Development and Psychopathology (2023), **35**, 1219–1234
doi:10.1017/S0954579421001140

CAMBRIDGE UNIVERSITY PRESS

Regular Article

School connectedness as a protective factor against childhood exposure to violence and social deprivation: A longitudinal study of adaptive and maladaptive outcomes

Leigh G. Goetschius[1,2], Vonnie C. McLoyd[1], Tyler C. Hein[3], Colter Mitchell[4,5], Luke W. Hyde[1,4] and Christopher S. Monk[1,4,6,7]

[1]Department of Psychology, University of Michigan, Ann Arbor, MI, USA, [2]The Hilltop Institute, University of Maryland, Baltimore County, Baltimore, MD, USA, [3]Department of Veterans Affairs, Serious Mental Illness Treatment Resource and Evaluation Center, Office of Mental Health and Suicide Prevention, Ann Arbor, MI, USA, [4]Survey Research Center of the Institute for Social Research, University of Michigan, Ann Arbor, MI, USA, [5]Population Studies Center of the Institute for Social Research, University of Michigan, Ann Arbor, MI, USA, [6]Neuroscience Graduate Program, University of Michigan, Ann Arbor, MI, USA and [7]Department of Psychiatry, University of Michigan, Ann Arbor, MI, USA

Abstract

School connectedness, a construct indexing supportive school relationships, has been posited to promote resilience to environmental adversity. Consistent with prominent calls in the field, we examined the protective nature of school connectedness against two dimensions of early adversity that index multiple levels of environmental exposure (violence exposure, social deprivation) when predicting both positive and negative outcomes in longitudinal data from 3,246 youth in the Fragile Families and Child Wellbeing Study (48% female, 49% African American). Child and adolescent school connectedness were promotive, even when accounting for the detrimental effects of early adversity. Additionally, childhood school connectedness had a *protective but reactive* association with social deprivation, but not violence exposure, when predicting externalizing symptoms and positive function. Specifically, school connectedness was protective against the negative effects of social deprivation, but the effect diminished as social deprivation became more extreme. These results suggest that social relationships at school may compensate for low levels of social support in the home and neighborhood. Our results highlight the important role that the school environment can play for youth who have been exposed to adversity in other areas of their lives and suggest specific groups that may especially benefit from interventions that boost school connectedness.

Keywords: early adversity; latent variable modeling; longitudinal; resilience; school connectedness

(Received 12 March 2021; revised 9 August 2021; accepted 10 August 2021; First Published online 15 November 2021)

Recent data from the Center for Disease Control and Prevention show that over 60% of adults have experienced at least one adverse childhood experience (ACE) with close to 25% of adults reporting exposure to three or more ACEs (Merrick et al., 2018). On average, exposure to early adversity is associated with an increased risk for poor mental and physical health outcomes across the life span (Green et al., 2010; Nusslock & Miller, 2016). However, many children display resilience to early adversity and do not go on to develop poor outcomes (Masten et al., 2004). Multiple environmental factors, including those outside of the home, such as connectedness to school, have been posited to promote resilience (Barber & Olsen, 1997; Masten et al., 2021). The present study examined child and adolescent connectedness to school as protective against childhood exposure to early adversity. Consistent with prominent calls in the field (Masten & Cicchetti, 2016), this study is precise in its specification of two dimensions of adversity that index multiple levels of environmental exposure and examines resilience in terms of both the absence of negative outcomes and the presence of positive outcomes.

Corresponding author. Christopher S. Monk, email: csmonk@umich.edu

Cite this article: Goetschius, L. G, *et al.* (2023). School connectedness as a protective factor against childhood exposure to violence and social deprivation: A longitudinal study of adaptive and maladaptive outcomes. *Development and Psychopathology* **35**: 1219–1234, https://doi.org/10.1017/S0954579421001140

Protective effects of school connectedness

Youth spend a majority of their day at school and thus their experiences there can play a large role in both socioemotional development and resilience (Masten & Cicchetti, 2016; Roeser, Eccles, & Sameroff, 2000). School connectedness, an index of youth's sense of belonging and supportive relationships in the school environment, has been associated with positive adolescent outcomes including reduced emotional distress, suicidality, violence, and substance use (Bond et al., 2007; Brookmeyer et al., 2006; Kalu et al., 2020; Resnick et al., 1997). Moreover, research has shown that school context factors, including connectedness, can buffer against the detrimental effects of cumulative risks, as well as specific exposures, such as neighborhood violence and negative family relations (Hardaway et al., 2012; Lensch et al., 2020; Loukas et al., 2010; Markowitz, 2017). Additionally, research suggests that social support in the school environment may compensate for low social support from other sources, such as the home (Barber & Olsen,

1997; Foster & Brooks-Gunn, 2009). In light of these findings and the fact that school connectedness is a potentially modifiable factor, it is an attractive target for interventions designed to promote positive outcomes in youth exposed to adversity (Foster & Brooks-Gunn, 2009; McNeely et al., 2002).

Dimensional models of adversity

Though a wealth of literature has examined the effects of either specific adversities (e.g., abuse, harsh parenting) or the cumulative effects of adversity broadly (i.e., cumulative risk research), dimensional models of adversity propose that the complex experiences of early adversity can be broken down into core underlying dimensions that influence neural and behavioral development through both distinct and more global mechanisms (McLaughlin et al., 2021; McLaughlin & Sheridan, 2016). In the dimensional model of adversity and psychopathology (DMAP), one of the first and more prominent dimensional models, adversity is broken down into threat and deprivation (McLaughlin et al., 2014). Guided by the DMAP, we have constructed very similar measures of violence exposure ("threat" in DMAP) and social deprivation (narrower than the broader "deprivation" in DMAP). Violence exposure, similar to the threat construct in DMAP, includes experiences of physical and emotional abuse, exposure to intimate partner violence (IPV) in the home, and community violence (Hein et al., 2020). Social deprivation, which differs from the DMAP dimension of deprivation, includes experiences of physical and emotional neglect, a lack of support in the home, and a lack of a sense of cohesion and support in the neighborhood (Hein et al., 2020). Both violence exposure and social deprivation exist on a continuum: violence exposure ranges from low (i.e., safety) to high and social deprivation from low (i.e., high levels of home/neighborhood support) to high (i.e., lack of support). These dimensions are conceptually and statistically distinct (Hein et al., 2020; Lambert et al., 2017; McLaughlin et al., 2014; Miller et al., 2018). For example, research has shown that violence exposure is specifically linked to differences in areas of the brain involved in fear-learning and emotion processing, while social deprivation has been related to differences in areas involved in social reward processing (Hein et al., 2020; McLaughlin et al., 2019). However, these dimensions coexist, are likely correlated, and interact with each other to create a unique environment of adversity for each individual (Goetschius et al., 2020; McLaughlin & Sheridan, 2016). Thus, it is important to assess exposure to both dimensions simultaneously.

Resilience can differ by risk process and outcome

Resilience is a multidimensional construct that encompasses processes that help youth do well even when exposed to adverse environments (Masten et al., 2021; Miller-Graff, 2020). These processes involve reciprocal influences across a network of interconnected systems within and outside the individual (Kalisch et al., 2019; Masten et al., 2021). Systems within an individual that work to promote resilience can be psychological (e.g., positive self-perception, adaptable temperament) or biological (e.g., the brain, genes), whereas external systems related to resilience can include networks of social support in home, neighborhood, and school environments (Ceballo & McLoyd, 2002; Hyde et al., 2020; Luthar et al., 2015; Masten et al., 2021). We examine the protective effects of school connectedness, an index of youth's sense of belonging and supportive relationships in the school environment, in the context of violence exposure and social deprivation in the home and neighborhood (Loukas et al., 2006; Resnick et al., 1997).

Protective processes underlying resilience can differ depending by risk process (Blum et al., 2001), therefore it is advantageous to examine the potential buffering effects of school connectedness in the context of multiple dimensions of childhood adversity. Prior research suggests that dimensions of adversity shape development in ways that are at least partially distinct (Hein et al., 2020; McLaughlin et al., 2021), but there is a lack of work empirically testing protective processes within a dimensional framework. Given that underlying core dimensions of risk may work through distinct neural and behavioral mechanisms (Lambert et al., 2017; McLaughlin et al., 2021), it is tenable that protective factors may function differently in the context of violence exposure and social deprivation.

Of equal importance to modeling the complexity of adversity in the study of resilience is the selection of outcomes. Most studies examining the protective effects of school connectedness have focused solely on outcomes such as externalizing behaviors (e.g., conduct disorder) (Klika et al., 2013; Loukas et al., 2010), or internalizing behaviors (Lensch et al., 2020; Markowitz, 2017). Given the high comorbidity of internalizing and externalizing disorders in children (Caron & Rutter, 1991; Smith et al., 2020), surprisingly little research has examined the protective effects of school connectedness against early adversity when predicting internalizing and externalizing *simultaneously* (Hardaway et al., 2012). Additionally, protective factors can promote resilience in ways that enhance adaptive outcomes rather than mitigating negative outcomes, though fewer studies of resilience have examined both positive and negative outcomes (Luthar et al., 2015; Masten & Cicchetti, 2016). Positive function, as measured in the present study (Kern et al., 2016), indexes qualities such as optimism and perseverance, which promote positive outcomes (Chen & Miller, 2012). To gain a greater understanding of protective processes, it is important to evaluate them with respect to adaptive *and* the absence of maladaptive outcomes.

Types of resilience processes

Protective factors, such as school connectedness, are defined by who they are protective for and how that protection differs across risk level. This can be best understood using a *hypothetical* example that displays three different types of protective effects of school connectedness against violence exposure when predicting academic performance (Figure 1). Protective factors can be *promotive*, meaning that they are associated with better outcomes for everyone regardless of risk level (Sameroff, 2010). In our hypothetical example, school connectedness would be *promotive* if it was associated with better academic performance, regardless of the level of neighborhood violence (Figure 1a). Alternatively, protective processes can be more complex involving interactions between risk and protective factors. A protective variable can be *protective-stabilizing*, where, in the context of increasing risk, having a certain attribute results in no decrease in rates of the positive outcome (Foster & Brooks-Gunn, 2009; Luthar et al., 2000). For example, school connectedness would be considered *protective-stabilizing* if high levels of school connectedness were associated with similar levels of high academic performance, regardless of the level of neighborhood violence (Figure 1b). Conversely, a protective variable can be *protective but reactive,* where it promotes positive outcomes, but less so as environmental risk or stress increases (Luthar et al., 2000;

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

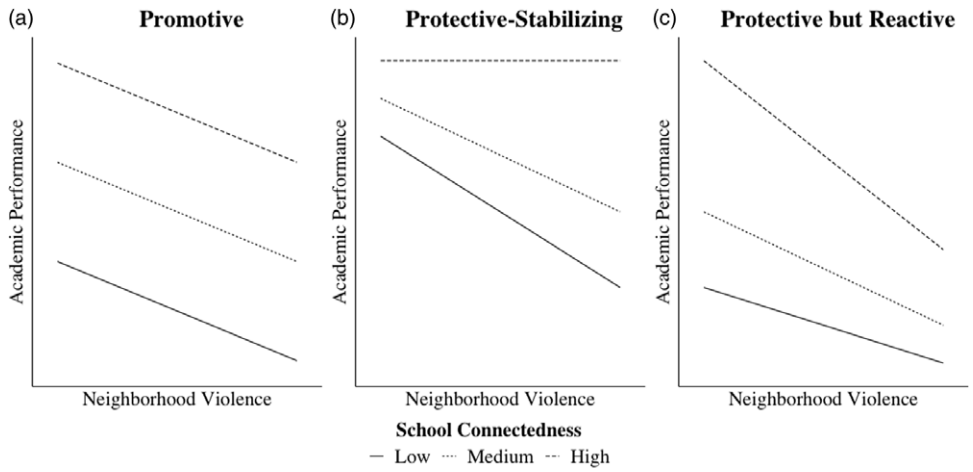

Figure 1. Hypothetical plots representing the different definitions of protective processes. Adapted from Luthar et al., 2000. All data and associations represented are for example purposes only and are not based on real data.

Proctor, 2006). Returning to our example, school connectedness could be considered *protective but reactive* if is associated with better academic performance, but as the level of neighborhood violence increases, the protective effect of school connectedness becomes less pronounced. Protective variables may also function in different ways depending on the risk factor and the outcome. The different ways that protective factors can promote resilience highlight the multidimensional nature of adversity.

Resilience and developmental timing

The protective effects of school connectedness may differ with developmental stage. The school experience can vary dramatically at different developmental stages due to differences in school environment, as well as, developmental characteristic (e.g., importance of peer relationships), which may impact both the level of school connectedness and what contributes to it (Eccles, 1999; Monahan et al., 2010; Oelsner et al., 2011). Research has shown that, on average, positive relationships with teachers and teacher support declines from elementary school across middle and high school (Eccles et al., 1993; Reddy et al., 2003). Additionally, social relationships with peers, including those at school, become more salient in adolescence compared to middle childhood (Eccles, 1999). Most research on school connectedness has focused on adolescence. The small amount of research examining the positive effects of school connectedness earlier in development has found links with more life satisfaction and positive academic outcomes (In et al., 2019; Klem & Connell, 2004; Liu et al., 2020).

The present study

In the present study, we examined whether childhood exposure to two dimensions of early adversity (composite across ages 3, 5, 9), violence exposure and social deprivation, predicted latent variables indexing child (Age 9) and adolescent (Age 15) internalizing and externalizing symptoms (4 separate variables) and adolescent positive function in youth from the Fragile Families and Child Wellbeing Study (FFCWS), a longitudinal birth cohort study. We hypothesized that both violence exposure and social deprivation would predict increased internalizing and externalizing symptoms and decreased positive function. Additionally, we tested whether connectedness to school in both childhood (age 9) or adolescence (age 15) was protective against the sequelae of early adversity and whether this differed across dimensions of adversity or by the outcome examined (i.e., internalizing symptoms, externalizing symptoms, or positive functioning) using a latent variable moderation approach. We did not have specific hypotheses regarding whether protective effects of school connectedness would be stronger for one dimension of adversity than another; however, given the multidimensional nature of resilience, we did not assume it would be uniformly protective. Additionally, given developmental differences in school connectedness, we did not assume that protective or promotive effects would be the same across development.

Methods

Sample

We used data from the FFCWS, a population-based, longitudinal, birth cohort study of 4,898 children born between 1998 and 2000 and their parents across 20 U.S. cities. The FFCWS oversampled for non-marital births at an approximately 3:1 ratio (Reichman et al., 2001). FFCWS families were interviewed at the birth of the focal child, and again when the child was 1, 3, 5, 9, and 15 years of age through a combination of in-person interviews and phone surveys.

Analyses use data from 3,246 families primarily from the mother and primary caregiver interviews at ages 3, 5, 9, and 15 and the focal child interviews at ages 9 and 15. Over the 3 waves where we used data from the primary caregiver survey (ages 3, 5, 9), an average of 96% of respondents were mothers. Therefore, for parsimony, we refer to responses from mothers and primary caregivers as maternal reports. Families were excluded from the full FFCWS sample ($N = 4898$) if they were missing from the age 15 wave ($N = 1633$). Participants who had age 15 data were excluded if they were missing all possible datapoints from the age 3, 5, *and* 9 waves ($N = 19$). Full information maximum likelihood estimation was used to account for missing data in participants who were not missing all variables but were missing individual items (Kline, 2015; Muthén & Muthén, 1998). See Table 1 for sample demographic information. When demographic characteristics from the included and excluded samples are compared, the excluded families had a slightly lower average income-to-needs ratio, lower levels of maternal education at the child's birth, and were more likely to be male (Supplemental Table 1). These sample differences were accounted for by adjusting for the average income-to-needs ratio and child sex at birth, in addition to other demographic characteristics in all models (details in Covariates section below). We did not include maternal education at birth due as a covariate to a high correlation with average income-to-needs ratio.

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

Table 1. Demographic characteristics of the sample

	Overall ($N = 3246$)
Child's Sex at Birth	
Female	1585 (48.8%)
Male	1661 (51.2%)
Adolescent Race-Ethnicity – Self-report at Age 15	
African American	1592 (49.0%)
European American	587 (18.1%)
Latinx	808 (24.9%)
Other (includes American Indian, Alaska Native, Asian, Native Hawaiian, Pacific Islander and Multi-Racial)	259 (8.0%)
Average Income-to-Needs Ratio[1] Across All Study Waves	
Mean (SD)	2.11 (2.10)
Median [Min, Max]	1.46 [0.120, 21.2]
Maternal Marital Status at Child's Birth	
Married	785 (24.2%)
Not Married	2443 (75.3%)
Missing	18 (0.6%)
Maternal Education at Child's Birth	
Less than high school	1025 (31.6%)
High school or equivalent	1030 (31.7%)
Some college or technical school	821 (25.3%)
College or graduate school	365 (11.2%)
Missing	5 (0.2%)

[1]Income-to-needs ratio variable is referred to as the poverty ratio in the FFCWS data set.

Measures

Childhood violence exposure and social deprivation composite scores

Violence exposure and social deprivation were assessed using composite scores calculated using data from the FFCWS at ages 3, 5, and 9 years. Both constructs included the maternal report of experiences that directly (i.e., child physical and emotional abuse, child physical and emotional neglect) and indirectly (i.e., intimate partner emotional, physical, or sexual violence, intimate partner support, community violence, community support) affect the child. Emotional abuse was included as part of the violence exposure dimension because it causes emotional harm, making a child feel unsafe (Berzenski & Yates, 2010; Font & Berger, 2015). Exposure to IPV and support was calculated from maternal reports based on their current partner who could be the baby's father or a different partner. Approximately 70% of mothers reported being in a relationship at each wave with 43% reporting being in a relationship all three study waves included in the composite scores. The dimensions of violence exposure and social deprivation exist on continua with violence exposure ranging from low (i.e., safety) to high and social deprivation from low (i.e., high levels of home/neighborhood support) to high (i.e., lack of support). Our approach of including experiences with varying levels of proximity to the child across multiple time points allowed us to comprehensively assess the child's cumulative, dimensional exposure to violence and social deprivation across childhood as has been done in previous research (Hein et al., 2020; McLaughlin & Sheridan, 2016). These composite scores were first utilized in previous work from our group (Hein et al., 2020).

Childhood exposure to violence. Included in this composite was the maternal report of child physical and emotional abuse based on items from the Parent-Child Conflict Tactics Scale (CTS-PC) (Straus et al., 1998) that have been used in previous research (Font & Berger, 2015; Hunt et al., 2017). Five items were used to assess physical abuse including, "hit him/her on the bottom with a hard object" and "shook him/her" and five items were used to assess emotional abuse including whether the parent/caregiver has "sworn or cursed at," or "called him/her dumb or lazy or some other name like that." Each item was rated on a 7-point Likert scale ranging from "never happened" to "more than 20 times." Maternal report of the child's exposure to or victimization of violence in the neighborhood (Zhang & Anderson, 2010) was also included in the composite. This was measured using the maternal report of the child witnessing or being the victim of beating, attacks with a weapon, shootings, and killings (witness only) on a 5-point Likert scale ranging from "never" to "more than 10 times." At age 9, the mother was not asked about whether the child had witnessed killings or if they had been the victim of a shooting, so these items were only included for ages 3 and 5 years. Lastly, we included maternal report of IPV (physical-2 items, emotional-3 items, or sexual-1 item) in the home at each wave (Hunt et al., 2017). Each item was rated on a 3-point Likert scale ranging from "never" to "often." Physical IPV items included "he slapped or kicked you" and "he hit you with his fist or a dangerous object." Emotional IPV items included "he tried to isolate you from family and friends," and "he tried to prevent you from going to work and/or school." The sexual IPV was "he tried to make you have sex or do sexual things you didn't want to do." The child's exposure to IPV against the mother was coded as missing for a given wave if the child did not live with their mother at least 50% of the time.

Childhood exposure to social deprivation. Included in this composite was maternal report of child physical and emotional neglect based on items from the CTS-PC (Straus et al., 1998) that have been used in previous research (Font & Berger, 2015; Hunt et al., 2017). Four items from the CTS-PC were used to assed physical neglect including whether the parent was ever "so drunk or high that you had a problem taking care of your child." One item, whether the parent was "ever so caught up in your own problems that you were not able to show or tell your child that you loved him/her," was used to assess emotional neglect. These items from the CTS-PC were reported on the same 7-point Likert scale as the items in the violence exposure composite. Maternal report of social cohesion in the neighborhood was also included in this composite (reverse coded such that higher scores corresponded to lower cohesion) (Donnelly et al., 2016; Morenoff et al., 2001). This included 4 items, such as "this is a close-knit neighborhood," rated on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." Lastly, we included maternal report of the level of intimate partner support for each wave using six items, such as "how frequently (the current romantic partner) expresses love and affection (for the mother)," that were rated on a 3-point Likert scale ranging from "never" to "often" (Manuel et al., 2012). This was also reverse coded such that higher scores corresponded to less support. Child exposure to the mother's intimate partner support was coded as

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

missing for a given wave if the child did not live with their mother at least 50% of the time.

Composite score calculation. To calculate composite scores indexing violence exposure and social deprivation across ages 3, 5, and 9 years, the Z scores for each of the childhood experiences at each time point (child abuse, exposure to IPV, community violence, child neglect, lack of romantic partner support, lack of neighborhood social cohesion) were summed for each of the childhood experiences within a dimension (violence exposure and social deprivation) (Song et al., 2013). The summed z-scores were then divided by the number of childhood experiences within a dimension for each participant, thus maximizing the number of participants and the diversity of the sample by minimizing drop out due to missing data at any given wave (see Supplemental Table 2 for a breakdown of missing participants per wave). In our sample, violence exposure and social deprivation were correlated at $r = .400$ with a variance inflation factor (VIF) of 1.191. VIF reflects how much the estimated regression coefficients are increased due to collinear independent variables. Cutoffs are typically between 5 and 10, therefore, based on the VIF reported here, the multicollinearity of violence exposure and social deprivation was low (Craney & Surles, 2002; Sheather, 2009).

Internalizing symptoms

Child internalizing symptoms. Child (age 9) internalizing symptoms were measured using maternal report on 28 items from the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983). These items came from three subscales; "anxious/depressed" (i.e., "Child cries a lot"), "withdrawn/depressed" (i.e., Child enjoys very little), and "somatic complaints" (i.e., "Child has nightmares"). These items were rated on a three-point Likert scale ranging from 1- "not true" to 3- "very true or often true." Four items from these subscales were not included due to very low endorsement (less than 20 responses for a category) which resulted in correlations with other items which exceeded +/−0.985 due to one or more zero cells.

Adolescent internalizing symptoms. Adolescent internalizing symptoms in the FFCWS were measured at age 15 using teen report on five items for depression and five items for anxiety. The items for depression were from the Center for Epidemiologic Studies Depression Scale (Radloff, 1977) and include statements such as, "I feel I cannot shake off the blues, even with help from my family and my friends." Teens responded with their degree of agreement based on the last four weeks on a four-point Likert scale ranging from 1- "strongly agree" to 4- "strongly disagree." The items for anxiety were adapted from the Brief Symptom Inventory 18 (Derogatis & Savitz, 2000) and include statements such as, "I have spells of terror or panic." Teens responded on a four-point Likert scale ranging from 1- "strongly agree" to 4- "strongly disagree." Items corresponding to both depression and anxiety were reverse coded such that higher values represented more internalizing symptoms.

Externalizing symptoms

Child externalizing symptoms. Child (age 9) externalizing symptoms were measured using maternal report on 25 items from the CBCL (Achenbach & Edelbrock, 1983). These items came from two subscales; "rule-breaking behavior" (i.e., "Child lacks guilt") and "aggressive behavior" (i.e., "Child argues a lot"). These items were rated on a three-point Likert scale ranging from 1- "not true" to 3- "very true or often true." Ten items from these subscales were not included due to very low endorsement (less than 20 responses for a category) which resulted in correlations with other items which exceeded +/−0.985 due to one or more zero cells.

Adolescent externalizing symptoms. Adolescent externalizing symptoms were measured at age 15 using teen report of delinquency (6 items), impulsivity (6 items), and substance use (5 items). The items for delinquency were adapted from the National Longitudinal Study of Adolescent Health (Add Health - (Harris, 2013) and included items such as "painted graffiti or signs on private property/public spaces." Items were rated on a four-point Likert scale ranging from 1- "never" to 4- "5 or more times." Seven items from the delinquency scale were not included due to very low endorsement (less than 20 responses for a category) which resulted in correlations with other items which exceeded +/−0.985 due to one or more zero cells. The items for impulsivity were adapted from the dysfunctional impulsivity items on Dickman's Impulsivity scale (Dickman, 1990), and included items such as, "I will often say whatever comes into my head without thinking first." Items were rated on a four-point Likert scale ranging from 1- "strongly agree" to 4- "strongly disagree." Impulsivity items were reverse coded so that higher scores represented increased impulsivity to match the delinquency scale. The items for substance use were binary variables (yes/no) indexing cigarette use, alcohol use (more than 2 drinks without parents), marijuana, illegal drugs other than marijuana, and taking prescription drugs without a prescription.

Adolescent positive function

Adolescent positive function was measured at age 15 using teen report on 20-items adapted from the EPOCH Measure of Adolescent Wellbeing (Kern et al., 2016). These items make up five subscales representing perseverance (i.e., "I finish whatever I begin"), optimism (i.e., "I am optimistic about my future"), connectedness (i.e., "When something good happens to me, I have people who I like to share the good news with"), happiness (i.e., "I feel happy"), and engagement (i.e., "when I do an activity, I enjoy it so much that I lose track of time"). Teens responded with their degree of agreement to the items based on the last 4 weeks on a four-point Likert scale ranging from 1- "strongly agree" to 4- "strongly disagree." These items were recoded so that higher values represented more positive function.

School connectedness

School connectedness was measured in the FFCWS via self-report at ages 9 (elementary school) and 15 (high school) years based on questions developed for the Panel Study on Income Dynamics Child Development Supplement (*The Panel Study of Income Dynamics Child Development Supplement: User Guide for CDS-III*, 2010). The focal child was asked if they "feel close to people at school," "feel like part of school," are "happy to be at school," and "feel safe at school." At age 9, children responded on a five-point Likert scale with the frequency that they felt the above questions ranging from "0 - not once in the past month" to "4 - every day." At age 15, teens responded on a five-point Likert scale with the degree of agreement with the same statements ranging from "0 - strongly agree" to "4 - strongly disagree." The Age 15 school connectedness items were reverse coded so that higher scores represented more connectedness to be consistent with the Age 9 items.

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

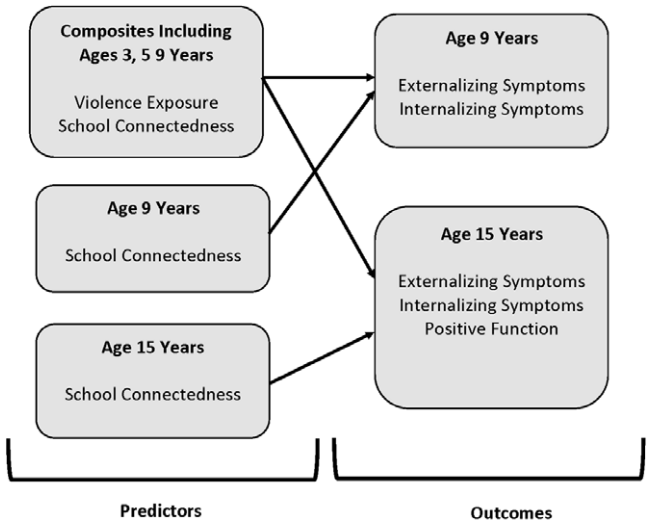

Figure 2. Conceptual figure of the main effects and moderation models.

Covariates

Focal child sex at birth, self-reported race/ethnicity at age 15 (dummy coded – African American, European American, Latinx, Other), and average income-to-needs ratio across the study waves were used as covariates. Self-reported race/ethnicity was coded using a set of 3 dummy coded variables to represent the following groups: African American, European American, Hispanic/Latinx, and Other. The average income-to-needs ratio (referred to as poverty ratio in the FFCWS data) is calculated by taking the average of $(\frac{household\ income}{poverty\ threshold})$ across the six study waves. The poverty threshold accounts for household size and composition as well as inflation; however, it does not differ geographically (U.S. Census Bureau, 2020). A value of less than 1 on this ratio means that the household income is less than the poverty threshold. For reference, the median Average income-to-needs ratio for the sample is 1.46%, or 146% of the poverty threshold, which is less than the 68% of the U.S. population living on more than 200% of the poverty threshold (Flood et al., 2016). All structural equation models (SEMs) were clustered by city of birth to account for the multiple site design of FFCWS with the exception of the moderation models (more detail in Statistical Analysis section).

Statistical analysis

Analyses for the present study were primarily SEMs done in Mplus (v.8.4-Muthén & Muthén, 1998–2017). Data were cleaned in R (v4.0.2) and were prepared for analysis in Mplus using the MplusAutomation package (v.0.7-3) (Hallquist & Wiley, 2018). R was also used to interpret significant moderation effects. See Figure 2 for a conceptual diagram of main effects and moderation models tested. The fit of the measurement and structural models were assessed using accepted fit indices: *RMSEA*, *CFI, TLI*, and *SRMR* (Hu & Bentler, 1999). The X^2 value of these model are reported but were not interpreted since X^2 is likely inflated by the large sample size and thus the significant value cannot be taken as an indicator of poor fit (Schermelleh-engel et al., 2003). To account for the multisite design of the FFCWS, all measurement and structural models were clustered by city at baseline and estimated using Taylor-series linearization using Type = Complex in Mplus. Cluster effects could not be accounted for in the same way in the moderation models because they required a different analysis type that allows for random slopes and models heterogeneity in the residual variance (Muthén & Muthén, 1998). When weighted, the FFCWS is representative of children born at the turn of the century in American cities of 200,000 or more. When not weighted (as here), the sample is not nationally representative, and the results cannot be generalized to the U.S. population in the same way. Given the oversample for non-marital births, the unweighted sample represents mostly low-income, urban families. We chose not to use the sample weights because the research question focuses on protective processes in families facing adversity.

Measurement model

Latent variables were created using item level indicators to measure school connectedness at age 9, school connectedness at age 15, internalizing symptoms at 9, externalizing symptoms at 9, internalizing symptoms at age 15, externalizing symptoms at age 15, and positive function at age 15 (a single latent variable though there are subscales), in Mplus. We used the WLSMV estimator because we had categorical as indicators of the latent factors (Kline, 2015). Items were excluded if they did not have a standard YX loading of at least 0.4 (Kline, 2015). Standardized coefficients (β) are effect size estimates (Kline, 2015) and all factor loadings reported in the present study are standardized.

Main effects models

We tested a model that estimated the main effects of childhood violence exposure (ages 3, 5, 9 years), childhood social deprivation (ages 3, 5, 9 years), and child (age 9) and adolescent (age 15) school connectedness on our predicted outcomes (internalizing symptoms, externalizing symptoms, positive function). It is tenable that internalizing symptoms, externalizing symptoms, or positive function could influence how connected teens feel to school rather than how it was specified in our hypothesized model. Therefore, we also ran a reverse effects model where the outcome variables predicted school connectedness at the same time point (e.g., age 9 internalizing symptoms predicting age 9 school connectedness) and compared model fit and path estimates. All path estimates reported in the present study are standard YX estimates. We used the WLSMV estimator because we had categorical variables included the latent variables (Kline, 2015). Models controlled for the demographic covariates listed above.

Moderation models

Two moderation models were run. The first tested whether school connectedness at either age 9 or age 15 moderated the association between childhood violence exposure and internalizing and externalizing symptoms (age 9 and 15) or the association between childhood social deprivation and internalizing and externalizing symptoms. The second tested whether school connectedness at either age 9 or 15 moderated the association between childhood violence exposure and adolescent positive function or the association between childhood social deprivation and adolescent positive function. All moderation models were tested in Mplus using a latent variable moderation approach (Maslowsky et al., 2015). In this approach, interaction terms are created from an observed (i.e., social deprivation composite score) and a latent variable (i.e., school connectedness at age 9) using the XWITH option along with ANALYSIS TYPE = RANDOM which allows for random slopes that model heterogeneity in the residual variance (Muthén & Muthén, 1998). We used the MLR estimator, because the WLSMV estimator cannot be used with TYPE = RANDOM, and the Monte Carlo option for numerical integration with 10,000 randomly generated integration points (Muthén & Muthén, 1998).

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

Table 2. Means, standard deviations, and zero-order correlations with confidence intervals of the variables of the interest

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Violence Exposure	0.01	0.53								
2. Social Deprivation	0.00	0.53	.40**							
			[.37, .43]							
3. School Connectedness (Age 9)	−0.05	0.77	−.05**	−.06**						
			[−.09, −.02]	[−.09, −.02]						
4. School Connectedness (Age 15)	−0.04	0.78	−.14**	−.13**	.16**					
			[−.17, −.10]	[−.16, −.10]	[.12, .19]					
5. Internalizing Symptoms (Age 9)	0.08	0.82	.20**	.26**	−.12**	−.07**				
			[.16, .23]	[.22, .29]	[−.15, −.08]	[−.11, −.04]				
6. Externalizing Symptoms (Age 9)	0.05	0.88	.34**	.24**	−.15**	−.12**	.60**			
			[.30, .37]	[.21, .28]	[−.19, −.11]	[−.16, −.08]	[.58, .62]			
7. Internalizing Symptoms (Age 15)	0.03	0.87	.08**	.12**	−.09**	−.31**	.14**	.13**		
			[.05, .12]	[.08, .15]	[−.13, −.05]	[−.34, −.28]	[.11, .18]	[.09, .16]		
8. Externalizing Symptoms (Age 15)	0.04	0.91	.19**	.11**	−.08**	−.26**	.08**	.24**	.42**	
			[.16, .23]	[.08, .15]	[−.12, −.05]	[−.29, −.23]	[.05, .12]	[.21, .28]	[.39, .45]	
9. Positive Function (Age 15)	−0.02	0.89	−.04*	−.11**	.13**	.42**	−.12**	−.09**	−.50**	−.27**
			[−.08, −.01]	[−.14, −.08]	[.09, .16]	[.39, .45]	[−.16, −.08]	[−.12, −.05]	[−.53, −.48]	[−.30, −.24]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2013).
*indicates $p < .05$.
**indicates $p < .01$.

The fit of these moderation models was assessed using a Satorra–Bentler Scaled Chi-Square Difference Test (TRd) using the log likelihood values for the main effects model verses the interaction model (Satorra & Bentler, 2010). This was done because the traditional global fit indices are not produced in Mplus when the analysis TYPE = RANDOM. Models controlled for demographic covariates.

Simple slopes analysis. To interpret significant interactions, simple slope and regions of significance analyses were conducted to determine the nature of the interaction and ensure that the interaction was within our observable data using methods outlined by Preacher et al, (2006). This was done in R using factor scores extracted from Mplus. Factor scores were extracted from measurement models containing all of the latent variables in the model (e.g., school connectedness at age 9, school connectedness at age 15, and adolescent positive function). Interactions were plotted using the *interactions* (v1.1.1) toolbox in R (Long, 2019).

Results

Descriptive statistics for and zero-order correlations between childhood exposure to violence and social deprivation as well as the factor scores representing child and adolescent school connectedness, internalizing and externalizing psychopathology, and adolescent positive function are in Table 2.

Measurement model

The final measurement (Cumming, 2013) model using CFA to fit the Age 9 School Connectedness, Age 15 School Connectedness, Age 9 Internalizing Symptoms, Age 15 Internalizing Symptoms, Age 9 Externalizing Symptoms, Age 15 Externalizing Symptoms and Age 15 Positive Function items to their respective factors fit the data well (Table 3 – *RMSEA*: 0.010, *RMSEA 95%* CI [0.009, 0.010], *CFI* = 0.935, *TLI* = 0.933, *SRMR* = 0.064, $X^2(4928) = 6619.97$). During the process of fitting the CFA model, we discovered that three items from the internalizing subscales of CBCL (1 from each of the Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints subscales) did not load well with the other items with standard factor loadings below the 0.4 threshold. These items were excluded in the final measurement model. Additionally, we discovered that the "Engagement" subscale of the positive function (EPOCH) scale (4 items – Kern et al., 2016) did not load well with the rest of the items from the other four subscales with standard factor loadings well below 0.4. Therefore, we excluded the items from the engagement subscale from further analyses. All factor loadings in the final measurement model had standard YX estimates of greater than 0.4.

Main effects models

The main effects model testing the main effects of childhood violence exposure, childhood social deprivation, and child and adolescent school connectedness on our predicted outcomes fit the data well (*RMSEA* = 0.009, 95% CI [0.008, 0.010], *CFI* = 0.928, *TLI* = 0.926, *SRMR* = 0.065, $X^2(5602) = 7094.661$ – Figure 3).[1]

[1]As a check, structural models were run separately for age 9 (*RMSEA* = 0.010, 95% CI: 0.009-0.011, *CFI* = 0.950, *TLI* = 0.948, *SRMR* = 0.059, $X^2(2808) = 3712.128$) and for age 15 (*RMSEA* = 0.021, 95% CI: 0.020-0.022, *CFI* = 0.897, *TLI* = 0.891, *SRMR* = 0.083, $X^2(1336) = 3301.428$) and path estimates were similar. The only difference was that there was a main effect of age 9 school connectedness on positive function at age 15 ($\beta = 0.178$, *SE* = 0.017, $p < 0.001$) when age 15 school connectedness was not in the model. As an additional robustness check because the moderation models were required to use the MLR estimator, we ran this model using the MLR estimator and used the Monte Carlo integration option (10000 integration points). On average, the path estimates and standard errors were smaller in the model estimated using the WLSMV estimator, however, the pattern of results or significance of estimates was not different.

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

Table 3. Standard factor loading values for the latent variable measurement model. All factor loadings were significant at $p < .001$. Items were excluded if loading <0.4 or if very low endorsement (less than 20 responses per category). Model was clustered by city at birth.

Latent Variable	Item	Standard YX Factor Loading
School Connectedness	K5E1A: Felt part of school	0.684
Age 9	K5E1B: Felt close to people at school	0.586
	K5E1C: Happy to be at school	0.753
	K5E1D: Felt safe at school	0.766
School Connectedness	K6B1A[1]: Feel close to people at school	0.663
Age 15	K6B1B[1]: Feel part of school	0.772
	K6B1C[1]: Happy to be at school	0.772
	K6B1D[1]: Feel safe at school	0.637
Internalizing Symptoms	Anxious/Depressed Subscale	0.463–0.845
Age 9[2]	Withdrawn/Depressed Subscale	0.475–0.713
	Somatic Complaints Subscale	0.436–0.754
Externalizing Symptoms	Rule-breaking Behavior Subscale	0.421–0.768
Age 9[2]	Aggressive Behavior Subscale	0.611–0.860
Internalizing Symptoms	K6D2AG[1]: Nervous or shaky inside	0.773
Age 15	K6D2AI[1]: Feel fearful	0.587
	K6D2D[1]: Spells of terror or panic	0.643
	K6D2J[1]: Feel tense or keyed up	0.563
	K6D2T[1]: Suddenly scared for no reason	0.685
	K6D2AC[1]: Feel depressed	0.878
	K6D2AK[1]: Feel so restless I can't sit still	0.543
	K6D2C[1]: Cannot shake off the blues even with help	0.616
	K6D2N[1]: Feel sad	0.820
	K6D2X[1]: Feel life is not worth living	0.768
Externalizing Symptoms	K6D2A[1]: Don't spend enough time thinking before act	0.508
Age 15	K6D2P[1]: Say/do things without considering consequences	0.675
	K6D2R[1]: Plans don't work because haven't gone over	0.550
	K6D2Z[1]: Make up mind without taking time to consider	0.551
	K6D2AB[1]: Say whatever comes into mind	0.572
	K6D2AJ[1]: Get into trouble because don't think before act	0.753
	K6D61C: Taken something from store without paying	0.902
	K6D61D: Gotten into a serious physical fight	0.644
	K6D61E: Hurt someone badly enough for medical care	0.628
	K6D61K: Stolen something worth less than $50	0.861
	K6D61L: Taken part in group fight	0.583
	K6D61M: Were loud/rowdy/unruly in public place	0.472
	K6D40[1]: Smoked entire cigarette	0.656
	K6D48[1]: Drank alcohol more than twice without parents	0.554
	K6F63[1]: Ever tried marijuana	0.597
	K6F68[1]: Ever tried illegal drugs other than marijuana	0.625
	K6F74[1]: Ever used prescription drugs (not prescribed)	0.681
Positive Function	K6D2B[1]: Love life	0.755
Age 15	K6D2F[1]: Am a cheerful person	0.672
	K6D2G[1]: Have friends that I really care about	0.444
	K6D2I[1]: Keep at my schoolwork until I am done	0.497
	K6D2K[1]: Make plans and stick to them	0.556

(*Continued*)

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

Table 3. (*Continued*)

Latent Variable	Item	Standard YX Factor Loading
	K6D2L[1]: People in my life who really care about me	0.724
	K6D2M[1]: Finish whatever I begin	0.564
	K6D2O[1]: Think good things are going to happen to me	0.568
	K6D2S[1]: Feel happy	0.866
	K6D2V[1]: Am a hard worker	0.592
	K6D2W[1]: Believe that things will work out	0.643
	K6D2Y[1]: Have someone who will be there if I have problem	0.659
	K6D2AA[1]: Have a lot of fun	0.721
	K6D2AE[1]: In uncertain times I expect the best	0.467
	K6D2AF[1]: Have person to share good news with	0.615
	K6D2AH[1]: Optimistic about my future	0.484
	K6D2AF[1]: Have person to share good news with	0.615
	K6D2V[1]: Am a hard worker	0.592

[1]Item was reverse coded.[2]CBCL subscale with range of standardized factor loadings.

In this model, childhood violence exposure predicted greater internalizing symptoms (age 9: $\beta = 0.154$, $SE = 0.030$, $p < .001$; age 15: $\beta = 0.061$, $SE = 0.018$, $p = .001$), greater externalizing symptoms (age 9: $\beta = 0.256$, $SE = 0.021$, $p < .001$; age 15: $\beta = 0.148$, $SE = 0.012$, $p < .001$), and lower positive function at age 15 ($\beta = -0.031$, $SE = 0.041$, $p = .029$). Childhood social deprivation also predicted greater internalizing symptoms (age 9: $\beta = 0.212$, $SE = 0.023$, $p < .001$; age 15: $\beta = 0.079$, $SE = 0.025$, $p = .002$) and externalizing symptoms at age 9 ($\beta = 0.128$, $SE = 0.019$, $p < .001$) but not age 15. Social deprivation also predicted lower positive function at age 15 ($\beta = -0.127$, $SE = 0.022$, $p < .001$). School connectedness at age 9 predicted lower age 9 internalizing ($\beta = -0.141$, $SE = 0.021$, $p < .001$) and externalizing ($\beta = -0.157$, $SE = 0.029$, $p < .001$) symptoms, but did not predict age 15 internalizing symptoms, externalizing symptoms, or positive function. School connectedness at age 15 predicted lower age 15 internalizing ($\beta = -0.371$, $SE = 0.016$, $p < .001$) and externalizing ($\beta = -0.289$, $SE = 0.020$, $p < .001$) symptoms as well as greater adolescent positive function ($\beta = 0.567$, $SE = 0.020$, $p < .001$).

The reverse effects model where the outcomes at age 15 (internalizing symptoms, externalizing, symptoms, and positive adolescent function) predicted school connectedness at age 15 and the outcomes at age 9 (internalizing and externalizing symptoms) predicted school connectedness at age 9 fit the data worse than our hypothesized model ($RMSEA = 0.017$, 95% CI [0.016, 0.017], $CFI = 0.751$, $TLI = 0.745$, $SRMR = 0.115$, $X^2(5611) = 10745.500$) and the standardized path estimates were lower suggesting that our hypothesized model may be a better fit for the data. No statistical comparison of the two models could be made; however, because the model degrees of freedom are equivalent, therefore the comparison is descriptive.

Moderation models

A latent variable moderation model which included the interaction between school connectedness at 15 and early adversity (violence exposure and social deprivation) was initially tested for both for sets of outcomes; however, the moderation paths including school connectedness at age 15 were non-significant.[2] In order to retain a more parsimonious model, those paths were removed in the final model making school connectedness at age 9 the only moderator in the models.

Child and adolescent internalizing and externalizing symptoms as outcome

This latent variable moderation model showed a significant interaction between social deprivation and child school connectedness (age 9) when predicting child externalizing symptoms (age 9) ($\beta = 0.073$, $SE = 0.036$, $p = .043$ – Figure 4). This moderation model fit the data better than the main effects model without interactions based on a Satorra–Bentler Scaled Chi-Square Difference Test ($TRd = 18.765$, $df = 8$, $p = .016$) and better than the moderation model with the school connectedness at age 9 and social deprivation interaction path predicting child externalizing symptoms set to 0 ($TRd = 6.515$, $df = 1$, $p = .011$).

A simple slopes analysis revealed that at all conditional levels of age 9 school connectedness that were tested (+1 standard deviation (SD), mean, −1 SD), social deprivation was positively correlated with externalizing symptoms at age 9 (Figure 5). However, when school connectedness was high (+1 SD), the slope of this association was steeper ($b = 0.162$, $p < .001$) and the intercept was lower ($intercept = -0.193$) than when school connectedness was at mean ($b = 0.123$, $p < .001$, $intercept = -0.001$) or low ($b = 0.0784$, $p = .005$, $intercept = 0.196$) levels. For ease of interpretation of these intervals, all variables were scaled such that the mean was 0 and SD was 1. An evaluation of Johnson-Neyman intervals showed that the interaction was significant until social deprivation was 3.02 SD above the mean and when school connectedness was greater than −1.80 SD below the mean. This suggests that school connectedness at age 9 was protective against

[2]As a robustness check, we tested for whether school connectedness at 15 interacted with social deprivation to predict either positive function or symptoms of psychopathology when age 9 school connectedness was not in the model; however, the interactions were still non-significant.

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

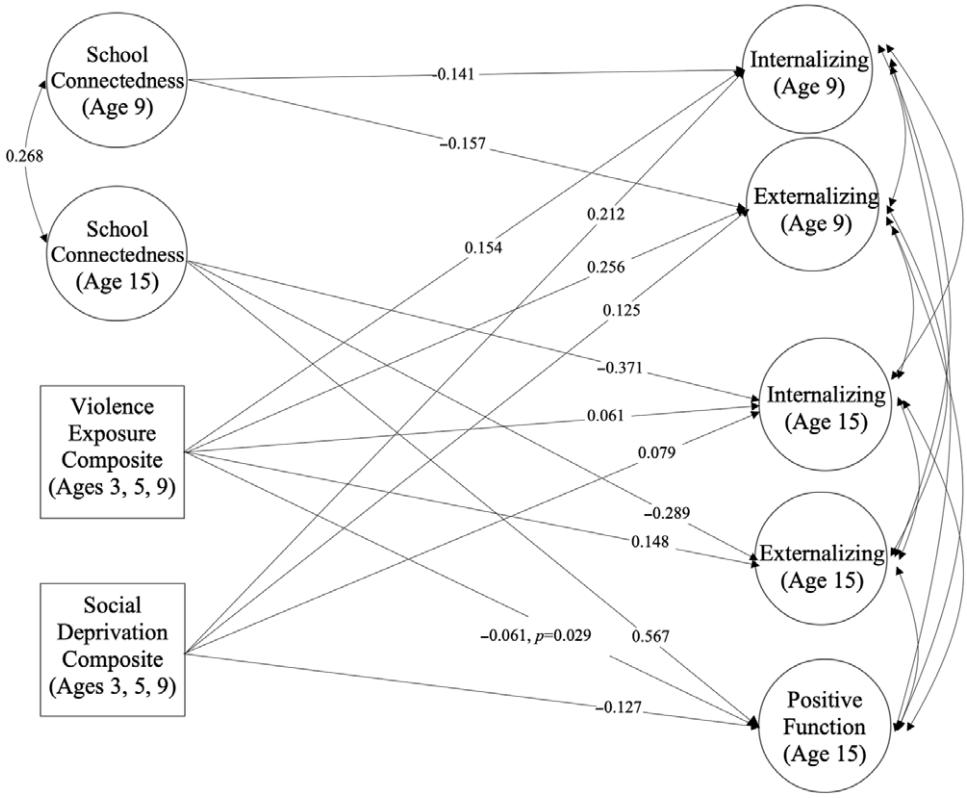

Figure 3. Diagram of the main effects model including school connectedness. Model controlled for average income-to-needs ratio, race-ethnicity, and sex and was clustered by city at birth. Path estimates shown are standard YX estimates. To make this figure more readable, only paths significant at $p < .05$ are shown, but all were modeled. *p*-values of all paths are $p < .01$ except where reported otherwise. Correlations between all outcome latent variables are all significant at $p < .01$.

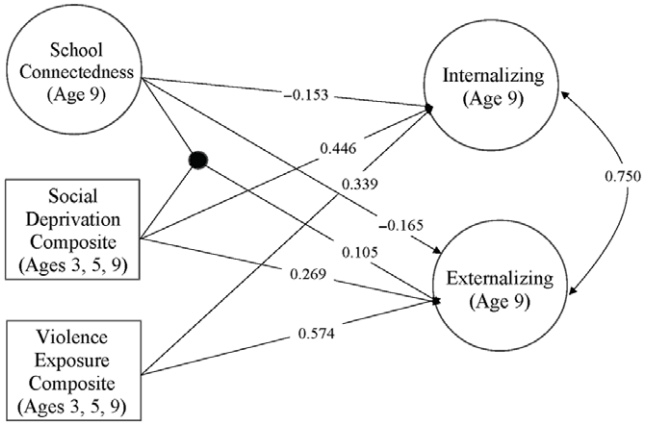

Figure 4. Diagram of the latent variable moderation model showing that school connectedness at age 9 moderates the association between social deprivation (ages 3, 5, 9) and externalizing symptoms (ages 9). Model controlled for average income-to-needs ratio, race-ethnicity, and sex. Note: Path estimates shown are standard YX estimates. To make this figure more readable, only paths significant at $p < .05$ are shown. All paths, including all 4 interaction paths, are retained in the model even though they are not shown. Including age 15 school connectedness and symptoms of psychopathology does not change the results of this model.

social deprivation, but that the protective effects diminished when social deprivation was moderately high (+3.02 SD −1% of sample). Additionally, when school connectedness at age 9 was low (−1.80 SD – 5% of sample), it was not protective against social deprivation. Therefore, the protective effect of school connectedness against social deprivation was present, to some degree, for 94% of the sample.

Adolescent positive function as outcome

This latent variable moderation model showed a significant interaction between social deprivation and school connectedness at age 9 when predicting adolescent positive function ($\beta = -0.051$, $SE = 0.026$, $p = .045$), even when accounting for the main effects of school connectedness at age 9, school connectedness at age 15, social deprivation, violence exposure, and the interaction between violence exposure and school connectedness at age 9 (Figure 6). This moderation model fit the data better than the main effects model based on a Satorra–Bentler Scaled Chi-Square Difference Test ($TRd = 7.088$, $df = 2$, $p = .029$) and better than the moderation model with the school connectedness at age 9 and social deprivation interaction set to 0 ($TRd = 6.603$, $df = 1$, $p = .010$).

A simple slopes analysis revealed that at all conditional levels of age 9 school connectedness that were tested (+1 SD, mean, −1 SD), social deprivation was negatively correlated with positive adolescent function (Figure 7). However, when school connectedness was high (+1 SD), the slope of this association was steeper ($b = -0.150$, $p < .001$) and the intercept was higher (*intercept* = 0.209) than when school connectedness was at mean ($b = -0.112$, $p < .001$, *intercept* = −0.001) or low ($b = -0.075$, $p = .002$, *intercept* = −0.210) levels. An evaluation of Johnson-Neyman intervals showed that the interaction was significant until social deprivation was 2.76 SD above the mean and when school connectedness was greater than −1.27 SD below the mean. For ease of interpretation of these intervals, all variables were scaled such that the mean was 0 and SD was 1. Similar to the interaction predicting externalizing symptoms at age 9, school connectedness at age 9 was protective against social deprivation when predicting positive adolescent function; however, it became less protective

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

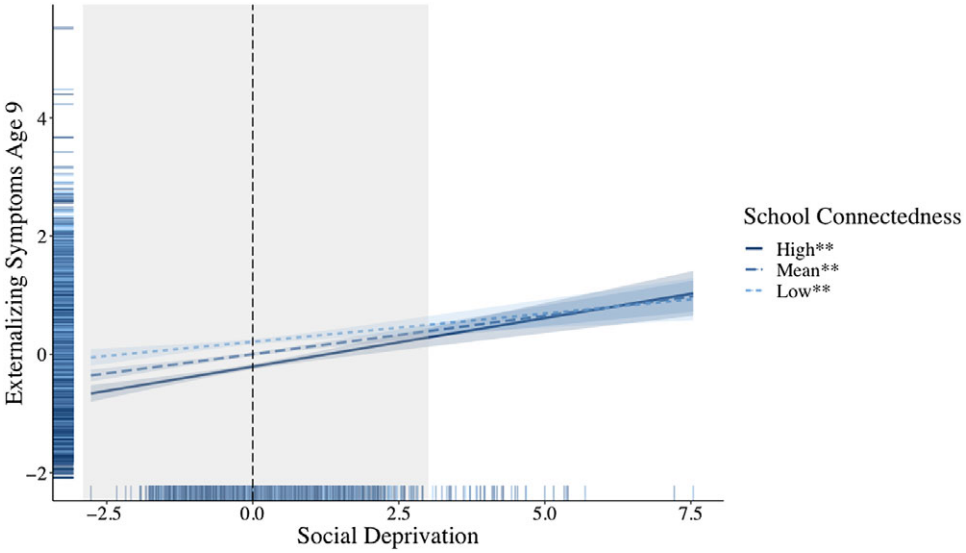

Figure 5. Plot illustrating the interaction between childhood social deprivation (ages 3, 5, 9) and school connectedness at age 9 in predicting childhood externalizing symptoms (age 9). For ease of interpretation, all variables have been centered and z-scored so that the mean is 0 and the standard deviation (SD) is 1. The dashed line represents mean levels of social deprivation. School connectedness has been plotted at mean and +/− 1 SD. For each level of school connectedness, the 95% confidence interval is shown. Rug plots depict individual data points for social deprivation and externalizing symptoms on the x and y axis, respectively. An evaluation of Johnson-Neyman intervals shows that, in this sample, the interaction was significant until social deprivation was very high (+3.02 SD) and when school connectedness was greater than −1.80 SD. This suggests that school connectedness at age 9 also had a protective but reactive association with social deprivation when predicting externalizing symptoms at age 9, meaning that school connectedness was protective against social deprivation but that the protective effects diminished when social deprivation was extreme. Additionally, when school connectedness at age 9 was low (−1.80 SD), it was not protective against social deprivation. The range of school connectedness at age 9 in this sample was [−3.31, 1.59] and the range of social deprivation values was [−2.77, 7.54].

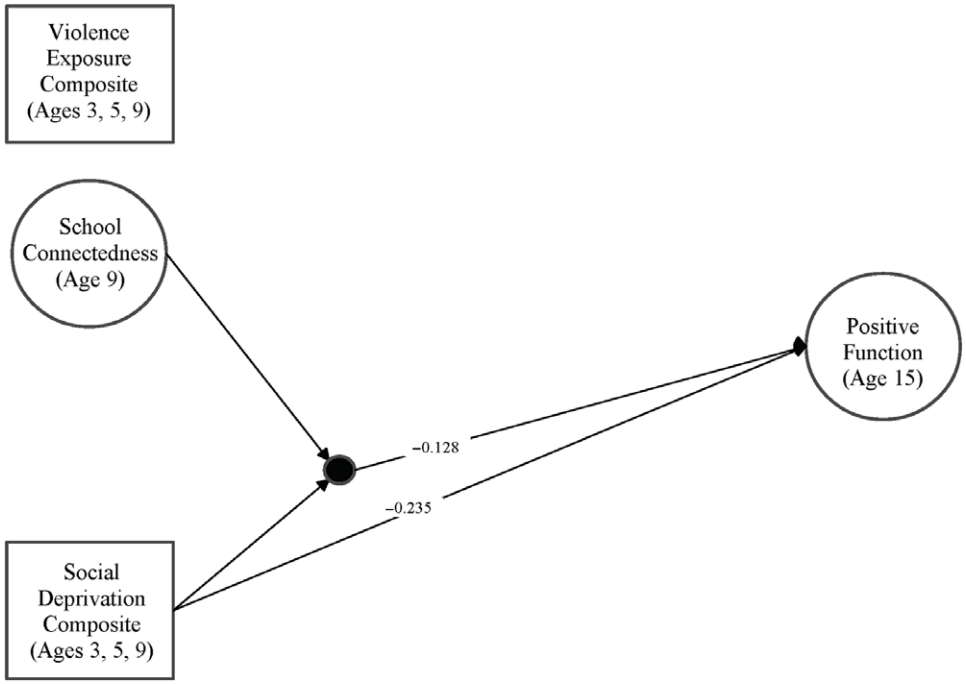

Figure 6. Diagram of the latent variable moderation model showing that school connectedness at age 9 moderates the association between social deprivation (ages 3, 5, 9) and positive adolescent function (age 15). Model controlled for average income-to-needs ratio, race-ethnicity, and sex. Note: Path estimates shown are standard YX estimates. To make this figure more readable, only paths significant at $p < .05$ are shown. All paths, including all both interaction paths, are retained in the model even though they are not shown. Including age 15 school connectedness does not change the results of this model.

as social deprivation becomes more extreme (+2.76 SD – 1% of sample). Additionally, when school connectedness at age 9 was low (−1.27 SD – 11% of sample), it was not protective against social deprivation. Therefore, the protective effect of school connectedness against social deprivation was present, to some degree, for 88% of the sample.

Discussion

We examined whether school connectedness was protective against childhood exposure to violence and social deprivation based on multiple indices of child and adolescent function in a longitudinal sample of greater than 3,000 youth from the

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

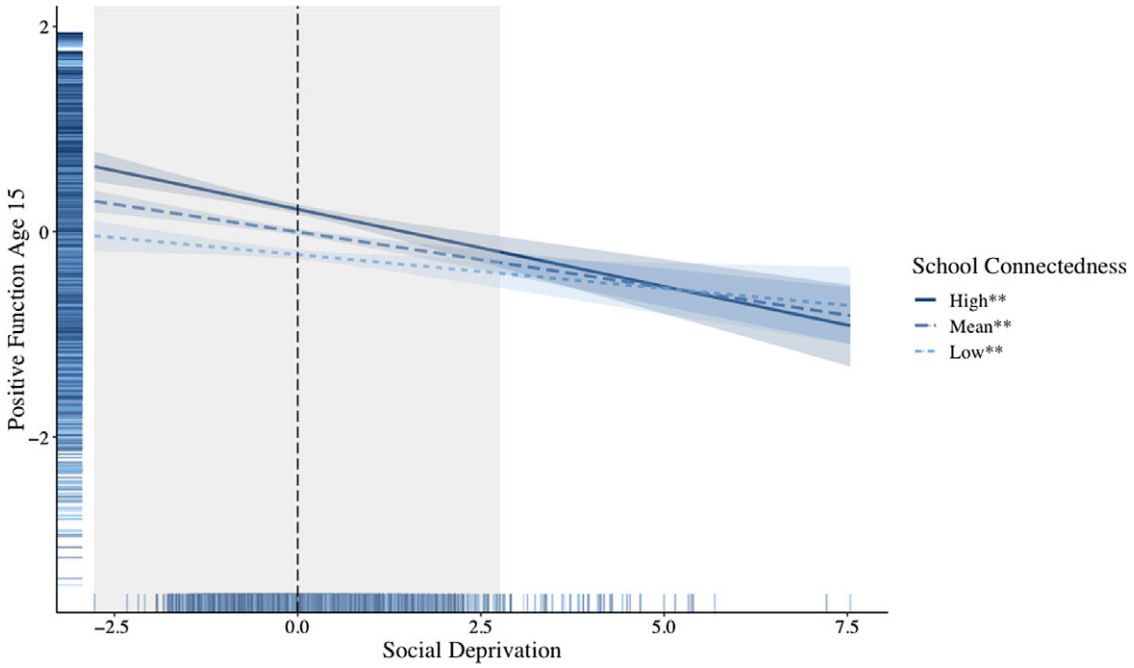

Figure 7. Plot illustrating the interaction between childhood social deprivation (ages 3, 5, 9) and school connectedness at age 9 in predicting adolescent positive function (age 15). For ease of interpretation, all variables have been centered and z-scored so that the mean is 0 and the standard deviation (SD) is 1. The dashed line represents mean levels of social deprivation. School connectedness has been plotted at mean and +/− 1 SD. For each level of school connectedness, the 95% confidence interval is shown. Rug plots depict individual data points for social deprivation and positive function on the x and y axis, respectively. An evaluation of Johnson-Neyman intervals shows that, in this sample, the interaction was significant until social deprivation was very high (+2.77) and when school connectedness was greater than −1.27. This suggests that school connectedness at age 9 had a protective but reactive association with social deprivation when predicting positive adolescent function, meaning that school connectedness was protective against social deprivation but that the protective effects diminished when social deprivation was extreme. Additionally, when school connectedness at age 9 was low (−1.27 SD), it was not protective against social deprivation. The range of school connectedness at age 9 in this sample was [−3.26, 1.46] and the range of social deprivation values was [−2.77, 7.54].

FFCWS. We found that both child and adolescent school connectedness were associated with better concurrent outcomes (i.e., higher positive outcomes, lower negative outcomes), even when accounting for the detrimental effects of violence exposure and social deprivation. Additionally, we found that child school connectedness (age 9) specifically interacted with childhood social deprivation, but not violence exposure, to moderate the association with child externalizing symptoms and adolescent positive function. An analysis of simple slopes for both interactions suggested that child school connectedness was protective against social deprivation, but that it became less protective when social deprivation was very high. Compared to the types of resilience processes, this is most similar to a *protective but reactive* factor, because it conferred benefit for most of the sample; however, as social deprivation became more extreme, the protective effects diminished (Luthar et al., 2000; Proctor, 2006).

Protective effects of school connectedness

Our results are consistent with the literature highlighting the protective effects of school connectedness (Brookmeyer et al., 2006; Hardaway et al., 2012; Kalu et al., 2020; Markowitz, 2017), but expand on it in four key ways. First, we utilized two multi-context measures of adversity that prospectively indexed a child's exposure to both violence and social deprivation at varying levels of proximity to the child (i.e., self, home, neighborhood) and at multiple time points (ages 3, 5, 9 years). Second, we operationalized resilience in terms of enhanced positive function in addition to reduced negative function (i.e., internalizing and externalizing symptoms) which supports examining protective processes in terms of multiple domains of function (Blum et al., 2001). Third, we examined the protective effects of school connectedness at an earlier developmental stage (childhood) than previous research studies. Last, we included measures of school connectedness and outcomes at two time points (age 9 and 15 years). This allowed us to gain insight into the longitudinal effects of school connectedness because we were able to assess how school connectedness can be correlated with better outcomes at the same timepoint, but also in the future, while controlling for the effects of contemporaneous school connectedness.

The specific interaction effect between social deprivation and school connectedness at age 9, but not age 15, suggests that there may be a developmental difference in the protective processes underlying school connectedness. Research shows that, on average, the level of emotional support from teachers decreases as youth transition from elementary to middle and high school (Eccles et al., 1993; Oelsner et al., 2011). Many schools also change formats across these stages (from mostly a single classroom with a single teacher to multiple classes and teachers across the day) (Eccles et al., 1993). This may explain why school connectedness in elementary school, but not high school, seemed to confer additional benefit specifically against a lack of expected social input in the home and neighborhood. An alternative explanation for the specific interaction between social deprivation and school connectedness at age 9 is that low school connectedness is a compounding risk factor for elementary school students who also experience social deprivation in the home and neighborhood. Previous work on the impact of teacher support found that low levels of teacher support in elementary school was a greater risk factor for negative academic outcomes (i.e., low school engagement,

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

achievement scores, attendance) compared to middle school (Klem & Connell, 2004). A third potential explanation is that school connectedness at age 15 would interact with social deprivation if the deprivation measure included information from when the focal child was 15 years old. However, the measures used in the social deprivation composite score were not collected in the Age 15 wave of the FFCWS. Future research should collect data that can probe this potential developmental effect in more detail.

Both child and adolescent school connectedness were promotive of contemporaneous outcomes in all youth, regardless of their childhood exposure to violence or social deprivation. Additionally, school connectedness at age 9 was a *protective but reactive* buffer against social deprivation when predicting age 9 externalizing symptoms and even six years later when predicting positive function. *Protective but reactive* effects confer protection against a risk factor, but the buffering effect diminishes with increasing stress (Luthar et al., 2000). Of note, the interactions observed in present study are not a perfect example of *protective but reactive effects* because school connectedness seemed to confer some advantage, even at low levels (i.e., when kids felt comparatively less connected to school). However, it is the type of resilience process that best describes our findings. This pattern of results suggests that the protective effect of age 9 school connectedness is reduced over time and with increasing stress, which is consistent with previous work showing a decreasing promotive effect size over time for late adolescent school connectedness (Markowitz, 2017). The residual protective effect of age 9 school connectedness on positive function six years later supports previous work positing that social connections and support at school can compensate for other areas of social deprivation (Foster & Brooks-Gunn, 2009) and it extends that work by showing that those connections seem to enhance adolescent self-reports of perseverance, optimism, connectedness, and happiness. An important consideration for interpreting the interactions in the present study, however, is that the protective effects became smaller as social deprivation became more extreme. This underlines the continued need for efforts aimed at reducing social deprivation in the home and neighborhood in addition to promoting connectedness to school.

Results from the present study underscore the important role that the school environment can play for youth who have been exposed to adversity in other areas of their lives. They also underscore the enduring effect of positive social connections. School-aged children and adolescents spend a majority of their day at school (Roeser et al., 2000), and thus, it is critical to help them develop strong social connections at school, especially those who are exposed to violence and social deprivation in their homes and neighborhoods. Previous research has shown that school connectedness is improved through social support and encouragement in school involvement from teachers, school counselors, peers, and parents, as well as through involvement in school-sponsored extracurricular activities (Daly et al., 2010). However, more research is needed to determine effective interventions to promote school connectedness because there are systematic disparities in school connectedness and climate based on race ethnicity, gender, and socioeconomic status (Liu et al., 2020; Voight et al., 2015). Promoting school connectedness may be particularly salient for African American boys who experience disparate treatment at school, including disproportionately high levels of suspensions and expulsions (Thomas & Stevenson, 2009) and systematically lower expectations for academic attainment (Wood et al., 2007). Additionally, Latinx youth are the largest ethnic minority in the U.S.; however, the rate of degree attainment in Latinx high school students is systematically lower and has been linked to academic discrimination (Alfaro et al., 2009). These troubling trends highlight the importance of identifying processes that promote factors, such as school connectedness, that improve academic and socioemotional outcomes in at-risk youth (Liu et al., 2020).

Resilience in the context of dimensional models

Results from the present study support modeling adversity in terms of their core underlying dimensions which relate to development in both distinct and overlapping ways (McLaughlin & Sheridan, 2016). We found that both violence exposure and social deprivation predicted childhood symptoms of psychopathology. However, violence exposure distinctly predicted adolescent externalizing symptoms and social deprivation, more strongly predicted reduced adolescent positive function. These findings are largely consistent with previous research modeling the effects of adversity using the DMAP framework, including work done with the FFCWS sample, which found that threat (similar to our violence exposure) was associated with both internalizing and externalizing symptoms (Miller et al., 2018, 2020). We are unaware of any prior research examining links between dimensions of adversity and positive function. The predictive effect of social deprivation suggests that there may be a specific mechanism linking the lack of expected social input in the home and neighborhood environment with teen self-reports of low perseverance, optimism, connectedness, and happiness.

Findings related to social deprivation in the present study are complementary, but not identical, to those found in previous research using the DMAP framework. This may be due to varying definitions of deprivation. Deprivation constructs have largely encompassed two areas: cognitive, which indexes information about a lack of cognitive enrichment of the child's environment (e.g., age-appropriate toys, books, measures of SES – Lambert et al., 2017; Miller et al., 2018); and social, which indexes information about a lack of expected social input in the child's environment as was done in the present study. Previous work has explicitly or implicitly operationalized deprivation as either cognitive deprivation, social deprivation, or both. Behavioral correlates of these differing definitions suggest that deprivation may be two dimensions rather than one. Deprivation, when indexed by both cognitive and social deprivation, has been linked to increased internalizing and externalizing symptoms (Miller et al., 2020). However, when deprivation is indexed strictly as cognitive deprivation, it is associated selectively with increased externalizing symptoms (Miller et al., 2018), suggesting that perhaps cognitive deprivation is related to a higher risk for externalizing psychopathology and, consistent with our findings, social deprivation may be a greater risk factor for internalizing psychopathology. Future work using dimensional models of adversity should more directly test whether social and cognitive deprivation form two separate dimensions in addition to violence exposure/threat. Additionally, future work comparing the neural correlates of differing definitions of deprivation may provide insight into if there are diverging neural mechanisms underlying cognitive and social deprivation.

We found that social connections at school can promote resilience broadly, but that protective effects also manifest in more specific ways through interaction with social deprivation, highlighting that resilience is the result of reciprocal influences across a network of interconnected systems within and outside the individual (Kalisch et al., 2019; Masten et al., 2021). A benefit of employing dimensional models of adversity is that it is possible to test specific

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

hypotheses regarding how variation in core aspects of childhood adversity relate to outcomes with the idea that particular dimensions are likely to impact development through specific mechanisms (e.g., threat exposure impacts the development of fear-learning and emotion processing systems – McLaughlin et al., 2014). By examining protective processes within a dimensional model of adversity, we were able to demonstrate that social connections at school protected against, and may compensate for, a lack of expected social input elsewhere (Foster & Brooks-Gunn, 2009), while also promoting outcomes overall. Future research should test whether the compensatory effects of school connectedness operate through distinct mechanisms compared to the general promotive effects. Additionally, future research should examine if school connectedness is protective against other dimensions of adversity, such as cognitive deprivation or environmental instability (Ellis et al., 2009; Miller et al., 2018), which would provide additional insight into the mechanisms through which school connectedness promotes resilience.

Limitations

The present study had limitations. First, there was a six-year gap between FFCWS data collection waves at ages 9 and 15. We would be able to better understand these protective associations and how the strength of school connectedness at age 9 changes over time if we had information about the children and their families during this gap. Second, because the adversity indexed by the composite scores temporally overlapped with the age 9 school connectedness and the age 9 outcomes, it is not possible to determine the temporal precedence or statistical causality of effects; however, this is a direction for future research. Third, we did not have a comparable index of positive function at age 9 to test whether school connectedness at age 9 is also correlated with positive function. Fourth, the violence exposure and social deprivation composites were derived from maternal reports. Data regarding childhood adversity from sources outside the home, such as social workers and teachers, would make our composites more comprehensive. Last, the environment of adversity is complex; thus, there are likely unmeasured variables that may influence these associations or contribute to cascades of risk.

Conclusion

The present findings suggest that school connectedness is a robust protective factor against exposure to early adversity in youth from the FFCWS in terms of both positive and negative metrics of child and adolescent function. Additionally, social connections at school in childhood may compensate for a lack of expected social support and input in the home and neighborhood to help reduce externalizing symptoms and promote positive adaptive function. Consistent with previous research, our results highlight the important role that the school environment can play for youth who have been exposed to adversity in other areas of their lives. Additionally, the interactive effect of school connectedness with social deprivation, but not violence exposure, supports modeling risk and resilience processes using dimensional frameworks to better identify specific groups of youth that may benefit from interventions that boost social connectedness at school.

Acknowledgments. This research would not have been possible without the participation of the families in the Fragile Families and Child Wellbeing Study.

Funding statement. The research reported in this paper was supported by grants from the National Institutes of Health, R01MH103761 (Monk), R01MH121079-01 (Monk, Hyde, Mitchell), T32HD007109 (McLoyd & Monk), and a Doris Duke Fellowship for the Promotion of Child Well-Being (Hein). Funding for FFCWS was provided by the NICHD (R01-HD36916, R01-HD39135, R01-HD40421) and a consortium of private foundations.

Conflicts of interest. The authors declare no competing financial interests.

Supplementary material. For supplementary material accompanying this paper visit https://doi.org/10.1017/S0954579421001140

References

Achenbach, T. M., & Edelbrock, C. S. (1983). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. Department of Psychiatry, University of Vermont, Burlington, VT, USA.

Alfaro, E. C., Umaña-Taylor, A. J., Gonzales-Backen, M. A., Bámaca, M. Y., & Zeiders, K. H. (2009). Latino adolescents' academic success: The role of discrimination, academic motivation, and gender. *Journal of Adolescence*, *32*, 941–962. https://doi.org/10.1016/j.adolescence.2008.08.007

Barber, B. K., & Olsen, J. A. (1997). Socialization in context: Connection, regulation, and autonomy in the family, school, and neighborhood, and with peers. *Journal of Adolescent Research*, *12*, 287–315. https://doi.org/10.1177/0743554897122008

Berzenski, S. R., & Yates, T. M. (2010). A developmental process analysis of the contribution of childhood emotional abuse to relationship violence. *Journal of Aggression, Maltreatment & Trauma*, *19*, 180–203. https://doi.org/10.1080/10926770903539474

Blum, R. W., McNeely, C. A., & Nonnemaker, J. M. (2001). Vulnerability, risk, and protection. In B. Fischhoff, E. O. Nightingale, & J. G. Iannotta (Eds.), *Adolescent risk and vulnerability: Concepts and measurement*. National Academies Press (US), Washington, DC, USA https://www.ncbi.nlm.nih.gov/books/NBK223737/

Bond, L., Butler, H., Thomas, L., Carlin, J., Glover, S., Bowes, G., & Patton, G. (2007). Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health*, *40*, 357.e9–357.e18. https://doi.org/10.1016/j.jadohealth.2006.10.013

Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology: The Official Journal for the Society of Clinical Child and Adolescent Psychology, American Psychological Association, Division 53*, *35*, 504–514. https://doi.org/10.1207/s15374424jccp3504_2

Caron, C., & Rutter, M. (1991). Comorbidity in child psychopathology: Concepts, issues and research strategies. *Journal of Child Psychology and Psychiatry*, *32*, 1063–1080. https://doi.org/10.1111/j.1469-7610.1991.tb00350.x

Ceballo, R., & McLoyd, V. C. (2002). Social support and parenting in poor, dangerous neighborhoods. *Child Development*, *73*, 1310–1321. https://doi.org/10.1111/1467-8624.00473

Chen, E., & Miller, G. E. (2012). "Shift-and-Persist" strategies: Why low socioeconomic status isn't always bad for health. *Perspectives on Psychological Science*, *7*, 135–158. https://doi.org/10.1177/1745691612436694

Craney, T. A., & Surles, J. G. (2002). Model-dependent variance inflation factor cutoff values. *Quality Engineering*, *14*, 391–403. https://doi.org/10.1081/QEN-120001878

Cumming, G. (2013). The New Statistics: Why and How. *Psychological Science*. https://doi.org/10.1177/0956797613504966

Daly, B., Buchanan, C., Dasch, K., Eichen, D., & Lenhart, C. (2010). Promoting school connectedness among urban youth of color: Reducing risk factors while promoting protective factors. *Prevention Researcher*, *17*, 18–20.

Derogatis, L. R., & Savitz, K. L. (2000). The SCL-90 and Brief Symptom Inventory (BSI) in primary care. In M. E. Maruish (Ed.), *Handbook of psychological assessment in primary care settings* (pp. 297–334). Lawrence Erlbaum Associates Publishers, Mahwah, NJ, USA.

Dickman, S. J. (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*, *58*, 95–102. https://doi.org/10.1037/0022-3514.58.1.95

Donnelly, L., McLanahan, S., Brooks-Gunn, J., Garfinkel, I., Wagner, B. G., Jacobsen, W. C., Gold, S., & Gaydosh, L. (2016). Cohesive neighborhoods where social expectations are shared may have positive impact on adolescent mental health. *Health Affairs*, *35*, 2083–2091. https://doi.org/10.1377/hlthaff.2016.0721

Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children*, *9*, 30–44. PMID: 10646256.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Iver, D. M. (1993). Development during adolescence. The impact of stage-environment fit on young adolescents' experiences in schools and in families. *The American Psychologist*, *48*, 90–101. https://doi.org/10.1037//0003-066x.48.2.90

Ellis, B. J., Figueredo, A. J., Brumbach, B. H., & Schlomer, G. L. (2009). Fundamental Dimensions of environmental risk: The impact of harsh versus unpredictable environments on the evolution and development of life history strategies. *Human Nature (Hawthorne, N.Y.)*, *20*, 204–268. https://doi.org/10.1007/s12110-009-9063-7

Flood, S., King, M., Rodgers, R., Ruggles, S., & Warren, J. R. (2016). Integrated public use microdata series, current population survey: Version 8.0 (8.0) [Data set]. Minneapolis: IPUMS. https://doi.org/10.18128/D030.V8.0

Font, S. A., & Berger, L. M. (2015). Child maltreatment and children's developmental trajectories in early- to middle-childhood. *Child Development*, *86*, 536–556. https://doi.org/10.1111/cdev.12322

Foster, H., & Brooks-Gunn, J. (2009). Toward a stress process model of children's exposure to physical family and community violence. *Clinical Child and Family Psychology Review*, *12*, 71–94. https://doi.org/10.1007/s10567-009-0049-0

Goetschius, L. G., Hein, T. C., Mitchell, C., Lopez-Duran, N. L., McLoyd, V. C., Brooks-Gunn, J., McLanahan, S. S., Hyde, L. W., & Monk, C. S. (2020). Childhood violence exposure and social deprivation predict adolescent amygdala-orbitofrontal cortex white matter connectivity. *Developmental Cognitive Neuroscience*, *45*, 100849. https://doi.org/10.1016/j.dcn.2020.100849

Green, J. G., McLaughlin, K. A., Berglund, P. A., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychiatric disorders in the national comorbidity survey replication I: Associations with first onset of DSM-IV disorders. *Archives of General Psychiatry*, *67*, 113–123. https://doi.org/10.1001/archgenpsychiatry.2009.186

Hallquist, M. N., & Wiley, J. F. (2018). MplusAutomation: An R package for facilitating large-scale latent variable analyses in Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, *25*, 621–638. https://doi.org/10.1080/10705511.2017.1402334

Hardaway, C. R., McLoyd, V. C., & Wood, D. (2012). Exposure to violence and socioemotional adjustment in low-income youth: An examination of protective factors. *American Journal of Community Psychology*, *49*, 112–126. https://doi.org/10.1007/s10464-011-9440-3

Harris, K. M. (2013). The add health study: Design and accomplishments. https://doi.org/10.17615/C6TW87

Hein, T. C., Goetschius, L. G., McLoyd, V. C., Brooks-Gunn, J., McLanahan, S. S., Mitchell, C., Lopez-Duran, N., Hyde, L. W., & Monk, C. S. (2020). Childhood violence exposure and social deprivation are linked to adolescent threat and reward neural function. *Social Cognitive and Affective Neuroscience*. https://doi.org/10.1093/scan/nsaa144

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*, 1–55. https://doi.org/10.1080/10705519909540118

Hunt, T. K. A., Slack, K. S., & Berger, L. M. (2017). Adverse childhood experiences and behavioral problems in middle childhood. *Child Abuse & Neglect*, *67*, 391–402. https://doi.org/10.1016/j.chiabu.2016.11.005

Hyde, L. W., Gard, A. M., Tomlinson, R. C., Burt, S. A., Mitchell, C., & Monk, C. S. (2020). An ecological approach to understanding the developing brain: Examples linking poverty, parenting, neighborhoods, and the brain. *American Psychologist*, *75*, 1245–1259. https://doi.org/10.1037/amp0000741

In, H., Kim, H., & Carney, J. V. (2019). The relation of social skills and school climate of diversity to children's life satisfaction: The mediating role of school connectedness. *Psychology in the Schools*, *56*, 1023–1036. https://doi.org/10.1002/pits.22247

Kalisch, R., Cramer, A. O. J., Binder, H., Fritz, J., Leertouwer, I. J., Lunansky, G., Meyer, B., Timmer, J., Veer, I. M., & van Harmelen, A. L. (2019). Deconstructing and reconstructing resilience: A dynamic network approach. *Perspectives on Psychological Science*, 14, 765–777. https://doi.org/10.1177/1745691619855637

Kalu, S. R., Menon, S. E., & Quinn, C. R. (2020). The relationship between externalizing behavior and school and familial attachments among girls from diverse backgrounds. *Children and Youth Services Review*, *116*, 105170. https://doi.org/10.1016/j.childyouth.2020.105170

Kern, M. L., Benson, L., Steinberg, E. A., & Steinberg, L. (2016). The EPOCH measure of adolescent well-being. *Psychological Assessment*, *28*, 586–597. https://doi.org/10.1037/pas0000201

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, *74*, 262–273. https://doi.org/10.1111/j.1746-1561.2004.tb08283.x

Klika, J. B., Herrenkohl, T. I., & Lee, J. O. (2013). School factors as moderators of the relationship between physical child abuse and pathways of antisocial behavior. *Journal of Interpersonal Violence*, *28*, 852–867. https://doi.org/10.1177/0886260512455865

Kline, R. B. (2015). *Principles and practice of structural equation modeling*. Guilford Publications, New York, NY, USA.

Lambert, H. K., King, K. M., Monahan, K. C., & Mclaughlin, K. A. (2017). Differential associations of threat and deprivation with emotion regulation and cognitive control in adolescence. *Development and Psychopathology*, *29*, 929–940. https://doi.org/10.1017/S0954579416000584

Lensch, T., Clements-Nolle, K., Oman, R. F., Evans, W. P., Lu, M., & Yang, W. (2020). Adverse childhood experiences and suicidal behaviors among youth: The buffering influence of family communication and school connectedness. *Journal of Adolescent Health*. https://doi.org/10.1016/j.jadohealth.2020.08.024

Liu, Y., Kim, H., Carney, J. V., Chung, K. S., & Hazler, R. J. (2020). Individual and contextual factors associated with school connectedness in the context of counseling in schools. *Journal of Counseling & Development*, *98*, 391–401. https://doi.org/10.1002/jcad.12341

Long, J. A. (2019). *Interactions: Comprehensive, User-Friendly Toolkit for Probing Interactions* (1.1.1) [R]. https://CRAN.R-project.org/package=interactions

Loukas, A., Roalson, L. A., & Herrera, D. E. (2010). School connectedness buffers the effects of negative family relations and poor effortful control on early adolescent conduct problems. *Journal of Research on Adolescence*, *20*, 13–22. https://doi.org/10.1111/j.1532-7795.2009.00632.x

Loukas, A., Suzuki, R., & Horton, K. D. (2006). Examining school connectedness as a mediator of school climate effects. *Journal of Research on Adolescence*, *16*, 491–502. https://doi.org/10.1111/j.1532-7795.2006.00504.x

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, *71*, 543–562.

Luthar, S. S., Crossman, E. J., & Small, P. J. (2015). Resilience and adversity. In *Handbook of child psychology and developmental science* (pp. 1–40). Wiley. https://doi.org/10.1002/9781118963418.childpsy307

Manuel, J. I., Martinson, M. L., Bledsoe-Mansori, S. E., & Bellamy, J. L. (2012). The influence of stress and social support on depressive symptoms in mothers with young children. *Social Science & Medicine*, *75*, 2013–2020. https://doi.org/10.1016/j.socscimed.2012.07.034

Markowitz, A. J. (2017). Associations between school connection and depressive symptoms from adolescence through early adulthood: Moderation by early adversity. *Journal of Research on Adolescence*, *27*, 298–311. https://doi.org/10.1111/jora.12275

Maslowsky, J., Jager, J., & Hemken, D. (2015). Estimating and interpreting latent variable interactions: A tutorial for applying the latent moderated structural equations method. *International Journal of Behavioral Development*, *39*, 87–96. https://doi.org/10.1177/0165025414552301

Masten, A. S., Burt, K. B., Roisman, G. I., Obradović, J., Long, J. D., & Tellegen, A. (2004). Resources and resilience in the transition to adulthood: Continuity and change. *Development and Psychopathology*, *16*, 1071–1094.

Masten, A. S., & Cicchetti, D. (2016). Resilience in development: Progress and transformation. In *Developmental psychopathology* (pp. 1–63). American Cancer Society. https://doi.org/10.1002/9781119125556.devpsy406

https://doi.org/10.1017/S0954579421001140 Published online by Cambridge University Press

Masten, A. S., Lucke, C. M., Nelson, K. M., & Stallworthy, I. C. (2021). Resilience in development and psychopathology: Multisystem perspectives. *Annual Review of Clinical Psychology*. https://doi.org/10.1146/annurev-clinpsy-081219-120307

McLaughlin, K. A., Sheridan, M., Humphreys, K., Belsky, J., & Ellis, B. J. (2021). The value of dimensional models of early experience: Thinking clearly about concepts and categories. *Perspectives on Psychological Science*. https://doi.org/10.1177/1745691621992346

McLaughlin, K. A., & Sheridan, M. A. (2016). Beyond cumulative risk: A dimensional approach to childhood adversity. *Current Directions in Psychological Science*, *25*, 239–245. https://doi.org/10.1177/0963721416655883

McLaughlin, K. A., Sheridan, M. A., & Lambert, H. K. (2014). Childhood adversity and neural development: Deprivation and threat as distinct dimensions of early experience. *Neuroscience & Biobehavioral Reviews*, *47*, 578–591. https://doi.org/10.1016/j.neubiorev.2014.10.012

McLaughlin, K. A., Weissman, D., & Bitrán, D. (2019). Childhood adversity and neural development: A systematic review. *Annual Review of Developmental Psychology*, *1*, 277–312. https://doi.org/10.1146/annurev-devpsych-121318-084950

McNeely, C. A., Nonnemaker, J. M., & Blum, R. W. (2002). Promoting school connectedness: Evidence from the national longitudinal study of adolescent health. *Journal of School Health*, *72*, 138–146. https://doi.org/10.1111/j.1746-1561.2002.tb06533.x

Merrick, M. T., Ford, D. C., Ports, K. A., & Guinn, A. S. (2018). Prevalence of adverse childhood experiences from the 2011–2014 behavioral risk factor surveillance system in 23 states. *JAMA Pediatrics*, *172*, 1038–1044. https://doi.org/10.1001/jamapediatrics.2018.2537

Miller, A. B., Machlin, L., McLaughlin, K. A., & Sheridan, M. A. (2020). Deprivation and psychopathology in the Fragile Families study: A 15-year longitudinal investigation. Journal of Child Psychology and Psychiatry. https://doi.org/10.1111/jcpp.13260

Miller, A. B., Sheridan, M. A., Hanson, J. L., McLaughlin, K. A., Bates, J. E., Lansford, J. E., Pettit, G. S., & Dodge, K. A. (2018). Dimensions of deprivation and threat, psychopathology, and potential mediators: A multi-year longitudinal analysis. *Journal of Abnormal Psychology*, *127*, 160–170. https://doi.org/10.1037/abn0000331

Miller-Graff, L. E. (2020). The multidimensional taxonomy of individual resilience. *Trauma, Violence, & Abuse*. https://doi.org/10.1177/1524838020967329

Monahan, K. C., Oesterle, S., & Hawkins, J. D. (2010). Predictors and consequences of school connectedness: The case for prevention. *The Prevention Researcher*, *17*, 3–7.

Morenoff, J., Sampson, R., & Raudenbush, S. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology*, *39*, 517–560.

Muthén, L. K., & Muthén, B. O. (1998). *Mplus user's guide* (8th ed.). Muthén & Muthén, Los Angeles, CA, USA.

Nusslock, R., & Miller, G. E. (2016). Early-life adversity and physical and emotional health across the lifespan: A neuro-immune network hypothesis. *Biological Psychiatry*, *80*, 23–32. https://doi.org/10.1016/j.biopsych.2015.05.017

Oelsner, J., Lippold, M. A., & Greenberg, M. T. (2011). Factors influencing the development of school bonding among middle school students. *The Journal of Early Adolescence*, *31*, 463–487. https://doi.org/10.1177/0272431610366244

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, *31*, 437–448. https://doi.org/10.3102/10769986031004437

Proctor, L. J. (2006). Children growing up in a violent community: The role of the family. *Aggression and Violent Behavior*, *11*, 558–576. https://doi.org/10.1016/j.avb.2005.12.004

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Medicine*, *1*, 385–401. https://doi.org/10.1177/014662167700100306

Reddy, R., Rhodes, J., & Mulhall, P. (2003). The influence of teacher support on student adjustment in the middle school years: A latent growth curve study. *Development and Psychopathology*, *15*, 119–138. https://doi.org/10.1017/S0954579403000075

Reichman, N. E., Teitler, J. O., Garfinkel, I., & McLanahan, S. S. (2001). Fragile families: Sample and design. *Children and Youth Services Review*, *23*, 303–326. https://doi.org/10.1016/S0190-7409(01)00141-4

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., Tabor, J., Beuhring, T., Sieving, R. E., Shew, M., Ireland, M., Bearinger, L. H., & Udry, J. R. (1997). Protecting adolescents from harm: Findings from the national longitudinal study on adolescent health. *JAMA*, *278*, 823–832. https://doi.org/10.1001/jama.1997.03550100049038

Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal*, *100*, 443–471.

Sameroff, A. J. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, *81*, 6–22. https://doi.org/10.1111/j.1467-8624.2009.01378.x

Satorra, A., & Bentler, P. M. (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika*, *75*, 243–248. https://doi.org/10.1007/s11336-009-9135-y

Schermelleh-engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research*, *8*(2), 23–74.

Sheather, S. (2009). *A modern approach to regression with R*. Springer Science & Business Media, New York, NY, USA.

Smith, G. T., Atkinson, E. A., Davis, H. A., Riley, E. N., & Oltmanns, J. R. (2020). The general factor of psychopathology. *Annual Review of Clinical Psychology*, *16*, 75–98. https://doi.org/10.1146/annurev-clinpsy-071119-115848

Song, M. K., Lin, F. C., Ward, S. E., & Fine, J. P. (2013). Composite variables: When and how. *Nursing Research*, *62*, 45–49. https://doi.org/10.1097/NNR.0b013e3182741948

Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent-child conflict tactics scales: Development and psychometric data for a national sample of American parents. *Child Abuse & Neglect*, *22*, 249–270. https://doi.org/10.1016/S0145-2134(97)00174-9

The Panel Study of Income Dynamics Child Development Supplement: User Guide for CDS-III. (2010). http://psidonline.isr.umich.edu/CDS/questionnaires/cds-iii/child.pdf

Thomas, D. E., & Stevenson, H. (2009). Gender risks and education: The particular classroom challenges for urban low-income African American boys. *Review of Research in Education*, *33*, 160–180. https://doi.org/10.3102/0091732X08327164

U.S. Census Bureau. (2020). *How the census Bureau measures poverty*. The United States Census Bureau. https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html

Voight, A., Hanson, T., O'Malley, M., & Adekanye, L. (2015). The Racial School climate gap: Within-school disparities in students' experiences of safety, support, and connectedness. *American Journal of Community Psychology*, *56*, 252–267. https://doi.org/10.1007/s10464-015-9751-x

Wood, D., Kaplan, R., & McLoyd, V. C. (2007). Gender differences in the educational expectations of urban, low-income African American youth: The role of parents and the school. *Journal of Youth and Adolescence*, *36*, 417–427. https://doi.org/10.1007/s10964-007-9186-2

Zhang, S., & Anderson, S. G. (2010). Low-income single mothers' community violence exposure and aggressive parenting practices. Children and Youth Services Review, 32, 889–895. https://doi.org/10.1016/j.childyouth.2010.02.010