Original Investigation

Assessment of the Harmful Psychiatric and Behavioral Effects of Different Forms of Child Maltreatment

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IMPORTANCE Several widely held beliefs about child abuse and neglect may be incorrect. It is most commonly assumed that some forms of abuse (eg, physical and sexual abuse) are more harmful than others (eg, emotional abuse and neglect); other assumptions are that each form of abuse has specific consequences and that the effects of abuse differ across sex and race.

OBJECTIVE To determine whether widely held assumptions about child abuse and neglect are valid by testing the hypothesis that different types of child maltreatment (CM) actually have equivalent, broad, and universal effects.

DESIGN, SETTING, AND PARTICIPANTS This observational study assessed 2292 racially and ethnically diverse boys (1254 [54.7%]) and girls (1038 [45.3%]) aged 5 to 13 years (mean [SD] age, 9.0 [2.0] years) who attended a research summer camp program for low-income, school-aged children from July 1, 1986, to August 15, 2012. Of these children, 1193 (52.1%) had a well-documented history of maltreatment. Analysis was conducted from September 25, 2013, to June 1, 2015.

MAIN OUTCOMES AND MEASURES Various forms of internalizing and externalizing personality and psychopathologic traits were assessed using multiple informant ratings on the California Child Q-Set and Teacher Report Form as well as child self-reported depression and peer ratings of aggression and disruptive behavior.

RESULTS Structural analysis showed that different forms of CM have equivalent psychiatric and behavioral effects, ranging from anxiety and depression to rule-breaking and aggression. We also found that nonsexual CM alters 2 broad vulnerability factors, internalizing ($\beta = 0.185$; SE = 0.028; $P < .001$) and externalizing ($\beta = 0.283$; SE = 0.023; $P < .001$), that underlie multiple forms of psychiatric and behavioral disturbance. We show that CM has comparable consequences for boys and girls of different races, and our results allowed us to describe a base rate and co-occurrence issue that makes it difficult to identify the unique effects of child sexual abuse.

CONCLUSIONS AND RELEVANCE Our findings challenge widely held beliefs about how child abuse should be recognized and treated—a responsibility that often lies with the physician. Because different types of child abuse have equivalent, broad, and universal effects, effective treatments for maltreatment of any sort are likely to have comprehensive psychological benefits. Population-level prevention and intervention strategies should emphasize emotional abuse, which occurs with high frequency but is less punishable than other types of child maltreatment.

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Worldwide prevalence estimates suggest that child physical abuse (8.0%), sexual abuse (1.6%), emotional abuse (36.3%), and neglect (4.4%) are common.[1,2] These forms of abuse and neglect are collectively referred to as *child maltreatment* (CM). At least 4 assumptions pervade the scientific literature on CM: (1) harmfulness (CM causes substantial harm), (2) nonequivalence (some forms of CM are more harmful than others), (3) specificity (each form of CM has specific consequences), and (4) nonuniversality (the effects of CM differ across sex and race).

The strongest assumption is that CM causes harm. In a meta-analysis, nonsexual forms of CM (physical abuse, emotional abuse, and neglect) were associated with a wide range of mental health problems, including depression, anxiety, eating disorders, substance use, and suicidal behavior.[3] Evidence from research on sexual abuse is less consistent. Although early literature reviews concluded that child sexual abuse predicts a range of psychiatric outcomes,[4-6] later meta-analyses based on community samples[7] and college samples[8] suggested that child sexual abuse is weakly associated with later adjustment problems. Unsurprisingly, these findings are controversial[9] and have been criticized[10,11] and defended[12,13] on several occasions.

The nonequivalence assumption is evident in the legal system, where some forms of CM are felonies but others are legal, and in the scientific literature, which focuses predominantly on sexual and physical abuse.[14] However, meta-analytic data do not show appreciable differences in harm across types of CM.[3] Furthermore, study-level comparisons are confounded by differences in samples and methods, and individual-level comparisons are rare and usually fail to model patterns of CM co-occurrence. The ubiquity of the assumption of nonequivalence must therefore be based on factors other than comparative evidence of harm, such as cultural mores and differences in the ability to measure and document maltreatment.

The specificity assumption is based on early studies suggesting that certain exposures may be linked to particular mental health outcomes.[15,16] However, subsequent evidence suggests that various forms of CM may have nonspecific, widespread effects on mental health.[13,16,17] An unanswered question is whether such widespread effects are the result of CM affecting common factors that underlie multiple psychiatric disorders.

The nonuniversality assumption has received occasional support from research showing sex differences[18] and racial differences[19] in outcomes related to CM, motivating some to recommend treatments tailored to sex and race.[20] However, research in this area is scarce, and few studies have directly statistically tested sex or race as a moderator. Prevalence rates may differ between populations, as might various risk factors and service response variables, but the question whether the effects of CM generalize across populations remains unanswered.

To test each assumption and overcome the limitations of previous research, this study rigorously assesses multiple forms of CM, relates them structurally, and uses them to predict a broad range of ensuing maladjustment in a large, racially diverse sample of boys and girls aggregated over 27 years. We hypothesized that our results would correspond with meta-analytic evidence supporting the assumption of harm; otherwise, our results would contradict the other assumptions, including nonequivalence, specificity, and nonuniversality. That is, we hypothesized that different forms of CM would have equivalent, broad, and universal consequences. Such findings would have substantial etiologic, clinical, and legal implications.

Methods

Participants

We studied 2292 children aged 5 to 13 years (mean [SD] age, 9.0 [2.0] years) who attended a summer camp research program designed for school-aged low-income children. Data were collected each year from July 1, 1986, to August 15, 2012. Analysis was conducted from September 25, 2013, to June 1, 2015. Some children attended the camp for multiple years; the data from their first year of attendance were used in the current study. The study design specified recruitment of both maltreated children (n = 1193) and nonmaltreated children (n = 1099). A total of 1254 (54.7%) participants were boys. The maltreated and nonmaltreated children were comparable in terms of racial/ethnic diversity and family demographic characteristics.[21] The National Longitudinal Study of Adolescent to Adult Health system for coding race and ethnicity was used.[22] The sample was 60.4% (n = 1382) African American (73 [5.3%] Hispanic), 31.0% (n = 711) white (261 [36.8%] Hispanic), and 8.6% (n = 197) from other racial groups (6 [3.2%] Hispanic). The families of the children were low income, with 2180 (95.1%) of the families having a history of receiving public assistance. Single mothers headed 1442 (62.9%) of the families.

Recruitment, Classification of CM, and Procedure

This research was reviewed and approved by the University of Rochester Institutional Review Board. Full details regarding the recruitment of participants, classification of CM, and study procedure are provided in eAppendix 1, eAppendix 2, and the eTable in the Supplement. Briefly, parents of all maltreated and nonmaltreated children provided informed written and verbal consent for their child's participation as well as consent for examination of any Department of Human Services (DHS) records pertaining to the family. Comprehensive searches of DHS records were completed, and maltreatment information was coded using operational criteria from maltreatment nosologic specifications in the Maltreatment Classification System (MCS).[23] The whole sample was representative of the children in families receiving services from the DHS.

Consistent with national demographic characteristics of families with maltreated children,[24] the children were predominantly from families of low socioeconomic status (SES). Consequently, demographically comparable nonmaltreated children were recruited from families receiving Temporary Assistance for Needy Families. To verify the absence of CM in

these families, DHS records were searched, mothers were interviewed using the Maternal Maltreatment Classification Interview,[23] and record searches were conducted in the year following camp attendance to verify that all available information had been accessed. Only children from families without any history of documented abuse or neglect were retained in the nonmaltreatment group.

The MCS is a reliable and valid method for classifying maltreatment that uses DHS records detailing investigations and findings involving maltreatment in identified families over time.[23] Rather than relying on official designations and case dispositions, the MCS codes all available information from DHS records, making independent determinations of maltreatment experiences. Coding of the DHS records was conducted by trained raters who demonstrated acceptable reliability with the criterion (weighted κ with the criterion ranging from 0.86 to 0.98). Reliabilities for the presence vs absence of maltreatment subtypes ranged from 0.90 to 1.00.

Children attended a weeklong day camp program, in which they were assigned to groups of 8 to 10 peers of the same age and same sex; half of the children assigned to each group were maltreated.[25] Each group was conducted by 3 trained camp counselors, who were unaware of the maltreatment status of children and the hypotheses of the study. During the week, camp provided 35 hours of interaction between children and counselors. In addition to the recreational activities, after providing written and verbal assent, children participated in various research assessments. Clinical consultation and intervention occurred if any concerns regarding danger to self or others emerged during research sessions. At the end of the week, children in each group completed sociometric ratings of their peers. The counselors, who had been trained extensively for 2 weeks prior to the camp, also completed assessment measures on individual children based on their observations and interactions with children in their respective groups.

Measures

The camp context and associated measurement battery allowed for views of a child's adaptive functioning from multiple perspectives. Measures included child self-report, peer ratings of behavior, and reports from counselors. These measures provided emotional, behavioral, and temperament indicators of the internalizing and externalizing spectra, the 2 broad factors that underlie common psychiatric disorders.[26]

Child Self-report

The Children's Depression Inventory (CDI)[27] is a widely used self-report questionnaire to assess depressive symptoms in school-aged children. Internal consistency for the total scale has ranged from 0.71 to 0.89, and validity has been well established.[27] In the current sample, scores on the CDI ranged from 0 to 42 (mean [SD], 8.9 [7.5]).

Peer Reports

On the last day of summer camp, children evaluated the characteristics of their peers in their respective camp groups. Children were given behavioral descriptors characterizing different types of social behavior and asked to select 1 peer from the group who best fit the behavioral description. Descriptors included a child who was disruptive and a child who was a fighter. The total number of nominations that each child received from peers in both categories was determined, and these totals were converted to proportions of the possible nominations in each category. Scores in each category were standardized within each year of camp.

Counselor Reports

Behavioral symptoms were evaluated at the end of each week by counselors' completion of the Teacher Report Form (TRF)[28] and the California Child Q-Set (CCQ).[29] The TRF is a widely used and validated instrument to assess a child's symptoms from the perspective of teachers; the TRF was used in our study because camp counselors are able to observe children's behavior in a way similar to that of teachers. The CCQ consists of statements about traits that represent major facets of personality. Counselors' scores on the TRF and CCQ were averaged to obtain individual child scores. Interrater reliability across all scales, based on average intraclass correlations among pairs of raters, ranged from 0.56 to 0.88 (mean, 0.76).

Results

Subgroup Comparisons

Figure 1 and **Figure 2** display differences between nonmaltreated children and specific subgroups of maltreated children. Because some psychiatric outcomes are skewed, differences between groups are represented using the nonparametric success rate difference effect size; values of 0.1, 0.3, and 0.4 represent small, medium, and large effects, respectively.[30] Also displayed are the number of cases per CM category; the effect sizes for type, variety, and frequency of CM; and severity across psychological outcomes. Figures 1 and 2 distinguish between measures of internalizing and externalizing, 2 broad factors that underlie personality and psychopathologic disorders.[26] Overall, these subgroup comparisons show that abused and neglected children experience all types of maladjustment at significantly higher rates than their nonmaltreated counterparts and that this maladjustment increases as CM grows more diverse, frequent, and severe.

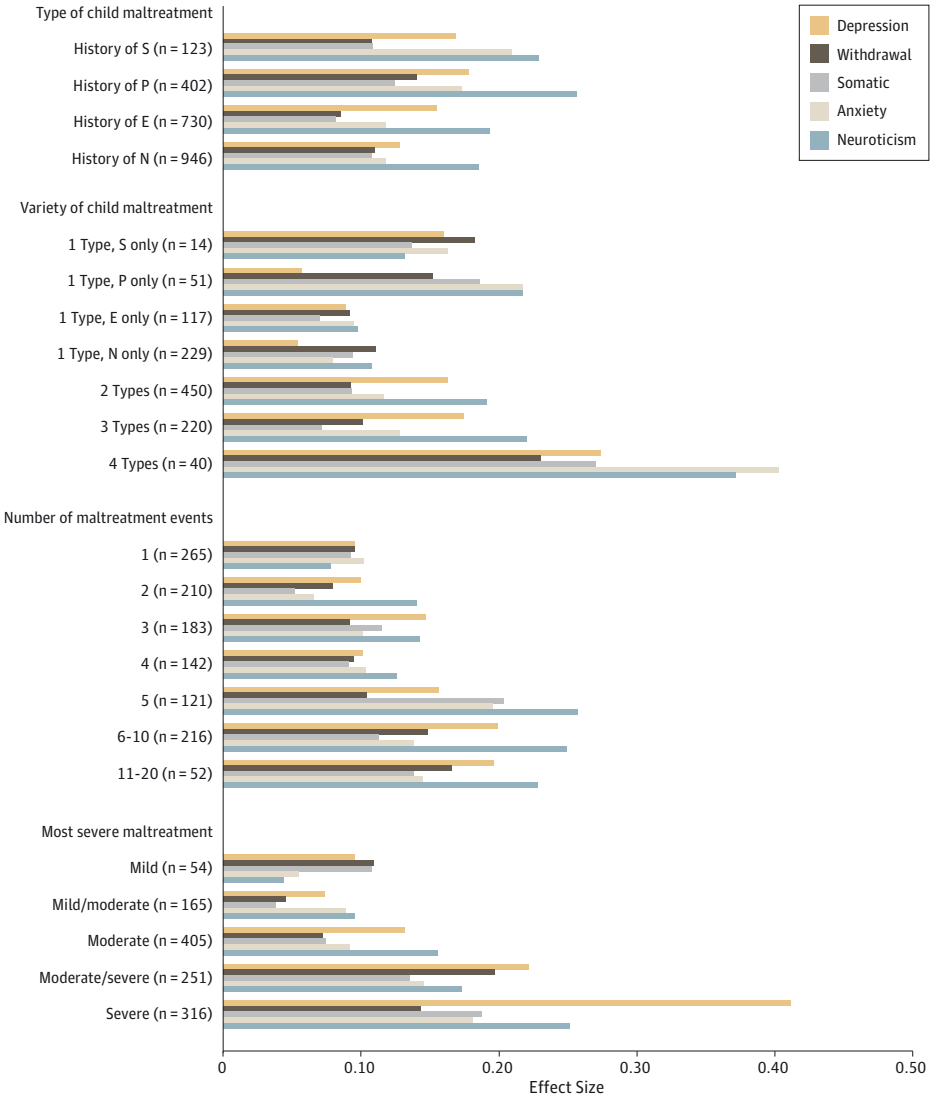
Co-occurrence of CM

Figure 3 displays the rate of co-occurrence between the different types of CM. The size of the circles in Figure 3 is proportional to the number of children who experienced each type of CM, and the amount of overlap between circles is proportional to the co-occurrence of CM types. Only 14 maltreated children (1.0%) experienced sexual abuse without another type of CM.

Multivariate Associations

Although subgroup comparisons support the assumption that CM is psychologically harmful, overlap among CM types and psy-

Figure 1. Internalizing Effect Sizes for Type, Variety, Frequency, and Severity of Child Maltreatment (CM)



Each bar reflects an effect size (success rate difference) from comparing different CM groups with the non-CM group. Effect sizes of 0.1, 0.3, and 0.4 are considered small, medium, and large, respectively. With the exception of the 1 type, S only (n = 14) bars, all displayed bars are significant at $P < .01$. Even the most mild form of CM was serious enough to reach the threshold for documentation. E indicates emotional abuse; N, neglect; P, physical abuse; and S, sexual abuse.

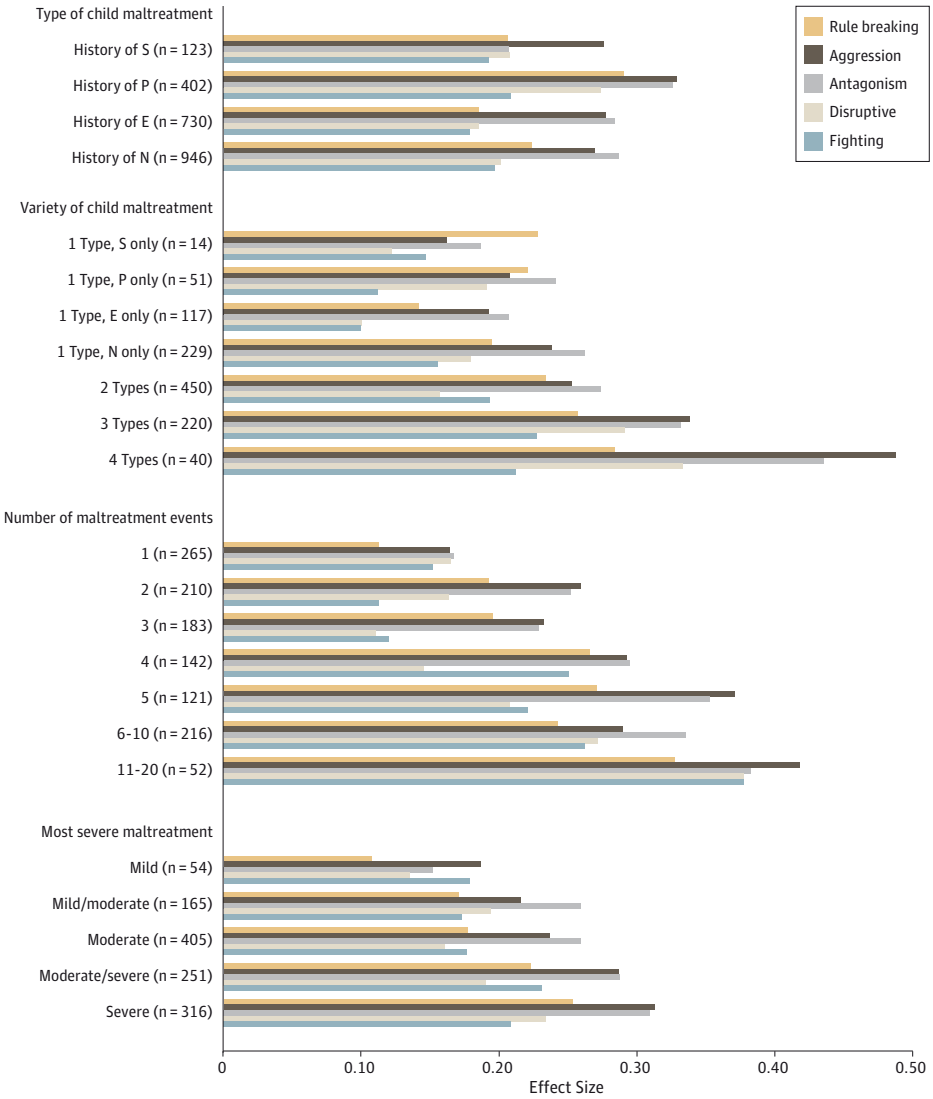
chiatric outcomes is substantial. Thus, structural modeling is needed to disentangle these effects and directly test assumptions of nonequivalence, specificity, and nonuniversality.

Structural Model

Structural equation modeling and measurement invariance models were fit using *Mplus*.[31] In the structural model, independent variables were 4 types of previously documented CM, each with 3 indicators representing the number of documented CM events committed by 3 different perpetrators (mother, father, and other). Dependent variables were self-, peer-, and counselor-rated psychological factors modeled as indicative of latent internalizing and externalizing factors. Because the threshold for legal documentation of CM was high, maltreatment indicators were modeled as censored from below. For this type of analysis, the default *Mplus* estimator is maximum likelihood estimation with robust standard errors (MLR). Initially, the 4 types of CM were modeled separately. However, under this initial model there were extremely high correlations among physical abuse, emotional abuse, and neglect (average correlation, 0.82). Multicollinearity among these variables produced partial regression coefficients that were in the opposite direction of theory and of implausible magnitude (eg, physical and emotional abuse were strongly associated with positive outcomes); this consequence is typical of multicollinearity.[32] Therefore, physical abuse, emotional abuse, and neglect were modeled as indicators of a single nonsexual CM variable.

Displayed in **Figure 4** is the final structural model, with prospectively assessed CM variables on the left side and psychological outcome variables on the right side. Arrows leading from the CM variables to the psychological variables represent regression paths, the predictive portion of the model. The child's age and year of camp attendance were statistically con-

Figure 2. Externalizing Effect Sizes for Type, Variety, Frequency, and Severity of Child Maltreatment (CM)



Each bar reflects an effect size (success rate difference) from comparing different CM groups with the non-CM group. Effect sizes of 0.1, 0.3, and 0.4 are considered small, medium, and large, respectively. With the exception of the 1 type, S only (n = 14) bars, all displayed bars are significant at $P < .01$. Even the most mild form of CM was serious enough to reach the threshold for documentation. E indicates emotional abuse; N, neglect; P, physical abuse; and S, sexual abuse.

trolled, although for the sake of clarity these 2 controls were omitted from the Figure. Two internalizing factor loadings were of modest size, including the loadings for the TRF Somatic Complaints scale and the CDI Depression scale. However, the TRF Somatic Complaints scale has the lowest co-occurrence rates with the other TRF syndromes,[33] and the correspondence between child self-reported depression and parent or teacher reports of child depression is typically low.[34] Both scales were retained because somatic symptoms are a common feature of adult internalizing disorders, and symptoms of childhood depression are not easily detected by an informant; the latent variable (internalizing) captures shared variance across sources, thus mitigating informant discrepancies.[35]

The full structural model was used to examine each of the 4 assumptions regarding the effects of CM, including whether CM significantly predicts psychiatric disturbances (harmfulness), whether some types of CM more strongly predict psychiatric disturbances than others (nonequivalence), whether CM predicts specific types of psychiatric disturbances incremental to the underlying internalizing and externalizing factors (specificity), and whether the full structural model varies across sex and race (nonuniversality).

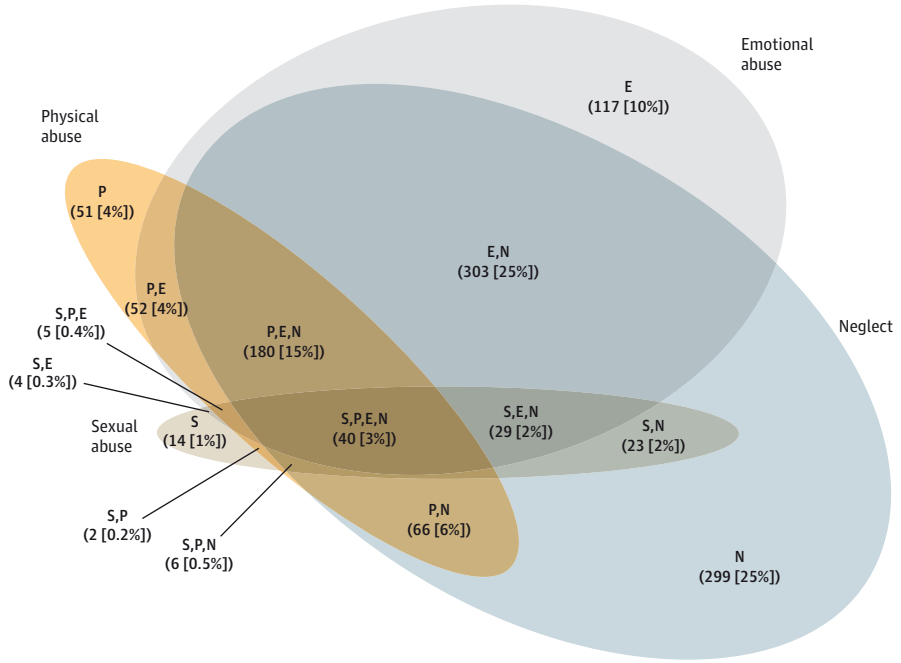
Harmfulness Assumption

In support of the harmfulness assumption, nonsexual forms of CM, including physical abuse, emotional abuse, and neglect, significantly predicted both internalizing ($\beta = 0.185$; SE = 0.028; $P < .001$) and externalizing ($\beta = 0.283$; SE = 0.023; $P < .001$) after accounting for age and year of camp attendance. In line with previous meta-analytic evidence, sexual CM was not significantly related to internalizing or externalizing.

Nonequivalence Assumption

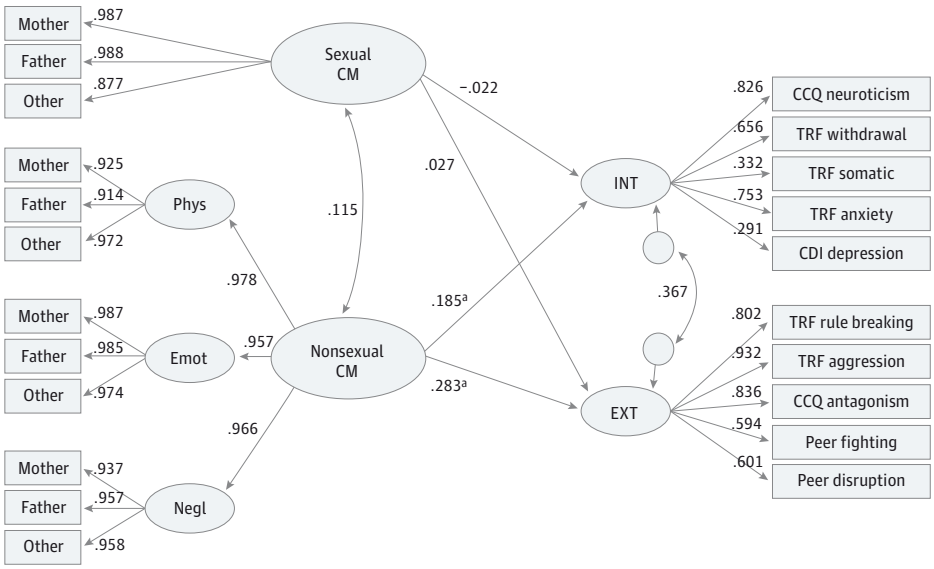
Contrary to the nonequivalence assumption, the structural model indicates equivalence between different forms of

Figure 3. Co-occurrence Between Different Types of Child Maltreatment



The size of the circles is proportional to the number of children who experienced each type of maltreatment, and the amount of overlap between the circles is proportional to the co-occurrence of maltreatment types. E indicates emotional abuse; N, neglect; P, physical abuse; and S, sexual abuse.

Figure 4. Structural Model Predicting Psychiatric Outcomes From Child Sexual Abuse, Physical Abuse, Emotional Abuse, and Neglect After Controlling for Age and Year of Camp Attendance



Prospectively assessed child maltreatment (CM) variables are presented on the left side and psychiatric outcome variables on the right side. One-headed arrows leading from the latent variables to their indicators represent standardized factor loadings, which are all significant at $P < .001$. One-headed arrows leading from the latent CM variables to the latent psychiatric variables represent standardized regression paths, the predictive portion of the model. Double-headed arrows represent correlations. CCQ indicates California Child Q-Set; CDI, Children's Depression Inventory; Emot, emotional abuse; EXT, externalizing; INT, internalizing; Negl, neglect; Peer, peer ratings; Phys, physical abuse; and TRF, Teacher Report Form.

[a] Regression paths are significant at $P < .001$.

CM. With the exception of sexual CM, which was not predictive of psychiatric outcomes, nonsexual forms of CM load heavily on a single factor (factor loadings ranged from 0.96 to 0.98).

Specificity Assumption

Contrary to the specificity assumption, the structural model indicates nonspecificity. Greater frequency of nonsexual CM predicts greater rates of internalizing and externalizing; beyond these effects, however, CM does not predict specific psychiatric outcomes. In each of 20 analyses, the structural model in Figure 2 was altered to add a direct pathway between CM and a specific psychiatric outcome (eg, anxiety). In all 20 cases (2 CM predictors, 10 psychiatric outcomes), the specific regression coefficient was very small ($\beta < .02$ for all) and not significant.

Table. Measurement and Structural Invariance Across Sex and Race

Model	No. of Parameters Estimated in Each Model	AIC[a]	BIC[a]	aBIC[a]
Sex (female vs male)				
1. Configural invariance: intercepts free, factor loadings free, regression paths free	160	172 013	171 902	17 1410
2. Strong measurement invariance: intercepts equal across groups, factor loadings equal across groups, regression paths free	116	171 090	171 755	171 386
3. Structural invariance: intercepts equal across groups, factor loadings equal across groups, regression paths equal across groups	112	171 090	171 732	171 376
Race (black vs white)				
1. Configural invariance: intercepts free, factor loadings free, regression paths free	160	155 781	156 673	156 171
2. Strong measurement invariance: intercepts equal across groups, factor loadings equal across groups, regression paths free	116	155 738	156 393	156 025
3. Structural invariance: intercepts equal across groups, factor loadings equal across groups, regression paths equal across groups	112	155 741	156 373	156 017

Abbreviations: aBIC, adjusted Bayesian Information Criterion; AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion.

[a] When a series of nested models are compared, the model with the lowest values is the best-fitting model.

Nonuniversality Assumption

Contrary to the nonuniversality assumption, invariance analyses indicate generalizability of effects across groups in the structural model. For sex and race, the **Table** presents fit statistics for 3 models that allow factor loadings, intercepts, and regressions to vary across groups; set factor loadings and intercepts equal across groups to evaluate strong measurement invariance; and set regressions equal across groups to evaluate structural invariance. For both sex and race, the improvement in fit (ie, generally lower values for fit statistics) across models indicates both measurement and structural invariance.

Discussion

Our results suggest that physical abuse, emotional abuse, and neglect are equivalent insults that affect broad psychiatric vulnerabilities. Our results also highlight an important problem—one that may explain mixed findings in the literature on child sexual abuse. Specifically, child sexual abuse is an infrequent event that is almost always accompanied by other types of CM. This pattern of rarity and lopsided co-occurrence has several consequences. First, it poses a statistical constraint that severely attenuates the correlation between sexual and nonsexual CM. For example, if nearly all people with a given disorder are men but very few men have that disorder, then sex will be nearly uncorrelated with the disorder (despite the fact that almost all cases are in men). This constraint explains why sexual CM and nonsexual CM are weakly correlated factors in our structural model: whereas 89% of cases of sexual CM are accompanied by nonsexual CM, only 9% of cases of nonsexual CM are accompanied by sexual CM.

Second, there is no practical way to understand the specific consequences of sexual CM because its correlates may be attributed to other forms of co-occurring CM. Statistically controlling for co-occurring CM removes what little covariation is left after the attenuation caused by unidirectional redundancy, further gutting the variance in the sexual abuse variable and producing unreliable parameter estimates. Alternatively, cases of "pure" sexual abuse (without co-occurring CM) are extremely rare and unrepresentative. This intractable issue may explain why research on sexual CM produces mixed results. The infrequency of sexual CM combined with its unidirectional redundancy with nonsexual CM attenuates their correlation and undermines efforts to identify the effects of sexual abuse, which are almost certainly detrimental. As such, previous meta-analyses of the literature on child sexual abuse[7,8] may produce misleading results.

This study also partially addresses a potentially confounding variable: SES. Because factors associated with low SES predict the occurrence of both CM[36] and mental illness,[37] low SES may explain the association between CM and psychopathologic disorders. In the current study, all children were sampled from families with low SES, attenuating this potential SES confounder. However, a different pattern of results may be found in populations with higher SES.

Sexual abuse may be an underreported type of CM that is difficult for child protection agencies to substantiate. Thus, an important limitation to overcome is collecting data on these missed cases; doing so may also help address the methodologic problem of rarity and lopsided co-occurrence. Other limitations of this study include reliance on official documentation, absence of data regarding psychopathologic disorders prior to CM, and use of psychological reports

from counselors and children who only knew the participants in the camp setting.

Conclusions

Complex etiologic models of the effects of CM on mental health may be less illuminating than parsimonious models emphasizing pathways to broad vulnerability factors. Evidence suggests this finding may also be true more generally of childhood adversity.[17] Thus, treatments tailored to specific types of abuse, to populations, or to outcomes may be less effective than those aimed at mitigating early changes in the neurobiological and temperamental factors that dispose individuals toward psychopathologic disorders. Such treatments are likely to have broad and comprehensive benefits. Finally, population-level prevention and intervention strategies should not ignore the considerable psychological harms imposed by emotional abuse, which rival those of physical abuse and neglect. Taken together with high worldwide prevalence[2] and evidence that emotional and physical pain share a common somatosensory representation in the brain,[38,39] it is clear that emotional abuse is widespread, painful, and destructive.

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Study concept and design: Vachon, Rogosch, Cicchetti.
Acquisition, analysis, or interpretation of data: Krueger, Rogosch, Cicchetti.
Drafting of the manuscript: Vachon.
Critical revision of the manuscript for important intellectual content: All authors.
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