Published in final edited form as:

J Child Fam Stud. 2019 January ; 28(1): 116–130. doi:10.1007/s10826-018-1261-7.

Associations between Child Maltreatment, Harsh Parenting, and Sleep with Adolescent Mental Health

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Abstract

Youth who suffer from psychiatric disorders are at high risk for negative outcomes, including aggression and substance abuse. Although many youth with psychiatric disorders have endured harsh parenting and/or child maltreatment (CM), differential associations between these experiential factors have yet to be fully explored. Sleep problems have also been implicated in psychiatric disorders and are consistently associated with CM. The overlap and unique contributions of CM and sleep problems to the mental health of youth remains unclear; longitudinal studies from late childhood into adolescence, when psychiatric illnesses frequently onset, are rare. The current longitudinal study examined associations of CM, harsh parenting, and sleep problems with symptoms of four psychiatric disorders: Conduct Disorder, Attention Deficit Hyperactivity Disorder, Anxiety, and Depression. Early adolescent youth with no history of substance use ($N = 529$) were sampled from a working class, medium-sized city in northern Kentucky, and an extensive battery of tests were administered to youth and a parent. CM was more strongly and consistently related to psychiatric disorder symptoms at baseline than was harsh parenting. Reports of harsh parenting were more strongly associated with externalizing symptoms than internalizing symptoms. Sleep problems were also positively associated with psychiatric disorder symptoms at baseline, but did not exacerbate the effects of CM or harsh parenting on symptom counts. Longitudinally, harsh parenting was more predictive of change in psychiatric

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Author Contributions

BHC analyzed the data and wrote the method, results, and discussion sections. TAR collaborated in interpreting the data, editing of the paper, and served as a consultant for data analyses. DHF designed and executed the study, contributed to interpretations, wrote the introduction, and collaborated in editing the paper.

Conflict of Interest: B. H. Calhoun declares that he has no conflict of interest. T. A. Ridenour declares that he has no conflict of interest. D. H. Fishbein declares that she has no conflict of interest.

Compliance with Ethical Standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional review board at RTI International and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

symptoms two to three years later than was CM. The potential significance of childhood adversity and sleep problems for prevention of later mental health problems are discussed.

Keywords

psychiatric disorders; child maltreatment; harsh parenting; sleep; adolescence

INTRODUCTION

Youth with psychiatric disorders are at considerably high risk for multiple concerning outcomes, including aggression, school drop-out, sexually transmitted diseases, unplanned pregnancy, and substance abuse (NRC/IOM, 2009). These youth pose a significant burden to society and their families in terms of disproportionate representation in the child welfare and juvenile justice systems (Pecora, Jensen, Romanelli, Jackson, & Ortiz, 2009; Wasserman, Ko, & McReynolds, 2004) and estimated annual costs of \$247 billion in the United States (Eisenberg & Neighbors, 2007). Poor outcomes often extend into adulthood in terms of chronic mental and physical illnesses, additional costs to the health care and justice systems, losses in productivity, and passing multigenerational risk for psychiatric disorders to their offspring.

Child maltreatment (CM), including emotional abuse, emotional neglect, physical abuse, physical neglect, and sexual abuse, has long been established as a risk factor for adolescent mental health problems (Gerson & Rappaport, 2013). CM has been shown to either precipitate or compound the severity and longevity of physical, behavioral, and psychological symptoms in adolescence (Balistreri & Alvira-Hammond, 2016; Bielas et al., 2016). CM has also been associated with the protraction of psychiatric disorders into adulthood (Merrick et al., 2017). For example, cross-sectional research has documented an association between CM and Attention Deficit Hyperactivity Disorder (ADHD) (Brown et al., 2017), and studies have shown that CM is pervasive in juvenile offenders with psychiatric disorders and in adult offenders (Bielas et al., 2016; Swogger, Conner, Walsh, & Maisto, 2011). A dose-response relationship appears to exist between the type and severity of CM and psychiatric disorder symptomatology (Anda et al., 2006).

There also appears to be an association between youth psychiatric disorders and harsh parenting, which is considered a lesser form of abuse and is generally not considered reportable (Green et al., 2010; Straus & Field, 2003). Harsh parenting is more prevalent in the United States than CM, and it involves corporal punishment (i.e., physical penalties for perceived misbehaviors, such as spanking and slapping) and psychological aggression, including verbal and symbolic acts by a caregiver that cause the child to experience psychological pain, fear, intimidation and/or threat. Although harsh parenting often co-occurs with CM and can at times be challenging to distinguish, there are instruments and methodologies that can be used to separate the two with reasonable confidence. Regardless, a refined understanding of ways in which these two types of experiences may differentially characterize relationships between negative familial experiences and youth mental health is needed to inform intervention and public education strategies.

The most prominent mechanistic hypothesis is that CM and harsh parenting lead to heightened physiological and psychological stress reactivity that may increase liability to psychiatric disorders (Heim, Shugart, Craighead, & Nemeroff, 2010). The repeated stimulation of the hypothalamic-pituitary-adrenal (HPA) axis by stressful experiences during childhood may dysregulate neurophysiological systems that support mental, emotional, and behavioral health when reacting to stressors experienced later in life. There may also be a role for hormonal changes in early pubertal development that, in interaction with CM, may exacerbate psychiatric disorder symptoms (Paus, Keshavan, & Giedd, 2008). Thus, the transition into adolescence itself, typified by substantial biological, cognitive, and psychosocial changes, has been associated with the onset or worsening of psychiatric symptoms in susceptible individuals (Cicchetti & Rogosch, 2002; Paus et al., 2008).

Research has yet to determine whether (1) CM and harsh parenting precipitate the development of psychiatric disorders (Chaffin, Kelleher, & Hollenberg, 1996), (2) psychiatric symptoms, such as aggression or impulsivity, increase the likelihood of CM (Schulz-Heik et al., 2010), or (3) they co-occur in some families due to shared variance, such as common genetic liability (e.g., there is a higher rate of psychiatric disorders among abusive parents that may be genetically transmitted) (Bornovalova et al., 2013). Correlational studies often refer to “impact,” “prediction,” and “effect;” however, in the absence of a prospective longitudinal design, inferring causality is not possible (Dinkler et al., 2017). Yet, early CM and harsh parenting have been repeatedly associated with the later emergence of psychiatric disorders, thereby giving existing theories some credence. There is also some evidence that the impact of early experiences may not manifest until prefrontal-mesolimbic brain circuits begin to connect during adolescence (Andersen, 2016), making it a highly vulnerable period for the expression of psychiatric disorders (Ladouceur, Peper, Crone, & Dahl, 2012). A longitudinal design will help clarify associations between CM, harsh parenting, and mental health in early and middle adolescence.

Another factor that may play a role in these relationships is sleep problems, which are now at the forefront of research on adolescent development and functioning in several domains (e.g., cognition, mood, physical ailments). Adolescence is characterized by distinctive needs with respect to the amount of sleep required, and the shift in sleep cycles toward later sleep and wake times (Carskadon, Acebo, & Jenni, 2004; Crowley, Acebo, & Carskadon, 2007). Insufficient sleep and/or sleep patterns misaligned with school and extra-curricular schedules, both of which are common in adolescence, are known to have adverse physical and mental health outcomes. Sleep deprivation has been linked to obesity (Nielsen, Danielsen, & Sørensen, 2011), mood problems and suicidal ideation (Sarchiapone et al., 2014; Touchette et al., 2012), academic and school concerns (Asarnow, McGlinchey, & Harvey, 2014; Beebe, 2011), and conduct problems (Lin & Yi, 2015). Poor sleep quality is further associated with earlier onset and increased use of substances (Hasler, Martin, Wood, Rosario, & Clark, 2014; Shocat, Cohen-Zion, & Tzischinsky, 2014).

Of relevance, chronic physical and psychosocial stressors (e.g., CM, harsh parenting, family dysfunction, poverty, trauma) can profoundly impact sleep and place youth at risk for sleep disturbances. Activation of the HPA axis mentioned above plays an essential role in sleep–wake cycles and functioning of the circadian system (Van Reeth et al., 2000), as well as

emotion regulation (Stansbury & Gunnar, 1994). Both human and animal studies have shown a bidirectional relationship between the regulation of the HPA axis and sleep variations (Buckley & Schatzberg, 2005). Prolonged activation of this system due to chronic stress can stimulate an overproduction of glucocorticoids, which may reflect a dysregulated response to stress, increasing risk for sleep disruptions (Cicchetti, Rogosch, Gunnar, & Toth, 2010; Lavie, 2001), attentional and inhibitory dyscontrol (Davis, Bruce, & Gunnar, 2002), poor social competence (Blair & Peters, 2003), cognitive deficits (Quas, Bauer, & Boyce, 2004), and psychiatric disorders (Lupien, McEwen, Gunnar, & Heim, 2009; Ruttle et al., 2011). As stressors, CM and harsh parenting can disrupt neuroendocrine regulation of sleep and, in turn, compromise the ability to modulate emotion; an effect that may contribute to the relationship between CM and harsh parenting and psychiatric disorders.

One necessary (but not sufficient) step toward disentangling how sleep problems, CM/harsh parenting, and psychiatric symptoms affect each other will be to delineate the sequence in which they occur. Moreover, as some psychiatric disorders frequently manifest during childhood (e.g., anxiety disorders and ADHD) while others onset in adolescence (e.g., Major Depressive Disorder and Conduct Disorder) (Merikangas et al., 2010), it is important to investigate symptoms of psychiatric disorders exhibited prior to and during adolescent development (e.g., Generalized Anxiety Disorder, Major Depressive Disorder, ADHD, and Conduct Disorder). An ongoing prospective, longitudinal study of the neurodevelopmental precursors and consequences of substance use afforded us a unique opportunity to examine differential associations between CM, harsh parenting, sleep problems, and psychiatric symptoms in early and middle adolescence. Results of these analyses are expected to guide subsequent investigations of the etiological role(s) of CM, harsh parenting and sleep problems in relation to psychiatric disorders and neurodevelopment in early adolescence. We first hypothesized that more severe CM (i.e., physical abuse and neglect) would show stronger and more consistent associations with psychiatric symptoms at ages 10–12 than would harsh parenting (i.e., corporal punishment and psychological aggression). Second, based on existing literature (McKee et al., 2007; Oshri, Rogosch, Burnette, & Cicchetti, 2011), we anticipated that harsh parenting would be more strongly and more consistently related to externalizing symptoms of ADHD and Conduct Disorder than to internalizing symptoms of Generalized Anxiety Disorder and Major Depressive Disorder. Third, we expected sleep problems to be positively associated with psychiatric symptoms at baseline, and that the interactions between sleep problems and both CM and harsh parenting would more strongly predict psychiatric symptoms than either would alone. Lastly, we hypothesized that CM and harsh parenting would differentially predict the onset or worsening of psychiatric symptoms two to three years later. Fleshing out these relationships will help advance the field in terms of the prominence and placement of CM, harsh parenting, and sleep problems with regard to psychiatric symptoms in adolescence.

METHOD

Participants

A detailed description of the recruitment and data collection procedures is provided in Fishbein et al. (2016). This study was granted approval from the Institutional Review Board

(IRB) at the third author's previous institution (Protocol #11928, Study Title: Longitudinal Study of Marijuana Use and Neurodevelopment). Early adolescent youth with no history of substance use ($N = 529$) were recruited from a working class, medium-sized city in northern Kentucky characterized by a high rate of early marijuana initiation compared to state and national rates (i.e., 12% of 6th graders had initiated use) (Fishbein et al., 2016). Administrators of all three middle schools were approached to assist with recruitment. A variety of subject recruitment strategies were used: (1) posters displayed and flyers distributed in schools described the study, its importance, and eligibility criteria; (2) mailing to all age-eligible households a study package that included a superintendent's endorsement letter and study brochure, both of which provided information regarding the study's purposes, procedures, and implications; and (3) directly contacting primary caregivers via telephone numbers and home addresses provided by the school district (information is public domain). To be eligible for inclusion, participants had to (1) be between the ages of 10 and 12, (2) provide assent and parental consent, and (3) have never used more than pre-specified small amounts of alcohol (i.e., one standard drink) or any illicit substances. Seventy-nine percent of the eligible participants who were recruited agreed to participate in the study and completed the screening instrument. At Wave 1, the average age of participants was 11.34 years ($SD = .97$), and the sample was 49% female. The average time between the two waves of data collection was 2.81 years ($SD = .35$).

Procedure

Parent and child interviews were conducted by field staff in separate sessions in private locations within the family's home. Interviews were computer-assisted, and Audio Computer-Assisted Self-Interview (ACASI) technology, which has been shown to elicit more accurate responses than paper-and-pencil mediums (Colpe et al., 2010), was used for sensitive questions. We also invoked an IRB-approved "Distressed Respondent and Mandatory Reporting Procedure" to address significant discomfort during the interview and reports from participants reflective of recent past trauma and imminent harm to self or others. Parents and children were compensated with cash (\$70) and gift cards (\$40), respectively.

Measures

Parent-reported psychiatric disorder symptoms were assessed at Waves 1 and 2 using the National Institute of Mental Health's *Computerized Diagnostic Interview Schedule for Children* (CDISC) (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000), which asked parents if their children experienced specific psychiatric disorder symptoms in the prior 12 months based on DSM-IV criteria. Items were coded as "Yes" (1) or "No" (0), with some items having the option of "Sometimes/Somewhat" (3). Participants also had the options "Refuse to answer" (7), "Not applicable" (8), and "Don't know" (9). All values other than 1 were later recoded as 0. Symptoms were summed to produce counts at Waves 1 and 2 for four psychiatric disorders: Generalized Anxiety Disorder (GAD), Major Depressive Disorder (MDD), Attention Deficit Hyperactivity Disorder (ADHD), and Conduct Disorder (CD). The test-retest reliability of the CDISC is acceptable (Cawthorpe, 2001; Shaffer et al., 2000); it has moderate to good criterion validity across diagnoses (Schwab-Stone et al., 1996); and it has reasonably good concurrent (King et al., 1997) and discriminant validity

(Friman et al., 2000). The test-retest reliability of the CDISC in this study was .28, .27, .25, and .54 for GAD, MDD, ADHD, and CD symptoms, respectively.

Child-reported child maltreatment (CM) was assessed at Wave 1 using the *Childhood Trauma Questionnaire* (CTQ; Bernstein & Fink, 1998), which is a 25-item self-report measure used to rapidly screen for five types of CM: emotional abuse, emotional neglect, physical abuse, physical neglect, and sexual abuse. The CTQ refers to anytime during childhood (i.e., it is not defined by specific ages), as items begin with the phrase “When I was growing up...” Further, it does not differentiate between events that happened previously and events that are ongoing. The CTQ includes items such as “I was punished with a belt, board, cord, or other hard object.” Items were answered on a five-point scale with responses ranging from “Never true” (0) to “Very often true” (4). CTQ total scores were computed by calculating the mean of all 25 items for each individual. The CTQ has demonstrated acceptable to excellent test-retest and internal consistency reliability (Bernstein & Fink, 1998; Scher, Stein, Asmundson, McCreary, & Forde, 2001), and support has been shown for the construct, discriminant, and convergent validity of the CTQ (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997; Bernstein & Fink, 1998). The internal consistency reliability of CTQ items in this study was .80.

Parent-reported harsh parenting was assessed at Wave 1 using a modified version of the parent-to-child version of the *Conflict Tactics Scale* (CTS-PC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998), which is a 27-item measure used to screen for four types of CM that have occurred in the past 12 months: non-violent discipline, psychological aggression, physical assault, and neglect. Items were answered on a seven-point scale with responses including “This has never happened” (0), “Once in the past year” (1), “Twice in the past year” (2), “3 to 5 times” (3), “6 to 10 times” (4), “11 to 20 times” (5), and “More than 20 times” (6). Items were recoded such that the midpoint of each interval (0, 1, 2, 4, 8, 15, and 25, respectively) was used. The CTS-PC includes such items as “Spanked him/her on the bottom with your bare hand.” Previous work has provided evidence supporting the internal consistency of the CTS (α 's > .79; Straus, Hamby, Boney-McCoy, & Sugarman, 1996), as well as the construct and discriminant validity of both the CTS and the CTSPC (Straus et al., 1998; Straus & Hamby, 1997). In this study, only the five-item psychological aggression scale and the five-item corporal punishment subscale of the physical assault scale were used. Psychological aggression scores were calculated by summing the five recoded items in that scale, and corporal punishment scores were calculated by summing the five recoded items in that subscale. The corporal punishment subscale scores were square root transformed in order to reduce the positive skew in its distribution. The internal reliability estimates for the psychological aggression scale and the corporal punishment subscale were .65 and .45, respectively.

Child-reported sleep problems were assessed at Wave 1 using the *Sleep Habits Survey* (SHS; Wolfson et al., 2003), which asks respondents about their usual sleeping and waking behaviors in the past two weeks. The SHS generates a number of variables related to sleep problems for both weekday and weekend nights. The validity of the *Sleep Habits Survey* has been supported in prior work comparing the SHS with diary and actigraphy methods of assessment (Wolfson et al., 2003). The only variable from the SHS included in this study

was *initial sleep latency for weekdays* (heretofore referred to as “sleep latency”), which asked children to report the number of minutes it typically takes them to fall asleep on weekdays using a free-response format. Sleep latency was selected due to its association with a host of habits that characterize poor sleep hygiene, such as viewing an electronic device prior to sleep, consuming caffeinated beverages, not having a consistent bedtime or routine, and less overall sleep (Mindell, Meltzer, Carskadon, & Chervin, 2009). As a result of experiencing a biological delay in sleep latency upon entering puberty, combined with earlier school start times from elementary to middle to high school, adolescents often get inadequate sleep on weekdays in comparison to weekend days (Carskadon & Acebo, 2002; Wolfson et al., 2003). The resulting sleep debt that accrues has been linked with sleepiness, moodiness, and poor performance at school (Wolfson & Carskadon, 1998). Thus, taking longer to fall asleep on weekdays, in which wake times are fixed, may be characteristic of irregular sleep patterns and possible sleep problems.

Data Analyses

Because the CDISC outcome variables consisted of count data, which are non-negative integers typically characterized by a positively skewed distribution, the assumptions of the general linear model (e.g., homoscedasticity, normality of residuals) were violated. Instead, negative binomial regressions (Coxe, West, & Aiken, 2009), which are based on the generalized linear model, were estimated using the `glm.nb()` function in the MASS package (Venables & Ripley, 2002) in R 3.3.3 (R Core Team, 2017). Negative binomial regressions are similar to overdispersed or quasi-Poisson regressions, but use a slightly different error structure and allow for heterogeneity among individuals with the same level on predictor variables (Coxe et al., 2009).

Three sequential sets of analyses were conducted, each providing unique information about how psychiatric symptoms are associated with CM, harsh parenting, and sleep problems. First, after descriptive statistics were computed, bivariate negative binomial regressions were estimated to determine the associations between all predictor and outcome variables used in analyses. These analyses provided concurrent associations and served as comparisons for partial associations from the subsequent multivariate regressions. Second, to clarify the unique associations among these characteristics at Wave 1, multivariate regressions were used to model Wave 1 CDISC symptom counts of each of the four psychiatric disorders as a function of child age, CM/harsh parenting, sleep latency, and the interaction between sleep latency and CM/harsh parenting. Lastly, to test whether CM, harsh parenting, and sleep problems have unique, long-term associations with later psychiatric symptoms (controlling for Wave 1 levels of psychiatric symptoms), multivariate regressions were used to estimate Wave 2 CDISC symptom counts of each of the four psychiatric disorders as a function of child age, Wave 1 symptom count, CM/harsh parenting, sleep latency, and the interaction between sleep latency and CM/harsh parenting. Predictor variables in all multivariate negative binomial regressions were assessed at Wave 1 and were mean-centered such that intercepts represented the number of symptoms reported for the typical child in the sample. In analyses predicting Wave 2 symptoms while controlling for Wave 1 symptom counts, results for other Wave 1 predictors can be interpreted as accounting for change in symptom counts between Wave 1 and Wave 2.

Missing data.—From the original sample of $N = 529$, two participants were missing data for all four outcomes at both waves, two were missing data on the CTQ, six were missing data on the CTS-PC, and seven were missing data on the sleep latency item. Further, there were 37 parents who provided responses to the CDISC outcome variables at Wave 1, but did not provide responses at Wave 2. However, there was only one variable for which these 37 individuals whose parents did not provide data on Wave 2 CDISC outcomes differed from adolescents whose parents did provide data on Wave 2 outcomes. Individuals who dropped out after Wave 1 reported more CD symptoms at Wave 1 ($M = 2.56$, $SD = 3.18$) than those who completed surveys at Wave 2 ($M = 1.74$, $SD = 2.46$, $F(1,521) = 3.90$, $p < .05$). Overall, our analytic dataset contained only 2.85% missing data. Therefore, participants who supplied complete data on all variables were included in analyses (i.e., missing data was handled using listwise deletion), and the analytic sample ranged in size from $N = 473$ –514.

RESULTS

Descriptive Statistics

Of the 529 youth who were recruited, 49% were female. Youth participants were diverse in terms of race (53% were White, 30% Black, and 17% other, as compared with county resident rates of 81% White and 11% Black) and academic competence (37% mostly “A’s” to 3% mostly “F’s”). Most caregivers were female (91%) and a biological parent of the child (90%). Caregivers varied in age ($M = 36.56$ years, $SD = 8.26$), and educational attainment was reported as 27% less than high school, 38% high school graduate/GED credential, 29% some college, and 6% college graduate or higher (as compared with county resident rates of 84% with high school degrees and 22% with a Bachelor’s degree or greater).

Univariate descriptive statistics are presented in Table 1. The average age of youth at baseline was 11.34 years old ($SD = .97$), and the average time between waves was 2.81 years ($SD = .35$). At baseline, the average number of psychiatric symptoms was 3.16 ($SD = 2.56$) for GAD, 5.81 ($SD = 4.45$) for MDD, 5.95 ($SD = 5.14$) for ADHD, and 1.80 ($SD = 2.53$) for CD. At Wave 2, the average number of psychiatric symptoms was 2.73 ($SD = 2.46$) for GAD, 4.86 ($SD = 4.54$) for MDD, 5.52 ($SD = 5.24$) for ADHD, and 2.74 ($SD = 3.00$) for CD. Notably, the only psychiatric disorder with increased symptoms from Wave 1 to Wave 2, on average, was CD.

Bivariate associations between predictor and outcome variables, estimated using negative binomial regressions, are shown in Table 2. Wave 1 and Wave 2 symptom counts of all psychiatric disorders were positively associated with each other, with weaker associations occurring in associations between waves. Wave 1 CTQ total scores were positively associated with symptom counts of all psychiatric disorders in both waves, except Wave 2 ADHD. These associations were weaker for Wave 2 psychiatric disorders than those in Wave 1. Wave 1 corporal punishment was positively associated with Wave 1 symptom counts of MDD, ADHD, and CD, but not GAD, and was positively associated with Wave 2 symptom counts of GAD, ADHD, and CD, but not MDD. Wave 1 psychological aggression was positively associated with Wave 1 symptom counts of MDD, ADHD, and CD, but not GAD, and was positively associated with symptom counts of all four psychiatric disorders at Wave 2. Sleep latency was positively associated with Wave 1 symptom counts of GAD, MDD, and

ADHD, but not CD, and it was not associated with symptom counts of any of the four psychiatric disorders at Wave 2.

Child Maltreatment and Harsh Parenting as Differential Predictors of Baseline Psychiatric Symptoms

Table 3 displays the results of three sets of negative binomial regressions estimating the number of psychiatric symptoms at Wave 1 as a function of child age, an indicator of CM or harsh parenting, sleep latency, and the interaction between sleep latency and the CM or harsh parenting indicator. Child-reported CTQ total scores were used as an indicator of CM in the first set of models; parent-reported CTS-PC corporal punishment subscale scores were used as an indicator of harsh parenting in the second set of models; and parent-reported CTS-PC psychological aggression scale scores were used as an indicator of harsh parenting in the third set of models.

CTQ total scores were positively associated with symptoms of all four psychiatric disorders at Wave 1. For example, in the model predicting GAD symptoms, each one unit increase in CTQ total score was associated with a 68% increase in GAD symptoms, or slightly more than two symptoms on average, when keeping other variables constant. More specifically, the exponentiated coefficient of 1.68 for CTQ total scores multiplied by the exponentiated intercept (3.09) resulted in an incidence rate ratio of 5.19 GAD symptoms for a person one-unit above the mean CTQ total score, when controlling for all other variables. Corporal punishment and psychological aggression were separately, positively associated with Wave 1 symptom counts of MDD, ADHD, and CD, but not GAD. It is important to note that the range of the psychological aggression predictor variable was 0–100, in contrast to a range of 0–2.76 for CTQ total score and a range of 0–7.35 for corporal punishment.

Taken together, findings supported our first hypothesis that child maltreatment (CM; i.e., CTQ total scores) would be a more consistent predictor of psychiatric symptoms than either indicator of harsh parenting (i.e., CTS-PC corporal punishment and psychological aggression). CM was associated with symptom counts of all four psychiatric disorders, whereas neither indicator of harsh parenting was associated with symptoms of GAD, but both were positively associated with symptoms of the other three psychiatric disorders. CM was also a stronger predictor of psychiatric symptoms, as the magnitude of the incidence rate ratios was greater for CM than for either indicator of harsh parenting across models. Additionally, findings supported our second hypothesis that both indicators of harsh parenting would be more strongly and more consistently associated with externalizing symptoms of ADHD and CD than with internalizing symptoms of MDD and GAD. Neither corporal punishment nor psychological aggression was significantly associated with GAD symptoms, and the magnitude of the incidence rate ratios for both harsh parenting indicators were larger in models estimating externalizing symptoms of ADHD and CD than those estimating internalizing symptoms of MDD and GAD.

Associations between Sleep Problems and Baseline Psychiatric Symptoms

Of the 12 models estimating Wave 1 psychiatric disorder symptom counts in Table 3, sleep latency was positively associated with symptom counts of psychiatric disorders in all

models, except for the model estimating CD symptoms with corporal punishment used as an indicator of harsh parenting. Figure 1 shows the expected number of symptoms for each of the four psychiatric disorders at varying levels of sleep latency based on regressions in which CTQ total score was used as indicator of CM.

As noted above, CM was positively associated with symptom counts of all four psychiatric disorders, and both indicators of harsh parenting were positively associated with symptom counts of MDD, ADHD, and CD, but not GAD. In the first set of models in Table 3, in which CTQ total scores were used as an indicator of CM, there was a statistically significant interaction between CTQ total scores and sleep latency in all four models, such that the association between CM and psychiatric disorder symptom counts was slightly attenuated for adolescents who also demonstrated sleep problems. Put another way, the effects of CM and sleep problems were slightly less than additive when experienced together.

In models in Table 3 in which corporal punishment was used as an indicator of harsh parenting, there were no statistically significant interactions between sleep latency and corporal punishment, which indicated that sleep problems did not exacerbate the effect of corporal punishment. In the models in which psychological aggression was used as an indicator of harsh parenting, the only statistically significant interaction between sleep latency and psychological aggression was in the model estimating ADHD symptoms. As with the models described above, the association between psychological aggression and ADHD symptoms was attenuated for those who also experienced sleep problems. Therefore, our findings provided only partial support for our third hypothesis that sleep problems would be associated with psychiatric symptoms and would exacerbate the effects of CM and harsh parenting on symptom counts.

Child Maltreatment and Harsh Parenting as Longitudinal Predictors of Psychiatric Symptoms

Table 4 displays the results of three sets of negative binomial regressions estimating the number of psychiatric symptoms at Wave 2 as a function of child age, Wave 1 symptom counts, an indicator of CM or harsh parenting, sleep latency, and the interaction between sleep latency and the indicator of CM or harsh parenting. CTQ total scores and sleep latency at Wave 1 were not associated with symptom counts of any psychiatric disorders at Wave 2, while controlling for Wave 1 symptoms. Wave 1 corporal punishment scores were positively associated with GAD symptom counts at Wave 2, but not Wave 2 symptom counts of MDD, ADHD, or CD. Wave 1 psychological aggression scores were positively associated with Wave 2 symptom counts of ADHD and CD, but not Wave 2 symptom counts of GAD and MDD. Taken together, findings provide only partial support for our fourth hypothesis that CM and harsh parenting would differentially predict the onset or worsening of psychiatric symptoms two to three years after baseline. Even though CM was the strongest and most consistent predictor of psychiatric symptoms at baseline, CM did not predict symptom counts of any psychiatric disorders at Wave 2, when controlling for Wave 1 symptom counts. Although the two indicators of harsh parenting were associated with symptom counts of the same psychiatric disorders at baseline, they were associated with symptom counts of different psychiatric disorders at Wave 2.

DISCUSSION

The present study explored the relationships between child maltreatment, harsh parenting (corporal punishment and psychological aggression), sleep problems, and psychiatric symptoms among adolescents in a largely working class community. Findings supported our first hypothesis that CM (i.e., physical abuse and neglect) would show stronger and more consistent positive associations with psychiatric symptoms than would harsh parenting (i.e., corporal punishment and psychological aggression). Results also supported our second hypothesis that harsh parenting would show stronger and more consistent positive associations with externalizing symptoms than with internalizing symptoms. However, we found only partial support for our third hypothesis that sleep problems would be associated with psychiatric symptoms and would exacerbate the effects of CM and harsh parenting on symptom counts. Similarly, we found only partial support for our last hypothesis that CM and harsh parenting would differentially predict the onset or worsening of psychiatric symptoms two to three years after baseline.

Differential Relationships of Child Maltreatment and Harsh Parenting with Psychiatric Symptoms

At baseline, CM showed stronger and more consistent positive associations with psychiatric symptoms than either indicator of harsh parenting. This finding is not surprising given that CM involves practices that are considered more serious and traumatic, hence their illegality in the United States, than harsh parenting (Afifi, Mota, Sareen, & MacMillan, 2017). And although harsh parenting is generally considered less severe and impactful, and as such is not legislated, evidence is mounting that it does have a measurable, negative impact on child mental health outcomes (Scott, 2012). It may be important to note that harsh parenting has been established as both corollary and a prelude to CM and, in some circumstances (e.g., in pediatric settings), is difficult to distinguish; however, our measures are designed to establish this distinction and clearly indicate that CM has been more impactful at baseline in our sample.

In contrast, our longitudinal analyses provided a more nuanced picture. Unsurprisingly, symptoms of psychiatric disorders at baseline were the strongest predictors of symptoms two to three years later. However, even though CM was the strongest predictor of symptoms at baseline, it was not associated with symptom counts of any of the four psychiatric disorders at Wave 2, when controlling for Wave 1 symptoms. Interestingly, corporal punishment was positively associated with GAD symptoms at Wave 2, and psychological aggression was positively associated with ADHD and CD symptoms at Wave 2, when controlling for Wave 1 psychiatric symptoms. Thus, harsh parenting seemed to be more predictive of increases in symptoms across waves than CM or sleep problems. This finding indicates that psychiatric symptoms are relatively stable during early adolescence, and that exposure to harsh parenting, which is often more continuous than CM, may be more detrimental to ongoing exacerbations in psychiatric symptoms than either CM or poor sleep patterns.

However, the mechanism underlying these differential associations is still unclear. CM may have triggered psychiatric symptoms in childhood that were detected at Wave 1, but that

stabilized by Wave 2. This would explain the strong associations between CM and psychiatric symptoms at baseline, and the lack of associations between CM at baseline and symptoms two to three years later. In this case, perhaps harsh parenting becomes more severe as individuals enter adolescence, or perhaps the effects of harsh parenting increasingly manifest during adolescence in the form of externalizing behaviors. Another possible pathway is that harsh parenting had an accumulating effect on externalizing behaviors over time or distinct developmental stages. Further interpretation of these findings is hampered by the lack of measures of any additional incidences of CM and harsh parenting or the ongoing nature of harsh parenting between waves. In addition to the possible pathways presented here, it is also important to note that many large maturational changes were occurring concurrent to the specific associations that were found. For example, normative adolescent development is characterized by a heightened sensitivity to reward and risk taking behaviors, while cognitive controls from a still immature brain circuitry are not yet in play. This disconnect can lead to behavioral and affective problems in response to new demands of the adolescents' social environment.

Differential Relationships of Harsh Parenting with Symptoms of Internalizing and Externalizing Disorders

In addition to documenting differential relationships of CM and harsh parenting with psychiatric symptoms more broadly, we also found more specific differential relationships in the associations of harsh parenting with symptoms of internalizing and externalizing disorders. Specifically, we found that harsh parenting was more strongly, positively associated with externalizing symptoms of CD and ADHD than with internalizing symptoms of GAD and MDD. These findings were consistent with existing literature documenting such differential relationships in adolescence and young adulthood (McKee et al., 2007; Oshri et al., 2011).

One explanation is that a developmental pathway may exist in which adverse family environments (e.g., those characterized by CM, familial conflict, harsh parenting) place children at increased risk for maladaptive personality functioning and/or emotion and physiological stress response dysregulation, which in turn places youth at later risk for externalizing problems, such as aggression or substance use (Skeer, McCormick, Normand, Buka, & Gilman, 2009). A second explanation is that genetic propensities may be similarly expressed as harsh parenting (e.g., as a reflection of greater antisocial behavior), CD, and ADHD. Another possible route emanates from social learning theory (Bandura, 1977), which suggests that exposure to aggressive or coercive parenting behaviors can encourage children's own aggressive behavior and problem-solving strategies, as well as serving as a model of aggressive responding to interpersonal conflicts (Erath, El-Sheikh, & Cummings, 2009). A fourth possibility pertains to measurement; that is, reports of externalizing symptoms, which are typically easier to observe, show more consistency across informants than do reports of internalizing symptoms, which tend to be less readily observable (de Los Reyes & Kazdin, 2005; Duhig, Renk, Epstein, & Phares, 2000). In effect, parents' reports of child externalizing symptoms may be more accurate and include less statistical noise, which would make the association between harsh parenting and child externalizing symptoms easier to detect. Finally, children's misbehavior elicits disciplinary actions, which may

become harsher if a child's behavior does not change (as often happens with CD and ADHD). Therefore, additional work exploring the differential relationships among harsh parenting and child psychopathology is warranted. It is likely that more than one or all of these factors contribute to the associations among harsh parenting and offspring CD and ADHD, and therefore is not surprising that associations between harsh parenting with CD and ADHD are more consistent than other associations between parenting and youth internalizing symptoms.

Sleep Problems as a Predictor of Psychiatric Symptoms

Sleep problems demonstrated consistent, positive associations with psychiatric symptoms at baseline, indicative of a solid relationship between them. As mentioned earlier, sleep problems have been found to precipitate and in some cases mediate mental health problems; however, it is not possible to discern any temporal ordering in the present study. Our finding does suggest, however, that neither CM nor harsh parenting acted as a third variable that drove the associations between sleep latency and psychiatric symptoms or vice versa. Importantly, sleep latency has been linked with stressful experiences, dysregulated stress responses (Schäfer & Bader, 2013) and abuse (Glod, Teicher, Hartman, & Harakal, 1997) during childhood. However, sleep problems were not associated with symptoms of any psychiatric disorders at Wave 2, and we found no evidence that sleep problems exacerbated the effects of CM and harsh parenting, as we hypothesized. Rather, it appeared that experiencing sleep problems slightly attenuated associations of CM and harsh parenting with psychiatric symptoms, such that the effects of sleep problems and CM or harsh parenting were slightly less than additive when experienced together.

Our findings are consistent with those of past studies documenting the association between general sleep problems, as well as prolonged sleep latency more specifically, and psychiatric symptoms in both childhood (Armstrong, Ruttelle, Klein, Essex, & Benca, 2014; Cortese, Faraone, Konofal, & Lecendreux, 2009) and adolescence (Alfano, Zakem, Costa, Taylor, & Weems, 2009; Pieters et al., 2015). It is also relevant that sleep problems may be symptomatic of psychiatric disorders, as opposed to being causal. For example, sleep disturbance is one of the core symptoms for diagnosing MDD (Nutt, Wilson, & Paterson, 2008). However, our analyses were unable to test bi-directional sequencing between sleep problems and psychiatric symptoms. Thus, further research on sleep problems and psychiatric disorders is warranted, especially research aimed at elucidating mechanisms of action, including the possible mediating or moderating influence of individual differences in physiological stress responses and the influence of CM and harsh parenting on neurobiological substrates of self-regulation.

Limitations and Future Research

Interpretations of our findings are tempered based on a few limitations, most of which involve issues of measurement. First, although child- and parent-reported measures were collected, children and parents did not complete the same instruments. Youth self-reported child maltreatment, and parents reported harsh parenting and youth psychiatric symptoms. Research has consistently shown that ratings of youth social, emotional, and behavioral problems vary significantly across informants (Achenbach, McConaughy, & Howell, 1987)

and that informant discrepancy is higher for internalizing symptoms than for externalizing symptoms (de Los Reyes & Kazdin, 2005; Duhig et al., 2000). Thus, parents may have underreported child internalizing symptoms, as these symptoms are typically more difficult to observe than externalizing behaviors. This could have led to different findings concerning the relations between CM, harsh parenting, and psychiatric symptoms than those that would have resulted had children self-reported psychiatric symptoms. Moreover, as our findings involved mostly mother reports, reports from fathers may yield different findings. For example, fathers might use harsh parenting techniques more frequently than mothers resulting in a different distribution and differing associations. Similarly, inaccuracies in reporting may occur differentially between parents by characteristics (e.g., perhaps social desirability differentially affects parent reports for harsh parenting), and youth may respond differentially to mother versus father harsh parenting behaviors. Future research using both child and parent reports of psychiatric symptoms, CM, and harsh parenting is needed to better understand the associations between these variables, as well as how reports of these variables differ across informants.

Further, it is important to note the limitations of self-report measures more broadly. There may have been interindividual variability in the interpretation of questions, such as what constituted a parent cursing at or threatening a child. Also, given the sensitive content of many of the items, the possible influence of social desirability bias cannot be ruled out. For example, parents may have underreported the extent to which they engaged in harsh parenting, and children may have underreported experiencing maltreatment in fear of being negatively judged. Nonetheless, our findings suggest that both CM and harsh parenting, using both child- (CTQ) and parent-reported (CTS-PC) measures, respectively, were associated with psychiatric symptoms, providing evidence of the convergent validity of the measures.

Lastly, our measure of sleep latency was a subjective, single-item self-report measure, as opposed to more objective measurements such as actigraphy (Glod et al., 1997; Schäfer & Bader, 2013), which would have provided more precision. However, objective measures of sleep used in many large-scale longitudinal studies are not economically or practically feasible for child psychological or psychiatric assessments. The instrument used here has the benefit of being relatively easy to administer, and thus, may be of particular relevance to clinicians. Although sleep latency is often used as a broadly informative construct in assessing adolescent sleep problems, the inclusion of additional indicators of sleep problems in future work would provide more complete characterizations of adolescent sleep patterns (Taylor, Jenni, Acebo, & Carskadon, 2005).

Future work is needed to identify to what extent psychiatric symptoms change across adolescence on average and for different subgroups of individuals in the context of these early experiences. Subsequent studies employing physical or biomarker measures would also serve to more fully characterize both sleep quality and affected stress systems and their relationship to mental health problems, given the shortcomings of subjective reports. Lastly, a more in depth examination of parenting practices may reveal the ability of positive parenting to buffer the negative effects of childhood adversities. There is some evidence to suggest that parental involvement or displays of parental affection/warmth may attenuate the

associations between child maltreatment and harsh parenting with psychiatric symptoms (e.g., Lind et al., 2018; Yildirim & Roopnarine, 2015). Identification of experiential factors related to the emergence of psychiatric disorders will inform the design of more precision-based preventive and treatment interventions that target conditions that are largely preventable or tractable. Future work is also needed on how sleep problems in early adolescence lead to the development or exacerbation of psychiatric symptoms. In addition to discerning these associations, sleep problems should be assessed as part of standard child mental health evaluations. With sleep clinics being widespread in sub/urban areas of the US, referrals are generally feasible. The evidence increasingly suggests that increased attention to child and adolescent sleep problems may be greatly beneficial in improving youth mental and behavioral health.

Acknowledgments

Funding: This research was supported in part by a grant from the National Institute on Drug Abuse (R01DA034618) to Diana H. Fishbein.

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Figure 1.

Expected number of psychiatric disorder symptoms at Wave 1 for varying levels of Wave 1 initial sleep latency for weekdays. ADHD = Attention Deficit Hyperactivity Disorder, MDD = Major Depressive Disorder, GAD = Generalized Anxiety Disorder, CD = Conduct Disorder.

Table 1

Univariate Descriptive Statistics

	Min.	Max.	Mean	Median	SD
<i>Age/Time Variables</i>					
Child Age at Wave 1	10.00	13.15	11.34	11.19	.97
Time Between Waves 1 and 2	1.88	3.99	2.81	2.83	.35
<i>Wave 1 CDISC Psychiatric Disorder Symptom Counts</i>					
Generalized Anxiety Disorder	.00	11.00	3.16	3.00	2.56
Major Depressive Disorder	.00	21.00	5.81	5.00	4.45
Attention Deficit Hyperactivity Disorder	.00	22.00	5.95	5.00	5.14
Conduct Disorder	.00	14.00	1.80	1.00	2.53
<i>Wave 2 CDISC Psychiatric Disorder Symptom Counts</i>					
Generalized Anxiety Disorder	.00	11.00	2.73	2.00	2.46
Major Depressive Disorder	.00	20.00	4.86	3.00	4.54
Attention Deficit Hyperactivity Disorder	.00	22.00	5.52	4.00	5.24
Conduct Disorder	.00	15.00	2.74	2.00	3.00
<i>Wave 1 Child Maltreatment Variable</i>					
Childhood Trauma Questionnaire	.00	2.76	.41	.32	.38
<i>Wave 1 Harsh Parenting Variables</i>					
CTS-PC Corporal Punishment subscale	.00	7.35	1.41	1.00	1.58
CTS-PC Psychological Aggression scale	.00	100.00	25.50	19.00	22.69
<i>Wave 1 Sleep Problems Variable</i>					
Initial Sleep Latency for Weekdays (minutes of sleep)	.00	240.00	23.15	12.50	29.68

Note. $N = 488 - 525$, CDISC = Computerized Diagnostic Interview Schedule for Children, CTS-PC = Conflict Tactics Scale – Parent-to-Child version.

Table 2

Exponentiated Coefficients of Bivariate Negative Binomial Regressions

Predictor	Outcome											
	W1 CTQ Total	W1 CTS-PC Corp. Pun.	W1 CTS-PC Psych. Agg.	W1 Sleep Latency	W1 GAD Symp. Count	W1 MDD Symp. Count	W1 ADHD Symp. Count	W1 CD Symp. Count	W2 GAD Symp. Count	W2 MDD Symp. Count	W2 ADHD Symp. Count	W2 CD Symp. Count
W1 CTQ Total	—	1.42 *	1.34 *	1.57 *	1.69 *	2.07 *	2.14 *	2.25 *	1.28 *	1.43 *	1.25	1.32 *
W1 CTS-PC Corp. Pun.	1.08	—	1.31 *	1.10 *	1.04	1.07 *	1.09 *	1.15 *	1.07 *	1.05	1.09 *	1.08 *
W1 CTS-PC Psych. Agg.	1.005	1.024 *	—	1.004 *	1.002	1.004 *	1.005 *	1.007 *	1.004 *	1.005 *	1.006 *	1.007 *
W1 Sleep Latency	1.004 *	1.004 *	1.002	—	1.005 *	1.006 *	1.006 *	1.004	1.005	1.003	1.003	1.003
W1 GAD	1.09 *	1.04	1.02	1.09 *	—	1.21 *	1.19 *	1.12 *	1.09 *	1.08 *	1.08 *	1.04 *
W1 MDD	1.07 *	1.03 *	1.03 *	1.07 *	1.12 *	—	1.15 *	1.12 *	1.04 *	1.05 *	1.04 *	1.03 *
W1 ADHD	1.06 *	1.03 *	1.02 *	1.05 *	1.08 *	1.10 *	—	1.14 *	1.02 *	1.03 *	1.04 *	1.05 *
W1 CD	1.07 *	1.06 *	1.04 *	1.04 *	1.06 *	1.10 *	1.17 *	—	1.02	1.02	1.05 *	1.20 *
W2 GAD	1.04	1.05 *	1.04	1.01	1.09 *	1.07 *	1.05 *	1.03	—	1.29 *	1.22 *	1.08 *
W2 MDD	1.03	1.02	1.02 *	1.03 *	1.04 *	1.04 *	1.03 *	1.02	1.12 *	—	1.15 *	1.07 *
W2 ADHD	1.02	1.03 *	1.02 *	1.03 *	1.03 *	1.03 *	1.04 *	1.04 *	1.08 *	1.12 *	—	1.08 *
W2 CD	1.03	1.05 *	1.04 *	1.04 *	1.02	1.03 *	1.07 *	1.22 *	1.06 *	1.09 *	1.13 *	—

Note. These negative binomial regression coefficients differ above and below the diagonal, because the regressions use the variables in each row to make predictions on the variables in each column and fit a line through the data. In contrast, Pearson correlations quantify the degree to which two variables are related and do not fit a line through the data, and, therefore, do not differ above and below the diagonal. $N = 476 - 523$, W1 = Wave 1, W2 = Wave 2, CTQ = Childhood Trauma Questionnaire, CTS-PC = Conflict Tactics Scale – Parent-to-Child version, Corp. Pun. = Corporal Punishment, Psych. Agg. = Psychological Aggression, GAD = Generalized Anxiety Disorder, MDD = Major Depressive Disorder, ADHD = Attention Deficit Hyperactivity Disorder, CD = Conduct Disorder. Ranges: W1 CTQ Total = 0–2.76, W1 CTS-PC Corp. Pun. = 0–7.35, W1 CTS-PC Psych. Agg. = 0–100, W1 Sleep Latency = 0–240, W1 GAD Symp. Count = 0–11, W1 MDD Symp. Count = 0–21, W1 ADHD Symp. Count = 0–22, W1 CD Symp. Count = 0–14, W2 GAD Symp. Count = 0–11, W2 MDD Symp. Count = 0–20, W2 ADHD Symp. Count = 0–22, W2 CD Symp. Count = 0–15.

* $p < .05$

Negative Binomial Regressions Estimating Wave 1 Psychiatric Disorder Symptom Counts

	W1 GAD Symptom Count IRR [95% CI]	W1 MDD Symptom Count IRR [95% CI]	W1 ADHD Symptom Count IRR [95% CI]	W1 CD Symptom Count IRR [95% CI]
<i>Set 1: Child Maltreatment</i>				
Intercept	3.09 [2.88, 3.32] ***	5.57 [5.21, 5.95] ***	5.65 [5.22, 6.13] ***	1.64 [1.45, 1.85] ***
Child Age	.92 [.85, .99] *	.97 [.91, 1.04]	1.08 [1.00, 1.18] ***	1.39 [1.23, 1.57] ***
Childhood Trauma Questionnaire Total	1.68 [1.39, 2.02] ***	2.06 [1.72, 2.47] ***	2.23 [1.78, 2.81] ***	2.53 [1.81, 3.59] ***
Initial Sleep Latency	1.005 [1.002, 1.007] ***	1.006 [1.003, 1.008] ***	1.007 [1.004, 1.010] ***	1.004 [1.000, 1.009] *
Childhood Trauma Questionnaire Total × Initial Sleep Latency	.995 [.99, 1.00] *	.994 [.989, .999] **	.990 [.984, .997] **	.991 [.982, 1.000] *
<i>Set 2: Harsh Parenting – Corporal Punishment</i>				
Intercept	3.13 [2.91, 3.36] ***	5.72 [5.33, 6.14] ***	5.79 [5.33, 6.30] ***	1.67 [1.48, 1.89] ***
Child Age	.91 [.84, .98] *	.97 [.90, 1.04]	1.07 [.98, 1.17]	1.40 [1.24, 1.59] ***
CTS-PC Corporal Punishment	1.03 [.98, 1.07]	1.06 [1.01, 1.11] *	1.09 [1.03, 1.15] **	1.18 [1.09, 1.28] ***
Initial Sleep Latency	1.005 [1.002, 1.007] ***	1.006 [1.003, 1.008] ***	1.006 [1.003, 1.010] ***	1.003 [.999, 1.008]
CTS-PC Corporal Punishment × Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]
<i>Set 3: Harsh Parenting – Psychological Aggression</i>				
Intercept	3.13 [2.91, 3.37] ***	5.70 [5.32, 6.12] ***	5.79 [5.33, 6.30] ***	1.70 [1.51, 1.92] ***
Child Age	.90 [.84, .97] **	.96 [.89, 1.03]	1.05 [.97, 1.15]	1.35 [1.20, 1.53] ***
CTS-PC Psychological Aggression	1.00 [1.00, 1.00]	1.004 [1.001, 1.007] *	1.005 [1.001, 1.009] *	1.007 [1.002, 1.013] **
Sleep Latency	1.005 [1.002, 1.007] ***	1.006 [1.003, 1.008] ***	1.007 [1.004, 1.010] ***	1.005 [1.003, 1.010] *
CTS-PC Psychological Aggression × Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	.9999 [.9997, 1.0000] *	1.00 [1.00, 1.00]

Note. $N = 510 - 514$, GAD = Generalized Anxiety Disorder, MDD = Major Depressive Disorder, ADHD = Attention Deficit Hyperactivity Disorder, CD = Conduct Disorder, IRR = Incident Rate Ratio, CI = Confidence Interval, CTS-PC = Conflict Tactics Scale – Parent-to-Child version.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 4

Negative Binomial Regressions Estimating Wave 2 Psychiatric Disorder Symptom Counts

	W2 GAD Symptom Count IRR [95% CI]	W2 MDD Symptom Count IRR [95% CI]	W2 ADHD Symptom Count IRR [95% CI]	W2 CD Symptom Count IRR [95% CI]
<i>Set 1: Child Maltreatment</i>				
Intercept	2.69 [2.48, 2.93] ***	4.73 [4.32, 5.19] ***	5.32 [4.83, 5.89] ***	2.45 [2.25, 2.68] ***
Child Age	1.05 [.96, 1.14]	.99 [.90, 1.09]	.87 [.79, .96] **	.94 [.86, 1.03]
Wave 1 Symptom Count	1.09 [1.05, 1.13] ***	1.05 [1.03, 1.07] ***	1.04 [1.02, 1.06] ***	1.21 [1.16, 1.25] ***
Childhood Trauma Questionnaire Total	1.08 [.85, 1.36]	1.09 [.84, 1.42]	1.01 [.77, 1.34]	.99 [.78, 1.25]
Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.01]	1.00 [1.00, 1.00]
Childhood Trauma Questionnaire Total × Initial Sleep Latency	1.00 [1.00, 1.01]	1.00 [.99, 1.01]	1.00 [.99, 1.01]	1.00 [1.00, 1.01]
<i>Set 2: Harsh Parenting – Corporal Punishment</i>				
Intercept	2.67 [2.46, 2.90] ***	4.71 [4.30, 5.16] ***	5.32 [4.82, 5.87] ***	2.46 [2.26, 2.69] ***
Child Age	1.06 [.98, 1.16]	1.00 [.91, 1.10]	.89 [.80, .98] *	.97 [.88, 1.06]
Wave 1 Symptom Count	1.09 [1.06, 1.13] ***	1.05 [1.03, 1.07] ***	1.04 [1.02, 1.06] ***	1.20 [1.16, 1.24] ***
CTS-PC Corporal Punishment	1.06 [1.01, 1.12] *	1.04 [.98, 1.10]	1.06 [1.00, 1.13]	1.05 [.99, 1.11]
Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.01]	1.00 [1.00, 1.00]
CTS-PC Corporal Punishment × Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]
<i>Set 3: Harsh Parenting – Psychological Aggression</i>				
Intercept	2.67 [2.46, 2.91] ***	4.70 [4.29, 5.15] ***	5.28 [4.79, 5.83] ***	2.42 [2.22, 2.64] ***
Child Age	1.05 [.96, 1.14]	.99 [.90, 1.09]	.87 [.79, .96] **	.94 [.86, 1.03]
Wave 1 Symptom Count	1.09 [1.06, 1.13] ***	1.05 [1.03, 1.07] ***	1.04 [1.02, 1.06] ***	1.20 [1.16, 1.25] ***
CTS-PC Psychological Aggression	1.003 [1.000, 1.007]	1.004 [1.000, 1.008]	1.005 [1.008, 1.010] *	1.004 [1.000, 1.008] *
Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.01]	1.00 [1.00, 1.00]
CTS-PC Psychological Aggression × Initial Sleep Latency	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]	1.00 [1.00, 1.00]

Note. $N = 473 - 476$, GAD = Generalized Anxiety Disorder, MDD = Major Depressive Disorder, ADHD = Attention Deficit Hyperactivity Disorder, CD = Conduct Disorder, IRR = Incident Rate Ratio, CI = Confidence Interval, CTS-PC = Conflict Tactics Scale – Parent-to-Child version.

* $p < .05$

** $p < .01$

.100 > *d*

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