



Published in final edited form as:

Child Abuse Negl. 2018 October ; 84: 82–94. doi:10.1016/j.chiabu.2018.07.029.

Dimensions of maltreatment and academic outcomes for youth in foster care

Austen McGuire^{a,*}, Yo Jackson^b

^aClinical Child Psychology Program, University of Kansas, Dole Human Development Building, 1000 Sunnyside Avenue, Lawrence, KS, 66045, USA

^bDepartment of Psychology, The Pennsylvania State University, University Park, PA, 16802, USA

Abstract

Childhood maltreatment is often associated with youth's ability to successfully function in school. Youth with a history of maltreatment often receive lower grades and scores on tests of academic achievement, as well as demonstrate more negative behaviors in school, as compared to non-maltreated youth. However, there are many inconsistencies in previous studies examining the association between maltreatment and academic outcomes in youth. One potential reason for mixed findings within the literature could be a result of how maltreatment is measured and operationalized. The current study examined if the methods used to define and describe maltreatment contribute to the association between maltreatment and academic functioning in youth. Youth in foster care ($N = 490$, $M_{\text{age}} = 13.13[3.09]$) were recruited and information on their maltreatment history and academic functioning was obtained from official agencies, school records, and self-reported measures. Using a SEM framework when examining each dimension separately in the same model, results suggested that frequency maltreatment was more predictive of academic behavior, as compared to type and severity. No dimensions were associated with grades and significant findings were only observed for models using self-report data. However, when examined using a measurement model approach, maltreatment as a whole was associated with school behavior, which was found for both self-report and case file measurement models. The findings suggest a need for research on academic functioning to take a comprehensive approach when measuring and defining maltreatment as this may be a more robust and accurate predictor of academic functioning.

Keywords

Maltreatment; Academic functioning; Measurement; Foster care

Childhood maltreatment is associated with an extensive and diverse range of negative outcomes affecting cognitive, language, and emotion regulatory abilities (e.g., Lansford et al., 2002). Thus, it is not surprising that maltreated youth tend to be at greater risk for negative academic outcomes as compared to non-maltreated youth (for review see

*Corresponding author. austenmcguire@ku.edu (A. McGuire).

Conflict of interest

The authors declare that they have no conflict of interest.

Romano, Babchishin, Marquis, & Fréchette, 2015). Maltreated youth often receive lower grades, lower achievement test scores, and fail or repeat a grade, as compared to non-maltreated youth (Eckenrode, Laird, & Doris, 1993). Additionally, research also suggests that maltreatment is related to greater rates of negative classroom behaviors, such as missing more school days and receiving more school suspensions, as compared to non-maltreated youth (Lansford et al., 2002).

However, there are mixed findings when examining the association between maltreatment and academic functioning, making it unclear as to what degree maltreatment contributes to academic difficulties. For example, multiple studies have reported that maltreated youth perform similarly on academic achievement tests when compared to non-maltreated, matched peers (e.g., Briscoe-Smith & Hinshaw, 2006). Contrarily, other studies report that almost half or more than half of the study's sample demonstrated behavioral or academic achievement difficulties (e.g., Leiter & Johnsen, 1997). Previous evidence suggests that one potential reason for these discrepant findings could be differences in maltreatment measurement methodology (English, Graham, Litrownik, Everson, & Bangdiwala, 2005; Litrownik et al., 2005). One common methodological difference between studies is the source of maltreatment information. Some studies measure maltreatment using self-reported abuse, while others rely on case file data. Differences in methodology of data collection could skew results. Second, operationalization techniques tend to vary greatly across studies. This often includes operationalizing abuse by type only and excluding other dimensions of maltreatment (e.g., severity or frequency). The current study sought to determine if these two aspects of maltreatment measurement, source and dimensions, might explain differences reported in the maltreatment-academic relation.

1. Maltreatment measurement and academic functioning

The two most common sources for information on youth maltreatment exposure history are self-report and data from official state social service or foster care records (Fallon et al., 2010). Self-report techniques (e.g., questionnaires, interviews) may provide researchers with a more complete maltreatment history, as compared to case files. This could be because many acts of abuse occur in private, and youth may be the only possible reporter (outside of the perpetrator) that has knowledge of their experience (MacMillan, Jamieson, & Walsh, 2003). However, the accuracy of self-report methods is often questioned because of potential biases (e.g., recall inaccuracy, worry of stigmatization; Greenhoot, 2011). Moreover, youth may not always be aware of their exposure to certain types of maltreatment (i.e., neglect at a young age).

Another method commonly used is the extraction of maltreatment information from state and federal agency case files. This typically involves the use of a coding system where trained personnel review case file reports, narrative descriptions made by caseworkers, in order to organize and operationalize a child's maltreatment exposure. Coding case files is considered a more reliable measure of maltreatment histories, compared to self-report, due to case files being a more objective approach to document maltreatment (Shaffer, Huston, & Egeland, 2008). However, official records are also subject to potential report and investigation biases, which could lead to inaccurate estimates of a child's maltreatment

history (Jonson-Reid, Drake, & Kohl, 2009). Case file reports may be limited to what is known or substantiated, potentially resulting in only a small number of cases ever being identified by official agencies. The true prevalence rates of youth who experience maltreatment is estimated to be two or three times higher than what is identified in case files (e.g., Turner, Finkelhor, & Ormrod, 2010).

Given the differences in data collection methods and potential biases implicit in both methods, inconsistencies between sources are common. Cho and Jackson (2016) reported concordance between case file and self-reported abuse ranged from approximately 20% to 60% depending on maltreatment type. These inconsistencies may partly explain differences in association with the academic outcomes. For example, in the literature on psychopathology and child maltreatment, Cohen, Brown, and Smailes (2001) found that self-reported maltreatment was associated with lower levels of psychopathology (e.g., depression, anxiety), as compared to those with maltreatment experiences indicated by official records.

2. Operationalization of maltreatment dimensions

2.1. Maltreatment type

The majority of research on academic outcomes and maltreatment have examined the differences between maltreatment types in relation to academic outcomes, such as grades and classroom behavior (Romano et al., 2015). Overall, studies report that children exposed to neglect, as opposed to other types of abuse tend to demonstrate lower grades, academic achievement scores, and more school behavioral problems (Eckenrode et al., 1993; Hildyard & Wolfe, 2002). Despite some consistency, findings are mixed. For example, Crozier and Barth (2005) examined academic achievement in relation to maltreatment subtype (physical abuse, sexual abuse, neglect, and other) and found no differences between maltreatment type and math and reading achievement scores. In contrast, Eckenrode et al. (1993) categorized youth by maltreatment type and reported that neglected and physically abused youth had significantly lower grades than sexually abused youth. In addition, findings regarding academic behavior are inconsistent. For example, Anthonysamy and Zimmer-Gembeck (2007) found differences in teacher ratings of aggression and prosocial behavior between non-maltreated neglected youth, whereas Kurtz, Gaudin, Wodarski, and Howing (1993) found no difference in problem behaviors between neglected and non-maltreated youth. One reason for the discrepancies may be the result of inconsistent and limited maltreatment operationalization techniques. Crozier and Barth (2005) categorized youth into maltreatment subtype based on reports from case workers, whereas Eckenrode et al. (1993) categorized youth using case file data.

2.2. Maltreatment severity

Within the maltreatment literature at large and academic literature specifically, severity is not as widely studied or included in maltreatment measurement, as type (English, Bangdiwala, & Runyan, 2005). For those studies that have included measures of maltreatment severity, the findings are mixed, which may reflect differences in how severity is operationalized. Coohy, Renner, Hua, Zhang, and Whitney (2011) found no association

between math and reading scores and maltreatment severity when using a dichotomous “severe” or “not severe” categorization. When examining the effect of maltreatment dimensions and academic outcomes, Kinard (2001) used the highest severity rating for a single event and found no association between maltreatment severity for the various types and math and reading achievement scores. In contrast, others authors have reported a significant association between maltreatment severity and academic functioning (e.g., Daignault & Hébert, 2008).

2.3. Maltreatment frequency

Within the academic literature specifically, there is also limited research on how frequency of maltreatment experiences may contribute to academic functioning. Kinard (2001) examined the influence of physical abuse, sexual abuse, and neglect frequency on academic ability and reported that only more incidents of physical abuse was associated with lower reading achievement scores. Despite the lack of research, researchers have consistently hypothesized that frequency of maltreatment may be a significant contributor to the development of academic functioning in youth. For example, after finding no differences for the effect of maltreatment subtype on academic achievement, Petrenko, Friend, Garrido, Taussig, and Culhane (2012) suggested that chronicity or frequency of maltreatment might have a greater impact on academic functioning, as compared to type and severity of maltreatment. The authors were only able to obtain maltreatment history during a two year window, which limited information on youth’s complete maltreatment history. Petrenko et al. proposed that the longer maltreatment occurs, the greater chance there is for maltreatment to disrupt the normal cognitive and behavioral development, thus resulting in greater academic difficulties.

2.4. Other maltreatment operationalization concerns

In addition to issues with measuring and incorporating maltreatment dimensions in research on academic outcomes, no research to date has examined maltreatment dimensions together using a method that incorporates the influence of each type and each dimension simultaneously on academic outcomes. Examining different dimensions of maltreatment together may help explain differences in research findings within the academic literature. Findings from large national samples suggest that polyvictimization or the experience of multiple types of abuse is common (Turner et al., 2010). For example, Turner et al. (2010) reported that 66% of their sample experienced more than one type of victimization and 30% experienced five or more types. Ignoring polyvictimization in samples of youth exposed to maltreatment means ignoring the considerable overlap that exists between the different types and characteristics of maltreatment. For example, Gabrielli, Jackson, and Brown (2016) reported on the correlations between different dimensions of maltreatment and found moderate and strong correlations between severity and frequency for each subtype of maltreatment. Additionally, there may also be strong associations between different types of maltreatment. Hodgdon (2009) found that many of the severity and frequency interaction scores calculated for each type of maltreatment were significantly correlated. As a result of overlap, it may be difficult to determine which characteristic (e.g., type or severity) of the maltreatment event(s) or which event(s) contributes to the outcome examined. For example, neglect is often a chronic experience, as opposed to other forms of maltreatment. What

may actually account for findings on neglect could be the frequency, not just the type of experience.

3. Current study

To better understand the association between maltreatment and academic outcomes in youth, the current study examined how report type (self-report, case file) and dimensions (type, severity, and frequency) of maltreatment were related to academic outcomes (grades and classroom behavior). Moreover, the associations between maltreatment and academic functioning were examined using two methods that both account for youth's complete maltreatment experiences and polyvictimization. The hypotheses in the current study were largely exploratory, but based on trends in the available empirical evidence. For the dimensional approach, where each maltreatment dimension was examined separately but simultaneously, it was hypothesized that 1) severity for each type of maltreatment (physical, sexual, emotional, and neglect) would be significantly negatively related to math and reading grades, 2) severity of maltreatment would be significantly positively associated with school problems and negatively associated with adaptive skills in school for all maltreatment types, and 3) frequency of neglect would have a stronger negative association with math and reading grades and adaptive skills and positive association school problems, as compared to the other types of maltreatment frequency. Potential differences between these associations were explored using self-report and case file maltreatment reports in separate analyses. For the measurement model approach, it was hypothesized that maltreatment would be negatively associated with English grades, math grades, and adaptive skills, and positively associated with school problems. Because of the exploratory nature of the current study, and lack of previous evidence, no specific hypotheses regarding differences between the self-report and case file data were made.

4. Methods

4.1. Participants

The current study included 490 youth participants ages eight to eighteen in foster care ($M_{\text{age}} = 13.3$, $SD = 3.1$; 52.1% male), their primary adult caretaker (51.5% foster parent; 28.1% residential staff; 12.7% biological relative; 7.8% other), and their teacher. Participants were recruited as part of the Studying Pathways to Adjustment and Resilience in Kids (SPARK) project. SPARK is a federally funded longitudinal research project focused on investigating factors that contribute to resiliency for youth in foster care. Youth were excluded from the project if they had a prior autism spectrum or psychosis disorder, or were a non-native English speaker. Additionally, participants were required to have been in foster care for at least 30 days prior to data collection. Most participants lived in a traditional foster home (61.7%) and identified as African American (50.6%), followed by Caucasian (33.6%), Multiracial (9.3%), and Hispanic/Latino (4.3%).

4.2. Measures

4.2.1. Self-report maltreatment—The current study determined type, frequency and severity scores of lifetime exposure to maltreatment via a modified version of the MMCS

system which was created and administered as a self-report questionnaire (English, Upadhyaya et al., 2005). This consisted of reformatting the codes for abuse subtypes and the severity of each subtype into age appropriate questions that ask about youth's lifetime experiences. This method has been reported to provide the highest levels of fidelity for recording maltreatment experiences (English, Upadhyaya et al., 2005). Youth participants in the study were asked to rate the how often a given event occurred on a scale from 1 (*never*) to 5 (*almost always*) for questions about physical abuse ($n = 19$), sexual abuse ($n = 12$), emotional abuse ($n = 15$), and neglect ($n = 22$). Frequency of each subtype of maltreatment were calculated by summing together the frequency scores for the endorsed maltreatment items endorsed. A frequency score for physical abuse, sexual abuse, emotional abuse, and neglect were used in the analyses. All maltreatment items were also rated for severity a priori on a scale from 1 (*least severe or mild*) to 3 (*most severe or severe*) using the MMCS coding system, defined by potential or actual physical harm from the event, and expert opinion (which included consultation from investigators from other large scale longitudinal maltreatment studies). Severity ratings on the MMCS have been previously established as a reliable indicator of maltreatment severity (Litrownik et al., 2005). A severity score for each maltreatment subtype (physical abuse, sexual abuse, emotional abuse, and neglect) was calculated by taking the sum of all severity scores and dividing by the number of events endorsed.

4.2.2. Case file maltreatment—Information on maltreatment history was obtained from youths' case files provided by the Division of Social Services (DSS). Case files were coded using the MMCS. The MMCS is used to extract detailed information from the case files for research purposes to classify characteristics of the maltreatment reports (English, Upadhyaya et al., 2005). Information on maltreatment events were coded by two trained coders, who were required to reach adequate levels of reliability (80% or kappa equivalent) based on reporter narratives for both substantiated and unsubstantiated reports. Each event from the reports was coded for maltreatment type, severity, and frequency. Type and severity of maltreatment was determined by matching up the description of the event with the definition of each type provided by the MMCS. Severity of physical abuse ranged from 0 to 4, emotional abuse and neglect ranged from 0 to 5, and sexual abuse ranged from 0 to 6. Frequency for each maltreatment type was calculated by summing together the number of reports for each maltreatment type for each child.

4.2.3. Academic functioning/progress—Participants' English and math class grades were obtained from their academic record (i.e., grade cards) of the semester of the study. Examples of math classes across age groups include courses such as algebra, geometry, and statistics. Examples of English classes include courses such as communication arts, reading, and writing. To improve generalizability and adequate comparison between participants from different schools in the current study, letter grades from grade card reports were converted into a continuous scale of 1 (letter grade of *F*, or not meeting expectations) to 5 (letter grade of *A*, or exceeds expectations). This type of conversion has been successfully used in previous studies examining youth's academic functioning (e.g., Schwartz, Gorman, Nakamoto, & Toblin, 2005).

4.2.4. School behavior—Youth’s behavior at school was obtained through the teacher rating scale of the Behavior Assessment System for Children, Second Edition (BASC-2-TRF; Reynolds & Kamphaus, 2004). Behaviors are rated on a four-point scale of frequency from 0 (*Never*) to 3 (*Almost Always*). The school problems and adaptive skills composite *T*-scores of the BASC-2-TRF were included in the analyses. The school problems composite score consists of attention and learning problems subscales, and the adaptive skills composite score consists of adaptability, social skills, leadership, study skills, and functional communication subscales, as reported by the teachers while the child is in a school setting. The BASC-2-TRF demonstrated adequate internal reliability for both the school problems (Cronbach’s α child = 0.64, adolescent = 0.86) and adaptive skills (Cronbach’s α child = 0.79, adolescent = 0.92) composite scores in the current study.

4.2.5. Intelligence—To estimate intelligence, which was included in the model as a covariate, participants completed the Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman & Kaufman, 2004). The KBIT-2 is an individualized and brief intelligence test for individuals ages 4 to 90. Although brief, the KBIT-2 has been shown to be a reliable and valid estimate measure of intelligence (Bain & Jaspers, 2010; Kaufman & Kaufman, 2004). The KBIT-2 produces strong validity coefficient and highly correlated with full length IQ tests, such as the Wechsler Intelligence Scales for Children, Fourth Edition ($r > 0.76$; Bain & Jaspers, 2010). Reliability estimates from the KBIT-2 are adequate with alpha coefficient above 0.80 for composite and sub-scale scores, as well as split half reliability coefficients greater than 0.78 (Kaufman & Kaufman, 2004).

4.2.6. Placement changes and demographics—Number of previous placement changes, which has been shown to be associated with academic performance in foster care youth (Ryan & Testa, 2005), was obtained from a placement database provided by the Children’s Division. A sum score of placement changes was calculated using this information and included in the model as a covariate. Child’s ethnicity and age was obtained through a demographic questionnaire administered to youth participants’ primary caretaker.

4.3. Procedures

All methods and procedures used in the current study were approved by the Institutional Review Board at the University of Kansas and the state’s Department of Social Services Review Board prior to data collection. All participants in the current study were recruited from a large Midwestern county (please see Jackson, Gabrielli, Tunno, & Hambrick, 2012 for more information). Since youth were in foster care and their legal guardian was the state, consent for youth to participate was obtained from the Division of Social Services (DSS) and the Chief Judge of the Circuit Court for the county from which the youth were recruited. Youth also provided assent before taking part in study activities, which was read aloud by a trained graduate student. Caregivers and teachers also provided consent for participation.

Data collection procedures at each time point were completed by trained graduate level clinical child psychology students. Youth completed study measures using an audio-computer assisted self-interview (ACASI) program on a laptop computer. This type of data collection method provided both a visual and audio description via headphones of each

question and possible question response to the participants. The ACASI system allowed for participant confidentiality and accommodated for participants who may have had difficulty reading. All study measures were included in the ACASI system for both the caregiver and the youth participant. Following completion of the ACASI program section, a graduate student administered the KBIT-2. Upon completion of data collection at each time point, a graduate research assistant completed a comprehensive debriefing session with the child and the caretaker to assess for current abuse, suicidal ideation, or significant changes in mood.

During data collection, children and their caregivers were asked to provide the name and contact information of their teacher and the school each child attends. Teachers were then contacted via email and asked to complete a set of online questionnaires about the youth participant in the study. School administrators also provided the SPARK research team with youths' grade report card. Youth, caregivers, and teachers were compensated for their time.

4.4. Data analysis

Means, standard deviations, and ranges were calculated for the continuous variables of interest included in the current study analyses (see Table 1). Multivariate outliers were identified and removed by using values obtained from Mahalanobis' distance using a chi-squared distribution ($p < .001$; Tabachnick & Fidell, 2007). Missing data (17.8% of the data) was managed using full information maximum likelihood (FIML) under the assumption of data missing completely at random. FIML allows for the calculation of unbiased parameter and standard error estimates by using a likelihood function calculated for each participant based on associations between non-missing variables (Kline, 2015; Raykov, 2005).

To test the hypotheses for the effect of maltreatment characteristics on academic functioning, the current study used structural equation modeling (SEM) using a maximum likelihood estimator with robust standard errors (MLR) in R software. MLR estimation was used to calculate robust standard errors and parameter estimates that account for multivariate non-normality in the distribution of the variables included in the models. The first tested model, the dimensional model approach, included frequency and severity of maltreatment regressed on math grades, reading grades, adaptive skills, and school problems. This model tested the association between each individual characteristics of maltreatment and academic outcomes, which included severity and frequency for each subtype of maltreatment: physical abuse, sexual abuse, emotional abuse, and neglect. The following covariates were also included in the model: age, non-verbal IQ, verbal IQ, and placement changes. All maltreatment variables were permitted to correlate and all endogenous variables were allowed to correlate with each other.

4.4.1. Maltreatment measurement model—Next, a one-factor maltreatment model based on severity and frequency for all maltreatment types was used to predict school behavior and grades. This type of measurement model has been successfully used and supported in previous studies with data from the SPARK Project (Gabrielli, Jackson, Tunno, & Hambrick, 2017). This method helps to account for the polyvictimization by combining the entirety of youths' maltreatment experiences, as measured by the severity and frequency of each maltreatment type, into a single, latent variable. To account for shared error

variance for each maltreatment type, the severity and frequency variables for each type were correlated and the variance of the latent maltreatment variable was fixed to 1.0 in the hypothesized model. Additionally, all endogenous variables were allowed to correlate with each other. Age, non-verbal IQ, verbal IQ, and placement changes were also included in the models as covariates. Modification indices were examined following testing of the original hypothesized model. For both types of models, the dimensional model and measurement model, a model was estimated based on self-report and case file maltreatment experiences. Thus, a total of four models were estimated. To evaluate model fit, the following global fit indices were evaluated with the following cutoff values (Browne & Cudeck, 1993; Hu & Bentler, 1999): the chi-squared test statistic, the RMSEA (< 0.05), the standardized root mean square residual (SRMR; < 0.08), the comparative fit index (CFI; > 0.95), and the Tucker-Lewis Index (TLI; > 0.95).

5. Results

A total of 490 participants were included in the current analyses following the removal of six participants that were identified as outliers using Mahalanobis' distance. The means, standard deviation, and ranges for all continuous variables included in the current study are presented in Table 1. According to self-reported maltreatment, the most prevalent type of abuse was neglect (99.39%), followed by emotional abuse (90.62%), physical abuse (86.93%), and sexual abuse (41.63%). The most prevalent maltreatment type provided through case file report was neglect (61.02%), and then physical abuse (51.63%), emotional abuse (40.00%), and lastly sexual abuse (28.37%). Concordance between self-report (SR) and case file (CF) was calculated for each type of abuse. For all types of abuse, there was a greater prevalence of youth who experienced at least one incident of abuse according to self-report data, as compared to maltreatment prevalence in case file records (Physical Abuse: SR = 86.9%, CF = 51.6%; Sexual Abuse: SR = 41.6%, CF = 28.4%; Emotional Abuse: SR = 90.6%, CF = 40.0%; Neglect: SR = 99.4%, CF = 61.0%). Moreover, it was often the case that youth experienced polyvictimization or at least one incident of two different maltreatment types (Physical Abuse-Sexual Abuse: SR = 44.9%, CF = 19.2%; Physical Abuse-Emotional Abuse: SR = 84.7%, CF = 30.0%; Physical Abuse-Neglect: SR = 88.2%, CF = 40.8%; Sexual Abuse-Emotional Abuse: SR = 45.3%, CF = 14.5%; Sexual Abuse-Neglect: SR = 46.73%, CF = 23.1%; Emotional Abuse-Neglect: SR = 91.63%, CF = 34.5%).

5.1. Maltreatment dimensions predict academic grades and behavior

The dimensional models for self-report and case file data (i.e., separate estimates for each maltreatment dimension) were used to test hypothesis one. The standardized parameter estimates and R^2 for each model are provided in Table 2. Both models demonstrated excellent model fit (Self-report: $\chi^2_{(36, n=490)} = 107.06$, $p < .001$, $RMSEA_{(0.05-0.08)} = 0.06$, $SRMR = 0.06$, $CFI = .97$, $TLI = 0.89$; Case File: $\chi^2_{(36, n=490)} = 61.54$, $p = .005$, $RMSEA_{(0.02-0.05)} = 0.04$, $SRMR = 0.04$, $CFI = 0.98$, $TLI = 0.94$). For maltreatment experiences obtained from self-report, sexual abuse frequency was a significant predictor of school problems ($B = 0.20$, $p = 0.01$) and emotional abuse severity was a significant predictor of English grades ($B = 0.19$, $p = .03$). Moreover, physical abuse frequency was a significant predictor of adaptive

skills ($B = -0.23, p = .04$) and marginally significant predictor of English grades ($B = -0.20, p = .09$). No other self-report maltreatment dimension was a significant predictor of school behavior or grades. In addition to maltreatment dimensions, age was a significant predictor of adaptive skills ($B = 0.23, p < .01$), and verbal IQ was a significant predictor of adaptive skills ($B = 0.32, p < .01$), school problems ($B = -0.29, p < .01$), and marginally significant predictor of English grades ($B = 0.02, p = .06$). No variables predicted math grades.

Standardized parameter estimates in the model using case file maltreatment revealed a different pattern. Of the maltreatment variables, only neglect frequency was a marginally significant predictor of English grades ($B = 0.17, p = .06$). Among the covariates, age was a significant predictor of adaptive skills ($B = 0.18, p = .02$) and marginally significant predictor of math grades ($B = -0.13, p = .09$), and verbal IQ was a significant predictor of adaptive skills ($B = 0.28, p < .01$) and school problems ($B = -0.29, p < .01$).

5.2. Maltreatment measurement model predicts academic grades and behavior

The second part of the analyses examined the influence of youths' collective maltreatment experiences on school problems, adaptive behavior and grades using a higher order one-factor maltreatment model, which included the collective contribution of the frequency and severity scores for each maltreatment type. The proposed model included correlations between the frequency and severity score of each maltreatment dimension and the fixing of the maltreatment latent variable to 1.0. For self-report data, the proposed model demonstrated poor fit ($\chi^2_{(80, n=490)} = 559.75, p < .001, RMSEA_{(0.10-0.12)} = 0.11, SRMR = 0.09, CFI = 0.77, TLI = 0.66$). The correlations and modification indices were examined for improvement in model fit. Results suggested the residuals between emotional abuse frequency and physical and neglect frequency be freed, as well as the residuals between emotional abuse severity and neglect frequency and severity. The final model for self-reported maltreatment (Fig. 1) demonstrated adequate fit ($\chi^2_{(76, n=490)} = 252.13, p < .001, RMSEA_{(0.06-0.08)} = 0.07, SRMR = 0.08, CFI = 0.92, TLI = 0.87$). The proposed maltreatment model based on case file maltreatment history (Fig. 2) demonstrated excellent fit ($\chi^2_{(80, n=490)} = 141.18, p < .001, RMSEA_{(0.03-0.05)} = 0.04, SRMR = 0.05, CFI = 0.96, TLI = 0.94$). No modifications were made to this model.

Factor loadings and standardized parameter estimates are presented in Table 2. In the model based on self-reported maltreatment history, maltreatment was a marginally significant predictor of both adaptive skills ($B = -0.14, p = .09$) and school problems ($B = 0.14, p = .09$). In addition to maltreatment, verbal IQ was a significant predictor of adaptive skills ($B = 0.28, p < .01$) and school problems ($B = -0.28, p < .01$). Age was also a significant predictor of adaptive skills ($B = 0.22, p < .01$) and marginally significant predictor of math grades ($B = -0.13, p = .09$). According to the case file model, maltreatment was a marginally significant predictor of adaptive skills ($B = -0.17, p = .06$), school problems ($B = 0.15, p = .08$), and math grades ($B = 0.15, p = .09$). Additionally, age was a significant predictor of adaptive skills ($B = -0.20, p < .01$) and marginally significant predictor of math grades ($B = -0.14, p = .06$). Lastly, verbal IQ was a significant predictor of adaptive skills ($B = 0.30, p < .01$) and school problems ($B = -0.29, p < .01$).

6. Discussion

Maltreated youth often experience more difficulty in school, as compared to non-maltreated peers (Romano et al., 2015). However, inconsistencies in the literature have raised questions about whether it is the type, frequency, or severity of abuse contributes to the maltreatment-school functioning relation. Additionally, there are also questions about whether source of maltreatment may contribute to the observed outcomes. The current study sought to improve understanding of the relation between maltreatment and academic functioning by simultaneously examining if maltreatment conceptualized by its various dimensions and cumulatively was associated with school grades and behavior based on maltreatment histories gathered self-report and case file data.

6.1. Maltreatment dimensions

When each dimension of maltreatment was examined separately, no type of maltreatment appeared to be more influential to school grades and behavior than another type. This appeared to be true for school grades and behavior regardless of the source of maltreatment information. There was no type of maltreatment where both dimensions (severity and frequency) for that type were associated with one or more of the academic outcomes. If one were to expect type of maltreatment to matter, then one might expect to find a significant association between both dimensions for a given type of maltreatment, and one or more of the academic outcomes and potentially some similarities between the case file and self-report models.

Of the different maltreatment types, previous findings suggested that neglect was associated with greater deficits in academic functioning (e.g., lower grades in school), as opposed to the various forms of abuse (Romano et al., 2015). However, in the current study, neither neglect frequency nor severity were significantly associated with school grades and behavior when measured by either self-report or case file data. This was in contrast to the study's original hypothesis that frequency of neglect would have a stronger association with both school grades and behavior, as compared to the other maltreatment types. One reason for this discrepancy could be that the present study accounted for youths' complete maltreatment history in the analyses. This is in contrast to previous studies which have tended to categorize youth into groups based on their primary maltreatment classification and then compare groups (e.g., Kurtz et al., 1993). This type of method may hide the potential influence of other maltreatment experiences by not taking into account experiences of other maltreatment types and polyvictimization, leading to assumptions that neglect is what is only accounting for differences in academic functioning. This may be especially problematic for neglect, as it is the most prominent type of maltreatment (U.S. Department of Health & Human Services, 2016). Overall, the considerable overlap between each type of abuse and insignificant associations between a specific type and the academic outcomes suggest that neglect and the other types of maltreatment do not have enough unique explanatory influence to predict how children function in school.

As with maltreatment type, severity of maltreatment experiences may not be an important indicator for youths' academic functioning for both school grades and behavior. With the exception of emotional abuse severity based on self-report data, none of the other severity

dimensions for self-report data and none of the maltreatment severity dimensions for case file data were significantly (or marginally significant) with school grades and behavior. This was in contrast to the original hypothesis of the current study that severity for each type of maltreatment would be associated with school grades and behavior. These findings are in line with some of the few previous studies that have examined maltreatment severity and academic functioning, and found no relation (Coohey et al., 2011; Kinard, 2001). The current study used a well-established technique for measuring maltreatment severity (i.e., the MMCS; English, Upadhyaya et al., 2005) with separate measurements of severity for each maltreatment type, which has been shown to be a more valid approach to studying maltreatment severity, as compared to just an overall severity score for example (Manly, 2005). What these results show is that even when using a well-validated measure, severity still did not generally contribute to academic functioning. This suggests that focusing on severity and examining severity independently may not be an advantageous approach when trying to understand how maltreated youth perform in school.

It is worth noting that emotional abuse severity (based on self-report) demonstrated a positive association with English grades, which was the only severity dimension significantly associated with any of the academic outcomes examined in the dimensional model. In the maltreatment literature, there is a considerable lack of research specifically examining how emotional abuse is associated with academic functioning (Maguire et al., 2015), and the present study is the first study to specifically examine emotional abuse severity in relation to school grades. Although somewhat counterintuitive, one hypothesis is that youth who experience emotional abuse are better able to perform at school because they feel more supported at school, as compared to home. Parents and other primary caregivers are typically the perpetrators of emotional abuse (Trickett, Mennen, Kim, & Sang, 2009), which may mean that for foster care youth, teachers may be a source of support, which can positively influence academic functioning (Pan, Zaff, & Donlan, 2017).

As compared to the type and severity, evidence from the current study appears to suggest that the frequency of maltreatment may be the most influential aspect of maltreatment with regard to how youth perform and behave in school. The current study builds on previous findings (e.g., Leiter & Johnsen, 1997) by providing evidence that the frequency for all three individual types, and the frequency of abuse in general, may be especially predictive of school behavior, even when taking into consideration the influence of each severity among each type. The findings support Petrenko et al.'s (2012) claims that the frequency of maltreatment might have a greater influence on youths' ability to perform in school, as opposed to type or severity. These results further expand on Petrenko et al.'s claims by showing that frequency might be influential for school behavior as well.

It is possible that the rationale for frequency being more important for school performance and behavior may be due to the nature of repeated disruption to the typical cognitive and behavioral development process, as suggested by Petrenko et al. (2012). Perhaps more than experiencing one to two severe events, experiencing recurrent "any" abuse event interferes with the youth's capacity for mastery of certain stage-salient tasks (e.g., developing efficient problem solving or emotional regulatory abilities), making it harder to learn more complex cognitive tasks at future developmental stages or properly behave in school. This may be

especially true for behavioral and emotional development, as the frequency of maltreatment tends to be more closely associated with a higher risk for psychopathology (including both internalizing and externalizing behaviors), as compared to other maltreatment dimensions such as severity (Manly, 2005).

6.2. Maltreatment measurement model

In addition to examining each maltreatment dimension separately, the current study also utilized a measurement model approach. Results partially supported the study hypothesis that maltreatment, as measured in the measurement model approach, would be associated with both academic performance and behavior. In both the case file and self-report maltreatment measurement model, maltreatment was marginally associated with both adaptive skills and school problems. Furthermore, maltreatment in the case file model was marginally associated with math grades. This novel approach of using a measurement model appears to provide several advantages over the dimensional approaches used in the current study and in past research. For one, this type of analysis method incorporated youths' complete maltreatment history. Maltreatment is a complex variable, and trying to capture or reduce this construct in a single yes/no variable, or through a single dimension, may exclude important information about these experiences that might influence school functioning (Manly, 2005). As seen in the current study, there is considerable overlap between the maltreatment dimensions and the use of the measurement model helps to account for the overlap or poly-exposure (Gabielli et al., 2017). Each event is likely to share several underlying characteristics, such as factors associated with family or community environment or threat. Moreover, since each dimension of maltreatment is only one piece of the larger maltreatment experience, each dimension in isolation may not have enough explanatory power on its own to demonstrate a significant association. The use of a latent model of maltreatment helps to reduce measurement error and capture some of the commonality and shared variance between the different maltreatment experiences, allowing for perhaps a more reliable measurement of maltreatment and academic functioning. This may partially explain why there were discrepancies (e.g., significant association between math grades) between the dimensional and measurement model approach.

Additionally, results suggest the use of a measurement model for maltreatment may provide a more consistent estimate of how maltreatment may influence academic functioning. A discrepancy was noted between the dimensional approach models, as there were several associations between maltreatment dimensions and academic functioning based on self-report data, but none when using the case file data for school problems, adaptive skills, or math grades. However, when using the measurement model, a more consistent pattern of findings emerged across the maltreatment source types, as both models showed a similar, marginally significant association between maltreatment and the academic behavioral outcomes. The self-report and the case file measurement models serve as a type of replication of the findings since each model is built from different sources. Inconsistency in findings is often observed in maltreatment research, as well as in maltreatment-academic research specifically. What the results of the measurement model suggest is that the possible influence of differences in maltreatment measurement and operationalization, which may contribute to the observed inconsistencies in the literature, may be reduced

by using a measurement model approach that incorporates several sources of maltreatment measurement in a single model.

Overall, given the lack of consistent associations when examining each dimension of maltreatment separately, but multiple significant associations when using the maltreatment measurement model, this suggests that what may be needed in research on academics and maltreatment is to take into consideration all aspects of youths' maltreatment experiences or polyvictimization, as opposed to only looking at one dimension independently. It may be inaccurate to claim that maltreatment as a whole is not associated with a certain outcome if a study were to find no relation between a certain type of maltreatment or a characteristic of maltreatment such as severity and frequency. For example, a study may only test and find no relation between physical abuse, sexual abuse, emotional abuse, and neglect frequency scores and the outcome being examined. It would be misleading to then claim that maltreatment in general is not related with the outcome examined. It may be the case that maltreatment severity is what contributes to the outcome, or as with the current results, that the cumulative experiences of frequency and severity dimensions together matter. One could compare this to studying Autism Spectrum Disorder (ASD), and claiming that by finding an insignificant association between stereotype or repetitive motor movements and learning problems that ASD is not associated with learning problems. When in actuality, there are many other aspects of ASD that might influence this association. As with other areas of study that involve a multidimensional construct, it may be most accurate or valid to examine the maltreatment construct cumulatively.

6.3. Case file vs. self-report

Consistent with past research, the nature of the current findings depended on the source of the maltreatment information (e.g., Cho & Jackson, 2016). Perhaps surprisingly, none of the academic functioning variables were associated with the maltreatment dimensions based on self-report data. One possibility for the discrepancy in findings between self-report and case file data when examining school functioning could be the result of slight differences in how each dimension of maltreatment was measured for self-report and case file data. The self-report maltreatment frequency score was a combination of a count measurement (how many times) and chronicity measurement (how often), whereas the case file maltreatment frequency scores were only a count measurement, or how many times. This was also the case with the severity score, as the severity scores were based on a three point scale for self-report and a five point scale for case file. This small difference in the operationalization of frequency and severity may have influenced the associations, or lack of associations, observed in the current study when using the dimensional approach for the case file and self-report models.

Past research comparing different operationalization techniques of frequency provides evidence that the way frequency is defined may influence the observed relation between maltreatment and an outcome of interest (English, Graham et al., 2005; Manly, 2005). In the current study, the operationalization of frequency based on self-report data may have been more sensitive to differences in academic functioning since it incorporated both how many times and how often youth experienced maltreatment. Additionally, the self-report

data included many more instances of abuse than were reported in the case file data (Fallon et al., 2010; MacMillan et al., 2003). However, despite the observed differences using the dimensional approach, there was far less discrepancy between the data sources in terms of how maltreatment is associated with academic functioning when using the measurement model approach.

6.4. Limitations

Although the findings provide new information, they are not without limitations. The use of school grades to measure academic performance is one limitation. It may be the case that nationally normed and validated tests of academic achievement would better reflect a youth's academic skills. Standardized tests of academic achievement tests follow a standardized protocol and a specific question set that provides a score of youth's academic competence that can accurately compared to other youths' scores. Although using school grades is common in research on youth in foster care (O'Higgins, Sebba, & Gardner, 2017), grade data from the youth in the study came from over 24 different schools across several school districts perhaps calling into question the equivalence of the grades across the sample. Two, the current study utilized a cross-sectional design when examining the association between maltreatment dimensions and academic functioning, thus causal explanations are not possible. Although maltreatment occurred prior to the measurement of academic grades and behavior, the exact time between and since the maltreatment and when academic functioning was measured is unknown, and the recency or timing of maltreatment has been associated with how youth behave and perform in school (Leiter & Johnsen, 1997). A longitudinal design, which measures changes in academic functioning, as well as potential changes in maltreatment experiences, would have allowed for casual inferences to be determined about the role of maltreatment in academic functioning.

6.5. Directions for future research

Based on the findings, several recommendations may help direct future research in this field. One, given that many of the dimensions of maltreatment were unrelated to academic outcomes when examined separately, but when combined together in the maltreatment measurement model were consistently associated with school behavior, future research should continue to examine maltreatment in a comprehensive manner. This includes not only measuring the various components of maltreatment, but also using analysis techniques that account for the whole of youths' maltreatment experiences. These types of analysis techniques may provide the most valid approach for studying the relation between maltreatment and academic functioning because they account for the polyvictimization that youth often experience and the shared commonalities between maltreatment experiences. It is also important to note that this type of analysis technique is still an ongoing area of research and more evidence is needed to develop a proper measurement model. As seen in the current study, the measurement model using self-report data only demonstrated adequate fit. Future research using this type of approach should work to identify models that best capture the accumulation of maltreatment exposure in youth. For example, while the current study used a single maltreatment factor model, it may be the case that a two factor or three factor model is needed (e.g., sexual and non-sexual abuse factor model; Briere, Runtz, Eadie, Bigras, & Godbout, 2017).

Two, a novel aspect of the current study was the comparison between self-report and case file maltreatment data sources. The goal was not to determine the accuracy of each source, but rather bring awareness that potential differences may arise when using different sources of information. Researchers attempting to compare findings on academic functioning and maltreatment across studies or replicate the findings from a previous study should take into account possible differences in the source of maltreatment information.

Three, a complete focus on maltreatment when studying its relation with academics may exclude other equal or more important factors that can influence youths' performance and behavior in school. Future research in this area should work to identify other closely related factors associated with school functioning that might be influenced by maltreatment. This may be especially true with foster care youth because many aspects of the foster care experience (e.g., social support, placement type, time in care; O'Higgins et al., 2017) may explain and contribute to youths' academic functioning. Researchers need to keep in mind that while youth in foster care are most often defined by their atypical maltreatment experiences, their exposure to maltreatment may not be the only or best way to conceptualize their life experiences.

Funding

This research was supported in part by funding from the National Institutes of Mental Health, RO1 Grant MH079252-03.

References

- Anthonsamy A, & Zimmer-Gembeck MJ (2007). Peer status and behaviors of maltreated children and their classmates in the early years of school. *Child Abuse & Neglect*, 31, 971–991. 10.1016/j.chiabu.2007.04.004. [PubMed: 17875319]
- Bain SK, & Jaspers KE (2010). Review of Kaufman brief intelligence test, second edition. *Journal of Psychoeducational Assessment*, 28, 167–174. 10.1177/0734282909348217.
- Briere J, Runtz M, Eadie E, Bigras N, & Godbout N (2017). Disengaged parenting: Structural equation modeling with child abuse, insecure attachment, and adult symptomatology. *Child Abuse & Neglect*, 67, 260–270. 10.1016/j.chiabu.2017. [PubMed: 28284895]
- Briscoe-Smith AM, & Hinshaw SP (2006). Linkages between child abuse and attention-deficit/hyperactivity disorder in girls: Behavioral and social correlates. *Child Abuse & Neglect*, 30, 1239–1255. 10.1016/j.chiabu.2006.04.008. [PubMed: 17097140]
- Browne MW, & Cudeck R (1993). Alternative ways of assessing model fit. In Bollen K, & Long J (Eds.). *Testing structure equation models* (pp. 136–162). Newbury Park, CA: Sage Focus Editions.
- Cho B, & Jackson Y (2016). Self-reported and case file maltreatment: Relations to psychosocial outcomes for youth in foster care. *Children and Youth Services Review*, 69, 241–247. 10.1016/j.childyouth.2016.08.013.
- Cohen P, Brown J, & Smailes E (2001). Child abuse and neglect and the development of mental disorders in the general population. *Development and Psychopathology*, 13, 981–999. [PubMed: 11771917]
- Coohey C, Renner LM, Hua L, Zhang YJ, & Whitney SD (2011). Academic achievement despite child maltreatment: A longitudinal study. *Child Abuse & Neglect*, 35, 688–699. 10.1016/j.chiabu.2011.05.009. [PubMed: 21943498]
- Crozier JC, & Barth RP (2005). Cognitive and academic functioning in maltreated children. *Children & Schools*, 27, 197–206. 10.1093/cs/27.4.197.

- Daignault IV, & Hébert M (2008). Short-term correlates of child sexual abuse: An exploratory study predicting girls' academic, cognitive, and social functioning 1 year later. *Journal of Child & Adolescent Trauma*, 1, 301–316. 10.1080/19361520802505693.
- Eckenrode J, Laird M, & Doris J (1993). School performance and disciplinary problems among abused and neglected children. *Developmental Psychology*, 29, 53–62. 10.1037/0012-1649.29.1.53.
- English DJ, Bangdiwala SI, & Runyan DK (2005). The dimensions of maltreatment: Introduction. *Child Abuse & Neglect*, 29, 441–460. 10.1016/j.chiabu.2003.09.023. [PubMed: 15970319]
- English DJ, Graham JC, Litrownik AJ, Everson M, & Bangdiwala SI (2005). Defining maltreatment chronicity: Are there differences in child outcomes? *Child Abuse & Neglect*, 29, 575–595. 10.1016/j.chiabu.2004.08.009. [PubMed: 15970326]
- English D, Upadhyaya M, Litrownik A, Marshall J, Runyan D, Graham C, ... Dubowitz H (2005). Maltreatment's wake: The relationship of maltreatment dimensions to child outcomes. *Child Abuse & Neglect*, 29, 597–619. 10.1016/j.chiabu.2004.12.008. [PubMed: 15970327]
- Fallon B, Trocme N, Fluke J, MacLaurin B, Tonmyr L, & Yuan YY (2010). Methodological challenges in measuring child maltreatment. *Child Abuse & Neglect*, 34, 70–79. 10.1016/j.chiabu.2009.08.008. [PubMed: 20053453]
- Gabrielli J, Jackson Y, & Brown S (2016). Associations between maltreatment history and severity of substance use behavior in youth in foster care. *Child maltreatment*, 21(4), 298–307. [PubMed: 27663751]
- Gabrielli J, Jackson Y, Tunno AM, & Hambrick EP (2017). The blind men and the elephant: Identification of a latent maltreatment construct for youth in foster care. *Child Abuse and Neglect*, 67, 98–108. 10.1016/j.chiabu.2017.02.020. [PubMed: 28254690]
- Greenhoot AF (2011). Retrospective methods in developmental science. In Laursen B, Little TD, & Card NA (Eds.). *Handbook of developmental research methods* (pp. 196–210). (1st ed.). New York, NY: Guilford Press.
- Hildyard KL, & Wolfe DA (2002). Child neglect: Developmental issues and outcomes. *Child Abuse & Neglect*, 26, 679–695. 10.1016/S0145-2134(02)00341-1. [PubMed: 12201162]
- Hodgdon HB (2009). Child maltreatment and aggression: The mediating role of moral disengagement, emotion regulation, and emotional callousness among juvenile offenders (Unpublished doctoral dissertation). Philadelphia, PA: Temple University.
- Hu LT, & Bentler PM (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal* 6, 1–55. 10.1080/10705519909540118.
- Jonson-Reid M, Drake B, & Kohl PL (2009). Is the overrepresentation of the poor in child welfare caseloads due to bias or need? *Children and Youth Services Review*, 31, 422–427. 10.1016/j.chilyouth.2008.09.009. [PubMed: 25598566]
- Jackson Y, Gabrielli J, Tunno AM, & Hambrick EP (2012). Strategies for longitudinal research with youth in foster care: A demonstration of methods, barriers, and innovations. *Children and youth services review*, 34, 1208–1213. [PubMed: 22773879]
- Kaufman AS, & Kaufman NL (2004). *Kaufman brief intelligence test* (second edition). Bloomington, MN: Pearson, Inc.
- Kinard E. (2001). Characteristics of maltreatment experience and academic functioning among maltreated children. *Violence and Victims*, 16, 323–337. [PubMed: 11437120]
- Kline RB (2015). *Principles and practice of structural equation modeling*. New York, NY: Guilford Publications.
- Kurtz PD, Gaudin JM, Wodarski JS, & Howing PT (1993). Maltreatment and the school-aged child: School performance consequences. *Child Abuse & Neglect*, 17, 581–589. 10.1016/0145-2134(93)90080-0. [PubMed: 8221213]
- Lansford JE, Dodge KA, Pettit GS, Bates JE, Crozier J, & Kaplow J (2002). A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine*, 156, 824–830. 10.1001/archpedi.156.8.824. [PubMed: 12144375]
- Leiter J, & Johnsen MC (1997). Child maltreatment and school performance declines: An event-history analysis. *American Educational Research Journal*, 34, 563–589. 10.2307/1163250.

- Litrownik AJ, Lau A, English DJ, Briggs E, Newton RR, Romney S, ... Dubowitz H (2005). Measuring the severity of child maltreatment. *Child Abuse & Neglect*, 29, 553–573. 10.1016/j.chiabu.2003.08.010. [PubMed: 15970325]
- MacMillan HL, Jamieson E, & Walsh CA (2003). Reported contact with child protection services among those reporting child physical and sexual abuse: Results from a community survey. *Child Abuse & Neglect*, 27, 1397–1408. 10.1016/j.chiabu.2003.06.003. [PubMed: 14644057]
- Maguire SA, Williams B, Naughton AM, Cowley LE, Tempest V, Mann MK, ... Kemp AM (2015). A systematic review of the emotional, behavioural and cognitive features exhibited by school-aged children experiencing neglect or emotional abuse. *Child: Care, Health and Development*, 41, 641–653. 10.1111/cch.12227. [PubMed: 25733080]
- Manly JT (2005). Advances in research definitions of child maltreatment. *Child Abuse & Neglect*, 29, 425–439. 10.1016/j.chiabu.2005.04.001. [PubMed: 15970318]
- O’Higgins A, Sebba J, & Gardner F (2017). What are the factors associated with educational achievement for children in kinship or foster care: A systematic review. *Children and Youth Services Review*, 79, 198–220. 10.1016/j.chilyouth.2017.06.004.
- Pan J, Zafif JF, & Donlan AE (2017). Social support and academic engagement among reconnected youth: Adverse life experiences as a moderator. *Journal of Research on Adolescence*, 27, 890–906. 10.1111/jora.12322. [PubMed: 29152870]
- Petrenko CL, Friend A, Garrido EF, Taussig HN, & Culhane SE (2012). Does subtype matter? Assessing the effects of maltreatment on functioning in preadolescent youth in out-of-home care. *Child Abuse & Neglect*, 36, 633–644. 10.1016/j.chiabu.2012.07.001. [PubMed: 22947490]
- Raykov T. (2005). Analysis of longitudinal studies with missing data using covariance structure modeling with full-information maximum likelihood. *Structural Equation Modeling*, 12, 493–505. 10.1207/s15328007sem1203_8.
- Reynolds CR, & Kamphaus RW (2004). *Behavior assessment scale for children* (second edition). Circle Pines, MN: AGS Publishing.
- Romano E, Babchishin L, Marquis R, & Fréchette S (2015). Childhood maltreatment and educational outcomes. *Trauma, Violence & Abuse*, 16, 418–437. 10.1177/1524838014537908.
- Ryan JP, & Testa MF (2005). Child maltreatment and juvenile delinquency: Investigating the role of placement and placement instability. *Children and Youth Services Review*, 27, 227–249. 10.1016/j.chilyouth.2004.05.007.
- Schwartz D, Gorman AH, Nakamoto J, & Toblin RL (2005). Victimization in the peer group and children’s academic functioning. *Journal of Educational Psychology*, 97, 425–435. 10.1037/0022-0663.97.3.425.
- Shaffer A, Huston L, & Egeland B (2008). Identification of child maltreatment using prospective and self-report methodologies: A comparison of maltreatment incidence and relation to later psychopathology. *Child Abuse & Neglect*, 32, 682–692. 10.1016/j.chiabu.2007.09.010. [PubMed: 18638626]
- Tabachnick BG, & Fidell LS (2007). *Using multivariate statistics*. Boston, MA: Pearson Education. Inc.
- Trickett PK, Mennen FE, Kim K, & Sang J (2009). Emotional abuse in a sample of multiply maltreated, urban young adolescents: Issues of definition and identification. *Child Abuse & Neglect*, 33, 27–35. 10.1016/j.chiabu.2008.12.003. [PubMed: 19178945]
- Turner HA, Finkelhor D, & Ormrod R (2010). Poly-victimization in a national sample of children and youth. *American Journal of Preventive Medicine*, 38, 323–330. 10.1016/j.amepre.2009.11.012. [PubMed: 20171535]
- U.S. Department of Health and Human Services (2016). *Administration on children, youth and families. Child maltreatment 2014*. Washington, D.C: U.S. Government Printing Office.

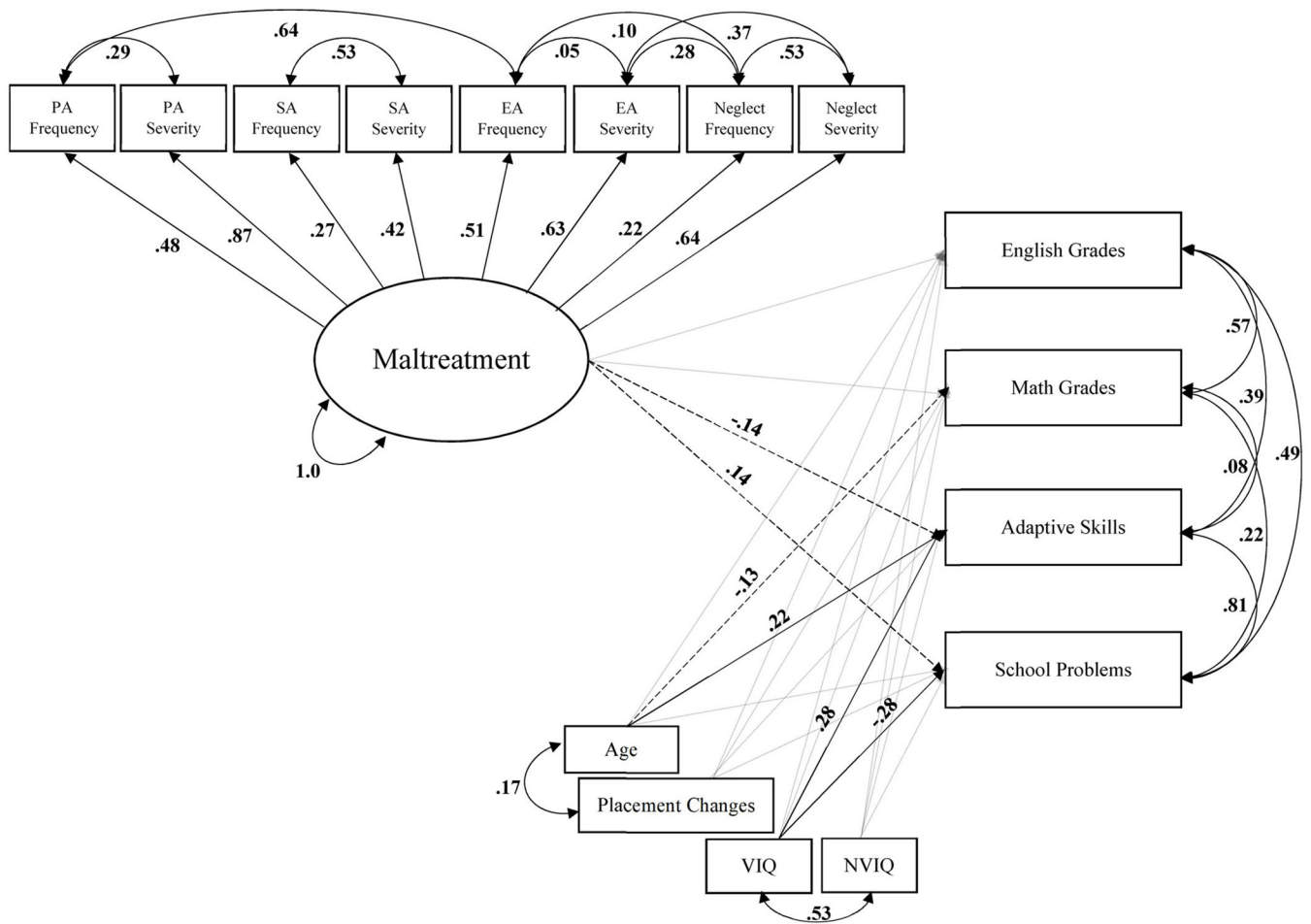


Fig. 1. Self-report Maltreatment Measurement Model Standardized Estimates. PA = Physical Abuse, SA = Sexual Abuse, EA = Emotional Abuse, VIQ = Verbal IQ, NVIQ = Non-verbal IQ Significant pathway estimates ($p < .05$) shown with bold line. Marginally significant pathway estimates ($0.05 < p < .10$) shown with dashed line.

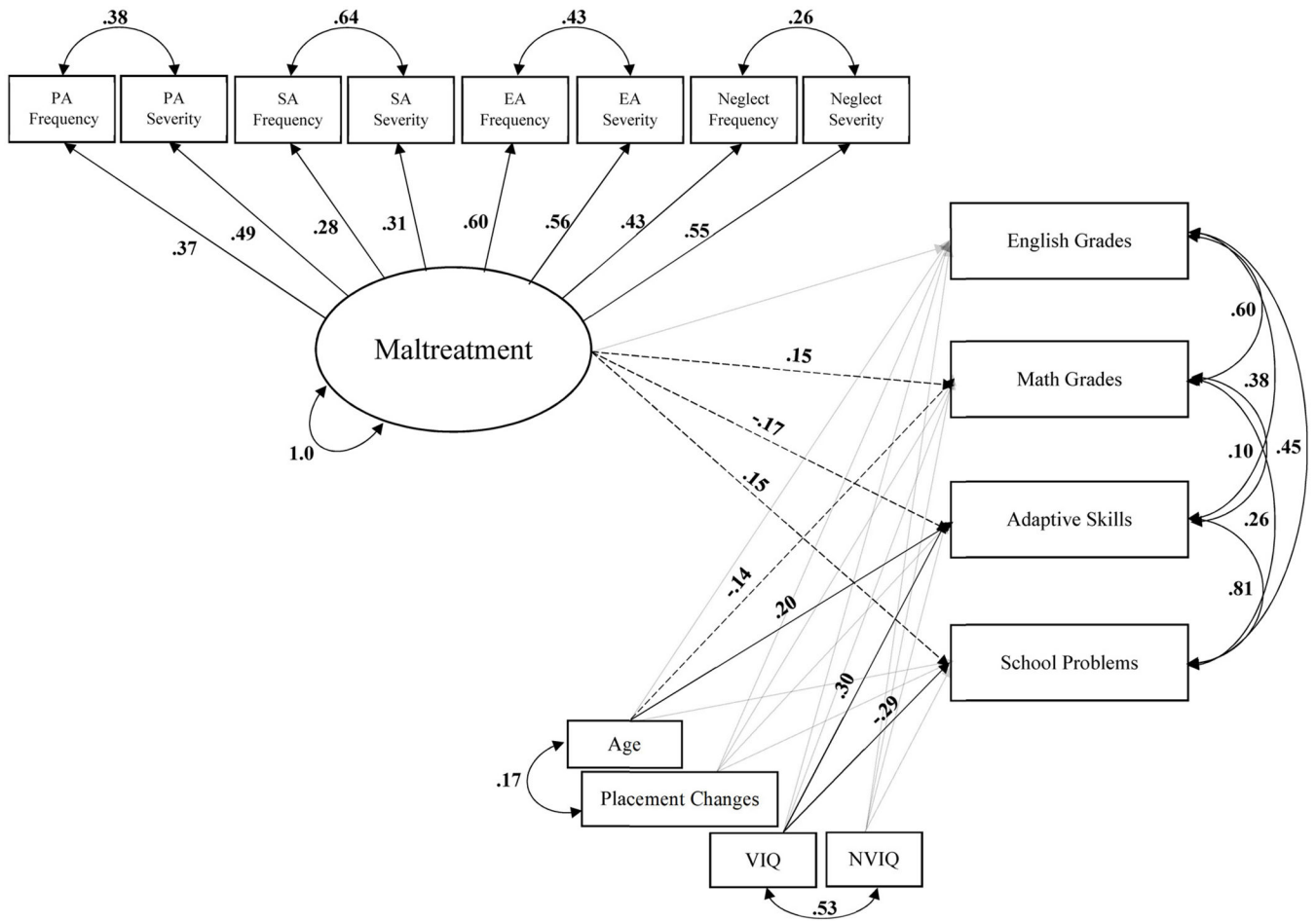


Fig. 2. Case File Maltreatment Measurement Model Standardized Estimates. PA = Physical Abuse, SA = Sexual Abuse, EA = Emotional Abuse, VIQ = Verbal IQ, NVIQ = Non-verbal IQ Significant pathway estimates ($p < .05$) shown with bold line. Marginally significant pathway estimates ($0.05 < p < .10$) shown with dashed line.

Table 1

Descriptive Statistics of Continuous Variables.

	<u>Self-Report</u>			<u>Case File</u>		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Maltreatment Dimensions						
Physical Abuse Frequency	11.89 (10.69)	0	58	2.15 (3.42)	0	30
Physical Abuse Severity	1.19 (.67)	0	3	0.83 (0.91)	0	4
Sexual Abuse Frequency	5.08 (9.08)	0	50	0.71 (1.57)	0	14
Sexual Abuse Severity	0.81 (1.01)	0	3	0.91 (1.61)	0	6
Emotional Abuse Frequency	21.27 (18.4)	0	105	0.8 (1.32)	0	8
Emotional Abuse Severity	1.58 (0.74)	0	3	1.02 (1.43)	0	5
Neglect Frequency	87.96 (20.65)	0	116	2.68 (3.65)	0	25
Neglect Severity	1.79 (0.56)	0	3	1.30 (1.31)	0	5
School Behavior and Grades						
School Problems	59.87 (11.07)	37	89			
Adaptive Skills	48.2 (7.77)	31	69			
English Grades	3.31 (1.13)	1	5			
Math Grades	3.00 (1.32)	1	5			
Covariates						
Placement Changes				9.15 (6.44)	1	46
Age	13.13 (3.09)	8.01	21.01			
Verbal IQ	87.71 (12.04)	59	125			
Nonverbal IQ	93.16 (15.71)	40	132			

Table 2

Path Estimates for the Dimensional and Measurement Model Approaches.

School Behavior					School Grades				
Path Estimates	Self-Report		Case File		Path Estimates	Self-Report		Case File	
	Standardized Estimates	R²	Standardized Estimates	R²		Standardized Estimates	R²	Standardized Estimates	R²
Dimensional Model Approach									
Adaptive Skills on		0.21		0.14	English Grades on		0.08		0.07
Physical Abuse	-0.23**		0.04		Physical Abuse	-0.20*		-0.01	
Frequency					Frequency				
Physical Abuse	-0.11		-0.12		Physical Abuse	-0.03		0.00	
Severity					Severity				
Sexual Abuse	-0.08		0.00		Sexual Abuse	0.06		0.12	
Frequency					Frequency				
Sexual Abuse	0.10		-0.00		Sexual Abuse	0.00		-0.05	
Severity					Severity				
Emotional Abuse	0.19*		-0.17		Emotional Abuse	0.17		-0.10	
Frequency					Frequency				
Emotional Abuse	0.01		0.06		Emotional Abuse	0.19**		-0.01	
Severity					Severity				
Neglect Frequency	-0.06		0.02		Neglect Frequency	-0.07		0.17*	
Neglect Severity	-0.06		0.00		Neglect Severity	-0.04		-0.06	
Placement Changes	-0.09		-0.07		Placement Changes	-0.09		-0.11	
Age	0.23**		0.18**		Age	0.09		0.08	
VIQ	0.32**		0.28**		VIQ	0.16*		0.12	
NVIQ	-0.01		-0.01		NVIQ	-0.07		-0.10	
School Problems on		0.21		0.18	Math Grades on		0.05		0.09
Physical Abuse	0.12		-0.12		Physical Abuse	-0.18		0.15	
Frequency					Frequency				
Physical Abuse	0.11		0.08		Physical Abuse	0.10		-0.02	
Severity					Severity				
Sexual Abuse	0.20**		0.05		Sexual Abuse	-0.02		0.09	
Frequency					Frequency				
Sexual Abuse	-0.14		0.08		Sexual Abuse	-0.04		-0.10	
Severity					Severity				
Emotional Abuse	-0.15		0.13		Emotional Abuse	0.10		-0.04	
Frequency					Frequency				

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

School Behavior				School Grades					
Path Estimates	Self-Report		Case File		Path Estimates	Self-Report		Case File	
	Standardized Estimates	R²	Standardized Estimates	R²		Standardized Estimates	R²	Standardized Estimates	R²
Emotional Abuse	-0.01		0.07		Emotional Abuse	0.10		0.06	
Severity					Severity				
Neglect Frequency	0.06		-0.06		Neglect Frequency	-0.05		0.14	
Neglect Severity	0.06		-0.05		Neglect Severity	-0.14		-0.01	
Placement Changes	0.12		0.09		Placement Changes	-0.08		-0.12	
Age	-0.06		-0.02		Age	-0.11		-0.13 [*]	
VIQ	-0.29 ^{**}		-0.29 ^{**}		VIQ	0.00		-0.05	
NVIQ	-0.10		-0.10		NVIQ	0.01		0.01	
Measurement Model Approach									
Adaptive Skills on		0.15		0.15	English Grades on		0.03		0.03
Maltreatment	-0.14 [*]		-0.17 [*]		Maltreatment	0.09		0.06	
Placement Changes	-0.11		-0.09		Placement Changes	-0.09		-0.09	
Age	0.22 ^{**}		0.20 ^{**}		Age	0.05		0.07	
VIQ	0.28 ^{**}		0.30 ^{**}		VIQ	0.12		0.12	
NVIQ	-0.01		-0.02		NVIQ	-0.08		0.09	
School Problems on		0.16		0.16	Math Grades on		0.04		0.06
Maltreatment	0.14 [*]		0.15 [*]		Maltreatment	0.04		0.15 [*]	
Placement Changes	0.12		0.11		Placement Changes	-0.02		-0.11	
Age	-0.03		-0.00		Age	-0.13 [*]		-0.14 [*]	
VIQ	-0.28 ^{**}		-0.29 ^{**}		VIQ	-0.02		-0.05	
NVIQ	0.11		0.11		NVIQ	-0.00		-0.00	

* p < .10.

** p < .05.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript