

# Adverse Childhood Experiences and Mental Health Conditions

## Among Multiracial Adolescents

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## Abstract

The relationships between adverse childhood experiences (ACEs) and mental health conditions have received much attention in the literature. A particularly well-documented type of ACE is household dysfunction. However, compared to monoracial youth, little is known about the relationship between this type of ACE and mental health outcomes among multiracial adolescents. *Objective:* The objective of this study was to verify the factor structure of the household dysfunction type of ACE using data from the National Survey of Children's Health (NSCH), and then examine whether household dysfunction (measured as a latent construct) was associated with mental health conditions among multiracial adolescents. *Design:* We used cross-sectional data collected in 2016 from caregivers who completed the NSCH and analyzed data from a subpopulation of adolescents (12-17) who reported more than one race (n=1,231). Mplus 8.4 was used to conduct confirmatory factor analysis and probit models from a structural equation modeling framework. *Results:* Results from this study indicated that the household dysfunction type of ACE, as a latent construct, had good model fit and was significantly associated with depression [standardized coefficient [ $B$ ] = .50, 95% confidence interval [CI] .36, .65], anxiety [ $B$  = .61, 95% CI .48, .73], behavior problems [ $B$  = .58, 95% CI .44, .72], and ADHD [ $B$  = .54, 95% CI .38, .69] for multiracial adolescents. *Conclusions:* Household dysfunction may result in adolescents being separated (physically or emotionally) from their caregivers, which may hinder adolescents' ability to establish or maintain one of the most important relationships needed to promote racial/ethnic identity development and mental health. Implications for advancements in theory and NSCH are presented.

*Key Words:* adverse childhood experiences; depression; anxiety; behavior problems; ADHD; multiracial adolescents

## **Adverse Childhood Experiences and Mental Health Conditions Among Multiracial Adolescents**

Adverse childhood experiences (ACEs) can have a detrimental influence on adolescent mental health outcomes. In particular, ACEs, which refers to individuals' experience with potentially traumatic events before the age of 18 (Felitti et al., 1998), have been linked to the most common mental health conditions among adolescents (depression, anxiety, behavioral problems, and attention deficit hyperactivity disorder [ADHD]; Danielson et al., 2018; Ghandour et al., 2018; Muniz et al., 2019; Negriff, 2020). The majority of research on ACEs has focused on youth who identify as white, black, or Hispanic (Elkins et al., 2019; Hunt, Slack, and Berger, 2017). Subsequently, there is a dearth of literature examining the consequences of ACEs for multiracial youth, who are one of the fastest-growing populations (Jones and Bullock, 2012) and have some of the highest mental health needs in the United States (Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). ACEs may result in a myriad of issues relevant to multiracial youth, including experiences with discrimination, exclusion from one or more racial/ethnic groups, and difficulty with racial/ethnic identity development (Goings et al., 2018; Franco et al., 2019; Parker et al., 2015), all of which may contribute to the onset of common mental health conditions.

Gaining knowledge of possible reasons for mental health conditions for multiracial adolescents is important because adolescents who identified as having more than one race often have poorer mental health outcomes than monoracial adolescents (e.g., youth who identify as only black, Asian, or white). For instance, in a nationally representative sample of U.S. students in grades seven through twelve, multiracial youth had average scores of depression significantly higher than those of white youth (Campbell and Eggerling-Boeck, 2006). Further, a school-based sample in one Midwest county found that multiracial youth had higher depression and anxiety

scores than black youth (Fisher et al., 2014). Another school-based study of youth, aged 10-14 years old, found that multiracial youth were significantly more likely to exhibit problematic behavior, such as carrying a gun or cutting or stabbing someone, compared to youth who identified as only black, white, or Asian (Choi et al., 2006). Moreover, another school-based study found that multiracial youth were 45% more likely to engage in violent behaviors (i.e., beating someone so severely that the person needed to seek medical attention) than white adolescents (Choi et al. 2012). Multiracial youth may experience poor mental health outcomes because ACEs may compound their ability to access knowledge and integrate specific racial, ethnic, or cultural experiences into their racial/ethnic identity development.

Multiracial adolescents are at risk for mental health issues, and, similar to monoracial individuals, ACEs may be underlying reasons. In fact, ACEs are widely accepted as plausible reasons for poor mental health outcomes (LeTendre and Reed, 2017); however, ACE research has encountered criticism. First, ACE research often uses a total score created by combining the total number of ACEs (as indicated by the number of “yes” responses to the occurrence of adverse events; Felitti et al., 1998). Though easy to score, this approach assumes all ACEs have an equal influence on outcomes without considering internal validity (Evans, Li, and Whipple, 2013; Olofson, 2018). Creating an ACE total score also disregards the conceptual foundation of the ACE framework, which includes three main types: household dysfunction, abuse, and neglect (Felitti et al., 1998). This omission is concerning because types of ACEs may be differentially associated with various mental health outcomes (van Duin et al., 2019). Second, ACE research is primarily retrospective (e.g., adults reporting on childhood experiences); thus, it is inherently biased (e.g., recall bias; Reuben et al., 2016). Third, ACE research was originally conducted using a predominantly white, insured adult sample (Felitti et al., 1998). Subsequently, concerns

have been raised about the utility of using ACE measures with adolescents (Negriff, 2020) and racially/ethnically diverse samples (Hunt et al., 2017), which has prompted the need for measurement studies focused on non-white youth.

Studies examining the psychometric properties of ACE measures have used structural equation modeling (SEM), which can address concerns about using the ACE total score. These youth-based studies have reported between one and two latent factors. For example, using exploratory factor analysis, researchers used data from the 2011/2012 National Survey of Children's Health and identified one latent factor representing ACEs (Bethell et al., 2017). Also using exploratory factor analysis, researchers used data from the 2002 Panel Study of Income Dynamics Child Development Supplement and identified two latent factors: household dysfunction and abuse (Olofson, 2018). Using confirmatory factor analysis, researchers used a community-based study in Canada and verified two latent factors: household challenges and child maltreatment/peer victimization (Afifi et al., 2020).

Despite the advantage of using SEM in addressing ACE measurement concerns, such research on multiracial adolescents is sparse. This gap in the literature exists in part because the sample sizes in many datasets of multiracial youth are often too small for analysis (Kaur and Kearney, 2015). Therefore, researchers either remove multiracial youth from analyses or combine multiracial youth with "other" non-white, non-black, and non-Hispanic youth (Cronholm et al., 2015; López et al., 2017; Shih and Sanchez, 2005). These current practices dilute the experience of multiracial youth (Kaur and Kearney, 2015) and thus make it difficult to draw conclusions about multiracial adolescents (Goings et al., 2018; Shih and Sanchez, 2005; Thompson, Kingree, and Lamis, 2019). These current approaches are inconsistent with a racial and ethnic equity perspective in research (Andrews, Parekh, and Peckoo, 2019), which advocates

for understanding and including the experiences of youth of color in research to enhance practitioners and policymakers' ability to make evidence-informed decisions that are necessary to achieve equity.

Given the lack of research on multiracial adolescents, the risk of developing mental health conditions across this population, and the potential for ACEs to be underlying reasons for these conditions, there is a critical need to understand the link between ACEs and the most common mental health conditions (i.e., depression, anxiety, behavior problems, and ADHD) among multiracial adolescents. However, because of the debate surrounding measurement, the first step in this area of research is to examine the psychometric properties of an ACE measure in a sample of multiracial adolescents and then examine the ability of the measure to explain mental health outcomes. We used data from caregivers who completed the National Survey of Children's Health (NSCH; Child and Adolescent Health Measurement Initiative [CAHMI], 2018). Though not nationally representative for multiracial adolescents, these data provide information on ACEs for a large sample of multiracial youth in the U.S. Further, questions on the NSCH capture various sources of household dysfunction type of ACE, including youths' exposure to caregiver separation or divorce, caregiver in jail, domestic violence, and mental illness or substance use at home. Therefore, the objective of this study was to verify the one-factor model of the household dysfunction type of ACE using data from the NSCH, and then examine whether household dysfunction (measured as a latent construct) was associated with depression, anxiety, behavior problems, and ADHD among multiracial adolescents.

## **Method**

### ***Data***

We used a non-experimental, retrospective design using secondary, cross-sectional data from the 2016 and 2017 National Survey of Children's Health (NSCH; CAHMI, 2018). Although the NSCH was used before 2016, this data collection cycle was the first year data were gathered using major substantive and methodological changes such as incorporating children with special health care needs into the same survey. We used the 2017 data because data gathered in 2016 cannot be compared to prior years. The NSCH gathers survey data from caregivers, who provided informed consent. Caregivers were randomly invited to complete the survey regarding non-institutionalized U.S. children, ages 0-17. If there was more than one eligible child in the household, data were collected regarding one child in the household using random selection. Data were collected about children from various racial and ethnic groups; however, data were only nationally representative of Hispanic, non-Hispanic black, and non-Hispanic white children.

We analyzed a subpopulation of data about adolescents 12 to 17 years old, who were identified as having more than one race. The NSCH dataset does not provide information regarding the racial combinations of individuals who identify as having two or more races. Therefore, specific racial combinations (e.g., black and white or black and Native American) cannot be examined. This study was considered exempt from human subjects research by the Institutional Review Board of the first author's institution.

### ***Measures***

*Sociodemographic characteristics.* We examined the following sociodemographic demographics: adolescent's gender (female or male), insurance status (current/adequate insurance or no/inadequate insurance), adolescent has special health care needs (yes or no), primary language spoken in the home (English or language other than English), caregiver's



highest level of education (no high school degree, high school graduate or equivalent, or more than high school graduate), and family income (at or less than 100%, 100-199%, 200-299%, 300-399%, or 400% or more of the federal poverty level). Because of their frequent association with mental health outcomes and the convention among researchers using this dataset (e.g., Author's Own, 2018; Park et al., 2014), these demographics were also examined in statistical models.

*Current mental health conditions.* We measured four specific mental health conditions: depression, anxiety problems, behavior problems, or ADHD. Two survey items from NSCH were used to determine whether each youth currently has one of these conditions. The first survey item had dichotomous response (“Yes”, or “No”): “Please tell me if a doctor or other health care provider ever told you that [CHILD’S NAME] had the condition, even if (he/she) does not have the condition now.” If the answer to the first survey item was “yes” then caregivers were requested to answer the second survey item, which also had a dichotomous response (“Yes” or “No”): “Does [CHILD’S NAME] currently have this condition?” If the caregivers answered “yes” to this item, then we coded the youth as having a *current mental health* condition. Therefore, rather than measuring mental health conditions as is consistent with the diagnostic criteria in the DSM-V (American Psychiatric Association, 2013), the measure in this study was based on caregiver report of information from a healthcare provider.

Because mental health conditions often co-occur (Author's Own, 2019), we created a variable to assess the number of mental health conditions present. We used the data in the *current mental health* condition variables to summarize the number of conditions. A total of 11 possible combinations of co-occurring conditions existed. To be parsimonious, we recoded this information (0 = no current mental health conditions; 1 = one current mental health condition; 2

= two or more current mental health conditions). This variable was used to provide descriptive information about the sample.

*Indicators of household dysfunction type of ACE.* Based on the items available in the dataset, we had five possible indicators of household dysfunction. The indicators were based on caregivers responding “yes” or “no” to the list of ACEs after the statement: “The next questions are about events that may have happened during this child’s life. These things can happen in any family, but some people may feel uncomfortable with these questions. You may skip any questions you do not want to answer.” The following possible ACE items related to household dysfunction were available: (a) parent or guardian divorced or separated; (b) parent or guardian served time in jail; (c) youth saw or heard parents or adults slap, hit, kick, punch one another in the home; (d) youth lived with anyone who was mentally ill, suicidal, or severely depressed; and (e) youth lived with anyone who had a problem with alcohol or drugs.

### ***Data Analysis Plan***

All models were conducted using Mplus 8.4 software (Muthén and Muthén, 1998-2019). Although the results were not nationally representative, the within-group variance estimators were trustworthy because we accounted for the complex sampling design, stratification, and clustering. We also used sampling weights (CAHMI, 2018).

To examine the psychometric properties of the household dysfunction type of ACE, we conducted confirmatory factor analysis (CFA) using data from caregivers who completed the 2016 NSCH (N = 1,231). This choice was made because of the current discussion in the literature regarding how to measure ACEs (e.g., Brumley, Brumley, and Jaffee, 2019), there were only enough indicators to assess this type of ACE in the dataset using structural equation modeling (Bollen, 1989), and we wanted to examine model fit. To confirm results from the 2016

NSCH, we conducted CFA with data from caregivers who completed the 2017 NSCH (N = 611). The sampling approach and survey items employed are the same across the 2016 and 2017 datasets (CAHMI, 2018). Further, with the exception of insurance status, the datasets did not differ significantly on key demographic characteristics (see Appendix A).

Once we identified a good measurement model, we then conducted several probit regression models using structural equation modeling approach. Using the data from 2016, we regressed the latent household dysfunction factor on the dichotomous mental health outcome variables. We also examined whether to include various demographic characteristics as covariates (i.e., gender, insurance status, status of special health care needs, primary language spoken in the home, and income). Further, because gender has been differentially associated with ACEs and mental health conditions (e.g., Brensilver et al., 2011; Monteiro, Matos, and Oliveira, 2015), we conducted multiple group analyses to examine whether gender moderated this relationship.

For all measurement and structural models, we used the oblique rotation (GEOMIN) and the mean- and variance-adjusted weighted least squares (WLSMV) estimator. WLSMV is recommended with categorical variables and uses probit regression models (Muthén and Muthén, 1998-2019). Model fit was assessed based on conventional fit criteria (West, Taylor, and Wu, 2014): values below 0.06 for the root mean square error of approximation (RMSEA) point estimate and upper confidence interval (CI); values above 0.95 for the Tucker-Lewis index (TLI) and confirmatory fit index (CFI); and a value equal to or below 0.08 for the standardized root mean residual (SRMR).

We computed the percentage of missing data and compared the cases with missing data to cases without missing data by sociodemographic conditions. Missing data were addressed

using the complete case method. This approach was used because leaders in the field on using Mplus report that no theoretical reasons exist to support the use of multiple imputation with complex data structures (Asparouhov, 2016), and full information maximum likelihood is not appropriate to use with the WLSMV estimation (Muthén and Muthén, 1998-2019). This approach is consistent with previous research (Author's Own, 2019; Lichstein, Ghandour, and Mann, 2018).

## **Results**

Table 1 presents the sociodemographic information for multiracial adolescents based on caregiver report. As shown, for example, 46.9% of the youth were female and 28.9% of youth had special health care needs. Further, youth experienced a range of household dysfunction types of ACEs. For example, 9.2% of youth had a parent or guardian serve time in jail and 41.2% of youth had caregivers who were divorced or separated. Additionally, anxiety and ADHD were the most common current mental health conditions, 14.9 and 14.5%, respectively, and 13.3% of youth had two or more mental health conditions.

[Table 1 near here]

### ***Measurement Model***

We examined the measurement model for the household dysfunction type of ACE. Results from CFA indicated the one-factor model had good model fit (RMSEA = .012; 90% CI .000, .043; CFI = 0.997; and TLI = 0.994, SRMR = 0.05). Table 2 presents the standardized and unstandardized coefficients. We selected this model as our measurement model. CFA results, using the 2017 NSCH data, confirmed the measurement model for household dysfunction (RMSEA = 0.000; 90% CI 0.000, .053; CFI = 1.000; and TLI = 1.000, SRMR=.040).

[Table 2 near here]

Figure 1 presents standardized estimates from the final CFA model. As shown, all paths were significant. This factor essentially represented adolescents' experience with the latent construct of household dysfunction.

[Figure 1 near here]

Household dysfunction, measured as a latent construct with five indicators, was positively associated with each mental health condition. As shown in Table 3, for example, ACEs were positively associated with depression (standardized coefficient = .504), anxiety (standardized coefficient = .606), behavior or conduct problems (standardized coefficient = .578), and ADHD (standardized coefficient = .536), controlling for gender and insurance status. All models had good fit and relationships between ACEs and mental health conditions were significant.

[Table 3 near here]

Including other conventional covariates in statistical models (i.e., adolescents with special health care needs, primary language in the home, caregiver's highest level of education, and poverty status) resulted in models with poor fit. Therefore, results do not adjust for these possible confounders. Further, multiple group analyses indicated that gender did not moderate the relationship between ACEs and mental health outcomes.

In the analyzed sample, 7.7% ( $n = 89$ ) had missing data. Cases with missing data did not differ significantly by gender, insurance status, adolescents with special health care needs, or primary language in the home. However, compared to cases without missing data, cases with missing data were significantly more likely to have less than a high school education than have more than a high school education ( $B = 0.26$ ,  $S.E. = 0.12$ ,  $p < 0.05$ ) and more likely to have a

family income at or below 100% than at or above 400% of the federal poverty level ( $B = 0.38$ , S.E. = 0.10,  $p < 0.05$ ).

## **Discussion**

The objective of this study was to verify the one-factor model of the household dysfunction type of ACE using data from the NSCH, and then examine whether household dysfunction (measured as a latent construct) was associated with the most common mental health conditions among adolescents. Results suggest the presence of one latent construct – household dysfunction. This finding indicates that the items in the NSCH may be measuring one of the foundational concepts in the ACEs framework, thereby providing preliminary evidence for using structural equation models to measure ACEs. Further, household dysfunction was positively associated with depression, anxiety, behavioral problems, and ADHD among multiracial adolescents. Therefore, household dysfunction may be an essential underlying factor for the most common mental health conditions among multiracial adolescents.

Household dysfunction may influence mental health outcomes for multiracial adolescents for a myriad of reasons. For instance, household dysfunction may result in adolescents being separated (physically or emotionally) from their caregivers, which may hinder their ability to establish or maintain their relationship with at least one of their caregivers. This disruption may be particularly concerning for adolescents with caregivers from different racial groups because each caregiver may provide youth with access to specific racial, ethnic, and cultural experiences that foster a strong racial/ethnic identity. For example, when a biracial adolescent with one black caregiver and one white caregiver experiences disruptions in their caregiver-adolescent relationship, the adolescent may experience the loss of access to knowledge and protective factors from one of their racial, ethnic, and cultural groups. Subsequently, adolescents may feel

excluded from their races and other racial groups (Goings et al., 2018), feel increased pressure to conform to one racial group (Parker et al., 2015), or experience difficulties developing a strong racial/ethnic identity (Franco et al., 2019). These experiences may contribute to poor mental health.

Results from this study are consistent with previous research indicating a one-factor solution to measuring ACEs (Bethell et al., 2017). However, rather than the one-factor model supporting the presence of one overarching construct (often considered ACEs), the current study used the conceptual foundation of ACEs to identify one factor that represented a part of the ACE framework – household dysfunction. Results further show that the NSCH dataset cannot be used to examine other conceptual foundation of ACEs (i.e., abuse and neglect), because items to measure these experiences do not exist in the dataset. Subsequently, more items assessing the other types of ACEs need to be added to the survey. Such information is needed because studies with adolescent samples have begun to find that different types of ACEs are associated with different outcomes (Muniz et al., 2019; Negriff, 2020).

In addition to adding items related to abuse and neglect, items explicitly related to adverse experiences for multiracial adolescents are needed. The NSCH expanded on the original ACE measure to include items related to discrimination, which is valuable; however, it does not include items that have been linked to poor outcomes for multiracial adolescents. For example, a weak racial and ethnic identity has consistently been linked to poor mental health outcomes among multiracial adolescents (Fisher et al., 2014; Franco et al., 2019). However, questions related to adverse experiences that can erode identity development (e.g., asking multiracial youth whether they were adopted or pressuring multiracial youth to select one racial identity) are not included in the NSCH. Therefore, we posit the incorporation of such questions, which will

increase the inclusiveness of the NSCH to more accurately reflect the lived experiences of one of the fastest-growing populations in the U.S. (Jones and Bullock, 2012). In turn, this information could be used to inform more inclusive policies and practices relevant to multiracial youth, who have some of the highest mental health needs (SAMHSA, 2015).

Consistent with previous research, our study found a positive association between ACEs and poor mental health outcomes for adolescents. Indeed, previous studies have documented that ACEs are positively associated with poor mental health outcomes for youth who identified as only black or white (e.g., Hunt et al., 2017; Villodas et al., 2016). The current study, however, expands on this research by documenting this relationship among multiracial youth.

Subsequently, this study shifts the discourse in research to also include multiracial individuals. Inclusion of multiracial individuals in research is critical given that one in seven infants born in the U.S. in 2015 were multiracial and thus exponentially growing as an adolescent group in the near future (Livingston, 2017). Understanding the needs of multiracial youth has merit because the current practice of removing multiracial youth from studies neglects both their lived experience and ability to guide clinicians on how to provide appropriate care (Csizmadia, 2011). This lack of information is of concern as multiracial youth have some of the highest mental health service needs in the U.S. (SAMHSA, 2015). The NSCH has the potential to contribute to this research. The survey was funded and directed by The Health Resources and Service Administration's Maternal and Child Health Bureau. They have demonstrated the ability to gather information from a large sample of multiracial youth and the flexibility needed to expand the content to be more inclusive, e.g., adding the concept of discrimination to the survey (CAHMI, 2018).



Unlike previous research using data from the NSCH with monoracial youth (Author's Own, 2018; Author's Own, 2019; Bethell et al., 2017; Toomey et al., 2013), our results suggest that conventional sociodemographic characteristics often considered important in studies with monoracial youth may not function the same way in studies with multiracial youth. In particular, although our models with gender and insurance had good fit, we detected poor model fit when including adolescents with special health care needs, primary language in the home, caregiver's highest level of education, and poverty status. This finding suggests that, unlike some research with monoracial youth, these characteristics may not improve our understanding of the relationship between ACEs and mental health for multiracial youth. This finding raises many questions. For instance, what are the protective processes operating among multiracial youth that are distinctive from monoracial youth? Moreover, this finding emphasizes that existing theories and empirical research have been normed on monoracial youth. This assertion is further underscored by our research not detecting gender differences when examining the strength of the relationships between adverse experiences in childhood and mental health outcomes, which is counter to previous research (e.g., Brensilver et al., 2011; Monteiro et al., 2015). Subsequently, advancements in theoretical and empirical research inclusive of the multiracial experience is needed.

Although this study expands on ACE research, it has several limitations. This study used a cross-sectional dataset based on retrospective caregiver accounts (Baldwin et al., 2019). Therefore, this study could not examine the temporal relationship between ACEs and mental health. Further, the presence of ACEs and mental health conditions may be underreported (Author's Own, 2012; Achenbach, McConaughy, and Howell, 1987; De Los Reyes, 2013; Rescorla et al., 2013). The study was based on a secondary dataset; therefore, many competing

explanations for the findings could not be examined. Cases with missing data had lower education completion and income than cases without missing data. Therefore, results may not be representative across education and income levels. In this study, all multiracial youth were combined into one category rather than examined by various combinations of race, because the dataset does not specify the different racial compositions. This study did not compare between multiracial youth and monoracial youth. This comparison was excluded to prevent misrepresentation of the results because, while this dataset is nationally representative for other racial groups, it is not nationally representative for multiracial youth.

Results from this study indicate several directions for future research. Longitudinal research using adolescent accounts are needed to examine whether ACEs cause mental health outcomes. Future measurement studies are needed to expand to include additional survey questions. In particular, it would be important to assess experiences such as common microaggressions experienced by multiracial youth (Nadal et al., 2011) and experiences with caregiver-youth discrepancies in racial identification (Franco et al., 2019). Future research also needs to examine differences within multiracial groups (Campbell and Eggerling-Boeck, 2006; Tabb et al., 2019). One such approach would be to use latent class analyses to identify latent profiles of ACEs among multiracial youth; such research has identified latent heterogeneity among other racial minority groups using the NSCH (e.g., Author's Own, 2020). Another approach would be to identify possible differences based on various racial combinations because some research has shown different risk levels based on the combination of races (e.g., Csizmadia, 2011). These considerations, along with the current findings, can help develop and analyze current and future interventions (Goings et al., 2018).

In conclusion, the latent household dysfunction type of ACEs was associated with the most common mental health conditions (i.e., depression, anxiety, behavior problems, and ADHD) among multiracial adolescents. Results from this study can be used to inform research using the NSCH survey with multiracial youth and provide suggestions for revision to the survey to enhance the use of it for multiracial youth, which could inform more inclusive policies and practice for multiracial youth. The funders and developers of the NSCH survey are well-positioned to lead such an initiative. Future research needs to expand the way ACEs are conceptualized and measured to include experiences specifically relevant to multiracial adolescents.

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