in Harsh Parenting

The first aim was to describe the distribution of IIV in harsh parenting. IIV in harsh parenting was quantified by computing a coefficient of variation for each participant across five waves of data. A larger coefficient of variation indicates larger variability relative to one's individual mean. I hypothesized that IIV in harsh parenting would be reliable (i.e., not random measurement error) for child and parent report. Descriptive statistics, test-retest reliability, and interrater reliability estimates were used to assess the properties of IIV in harsh parenting.

Descriptive statistics for IIV are presented in Table 2. IIV in harsh parenting was normally distributed for child report about mother, and child report about father. Mother report IIV of their harsh parenting was slightly positively skewed (1.42) as was father

report (2.79). On average, children reported higher IIV in harsh parenting about their parents, than parents reported about themselves.

Test-retest reliability was estimated by correlating IIV from waves 1, 2, and 3 (IIV 1) with IIV from waves 3, 5, and 6 (parents) or 7 (children) (IIV 2), for each respondent. All correlations between IIV 1 and IIV 2 for each respondent can be found in Table 3.

For child-report about mother, there was a significant positive correlation between IIV 1 and IIV 2 ($r = .15, p = .016$). However, there was no significant association between IIV 1 and IIV 2 for child-report about father ($r = .12, p = .095$). There was a significant positive association between IIV 1 and IIV 2 for both mother ($r = .34, p < .001$) and father ($r = .28, p = .001$) self-reported parenting.

Interrater reliability was tested by estimating correlations of respondents' IIV scores; these can be found in Table 4. Child-report IIV about mother was significantly and positively associated with child-report IIV about father ($r = .47, p < .001$), and with mother-report IIV ($r = .13, p = .036$). Child-report IIV about father was not significantly associated with father-report IIV ($r = .02, p = .827$), and mother-report IIV was not significantly associated with father-report IIV ($r = .06, p = .413$).

IIV in Harsh Parenting as a Predictor of Internalizing and Externalizing Symptoms

Path analysis was used to assess whether IIV in child-perceived harsh parenting was a predictor of adolescent internalizing and externalizing symptoms, controlling for average levels of harsh parenting. First, a model was fit with only average levels of child-reported harsh parenting about mother and father, and child-reported IIV in harsh parenting about mother and father as predictors (Model 1). Next, initial levels of

internalizing and externalizing symptoms (measured when children were 8), were included in the model to control for initial levels of psychopathology (Model 2). Finally, pubertal status at age 10 and 13, and the two race/ethnicity dummy coded variables (Black/African American as reference) were entered into the model as covariates (Model 3). Table 5 presents unstandardized coefficients and their standard errors, and standardized coefficients for all predictors in this model.

Model 1 (average harsh parenting and IIV in harsh parenting as predictors).

Absolute fit indices for Model 1 indicated good fit to the data (RMSEA < .001, $\chi^2_M = 0.08$, $p = .999$, CFI > .99, SRMR = .003).

Internalizing Symptoms. Contrary to the hypothesis, there was no statistically significant effect of average mother ($b = 5.61$, $SE = 3.50$, $p = .108$) or father ($b = -0.45$, $SE = 3.33$, $p = .892$) harsh parenting on adolescent internalizing symptoms at age 15. There was also no significant effect of IIV in mother harsh parenting ($b = 12.21$, $SE = 8.88$, $p = .169$) or IIV in father harsh parenting ($b = 4.53$, $SE = 7.88$, $p = .565$) on adolescent internalizing symptoms at 15. R^2 for internalizing symptoms in this model was .066.

Externalizing Symptoms. The results for externalizing symptoms partially supported the hypothesis. There was a significant, positive effect of average father harsh parenting on externalizing symptoms at age 15 ($b = 5.74$, $SE = 2.41$, $p = .017$). However, there was no significant effect of average mother harsh parenting on adolescent externalizing symptoms ($b = 4.01$, $SE = 2.52$, $p = .578$). There was a significant positive effect of mother IIV in harsh parenting on adolescent externalizing symptoms ($b = 13.50$,

$SE = 6.38, p = .034$), but no significant effect of father IIV in harsh parenting ($b = -6.67, SE = 5.63, p = .236$). R^2 for externalizing symptoms in this model was .118.

Model 2 (added initial levels of internalizing and externalizing). Absolute fit indices for Model 2 indicated good fit to the data (RMSEA < .001. $\chi^2_M = 1.20, p = .997$, CFI > .99, SRMR = .009).

Internalizing Symptoms. When controlling for initial levels of child internalizing symptoms (at age 8), there was still no significant effect of average mother harsh parenting ($b = 3.29, SE = 0.98, p = .326$) or father harsh parenting ($b = -2.25, SE = 3.18, p = .479$) on adolescent internalizing symptoms. There were also no effects of IIV in mother ($b = 13.42, SE = 8.42, p = .111$) or father ($b = 2.57, SE = 7.48, p = .731$) harsh parenting on adolescent internalizing symptoms. R^2 for internalizing symptoms in this model was .147.

Externalizing Symptoms. When controlling for initial levels of externalizing symptoms (at age 8), there was no significant effect of average mother harsh parenting ($b = -1.66, SE = 2.36, p = .481$) or father harsh parenting ($b = 3.74, SE = 2.25, p = .097$) on adolescent externalizing symptoms. There were also no effects of IIV in father harsh parenting ($b = -8.93, SE = 5.23, p = .088$) on adolescent externalizing symptoms. However, there was a significant, positive effect of IIV in mother harsh parenting on adolescent externalizing symptoms ($b = 16.04, SE = 5.87, p = .006$). When controlling for initial levels of externalizing symptoms, as IIV in child-reported mother harsh parenting increases, externalizing symptoms in adolescence are also predicted to increase. R^2 for externalizing symptoms in this model was .272.

Model 3 (added pubertal status [10, 13 years] and race/ethnicity covariates).

Absolute fit indices for Model 3 indicated adequate fit to the data (RMSEA = .070, $\chi^2_M = 61.28$, $p < .001$, CFI = .86, SRMR = .054). While controlling for race/ethnicity, and child pubertal status at age 11 and 15, there were no substantive changes in the results between Model 2 and Model 3. There was still a significant, positive effect of IIV in mother's harsh parenting on adolescent externalizing symptoms ($b = 17.91$, $SE = 5.91$, $p = .002$). There was no significant effect of average harsh mother harsh parenting ($b = -1.88$, $SE = 2.38$, $p = .430$) or father harsh parenting ($b = 4.04$, $SE = 2.24$, $p = .071$) on adolescent externalizing symptoms. Further, there were still no significant effects of average harsh parenting, or IIV in harsh parenting on adolescent internalizing symptoms. R^2 for internalizing symptoms in this model was .228.

R^2 for externalizing symptoms in this model was .285.

Mixed Modeling (RDSEM)

All effects and model fit statistics for this model are presented in Table 6. The significant effect of child-perceived variability in mother's harsh parenting on externalizing symptoms in adolescence were tested using RDSEM (described above in data analytic plan), to assess if results replicated across methods. Because the models were Bayesian estimated models, 95% credible intervals (CIs) are reported. If the CI does not contain zero, results are statistically significant.

Measurement Model. The fixed effects in the model indicated that on average, child-reported mother harsh parenting when children were eight years old was 1.63 ($\gamma_{00} = 1.63$, 95% Cr.I. [1.599, 1.655]). The linear term was also statistically significant; on average, there was a slight linear decrease in child-reported mother harsh parenting

across the five time points ($\gamma_{10} = -0.001$, 95% Cr.I. [-0.002, -0.001]). Finally, average *variability* around the predicted linear trajectory was also significantly different from zero ($\sigma^2_{\text{average}} = -3.63$, 95% Cr.I. [-3.792, -3.470])¹.

Random effects from the model indicated statistically significant individual differences in initial levels of child-reported mother harsh parenting ($\tau_{00} = 0.03$, 95% Cr.I. [0.023, 0.042]). There were also statistically significant between-person differences in individual's trajectories of harsh parenting across time ($\tau_{11} = < .001$, 95% Cr.I. [< 0.001 , < 0.001]). Finally, there were statistically significant individual differences in variability, indicating that there are significant differences in the degree to which individual's fluctuate around their trajectory for child-reported mother harsh parenting ($\sigma^2_{\text{variance}} = 1.07$, 95% Cr.I. [0.777, 1.465])².

Structural Model. After obtaining the latent measure of variability in harsh parenting using multi-level modeling, the latent variability score was used as a predictor in a multiple-predictor structural regression. Initial levels of child externalizing symptoms and mother's harsh parenting (at age 8), and child race/ethnicity were included in the model as covariates. As predicted, there was a significant, positive association between variability in harsh parenting and externalizing symptoms at age 15 such that for every one-unit increase in variability in harsh parenting, there is an associated 2.515 unit increase in externalizing symptoms, controlling for initial levels of externalizing symptoms, initial levels of mother's harsh parenting and child race/ethnicity. R^2 for externalizing symptoms in this model was .224 when the variability parameter was not

¹ Back-transformed values for average variability in residuals = 0.03, 95% Cr.I. [0.022, 0.031].

² Back-transformed values for variance in residuals = 2.92, 95% Cr.I. [2.175, 4.328].

constrained to zero (22.4% of variance in externalizing symptoms explained), compared to .118 when the path for variability predicting externalizing symptoms was constrained to zero (11.8% of variance in externalizing symptoms explained).

Average Harshness-by- IIV Interaction

To further explore the significant effect of child-perceived mother IIV in harsh parenting on externalizing symptoms in adolescence, I tested if there was an interactive (rather than merely additive) effect of average level of mother's harsh parenting by IIV in mother's harsh parenting. This was done to understand whether the effect of IIV in mother's harsh parenting depends on the average level of harsh parenting (i.e., if the effect of IIV in harsh parenting matters differs when average levels of harshness are high, compared to low average levels of harshness), or if the effect of IIV in harsh parenting is present regardless of the overall average level of harshness across time. There was no significant interaction found ($b = 3.99$, $SE = 22.83$, $p = .861$). Thus, the relationship between child perceived IIV in mother's harsh parenting and child externalizing symptoms did not depend on the average level of mother's harsh parenting.

CHAPTER 4

DISCUSSION

Findings from aim 1 supported the first hypothesis regarding reliability, suggesting that within-person variability in child-perceived mother harsh parenting is a reliable construct, and not simply measurement error (as it is usually considered to be). Findings from aim 2 partially supported the second hypothesis regarding validity. IIV in child/adolescent-perceived mother harsh parenting statistically predicted adolescent externalizing symptoms, as well as changes in externalizing symptoms from childhood to adolescence. This effect was found while controlling for average levels of harsh parenting, pubertal status, and race/ethnicity, indicating that IIV in harsh parenting has predictive validity even after controlling for the effect of average harsh parenting across the five waves of data. These results replicate previous findings that found within-person variability in parental knowledge, warmth, and hostility to be a predictor of externalizing symptoms in children/adolescents (Branje et al., 2010; Fosco et al., 2019; Lippold et al., 2018). However, contrary to the hypothesis and previous literature (Lippold et al., 2021; Zheng & McMahon, 2019), there was no significant effect of IIV in child-perceived mother harsh parenting on adolescent *internalizing* symptoms in the present sample. Additionally, whereas previous research has found associations between variability in fathers' parenting behaviors and child/adolescent externalizing symptoms (Fosco et al., 2019), there were no effects of IIV in child-perceived father harsh parenting on adolescent internalizing or externalizing symptoms in the present sample. Post-hoc analyses found no evidence to suggest that average levels of mother's harsh parenting and mother's IIV in harsh parenting interact to predict adolescent externalizing

symptoms. The significant results were replicated using RDSEM, providing further evidence that IIV in child-reported harsh parenting is an important construct to consider in the development of adolescent externalizing symptoms.

Taken together, the findings indicate that 1) IIV in harsh parenting is not random error, but is a reliable construct, and 2) IIV in child-perceived mother (but not father) harsh parenting is a predictor of externalizing (but not internalizing) symptoms in adolescence, that and this effect does not depend on the average level of child-perceived mother harshness across time.

Theoretical Implications

These findings highlight the importance of within-person variability as a predictor of adolescent externalizing symptoms. While many studies have focused on the effect of between-person differences in average levels of harsh parenting on child/adolescent psychopathology symptoms (Kingsbury et al., 2020; Ugarte et al., 2020), the present study's findings underscore that year-to-year within-person changes in parenting behaviors are an important factor to consider in understanding the role of parenting in the development of adolescent externalizing symptoms. This provides evidence that within-person variability is an important source of variance that should be considered when considering how the child's perception of parenting behaviors across time relates to externalizing problems in adolescence.

Furthermore, the multiple methodological approaches used to assess the predictive effect of IIV in harsh parenting point to the utility of the coefficient of variation, as well as the more complex multilevel modeling approach to quantify within-person variability in parenting behaviors. The replication of significant results using these

two methods underscores the importance of quantifying year-to-year variability in parenting behaviors and provides further evidence that these fluctuations are not measurement error, but rather provide important information about development of child/adolescent externalizing problems.

What Should IIV in Harsh Parenting be Called?

Although the findings suggest that child perceived IIV in harsh parenting is not just measurement error, the question of what IIV in harsh parenting is capturing remains. For externalizing symptoms, the study's findings aligned with the hypothesis and theory. In line with social learning theory, and the idea that inconsistent or intermittent reinforcement of child behaviors increases those behaviors (Bandura, 1977; Deur & Parke, 1970; Long et al., 1958), the findings indicated that higher levels of year-to-year variability in harsh parenting was significantly related to higher levels of externalizing symptoms in adolescence. It may be that when parents are modeling harsh behaviors inconsistently across years, children develop more aggressive behaviors as they transition into adolescence. This suggests that child perceived IIV in harsh parenting may be capturing unpredictability or inconsistency in parenting. However, the lack of significant findings for internalizing symptoms did not support the hypothesis or theory that variability in harsh parenting across years increases children's anticipatory stress, thus increasing rumination and internalizing problems.

Further, the length of time between assessments (1-2 years) brings into question whether IIV is or should be considered "inconsistency", as inconsistency typically refers to fluctuations in behaviors on a shorter timescale (Katz et al., 2019; Lippold et al., 2016). Previous work examining year-to-year fluctuations in parenting behaviors has

conceptualized this within-person variability as “lability” (Lippold et al., 2016). However, the term “lability” is also used in research that examines within-person variability in emotions and/or mood on a shorter timescale (i.e., day-to-day, week-to-week) (Dixon-Gordon & Laws, 2021; Rusby et al., 2019). These differing definitions of “lability” bring into question of if year-to-year fluctuations in parenting behaviors should be characterized as lability, or something else.

The present study provides initial evidence that child perceived IIV in mothers’ harsh parenting is a reliable construct, and that it statistically predicts externalizing, but not internalizing problems in adolescence. However, given the mixed findings, I propose that IIV be referred to simply as “variability” until further research has been done.

Practical Implications

This research also has several important practical implications. The findings underscore that IIV in harsh parenting captures a distinct aspect of parenting and the parent-child relationship that is not captured by average harsh parenting over time, or an individual’s predicted linear growth over time. This may be particularly useful for clinicians and other healthcare professionals working with families, as it underscores the importance of considering variability in child-reported parenting behaviors when considering risk for the development of externalizing problems as children transition into adolescence.

Additionally, the emphasis on child-perceptions of the parenting environment highlights the importance of clinicians and healthcare providers focusing on what the child is reporting about their mothers when identifying risk for the development of externalizing problems. The results also underscore the utility of collecting repeated

measures of a child's parenting environment and assessing variability as well as average harshness over time. This may allow for improved identification of children at risk for developing externalizing problems in adolescence.

Finally, the findings from the present study are important for informing interventions aimed at parenting and child/adolescent development. Understanding the importance of IIV as a predictor of adolescent externalizing problems allows for interventions targeted at reducing year-to-year variability in the parenting environment. Regardless of average levels of child-perceived harshness, results from the present study suggest that it may be beneficial to reduce the amount of variability in child-perceived harshness across time, particularly in mothers.

Strengths

One strength of the present study is the use of reliable, multi-informant (mother, father, and child) measures. This allowed for the examination of IIV in harsh parenting from multiple perspectives to understand the distributions of each and how they were or were not related to each other. The use of child-report of harsh parenting is also an important aspect of the present study, as the child's perception of their parents' behaviors provide valuable insight into the family system and children's well-being that parent-report may not provide us with (Rohner et al., 2005). Furthermore, the present study's large and diverse sample increases the generalizability of the study findings and addresses the ongoing issue of using predominately White samples in psychological research (Nielsen et al., 2017; Roberts et al., 2020).

Finally, the utilization of multiple modeling techniques provides a deeper understanding of the different methods that may be used to conceptualize and quantify

within-person variability in parenting behaviors. To my knowledge, using the coefficient of variation to capture IIV has not been applied to parenting research. This study provides evidence that this is a simple, useful, and reliable tool in estimating within-person variability. Further, replicating the results using RDSEM, which estimates individuals' variability around their slope *within* the model reduces measurement error, and provides further evidence that within-person variability in child perceived mother harsh parenting is an important factor to consider when thinking about the development of adolescent externalizing problems. No study has directly tested and compared these two methods of estimating IIV to each other. Doing so allows for a deeper understanding of the association between IIV in harsh parenting behaviors and adolescent outcomes.

Limitations

This study is not without limitations. It is important to consider that parenting behaviors are themselves influenced by child and adolescent behaviors and attributes (i.e., “child effects”), and therefore, the observed association between harsh parenting and child emotional and behavioral problems is bidirectional (Lengua & Kovacs, 2005; Reitz et al., 2006; Wiggins et al., 2015). For instance, children and adolescents who are higher in aggression are more likely to elicit harsh responses or discipline from their parents, which may then further increase the children's or adolescents' problem behaviors. Because the primary aim of this study was to explore a novel statistical approach to capturing within-person variability in harsh parenting, and to examine its predictive validity, child effects were not included in the model.

Further, the spacing between time points is not ideal, and limits the practical utility of the findings, as needing at least three annual assessments to estimate year-to-

year IIV in harsh parenting is not practical in many cases. While the findings demonstrate that year-to-year IIV in harsh parenting is a predictor of externalizing symptoms in adolescence, it is not yet known if this effect is present when thinking about IIV day-to-day, week-to-week, etc. However, the present study's findings provide the groundwork for future work to assess IIV in harsh parenting on a more frequent timescale.

When conducting research with parents and their children, it is always important to keep in mind the possibility of genetic confounding. This refers to the fact that parents not only influence their child's behavior through the environment they create, but also through their genes (Hart et al., 2021). In the context of this study, it may be that variability in parents' harsh parenting behaviors are directly predicting adolescent outcomes, but it may also be that parents who are higher in externalizing behaviors themselves 1) act more variably, and 2) passed along genes that make it more likely their child would also have elevated externalizing symptoms. Methods such a twin design are needed to remove the possibility of genetic confounding (Hart et al., 2021). Although these analyses were not permitted given the nature of the dataset, it is an important limitation to mention, and future work examining within-person change in parenting behaviors should consider utilizing designs that allow to disentangle genetic and environmental effects.

Lastly, although longitudinal data were used in the analysis, no causal claims can be made about the direction of the effect of IIV in harsh parenting on adolescent externalizing symptoms. Data were observational and not experimentally manipulated, thus, no causal claims can be made.

Conclusion and Future Directions

Overall, despite the study's limitations, the findings provide preliminary evidence for the effect of child-perceived mother year-to-year variability (IIV) in harsh parenting on externalizing symptoms during adolescence. Contrary to the hypothesis and previous research (Fosco et al., 2019), there was no significant effect of IIV in father harsh parenting on adolescent externalizing symptoms. This may be due the mother typically being the child's primary caregiver, and thus spending more time with the child. Thus, the mother's behaviors may have a larger effect on the development of adolescent externalizing symptoms. Further work is needed to understand the differences between the effect of IIV in child-perceived mother and father harsh parenting. Additionally, there were fewer fathers included in the analysis, and the effect size for fathers was about half the magnitude of the mothers' effect size, and in the opposite (i.e., negative) direction (see Table 5). This suggests that the smaller sample of children reporting about their fathers was probably not the reason for non-significant father findings.

Future work should incorporate the effect of child behavior on parenting, by examining how child behavior co-varies with harsh parenting year-to-year would provide insight into how parents and their children are interacting within the family system, and how that relates to the development of psychopathology as children transition into adolescence. Additionally, future work should examine the association of IIV in harsh parenting with other outcomes in childhood/adolescence (i.e., social adjustment, risky behaviors), in order to further understand outcomes associated with increased variability in parenting behaviors. Similarly, considering additional household/environmental factors (i.e., socioeconomic status, household chaos) that relate to or covary with IIV in harsh

parenting is an important next step in identifying factors to target in interventions aimed at reducing IIV in harsh parenting, thus, buffering against negative effects for children/adolescents. Further exploration of factors that covary with and predict IIV in harsh parenting would highlight *why* variability in parenting behaviors is occurring, identify barriers in place that may explain this variability (i.e., parents exhibiting harsher behavior during years with less financial stability, more stress, etc.), and pinpoint ways in which interventions can be targeted to reduce such barriers and promote positive emotional development for adolescents.

Regarding study design, some previous studies that found a significant effect of variability in parenting behaviors on child/adolescent internalizing symptoms assessed parenting behaviors on a shorter timescale (i.e., daily, monthly) (Lippold et al., 2016). Thus, the lack of significant findings related to the predictive effect of IIV on internalizing symptoms may be due to the long (i.e., annual) length of time between assessments in the current sample. Findings from the present study should be replicated using intensive, longitudinal data with less time between assessments (i.e., hourly, daily, weekly assessments). This will allow for a more nuanced understanding of how IIV in harsh parenting relates to outcomes in children and adolescents.

Finally, while the present study focused on symptoms of psychopathology during the transition from childhood to adolescence, future work should consider examining the effects of IIV in harsh parenting during other developmental periods (i.e., early childhood) to understand if effects are similar across development, or unique to specific developmental stages.

Table 1. Descriptive Statistics for predictor, outcome, and control variables

	M	SD	Min	Max	Skew	Kurtosis
Harsh parenting – Child report about mother	1.60	.20	1.23	2.35	1.13	1.64
Harsh parenting – Child report about father	1.57	.21	1.13	2.59	1.26	2.90
Harsh parenting – Mother report	1.56	.16	1.21	2.27	.83	1.30
Harsh parenting – Father report	1.57	.16	1.16	2.18	.61	.86
Internalizing symptoms – age 8	11.00	5.40	1.67	30.50	.65	.24
Externalizing symptoms – age 8	8.98	5.64	0.67	39.50	1.28	3.09
Internalizing symptoms – age 15	9.03	6.95	0.00	36.50	.95	.41
Externalizing symptoms – age 15	6.34	5.14	0.00	29.00	1.42	2.43
Pubertal status – age 11	2.09	.59	1.00	3.80	.37	-.56
Pubertal status – age 15	3.13	.50	1.40	4.00	.16	-.01

Table 2. Descriptive Statistics for IIV in Harsh Parenting

	M (SD)	Min	Max	Skewness
Child report about mother	.116 (.07)	.02	.36	.93
Child report about father	.118 (.07)	.01	.40	1.39
Mother report	.072 (.04)	.01	.27	1.42
Father report	.081 (.06)	0	.47	2.79

Note. IIV = intraindividual variability. IIV in Harsh Parenting was quantified using the coefficient of variation with data from waves 1, 2, 3, 5, and 7 for child-report, and waves 1, 2, 3, 5, and 6 for parent-report.

Table 3. Test-retest Reliability for IIV in Harsh Parenting

	Child – mother 1	Child- mother 2	Child- father 1	Child- father 2	Mother 1	Mother 2	Father 1	Father 2
Child-mother 1	--							
Child-mother 2	.15*	--						
Child-father 1	.49**	.12	--					
Child-father 2	.09	.51**	.12	--				
Mother 1	.09	.03	.07	.14*	--			
Mother 2	.05	.03	.02	.01	.34**	--		
Father 1	.12	.01	-.04	-.03	.07	-.10	--	
Father 2	.06	.15	.02	.03	.08	.02	.28**	--

Note. ** $p < .001$, * $p < .05$; IIV 1 for all respondents was computed using time points 1, 2, and 3. IIV 2 was computed using time points 3, 5, and 7 for child-report, and 3, 5, and 6 for parent-report. Correlation coefficients in bold are those that were expected to be significantly and positively correlated with each other. Child-mother refers to child reporting about their mother, child-father refers to child reporting about their father, mother refers to mother self-report, and father refers to father self-report.

Table 4. Interrater Reliability for IIV in Harsh Parenting

	Child - mother	Child - father	Mother	Father
Child - mother	--			
Child - father	.47**	--		
Mother	.13*	.04	--	
Father	.12	.02	.06	--

Note. ** $p < .001$, * $p < .05$. Correlation coefficients in bold are those that were expected to be significantly and positively correlated with each other. Child-mother refers to child reporting about their mother, child-father refers to child reporting about their father, mother refers to mother self-report, and father refers to father self-report.

Table 5. Effect of IIV in Harsh Parenting on Adolescent Internalizing and Externalizing Symptoms, Controlling for Average Levels of Harsh Parenting, Initial Levels of Psychopathology, Race/Ethnicity, and Pubertal Status (Model 3)

	Internalizing			Externalizing		
	<i>b</i> (SE)	β	<i>p</i>	<i>b</i> (SE)	β	<i>p</i>
Average mother harshness	4.82 (3.28)	.14	.142	-1.88 (2.38)	-.07	.430
IIV - mother	14.68 (8.20)	.14	.074	17.91 (5.91)	.23	.002
Average father harshness	-1.30 (3.07)	-.04	.671	4.04 (2.24)	.17	.071
IIV - father	2.59 (7.14)	.03	.717	-8.61 (5.15)	-.12	.095
Internalizing age 8	.36 (.06)	.28	< .001	--	--	--
Externalizing age 8	--	--	--	.38 (.05)	.41	< .001
Pubertal status age 10	-.59 (.90)	-.05	.517	-.61 (.64)	-.07	.347
Pubertal status age 13	2.95 (1.00)	.21	.003	.29 (.76)	.03	.698
White	2.85 (.98)	.20	.004	.78 (.70)	.07	.266
Hispanic	2.63 (1.04)	.17	.011	1.38 (.75)	.12	.065

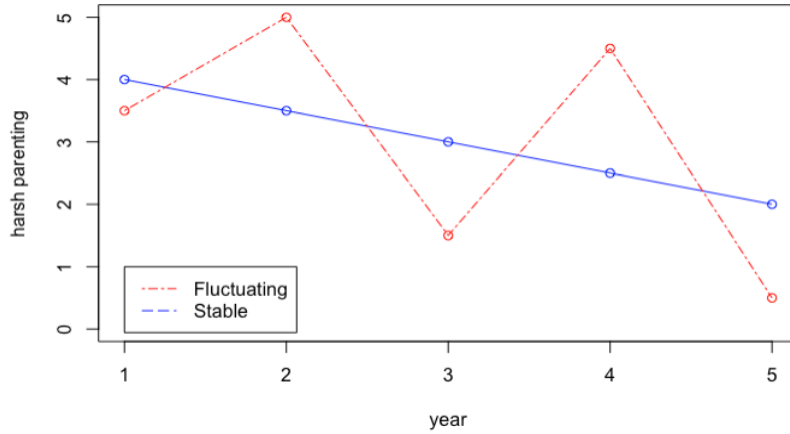
Note. All reported p-values are for the unstandardized estimates. All reports of IIV in harsh parenting, and average harsh parenting are child-report.

Table 6. Variability in Child-Reported Harsh Parenting as a Predictor of Adolescent Externalizing Symptoms using Residual Dynamic Structural Equation Modeling (RDSEM)

	Measurement Model		Structural Model	
	Est.	95% Cr.I.	Est.	95% Cr.I.
<i>Fixed Effects</i>				
Intercept, γ_{00}	1.626	[1.599, 1.655]	--	--
Slope, γ_{10}	-0.001	[-0.002, -0.001]	--	--
Variability, $\sigma^2_{\text{average}}$	-3.628	[-3.792, -3.470]	--	--
<i>Random Effects</i>				
Intercept, τ_{00}	0.031	[0.023, 0.042]	--	--
Slope, τ_{11}	< 0.001	[< 0.001, < 0.001]	--	--
Variability, $\sigma^2_{\text{variance}}$	1.074	[0.777, 1.465]	--	--
IIV harsh parenting	--	--	2.515	[0.732, 5.171]
Externalizing age 8	--	--	0.380	[0.274, 0.488]
Harsh parenting age 8	--	--	-11.903	[-26.672, -0.730]
White	--	--	0.508	[-0.761, 1.803]
Latinx/Hispanic	--	--	1.214	[-0.310, 2.7008]
R ² Externalizing age 15		--		0.224

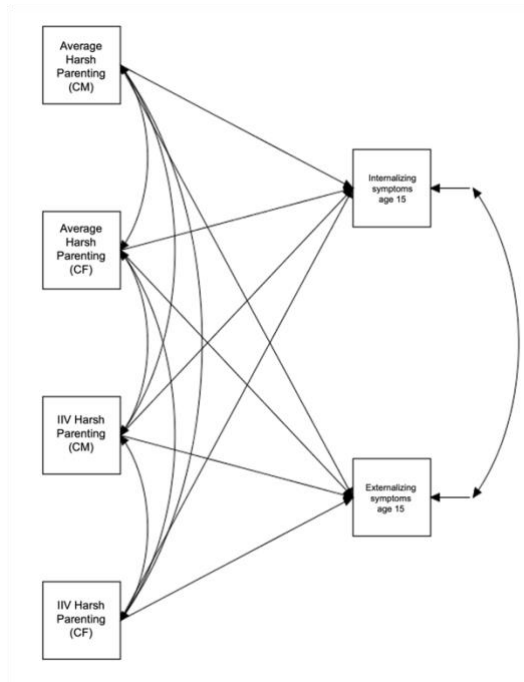
Note. Est. = estimated parameter. Models were estimated using a Bayesian estimator; thus 95% Credible Intervals (Cr.Is) are reported. Boldface indicates a statistically significant effect. The measurement model estimated the latent variability parameter. The structural model estimated the effect of each predictor on adolescent externalizing symptoms.

Figure 1. Example of Two Individuals with the Same Mean but Different Variability



Note. Both individuals in this example have a mean across time of 3 for harsh parenting, but the fluctuating individual varies much more year to year, whereas the stable individual decreases gradually. Additionally, both have a small negative slope, and would therefore have the same estimated slope if using LGM. The present study will be focusing on if the fluctuations over time, as shown in the red dashed line in this figure, predicts adolescent internalizing and externalizing symptoms

Figure 2. Input diagram for Model 1



Note. CM indicates child-report about mother, CF indicates child-report about father.

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