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Let it go, let it go: Stop measuring child maltreatment as a binary yes/no

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Abstract

Numerous methods are used in the measurement of child maltreatment (CM) exposure. As a science, it is necessary that the field of CM research evaluate its measurement approaches periodically to ensure that the common approaches are the best approaches. A prominent method for measuring CM in research as a predictor variable is to conceptualize CM as a two-level, yes/no binary variable (e.g., 0 = No CM exposure, 1 = CM exposure). While there is no consensus on what method is the best approach for measuring CM, empirical evidence suggests that the binary measurement approach to CM has significant limitations. The current paper sought to progress the field of CM and trauma research forward by reviewing several lines of research demonstrating why the use of a binary yes/no CM measurement approach is problematic. As evidence for why a binary measurement of CM should be halted, this paper reviews research on: why the characteristics or details of CM exposure matter, risk of CM "contamination," and CM's relation with environmental or systemic factors. The ethical and clinical implications of a CM binary measurement approach are also discussed. Several recommendations for the field are provided on how researchers can improve the measurement of CM and ensure accurate and replicable studies are being published.

Keywords

Child maltreatment; Youth; Measurement; Trauma

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1. Introduction

The general premise of the scientific method is that a falsifiable hypothesis is proposed based on existing evidence, an experiment is created and run to test that hypothesis, and the results examined. Key to this process is the use of accurate assessment and measurement methods for the constructs under investigation. If appropriate construct assessments and measurements are not used, this can contribute to a breakdown in scientific process and limited scientific progress. Thus, researchers must continue to (re)evaluate their assessment and measurement approaches. How child maltreatment (CM) is assessed could benefit from a review and subsequent termination of outdated or problematic measurement practices (e.g., Finkelhor, 2018; Gabrielli & Jackson, 2019).

Perhaps the first and most enduring way of measuring or coding CM is the binary approach. In this approach, there is one group of youth who are characterized as having exposure to CM (i.e., what might be called the "yes," "exposure," or "maltreatment" group) and another group of youth characterized as never experiencing CM (i.e., the "no maltreatment," "control," or "comparison" group). In some situations, this also involves measuring CM as a binary variable in cases of polyvictimization, such as one group being exposure to no or one form of CM, whereas the other group is defined as exposure to two or more types of CM (Radtke et al., 2024). A binary variable of CM exposure is then used as a grouping or predictor variable in relation to an outcome of interest, such as a mental health or physical health. This applies to measurement across CM types and for single CM types. For example, researchers may compile post-traumatic stress symptom (PTSS) scores to compare a group of youth with and without CM exposure to determine if the scores are statistically significantly different. If the researcher were to find a difference, such that youth in the CM group tended to report more frequent symptoms compared to the no CM group, the researcher might conclude that "CM is associated with higher PTSS compared to no CM."

The binary, data reductionist approach to measuring CM is prevalent in the literature. For example, in a recent systematic review on the relation between CM and language difficulties in youth, Alvarado et al. (2023) reported that 33 of 50 studies in the review relied on a dichotomous grouping method for measuring CM. Further examples of these types of studies can be found when examining metaanalyses on CM, where researchers rely on literature that define CM as binary yes/no variable (e.g., Fitton et al., 2020; Lavi et al., 2019). Even when type of CM exposure and multiple CM variables are included in the same model, it is often the case that each type of CM considered is measured dichotomously, as is often the case for example in studies using Adverse Childhood Experience (ACEs) measures (e.g., Ports et al., 2020). In a related example, Radtke et al. (2024) examined the operationalization practices since 2006 of polyvictimization exposure in childhood, which most often included exposure to CM in addition to other forms of violence. Among the articles extracted, 49.3% of the studies created a dichotomous variable of polyvictimization based on selected study cutoffs, which varied markedly between studies (e.g., no or 1 exposure vs. two or more exposures, or "low" vs. "high" exposure). Similarly, Lee et al. (2023) evaluated recent childhood polyvictimization measurement approaches in relation to health outcomes between June 2020 to January 2021, finding that only 30.21% of studies used a continuous metric of polyvictimization. Among the categorical approaches evaluated,

7.29% used a dichotomous none or one exposure vs. more than one exposure, and 29.17% used an ordinal variable approach with minimal categories (e.g., 0 vs. 1 vs. 2 vs. 3+ CM exposure types). Although some of these may not be binary distinctions, such methods still employ a data reduction approach from a more detailed assessment of CM.

2. Brief history of binary assessment in CM research

The idea that accidentally or intentionally failing to provide basic care and abstain from physically, emotionally, or sexually hurting youth (i.e., CM) has been documented in news reports, legal cases, and medical journals for a long time (Jackson, 2023). After several high-profile cases in the late 1800s and early 1900s of youth experiencing extreme physical cruelty, new laws against this behavior were created and the study of CM began soon after. Since that time, there have been thousands of studies, from a range of professional disciplines, devoted to understanding the causes, consequences, and contributing factors that continue to make CM a common problem in society.

While no single reason is likely to explain the popularity of measuring CM as a binary variable, it is not challenging to see why the field came to rely extensively on this metric. The field from the start organized CM by types and by the presence or absence of a given type. In the early years of CM research, the focus was often on the more severe cases where youth died because of abuse or suffered lifelong impairments because of CM (Shelman & Lazoritz, 2005). It perhaps made little sense to know much else as these populations were hard to access and even more challenging to study given the stigma and legal threats from reports of CM. Further, given that types of CM were thought to be so different from each other in the early years of research, the only necessary form of assessment was to document if the event had occurred. Adding to the conceptualization of CM being a binary construct was also the legal aspect of CM, as the act of CM has both a federal and state definition that includes the presence of risky or damaging behavior by caretaker(s) on youth or the absence of care for basic needs (Perrin-Miller & Perrin, 2012). Research followed these definitions as well and the documentation practices of CM, and, thus, a presence/absence focus on CM was maintained in social sciences to be consistent with legal definitions and measurement approaches of CM across the United States. There is also the likely influence of research on what CM is being examined in relation to. For example, CM is often evaluated in relation to posttraumatic stress disorder (PTSD) and other trauma and stress diagnosis outcomes, where all that is needed for the purpose of diagnosis is absence or presence of CM. Further, one also needs to consider the earlier limitations of statistical computation ability and availability of researchers to examine CM exposure beyond group comparison analytics. Taken together, there is a wide range of societal and scientific influences that can help explain why the field became very good at understanding CM through the binary approach.

3. Current review

Despite the perceived ease perhaps in defining youth who fit a yes/no category of CM and its widespread prevalence as a CM measurement method, continuing to conceptualize a complex variable like CM into two groups of present or absent (or even “high” vs. “low”) may limit the capacity for the field to fully understand the impact of CM on youth

and families. Current evidence indicates that grouping youth into yes/no categories could be problematic for interpretation and should likely not be a method of operationalizing CM. The current paper reviews and summarizes empirical evidence and theoretical work demonstrating why it may be problematic to use a binary CM grouping method. This includes literature on the importance of dimensions of CM, risk of "contamination," and CM's relation with other environmental or systemic factors. Moreover, the paper also highlights ethical concerns with grouping youth exposed to CM in a binary manner. By doing so, this paper serves as a call to research to improve measurement practices related to CM to improve the evidence-base and better serve individuals this research intends to help.

4. Reasons against the use of a binary child maltreatment (CM) variable

4.1. Dimensions of CM matter

Beyond whether or not exposure has occurred, CM can be measured based on the type, severity or impact, how many times an event occurred (i.e., frequency), how long these events have been occurring (i.e., duration, chronicity), age of onset, or even who was the perpetrator (English et al., 2005; Manly, 2005). Several lines of research have systematically examined these dimensions of CM and shown that this information is paramount when determining the relation between CM and an outcome of interest, such that specific characteristics of CM exposure may be uniquely associated with an outcome of interest. For example, Jackson et al. (2014) examined the relation between CM exposure and internalizing, externalizing, and adaptive behaviors among youth in foster care. When the authors examined the unique relation for frequency and severity of CM with these behavioral outcomes, only severity of CM was found to be statistically significantly associated with adaptive and externalizing behaviors. These types of patterns demonstrating a potential importance of one dimension over others or the combination of dimensions in understanding youth's adjustment following exposure to CM extend beyond behavioral functioning. For example, results suggesting that specific dimensions of CM matter more than others have been found in studies examining the relation between CM and physical health (e.g. obesity; Shin & Miller, 2012), concerning health behaviors (e.g., condomless receptive anal/vaginal sex, multiple sex partners; Thompson et al., 2017), cognitive functioning (e.g., working memory; Cowell et al., 2015), academic performance (e.g., school grades; McGuire & Jackson, 2018), and social wellbeing (e.g., social acceptance; Taussig & Culhane, 2010).

For a series of examples of this type of research, one can refer to the special issue (Vol. 29, Issue 5) published in *Child Abuse & Neglect* on CM measurement and conceptualization in 2005. The consensus across the papers in the special issue was that researchers need to account for the multidimensional nature of experiences of CM (e.g., English et al., 2005; Herrenkohl, 2005). These efforts were even followed up in a second special issue in *Child Abuse & Neglect* in 2019 (Vol. 87) on the topic of CM measurement given: (a) the continued problems observed in the field of CM research as it relates to CM measurement and (b) the number of innovative ways that had been developed over the years for how researchers can improve in their ability to capture the complexity of CM (Gabrielli & Jackson, 2019;

Jackson et al., 2019). Again, consensus in the special issue was that researchers should utilize multidimensional approaches to examining CM.

Taken together, the evidence across a diverse collection of research has demonstrated that CM is a construct not likely to be measured well when there are only two possible values in a binary conceptualization: 0 = no exposure, 1 = exposure. In situations where CM is reduced to an exposure vs. no exposure group operationalization, all the information on CM and its characteristics are now missing, and the heterogeneity of exposure history among youth is removed. It is well documented (and advised against) from a statistical standpoint that dichotomization of a multidimensional/continuous variable results in a significant loss of information and variance within a sample, which in turn negatively influences subsequent analyses (e.g., MacCallum et al., 2002; Royston et al., 2006). The case of CM is no different from the study of other psychological constructs, yet this approach has been allowed to continue.

Beyond a statistical standpoint, consider examples from youths' lived experiences to further illustrate this point. There have been well reported cases in the news and literature of youth, such as the famous case of Genie (pseudonym for her real name; Dombrowski et al., 2011) or the reported experiences of the children in the Turpin family (e.g., Medina, 2018), who experienced frequent, chronic, and severe victimization across several different types of CM (e.g., neglect, physical and emotional abuse). In situations where a grouping method of CM is used, these youth would be considered equivalent (i.e., placed into a "yes" maltreatment group) to a youth who was reported for supervisory neglect after being left home alone for a few hours one day (even if nothing problematic happened while at home alone). The experiences of these youth would also potentially be equated to a youth where no CM occurred in a situation where a researcher is relying on case file data and counting any report of CM made to child protective services, even if unsubstantiated. Although this example seems extreme and the purpose is not to downplay certain CM experiences, this would be the situation if a binary grouping method was used. All the complex polyvictimization and dimensionality of CM is reduced to yes or a no, and a single unit value (i.e., 0 vs. 1) is what separates all these youth from youth with no suspected CM.

It is worth noting that some of the exact mechanisms explaining why CM dimensions may matter is not fully understood and that not every study finds differences among CM dimensions. There are also theories posited that suggest there may be "universal" effects of CM for some outcomes and groups of youth (e.g., Vachon et al., 2015). However, when these ideas are tested, it is often found that the influence of CM is not uniform and equal for all types of experiences and that researchers need to consider CM as multidimensional (Gabrielli & Jackson, 2019; Manly, 2005). Take for example research on the relation between CM and academic performance (e.g., school grades, standardized tests). Early research in this domain tended to only examine CM as a binary variable and find that youth exposed to CM tended to perform worse in school compared to youth with no CM exposure (e.g., Eckenrode et al., 1993). However, as research in this area progressed and researchers began to explore what about CM may relate to academic performance, differing patterns emerged. For example, not all types of CM were consistently associated with academic performance (e.g., physical abuse) and certain characteristics of CM (e.g., chronic

exposure) appeared more strongly associated with academic performance compared to other characteristics within specific types of CM (e.g., McGuire & Jackson, 2018; Romano et al., 2015). Collectively, the research now indicates that not all youth who experience CM have similar performance deficits to youth without CM exposure, as well as similar deficits among each other according to CM exposure; thus, dimensionality of CM exposure partly matters with regard to determining which youth are at-risk for poor academic performance.

4.2. Contamination of the “no maltreatment” group

Another reason for concern with yes/no binary assessment of CM is the amplified risk of contamination in the “no maltreatment” group. Contamination refers to when the supposed no-maltreatment or control group contains youth with exposure to CM. Studies examining contamination have consistently found that close to 50% of a comparison group thought to have no prior exposure to CM has experienced CM (e.g., Shenk et al., 2016; Widom & Morris, 1997). The issue of contamination is important as it can influence the results of a given study and thus the conclusions reached by the authors of that study (Scott et al., 2010; Widom & Morris, 1997). For example, Shenk et al. (2016) found that over 40% of a suspected no maltreatment group contained youth with reported exposure to CM. When comparing differences in risk for health outcomes (e.g., teenage births, major depression) between the CM, “contaminated” comparison, and “cleaned” comparison groups without CM, the authors found much higher risk differences across most health outcomes between the maltreatment vs. “cleaned” comparison group as compared to the maltreatment vs. “contaminated” comparison group.

This risk of contamination is further emphasized when considered in conjunction with general assessment issues within the field. That is, the tools often used to assess CM and thus identify youth with or without CM tend to lack adequate sensitivity and specificity. This can result in failing to identify youth with CM exposure (i.e., false negative), in addition to overidentifying youth with supposed CM when CM did not occur (i.e., false positive; McTavish et al., 2020). Additionally, there is substantial evidence indicating both overestimation and underestimation of CM exposure depending on the specific assessment method used to evaluate CM exposure (e.g., case file vs. self-report information) and when in an individual’s life CM is assessed for (e.g., prospective vs. retrospective; Baldwin et al., 2019). Thus, not only do researchers run the risk of having contamination in their supposed CM group, but they also run the risk of having youth with no CM exposure in their supposed CM exposure group. One of the suggested methods for determining the presence of contamination is using multiple assessment methods, such as obtaining case file data in combination with youth self-report (e.g., Shenk et al., 2016). However, rarely does this type of approach get used when assessing CM (e.g., Jackson et al., 2019).

Furthermore, another form of potential contamination that has received minimal attention is the contamination of exposure to other general traumas (e.g., car accidents, natural disasters, community violence). When CM is measured as a binary variable, there may still be youth in the supposed no-CM group with exposure to non-CM traumatic or adverse events. Despite some minor differences across these definitions, there are several similarities in what constitutes a general trauma and CM and the general theories linking exposure to CM

and maladjustment (both physical and psychological) run parallel to that of non-CM forms of trauma and maladjustment. For example, from a biological perspective, both CM and general trauma represent threating or stressful situations that have the potential to negatively influence activation patterns of the hypothalamic–pituitary–adrenal axis (HPA-axis), and in turn this problematic neuroendocrine response may increase risk for psychopathology (e.g., Glaser & Kiecolt-Glaser, 2005; Kuhlman et al., 2015). Indeed, studies have shown that when CM and general trauma are evaluated in conjunction, both predict poor functioning (e.g., Negriff, 2020); yet rarely are both types of potentially traumatic events considered in the same study. Further, general trauma cannot be accounted for when CM is evaluated as a binary variable and used to test group differences (e.g., using a *t*-test to evaluate mean differences for an outcome of interest between youth with and without CM). Thus, an individual may believe the proposed factor that differentiates two groups of youth (i.e., CM) is only in one group when there is actually a different form of a similar factor (i.e., another form of non-CM trauma) present in both groups and potentially responsible for the findings.

Collectively, the research on contamination indicates a high likelihood of youth being improperly classified into either the CM or no CM group when one relies on a binary CM measurement. These issues are further underscored when considering the lack of use of psychometrically sound methodology or assessment tools that might address this issue (e.g., "validating" whether maltreatment occurred or using multiple assessment methods; Jackson et al., 2019). This is not to say that other methods of measuring CM are exempt from this occurring or any type of measurement error. However, the likelihood of contamination occurring and having a stronger negative influence on subsequent comparisons and data analysis is much higher when CM is examined only as a two-level variable since this is the smallest amount of information possible in a variable and the emphasis is placed on simply whether exposure occurred.

4.3. CM's relation with other individual and environmental/system level factors

CM is often not the only major life event a victim of CM has experienced, nor does it exist within a vacuum independent from other aspects of a youth and their environment. The factors that contribute to CM and coincide with CM are complex and exist within a multilevel or ecological systems framework (Belsky, 1980; Font & Maguire-Jack, 2020). For example, consider Fig. 1 in Coulton et al.s' (2007; pg. 1120) paper or Clauss-Ehlers et al.' (2019) *Ecological Model of the Multicultural Guidelines* that capture part of the complex systems that may contribute and relate to CM at the individual and environmental levels. Taken together, a conceptualization of CM as part of a multidimensional link in a web of factors that contribute to youths' wellbeing should be considered, as opposed to a type of independent, unidimensional factor. Yet, when CM is measured as a binary variable, there are several mechanisms for how CM becomes more prone to measurement error and inaccurate conclusions resulting from CM's relation with other individual or environmental factors.

One way through which this can happen when measuring CM as a binary variable is the risk of creating artificial grouping that do not actually represent exposure vs. no exposure to CM. Instead, the binary CM variable represents a different and inaccurate dichotomy.

This is often the result of poor measurement approaches to CM. This can be done in a direct manner, such as when a proxy variable that does not actually measure CM is used to classify youth into CM or no CM groups. For example, placement in foster care has been used as a proxy for exposure to CM (e.g., for reviews, see Bywaters et al., 2022; Jackson et al., 2019). This is problematic because not all youth are placed in foster care because of CM (e.g., child behavioral challenges and parental incarceration; U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2022) and youth in community samples experience CM. Further, given what is known about numerous other aspects associated with involvement in the foster care system being related to poor functioning (e.g., placement changes, lack of access to mental health services), assuming that it is only CM that separates these youth and explains youths' functioning becomes more problematic (e.g., Singh & Gudiño, 2022).

The creation of artificial groupings because of the CM binary approach can also occur in an indirect way because of poor measurement of CM that does not account for other individual and environmental factors. One prominent example relates to the overlap between poverty and CM, and more specifically neglect (Berger, 2004). Youth exposed to neglect include those whose caregivers do not provide adequate food, housing, and/or various forms of care to meet a youth's basic needs, despite the means to do so. When living below the federal poverty threshold, the same kinds of challenges are observed; however, caregivers do not have the capacity to provide this care. Often, measures of CM may ask about exposure to neglect, such as asking about not having enough food to eat or clothes to wear (e.g., *Trauma History Questionnaire*; Hooper et al., 2011). However, these measures do not qualify these experiences or account for the role of poverty in their assessment. Thus, when a youth endorses this type of item and gets placed into the "maltreatment" group, they may be placed there for coming from a family with minimal financial resources, rather than experiencing CM. This also applies to reporting and documentation situations among child welfare agencies, which has implications for case files. For example, while poverty status should be accounted for by child protective agencies when evaluating neglect, this is not always considered and the resulting information (i.e., exposure to neglect) is then put in case files that is used by researchers for measuring CM (e.g., Eamon & Kopels, 2004). As a result of these prominent issues in CM measurement, the yes/no CM variable may become a stronger measure of yes/no to living in poverty. This is notably concerning since neglect is the most common form of CM, especially among young children (U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2022).

It is also important to address the many statistical concerns that arise when CM is dichotomized into a binary yes/no and examined in relation to an outcome of interest alongside other individual and environmental factors. For one, the issue of CM being confounded by a third, related variable would be especially pronounced in data analysis approaches that are unable to account for confounding variables and rely on a binary CM approach, such as when doing an independent samples *t*-test between a supposed maltreatment and no-maltreatment group. In some aspects of CM research, the field has recognized this feature of CM. That is, it would be rarer today compared to research 50 years ago to only see analytic models with CM as the only predictor variable or grouping variable. Evidence for this can be demonstrated through the multitude of studies and

recent meta-analyses examining the moderating or mediating role between CM and another variable of interest on an outcome of interest (e.g., Miu et al., 2022).

However, the use of a binary CM variable is still problematic in data analytic approaches that account for CM and other individual or environmental factors in relation to an outcome of interest. One well-established statistical phenomenon associated with using a binary variable as opposed to a continuous version of that variable is the bias introduced on other variables included in the same model (MacCallum et al., 2002; Royston et al., 2006). As a result of dichotomizing a continuous variable, spurious results (e.g., statistically significant predictors) may be more likely to emerge both for the predictor variable that was dichotomized and/or other predictor variables in the model. These types of issues can be further exacerbated in cases involving mediation or moderation with the binary variable (DeCoster et al., 2009). This has notable implications for research on CM that seeks to evaluate CM in conjunction with other individual and environmental risk and resilience factors for an outcome of interest. That is, measuring CM as a binary variable is not only a problematic approach for understanding CM itself but also the other individual and environmental factors thoughts to influence CM and an outcome of interest. For example, suppose a researcher is trying to understand why some adolescents demonstrate alcohol use concerns, so they examine several known risk factors (i.e., CM exposure, caregiver alcohol use, family income level, depression) together in a multivariate regression model predicting weekly alcohol consumption. In a model where CM is measured dichotomously, it may be the case that CM exposure, depression, and family income level are statistically significantly associated with alcohol consumption. However, had the authors used a continuous or multidimensional measure of CM, it may have been the case that only caregiver alcohol use and family income level are related to alcohol use. Initial evidence for such phenomena has been documented in the adversity literature, such as Ettekal et al. (2019) who found shifting relations between sets of risk factors (e.g., harsh discipline, maternal psychopathology) for externalizing concerns in young children depending on whether the risk factors were examined continuously vs. dichotomously in the same model.

Additionally, dichotomizing a continuous or multidimensional variable can result in a loss of statistical power. In some circumstances, this can be equivalent to losing almost half of a sample size compared to if the continuous variable had been used (e.g., Fedorov et al., 2009; Zhao & Kolonel, 1992). In the case of CM research, this may be associated with an overall lack of ability to properly evaluate CM in relation to other possible predictors of functioning when trying to determine the role of CM in youths' wellbeing. Sample size issues are a commonly reported concern in research on CM. Thus, maximizing sample size efficiency is an important need for this research that is not supported when using a binary, as opposed to multidimensional, CM variable.

4.4. Ethical considerations of using a binary maltreatment variable

Researchers have a duty to ensure that their work represents an accurate and valid assessment of the construct of interest (e.g., *Ethical Principles of Psychologists and Code of Conduct;* American Psychological Association, 2017). Because of the stigma associated with CM and the vulnerability of the victims of CM and their families, researchers need

to consider if using a binary approach demonstrates integrity through accurate and honest assessment of CM. For example, researchers should critically evaluate if limiting or reducing exposure of CM to a yes/no variable in effect suggests that the victim's unique experiences of CM do not matter for scientific endeavors or demonstrates equity when accounting for youths' lived experiences.

Ultimately, the refinement of the measurement methods should seek to improve research practices with the end goal of the research contributing to the betterment of society, put broadly. However, there are plenty of cases throughout the history of psychological science where issues with methods of measurement have taken this goal in the opposite direction. Similar issues are raised in the field of CM research. This is not to say that researchers using a binary CM variable, or the research evidence established prior based on this method, are seeking to create harm. However, it is also clear that research based on a binary CM variable could be used negatively or be interpreted inaccurately. For example, in a recent meta-analysis on prospective studies examining CM and violent outcomes, Fitton et al. (2020) reported that there was an overall almost two-fold increase in risk for violent outcomes between individuals with CM compared to those without CM. This finding might lead to inaccurate assumptions or biases about individuals who have been maltreated being more violent-that by simply experiencing any form of CM an individual is now likely to be more violent. Even though this is not what the authors claim, it is a possible interpretation for a reader who is uninformed or selective in the information they extract. As the authors point out, there were several limitations in the literature, including studies not examining CM in more detail, in addition to a lack of control of external or environmental factors which have been previously shown to be associated with violence. As illustrated in the subgroup analyses (which were based on a limited number of studies where this type of data could be extracted), only the specific CM subtype of physical abuse had a 95% confidence interval for its odd ratio pooled estimate greater than 1.00, which suggests a more certain possible increased risk for violence for this CM type (Fitton et al., 2020). Again, these results were based on binary variable research largely, which notably limited what could be understood about the connection between violence and CM. Concerns with binary classification of childhood sexual abuse across studies and lack of proper definitions of sexual abuse that account for the heterogeneity of experiences were also cited as measurement issues in the controversy surrounding the Rind et al. (1998) meta-analysis on the long term influences of childhood sexual abuse (e.g., Dallam et al., 2001). The results of which had consequential effects on the perception of CM research in public and political domains.

Using the either/or and binary approach has also been characterized within science as a problematic form of western scientific practices, where complex topics are simplified through a duality approach without appreciation for individual differences (e.g., Bermúdez et al., 2016; Tema, 2021). These concerns, in combination with findings about racial and ethnic biases when categorizing youth from historically marginalized population (e.g., greater likelihood to be reported for CM for Black vs. white populations; Maguire-Jack et al., 2015), paint a despairing picture of the potential for binary classifications of CM to further perpetuate discrimination against these individuals. Further, proper CM measurement in this domain fits within the liberation psychology and psychologist-activist models of

clinical child psychology to address systemic issues faced by historically marginalized populations exposed to CM (e.g., Singh & Gudiño, 2023).

The issues associated with a binary variable approach to CM extend beyond research where the main priority is understanding and theory testing (i.e., "basic" science research) to more applied or clinical applications. Consider dissemination and implementation efforts, where the goal is to identify contextual factors to use effective implementation strategies in applying prevention and intervention strategies to address the challenges of youth exposed to CM (Waltz et al., 2019). The binary CM variable would not be able to provide contextual factors to apply to CM prevention or intervention strategies. For example, Van der Put et al. (2018) cited measurement of CM as a limitation in understanding effective components of treatments that seek to prevent or reduce CM. If research should lead to tangible and implementable solutions, then using a simplistic variable for CM may not be the most effective. If research findings are to better support youth with CM to improve functioning and ameliorate suffering, the next steps should be to make an effort to better understand various constructs that factor into their experiences. It is only through meticulous methods that the field can use research to provide targeted prevention and treatment methods.

Lastly, it is important to note that there are often perceived ethical risks associated with asking youth and caregivers (as well as adults) about past CM experiences. This includes concerns associated with "re-traumatizing" individuals or that the process will create significant distress (e.g., Goddard & Mudaly, 2009). These concerns have implications regarding the use of a binary variable to measure CM. For example, researchers may have to consider asking for detailed information from youth about their experiences (e.g., how many times an event occurred) if they want to include a non-binary measure of CM. Additionally, in considering the risk for contamination, even if a researcher plans to use case file data for measuring CM, it may be necessary to ensure no CM has occurred by asking youth to self-report on possible CM exposure. However, several studies have shown that the vast majority of youth who are asked to report on detailed characteristics of their CM history do not report negative reactions (e.g., Jackson et al., 2012; Zajac et al., 2011). It may be likely that the proposed benefits of ensuring accurate CM measurement would outweigh the proposed risks of asking about CM exposure.

5. General recommendations and conclusions

Researchers are encouraged to think critically about how the complex variable of CM should best be measured and conceptualized for their study. The goal is for researchers to appreciate all that has been learned about CM and consider what tools and sources of information will best capture CM for a given study. It is strongly encouraged that researchers strive for as accurate as possible assessment over perhaps what is easiest and fastest, given what is known about the toll of CM on the lives of victims and families. It is important moving forward that those trusted with developing the knowledge base on CM treat this variable with as much care and consideration as possible. To this end, based on the points raised in this paper on the challenges associated with binary measurement of CM, several recommendations can be posited for how to potentially improve measurement in CM research and thus utilize more evidence-based approaches for CM.

Addressing these concerns starts prior to data collection. Researchers are encouraged to design their CM studies from a multidimensional approach. Generally, CM measurement should assess for (a) multiple characteristics of CM exposure (e.g., frequency, severity) and (b) all major types of CM given the regularity of polyvictimization, even if the focus of a study is on a specific form of CM. Doing so will allow researchers to control for the influence of other kinds of CM when present in the lives of the participants. Considering the multitude of assessment factors relevant when selecting a measure of CM exposure (e.g., reporter, time of administration, format), no specific CM measurement tool can be recommended for all situations. To select an appropriate measure, it is advised that researchers first start by closely examining published reviews available in the literature that describe the available psychometric properties and logistical characteristics (e.g., time of administration, cost) of CM measures to find an appropriate, multidimensional measure (e.g., Georgieva et al., 2023; Saini et al., 2019; Yoon et al., 2021). Reviews exist that are specific to certain settings and populations (e.g., primary care settings- Reid & Snyder, 2021, Oh et al. [2018], schools- Eklund et al., 2018). Moreover, several national organizations (e.g., The National Child Traumatic Stress Network) offer free resources to help with selecting appropriate CM assessment tools. Some examples of measures used across various settings and populations that capture multiple forms of CM in a multidimensional manner include the Childhood Trauma Questionnaire- Short Form (CTQ-SF; Bernstein et al., 2003), Maltreatment and Abuse Chronology of Exposure (MACE) Scale (Teicher & Parigger, 2015), and the Childhood Experiences of Violence Questionnaire (CEVQ; Walsh et al., 2008). While each of these measures has their strengths and weaknesses (e.g., Saini et al., 2019), researchers may consider starting with a review of these measures to see how such tools are being implemented in CM research. Additionally, should researchers still feel inclined to use the ACEs despite the measure's well-documented limitations (e.g., Anda et al., 2020; McLennan et al., 2020), it is worth noting that several research groups have developed expanded versions of this tool that assess for ACEs in a multidimensional manner (e.g., Cross et al., 2023; Krinner et al., 2021), as well as questions that may be necessary to add based on population of interest (e.g., LGBTQ+ specific ACEs; Jones & Worthen, 2023).

Another important recommendation regarding measure selection is to ensure all forms of CM and exposure to non-CM potentially traumatic events are assessed for given the common co-occurrence of these experiences (e.g., Finkelhor et al., 2015). The issue is that CM and general traumas are not always mutually exclusive, and there are situations that may complicate the ability to accurately distinguish between exposure "classes." For example, researchers may be interested in assessing for sexual abuse during childhood. However, they may not include assessment of other similar forms of sexual violence that can occur during childhood but are not always captured by a sexual abuse or general CM measure, such as teen dating violence (e.g., Karsberg et al., 2019; Woolweaver et al., 2024). Thus, more comprehensive measurement of the full range of youths' exposure history can help ensure that proper mechanisms or reasons for changes in functioning are identified when CM is used as a predictor variable. It is also recommended that when seeking to measure non-CM traumas, similar dimensions are captured to that of CM, so that researchers may be better able to compare across experiences. Example measures include some interview forms of the Juvenile Victimization Questionnaire-2nd Revision (JVQ-R2; Finkelhor et al., 2011) and

Traumatic Events Screening Inventory (TESI; e.g., Ghosh-Ippen et al., 2002), which assess for both CM and non-CM events in a multidimensional manner, while also offering versions for caregivers and youth.

When considering potential differences in reporting based on data collection method, it is also suggested that researchers use a multi-method or a dual assessment approach for exposure to CM and its dimensions. Such approaches can minimize the risk of contamination in CM samples (e.g., Shenk et al., 2016), as well as address limitations among certain types of measures for capturing specific characteristics of exposure (e.g., caregiver report may provide information on age of onset of CM when combined with youth self-report, as youth may not be able to report on early life experiences). Muli-method or multiple data sources can take many forms and may depend on the population being investigated. For example, when measuring CM exposure among child welfare involved youth, this may include administering a self-report measure and obtaining case file data for coding when case file data is available and accessible by a research team. If working with school-age or adolescent youth who can self-report, a dual assessment approach might involve administering a self-report measure and a measure to one of the youth's caregivers (e.g., Allen et al., 2012). For young children who cannot self-report, assessing CM might involve administering a caregiver report measure of CM using both a questionnaire and an interview form given noted differences in what is reported according to administration format (e.g., McGuire et al., 2024b). This also includes situations with adults reporting retrospectively about their exposure to CM in childhood, such as using two similar CM assessments administered via paper-pencil questionnaire and interview formats (e.g., DiLillo et al., 2006). Unfortunately, given the diversity of assessment and measurement approaches, coupled with the diversity of research questions and populations, the field is not yet at a place where a single multi-method approach can be recommended (Shenk et al., 2023). However, research has clearly documented discrepancies across methodologies, emphasizing that no single method is perfect for capturing exposure to CM.

It is important to note that the suggestions provided here are not necessarily easy to implement. That is, measuring CM is a multidimensional manner and using two different measurement methods would require more questions for participants and resources for researchers. However, these are difficulties that researchers wishing to study CM should be willing to take on, rather than settling for an easier but likely inadequate measurement of such an important variable. Further, many research groups that have utilized a multidimensional, multiple format measurement of CM have published methodological articles on the topic to help future researchers understand and plan for the challenges of these approaches, such as how to support youth self-reporting on CM and obtaining case file data from child welfare agencies (e.g., Dolan et al., 2023; Knight et al., 2006; Jackson et al., 2012; Shenk et al., 2016). Moreover, such recommendations often align with the initiatives or priorities of organizations funding research in this area (e.g., aspects of Goal 2 of the National Institute of Mental Health's Strategic Plan), such that requesting funding for comprehensive measurement of CM would be possible and encouraged. Still, more methodological research in this domain is necessary as it relates to dual or multi-method assessment (as well as how to analyze this data) to determine what might be efficient approaches to accurately capture CM exposure. Researchers using multiple measurement

methods can help to answer these research questions, in addition to addressing what might be their primary research question.

It is important to highlight that using a binary CM variable is not a specific measure or assessment issue. Even if a researcher were to administer the most complex CM measurement tool, they may still simply reduce all those data to a binary CM exposure variable or similarly abbreviated variable (e.g., ordinal variable of 0 vs. 1 vs. 2 vs. 3+ CM exposures). Thus, it is important to consider how the information collected from the measures is used in data analyses. Several advances over the last 20 years in the development of new measurement and statistical approaches make it easier to capture and analyze the complexity of CM exposure. As with CM measures, researchers have a multitude of statistical options to choose from for their research question, so no universal approach can be recommended based on the empirical data available. At an initial level though, researchers should seek to not reduce their data on CM, such as keeping CM as a continuous metric in their model. This also applies to creating artificial CM groups for group comparisons, such as “high” vs. “low” levels of CM. Moreover, if researchers are interested in a specific form of CM, it is also recommended that researches include variables for exposure to other types of CM, as well as non-CM trauma, in the same model. Often, studies comparing models with a single form of CM vs. models with multiple forms of CM show shifts in which predictors are significant when evaluating single vs. multiple forms of CM (e.g., McGuire et al., 2021).

Moving into more complex modeling frameworks when seeking to examine CM as a predictor variable, there exists several analytic approaches that allow for the incorporation of multiple types and multiple dimensions of CM. For example, one notable variable-centered approach is latent variable measurement modeling, where the dimensions of CM across and within CM types are combined to form a CM latent variable (e.g., Kobulsky et al., 2018; McGuire et al., 2024a). Such methods have also shown success when combined with non-CM traumas (e.g., Lombera et al., 2021). For researchers with continuous metrics of CM, latent profile analysis (LPA) is another useful option for helping to identify different patterns of exposure, whereas latent class analysis (LCA) may be used by those with only categorical CM variables. These person-centered approaches have demonstrated notable value in helping to identify certain classes or patterns of CM exposure, where group membership can then be used to predict an outcome of interest (Rivera et al., 2018). Such approaches have also demonstrated well-fitting models when incorporating CM and non-CM traumas (e.g., Estrada et al., 2023). Evidence is also growing for the role of qualitative and mixed-method approaches for measuring CM (e.g., Glass et al., 2016).

Given the diversity of choices of data analytic method to select, as well as the range of CM dimensions to include, CM researchers may have several “researcher degrees of freedom” regarding how to examine CM. One way to navigate this “freedom” is to use a multiverse analysis framework. For a multiverse analysis, similar sets of analyses or models are computed but each model uses a different data processing approach, which is reasonable and justified based on existing literature (Steegen et al., 2016). In the case of CM research, this might take on many forms, some of which have already been conducted in the field. For example, researchers may seek to compare model performance when using

different operationalizations of CM dimensions (e.g., using different methods to compute CM dimension scores [Litrownik et al., 2005] or how many dimensions to include in a model [McGuire & Jackson, 2024]). Although systematic review is needed, completing competing analyses to test outcomes within the same dataset could help move the field closer to developing gold standard recommendations.

Another important recommendation is for those individuals who serve as "gatekeepers," such as grant reviewers, journal editors, and journal reviewers. It is imperative that service in these roles include ensuring that studies utilize accurate and valid measurement and data analysis approaches when examining CM exposure as a predictor variable. In some cases, it may be necessary to request that researchers change their measurement methods or approach (e.g., requesting that a model be re-run with the continuous metric of CM vs. a dichotomized variable if applicable), or that papers are rejected for publication if there are significant concerns with how CM is measured and operationalized when used as a binary variable. In situations where a binary CM variable is used and no other measurement options are available, it is recommended that the researchers provide *very strong* rationale for why such a method is used, whether other measurement methods had been considered and why not used, justify how the information generated from the binary or similar CM variable progresses the field forward, and also clearly describe the limitations of this approach.

Finally, it is also recommended that graduate programs and those responsible for training the next generation of scientists be mindful of the need to teach the pros and cons of any given measurement approach or conceptualization of any complex variable. It is important that trainees do not rely solely on what data or information is easy to access from their participants and strive to measure constructs of interest with rigor. CM is not the only kind of adverse life event commonly studied in youth and the interest in areas like trauma-focused assessments and trauma-informed care is growing (e.g., Foltz et al., 2023). Moving forward, it is hoped that the next generation of CM experts will adopt a comprehensive approach that includes measuring the complexity of CM so that the full experiences of youth are recorded.

In conclusion, CM is not an easy construct to measure given its complexity, but it is necessary that this field of research strive to create and adopt valid and reliable measurement approaches. The ideas and recommendations presented in this paper for moving away from the binary CM measurement approach are an effort to challenge the field to improve measurement of CM through halting the use of this outdated and problematic measurement practice. Further, while the recommendations presented do not provide sufficient support to address all measurement concerns in the field of CM research and offer some ideal approaches that may not be fully implementable in practice for all researchers, these should encourage more dialog and research that might assist in further improving CM measurement. It is also important to note that past research using a binary approach is not unhelpful or should be ignored. However, it is critical that researchers and the field as a whole acknowledge the limitations of research based on studies using a CM binary measurement method and move to improve measurement approaches in their future studies. It is hoped that through such changes in CM measurement, the field can produce more

accurate and replicable research that in turn better serves youth and families experiencing CM.

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Data availability

No data was used for the research described in the article.

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