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A Longitudinal Study of Gun Violence Attitudes: Role of Childhood Aggression and Exposure to Violence, and Early Adolescent Bullying Perpetration and Victimization

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Abstract

This prospective study examined the effects of early childhood physical aggression and violence exposure on bullying victimization/perpetration and attitudes toward guns and violence in early adolescence (EA) in a high-risk sample. Participants included 216 mother-child dyads from an ongoing longitudinal study using multi-method assessments (e.g., classroom observations, laboratory assessment, parent-, teacher-, and child self-reports). Results supported a developmental pathway from early adversity (i.e., prenatal substance use) to aggression at kindergarten age to bullying perpetration and gun violence attitudes (aggressive responses to shame) in EA. Higher peer victimization was also associated with aggressive responses to shame in EA. Results are discussed in light of the complexity of the motives for aggression and the need for prevention and early intervention.

Keywords

Aggression; gun violence; bullying; longitudinal

Gun violence is a major public health concern, and positive attitudes toward weapon carrying and violence may be a marker of later gun violence. Research is needed to examine

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the significant early risk factors for these attitudes, using longitudinal designs with high-risk samples (Grych & Swan, 2012; Institute of Medicine & National Research Council, 2013; Spano, 2012). A persistent pattern of aggressive behavior and positive attitudes may initiate a proactive aggression pathway, whereby these behaviors persist and escalate over time and generalize across contexts (Crick & Dodge, 1996; Vitaro, Brendgen, & Barker, 2006). However, this has rarely been assessed in relation to gun violence risk. Early childhood exposure to violence and related comorbid risks may also place children at risk for later forms of peer victimization (e.g., bullying victimization), which could lead adolescents to have more positive views of gun violence and engage in aggression for protective functions (Reid, Richards, Loughran, & Mulvey, 2017).

From a social-ecological perspective, early exposure to violence and adversity may be part of overarching multi-systemic environmental interactions and create contexts for children that perpetuate generational transmission of aggression (Bronfenbrenner, 1977). Strain theory also suggests that persistent, negative experiences that are unjust, high in magnitude, associated with low social control, and model violence and crime lead youth to engage in violence and crime to cope (Agnew, 2001, 2007). These strain experiences include but are not limited to child abuse, parental rejection, negative school experiences, and abusive peer relations, although the latter has been understudied (Agnew, 2001). In addition, behavioral teratology models suggest that prenatal substance exposure increases biological vulnerability to children's regulation physiologically and in aggression and conduct problems (Eiden, Godleski, Schuetze, & Colder, 2015; Mayes, 2002). There is also strong theoretical and empirical support for transmission of violence through interpersonal networks via exposure to violence and experiences of individual victimization or perpetration (Tracy, Braga, & Papachristos, 2016). Being in high-risk environments with shared violent experiences and norms may also increase the risk of further victimization by accepting violence as a norm, predisposing one to engage in violence in defense or retaliation, and sharing violent experiences with others in their network (Tracy et al., 2016). From a stress process model, children living in disadvantaged environments are more likely to be exposed to violence, with co-occurrence of violence and victimization resulting in a variety of adverse outcomes (Foster & Brooks-Gunn, 2009). As depicted by the theoretical model in Figure 1, we conceptualized that early adversity (i.e., prenatal substance exposure, socioeconomic adversity) would lead to increased violence exposure and stable childhood aggression throughout early childhood and kindergarten, which would then lead to bullying victimization and perpetration, as well as more positive attitudes toward guns and violence in EA in a low-income, diverse sample of mostly substance using mothers and their children.

Attitudes toward guns and violence predict aggression (Bryant, 2011) and youth gun ownership (Shapiro, Dorman, Burkey, Welker, & Clough, 1997). These findings are consistent with social-cognitive theory and related research demonstrating that cognitive processes (e.g., pro-aggression attitudes, hostile attribution biases) predict aggressive behavior and mediate the relation between exposure to violence and aggressive behavior (Bradshaw, Rodgers, Ghandour, & Garbarino, 2009; Houston & Grych, 2016). Factor analysis of the *Attitudes Toward Guns and Violence Questionnaire* (Shapiro, 2000) has identified four subscales to assess this construct: (a) aggressive response to shame, or beliefs that aggression is the only way to counter shame arising from being insulted; (b)

comfort with aggression (i.e., general values about aggression and guns); (c) excitement, or the intrinsic stimulation associated with guns; and (d) power/safety (i.e., viewpoint that violence and guns give power and increase safety). Aggressive response to shame has been most consistently related to aggressive behavior in youth (Bryant, 2011; Hart, O'Toole, Price-Sharps, & Shaffer, 2007). Relatedly, shame displacement, including blaming others, and having a desire to retaliate aggressively, increases bullying behavior (Ahmed & Braithwaite, 2004). Feelings of power and safety also discriminate between violent, non-violent delinquent, and non-delinquent male youth (Hart et al., 2007).

These distinct attitudes toward guns and violence may develop from different developmental pathways, although there is a dearth of research testing models with high-risk samples (Myers et al., 2018; Reid et al., 2017). The majority of research on the transmission of violence through interpersonal networks via exposure to violence and individual victimization or perpetration experiences is cross-sectional, based on single-informant self-reports, or retrospective (Tracy et al., 2016). Developmental studies of aggressive behavior are often conducted with predominantly White middle-class samples, despite the fact that violence is most prominent for African-American youth in low-income neighborhoods (Bryant, 2011; Stoddard, Zimmerman, & Bauermeister, 2012). In this study, we examined two pathways to predict attitudes toward guns and violence in a high-risk, diverse sample of youth using multi-method assessments of major constructs from infancy through EA.

Early Childhood Aggression, Bullying Perpetration, and Gun Violence

Physical aggression is common in the toddler years and declines sharply in early childhood (Côté et al., 2007), although a subset of children exhibits persistent patterns of aggressive and antisocial behavior across time and contexts (Loeber & Farrington, 2000; Moffit, 2003). Aggression is associated with higher levels of community violence exposure (Foster & Brooks-Gunn, 2009), developed and maintained in part by modeling, exposure to, and endorsement of pro-aggressive attitudes and behaviors (Fite et al., 2010; Fite, Schwartz, & Hendrickson, 2012; Vitaro et al., 2006). This pattern of aggression, and having friends who carry weapons, increase the risk of youth weapon carrying (Dijkstra, Gest, Lindenberg, Veenstra, & Cillessen, 2012; Dijkstra et al., 2010).

Although there is a voluminous body of developmental research on aggression, longitudinal studies of bullying perpetration are sparser (Rodkin, Espelage, & Hanish, 2015). Bully perpetrators are more likely than their uninvolved peers to carry weapons (Dukes, Stein, & Zane 2010; van Geel, Vedder, & Tanilon, 2014), but due to a dearth of longitudinal studies, it remains unclear whether bullying perpetration is incidental to underlying aggression or if it mediates the association with later antisocial outcomes (Rodkin et al., 2015). Interestingly, a recent study by Schwartz, Lansford, Dodge, and Pettit (2018) found that high levels of peer victimization attenuated the association between early aggression and adult arrest, suggesting that the link between bullying experiences and adult criminal outcomes may be rooted in childhood adversity.

The current study addresses a gap in the literature by examining the relation of early and ongoing aggressive and problem behavior across contexts (e.g., home and school)

to bullying perpetration and attitudes toward guns and violence in EA in a high-risk, predominantly low-income African-American sample. We hypothesized that this pattern may be particularly associated with comfort with aggression, as youth may view violence as a way to achieve goals (Fite et al., 2010, 2012), suggested by strain theory (Agnew, 2001).

Exposure to Violence, Bullying, and Gun Violence

Multiple studies have found an association between violence exposure and youth weapon carrying (Shapiro et al., 1997; Spano & Bolland, 2013). Some research has suggested that the link between exposure to violence and aggression occurs through indirect associations with anxiety (Myer et al., 2018). However, Reid and colleagues (2017) found that violence exposure and psychological distress predicted adolescents' later gun carrying, although the effect of psychological distress was reduced after accounting for exposure to violence.

A link has also been found between peer victimization (e.g., bullying) and weapon carrying, particularly for males (Esselmont, 2014; Goldstein, Young, & Boyd, 2008). This issue has received national attention, due in part to findings that 71% of school shooters had been victims of bullying (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2002). There is growing research support indicating that victimized youth are more likely to carry weapons and perceive their schools as less safe (Esselmont, 2014; Goldstein et al., 2008). These reduced perceptions of school safety mediate the relation between peer victimization and weapon carrying, particularly for boys (Goldstein et al., 2008). Thus, we examined if childhood exposure to violence was prospectively predictive of peer bullying and victimization in EA, and its further association with aggressive responses to shame and power and safety attitudes toward guns and violence.

Current Study

We examined two pathways, informed by social-ecological, strain theory, and biological teratology models of the effects of prenatal substance exposure, to specific attitudes toward guns and violence (e.g., aggressive response to shame, comfort with aggression, power/safety) from infancy to EA for a sample at high risk due to prenatal substance exposure and socioeconomic adversity. The first pathway examined persistent aggressive behavior from toddler age to kindergarten to EA bullying perpetration and attitudes toward guns and violence. The second pathway examined the association between exposure to violence from toddler age to kindergarten to bullying victimization in EA and its association with attitudes toward guns and violence. Covariates were included in the model given their associations with the constructs under examination, including maternal race and being in non-biological parent care, which has been linked to more negative outcomes in some samples (Linares et al., 2006; Minnes et al., 2010) and more positive outcomes for others (Eiden, Foote, & Schuetze, 2007).

Method

Participants and Procedure

The sample included 216 caregiver–child dyads (49% boys) participating in a longitudinal study since the child's birth, recruited from two urban hospitals serving a predominantly African American low-income population. All mothers were screened after delivery to identify a sample of participants with high rates of prenatal cocaine use. Exclusionary criteria consisted of maternal age < 18 years, use of illicit substances other than cocaine or marijuana during pregnancy, plural births, and significant infant medical problems. The sample consisted of 116 infants exposed to cocaine and other substances (alcohol, cigarettes, marijuana) in utero, and 100 not exposed to cocaine but may have been exposed to other substances (see Eiden, Coles, Schuetze, & Colder,2014 for more information). Caregiver-infant dyads were group matched on maternal race/ethnicity and education (see Table 1 for demographics). Caregiver-infant dyads were assessed beginning at 1 month of infant age (corrected for prematurity), with follow-up assessments every 6 months until and including kindergarten age, at 2nd grade, and in EA (M = 13.6 years, SD = 1.22). Although the primary caregiver of the child was identified at each assessment and invited to participate, the term mother is used for ease of presentation. In EA, adolescents self-identified their race/ethnicity as 57.6% African American, 17.9% Mixed Race, 7.9% Hispanic, 6.6% Caucasian, 2.0% American Indian, 0.7% Asian, and 7.3% other.

Measures

Early Adversity and Sociodemographic Risk.—Maternal prenatal substance use included cocaine use (*0 = no, 1 = yes*) assessed by a combination of urine toxicology, maternal hair analysis, and self-report (see Eiden, Coles, Schuetze, & Colder, 2014 for additional details), as well as cigarette and alcohol use (measured by the Timeline Follow-Back Interview [TLFB]; Sobell et al., 1986). Socioeconomic adversity was assessed at 1-month of age based on a composite variable consisting of low maternal education, single parenthood, and low family income. Mothers reported their highest level of education, dichotomized to reflect those who had not completed high school (40%). Mothers who reported not living with a partner in the past month were coded as single (67%). Income-to-needs ratios were computed by dividing each family's total income (including public assistance) by the number of family members supported by this income. This variable was reverse-coded; higher scores reflected lower income-to-needs, turned into a proportion by dividing each family's income by the sample maximum. To create the composite socioeconomic adversity score, an average of all indicators was computed (Moran et al., 2016).

Violence Exposure.—Maternal exposure to violence was assessed at each appointment between 1 and 48 months of child age (9 total assessments) using the TLFB (Sobell et al., 1986) where mothers reported about violence they witnessed, experienced, or perpetrated in the six months prior. Child exposure to violence (e.g., shootings, drug deals, beatings) was assessed with the 26-item *Survey of Exposure to Community Violence* (Richters & Saltzman, 1990) from maternal report when the child was in kindergarten (α = .84). Due to

high skewness and kurtosis, which persisted despite transformation, both maternal and child exposure variables were dummy-coded 0 = non-exposed and 1 = exposed to violence.

Child Aggression.—Early childhood aggression was assessed using maternal reports on the Child Behavior Checklist, 1.5- to 5-year version (CBCL; Achenbach, 1992) every 6 months from 18 to 48 months. Only the six items related to pure physical aggression (e.g., attacks people) were utilized in the composite (see NICHD Early Child Care Research Network, 2004), averaged across the waves of data collection (αs = .75 to .82).

In kindergarten, teacher ratings and classroom observations were used as measured indicators of a latent construct for child aggression. Specifically, teachers rated students on 10 items from the *Behavioral Assessment for Children Teacher Rating Scales* (*BASC TRS*; Reynolds & Kamphaus, 1992) assessing classroom aggression (e.g., "Hits other children") on a scale of *0 (Never)* to *3 (Almost Always).* Responses were summed to create the aggression score (α = .93). Teachers also reported on children's aggression/defiance using 5 items from the Swanson, Nolan and Pelham – IV (SNAP-IV; Swanson, Nolan, & Pelham, 1982) rated on a scale of *0 (Never)* to *3 (Very Much).* Scores were averaged, and the internal consistency of the subscale was good (α = .90). Finally, classroom problem behaviors were assessed using the *BASC Student Observation System (BASC SOS;* Reynolds & Kamphaus, 1992). Trained research assistants blind to group status observed the child in the kindergarten classroom for 90 minutes, and recorded the percentage of time students were engaged in problem behaviors across six 15-minute episodes. Coders were trained to a minimum inter-rater reliability criterion of $r = .80$. Inter-rater reliability checks occurred at 4-week intervals on 4–5 school observations (Cohen's Kappa = .87). Confirmatory factor analyses (CFA) revealed sufficient standardized factor loading for the BASC aggression scale (.87), the SNAP-IV aggression/defiance scale (.98), and the BASC SOS problem behavior scale (.51). This factor was labeled child aggression and was included as a latent indicator in subsequent analyses.

Bullying Perpetration and Victimization.—In EA, bullying victimization and perpetration in the previous 30 days were assessed with the *California Bullying Victimization Scale* (Felix et al., 2011). Each subscale consists of eight items assessing the frequency of bullying victimization (e.g., "How often have you been hit, pushed, or physically hurt in a mean or hurtful way?") or perpetration (e.g., "How have you hit, pushed, or physically hurt another student in a mean or hurtful way?") on 5-point Likert scale (1; *not in the past month, 2; once in the past month, 3; 2 or 3 times in the past month, 4; about once a week, or 5; several times a week*). Total scores were obtained by averaging across items (Hase, Godlberg, Smith, Stuck, & Campain, 2015), with α = .76 for victimization and .73 for perpetration in the current study.

Attitudes Towards Guns and Violence.—Adolescents completed the *Attitudes Toward Guns and Violence Questionnaire* (ATGVQ; Shapiro, 2000), a measure assessing comfort with aggression (6 items, e.g., "I wish there weren't any guns in my neighborhood"; α = .77), excitement about guns (5 items, e.g., "It would be exciting to hold a loaded gun in my hand"; α = .65), power/safety derived from the violence and guns (4 items, e.g., "Carrying a gun makes people feel powerful and strong"; α = .70), and aggressive responses

to shame (8 items, e.g., “If somebody insults you and you don’t want to be a chump, you have to fight”; α = .78). Each item was rated from *0 (disagree)* to *2 (agree),* and a summed score was calculated for each subscale; higher scores indicated more positive attitudes about guns, aggression, and violence. Due to the questionable reliability of the excitement subscale and its low base rate (70% of the sample scored 0), this subscale was not included in further analyses. The ATGVQ has been associated with handgun ownership (Shapiro et al., 1997). In the current sample, more positive attitudes toward guns and violence correlated significantly with *Youth Self-Report* (YSR; Achenbach & Rescorla, 2001) of aggression (r = .34, p < .01) and the *Adolescent Delinquency scale* (Huizinga, Esbensen, & Weiher, 1991) assault subscale (r = .29, p < .01) in EA.

Covariates.—Maternal race and non-biological parent care were covariates in the model. These variables were assessed through caregiver interview.

Data Analysis

First, associations between variables were examined using Pearson’s correlations or Analysis of Variance (ANOVA) as appropriate. Covariates that had bivariate associations with early childhood variables (1–48 months) or outcome variables (attitudes towards guns and violence) at p < .10 were included in the analysis. Data were analyzed using structural equation modeling (SEM) in Mplus version 8 (Muthén & Muthén, 1998–2017). Model fit was evaluated using the comparative fit index (CFI), the root-mean-square-error of approximation (RMSEA), and the standardized root mean square residual (SRMR); nested models were compared using the chi-square difference test. Modification indices were examined to determine if respecification of the model was warranted and theoretically relevant paths indicated by the modification indices were added.

Missing Data

As with any longitudinal study and in particular studies involving at-risk samples (e.g., Sturge-Apple et al., 2017), there were incomplete data for some participants at one or more of the assessment points. Of the 216 participants enrolled in the study, 164 completed the kindergarten assessment (155 of these had complete teacher and school observation data), and 152 participants completed all EA assessments. Families with missing data in EA were not significantly different on maternal age, partner status, or prenatal substance exposure, but 42.2% of children missing data for the EA assessment were in non-biological parent care at some point between birth and kindergarten, compared to only 24.2% of children without missing EA data, Pearson χ^2 = 7.46, p < .01, Cohen’s d = .38. Little’s test indicated data fit criteria for missing-completely at-random χ^2 (190) = 168.00, p = .87. Full information maximum likelihood estimation procedures (Arbuckle, 1996), robust to violations of normality were used to estimate model parameters (Schafer & Graham, 2002).

Results

Bivariate associations and descriptive statistics for study variables are presented in Table 1. Child aggression in both early childhood and kindergarten were positively associated with bullying perpetration in EA, and bullying perpetration and victimization in EA were

associated with aggressive responses to shame, but not to the other attitudes about guns and violence.

Model Testing

The first step in SEM analyses was to fit the measurement model for the latent variable for child aggression (see CFA results in Method). The second step was to test the structural model. We tested the hypothesized model (Figure 1) with prenatal substance use, maternal race, and socioeconomic adversity as exogenous variables. The model included predictive paths from prenatal substance exposure, race, and socioeconomic adversity to three early childhood variables: maternal violence exposure (*0 = never, 1 = ever from 1 to 48 months*), child aggression (composite scores from 1 to 48 months), and non-biological parent care status (*0 = never in non-biological care, 1 = ever in non-biological care through EA*). This was followed by predictive paths from all three early childhood variables to the two kindergarten variables (i.e., child violence exposure, child aggression). Predictive paths from the kindergarten variables included paths to EA bullying perpetration and victimization, and finally, there were associations from bullying and victimization to the three attitude outcomes (i.e., power/safety, aggressive response to shame, comfort with aggression). All within time residuals were covaried. This model fit the data well ($\chi^2(63) = 76.84$, $p = .11$, CFI = .96, RMSEA = .03, CI [.00-.05], SRMR = .06).

Modification indices suggested the addition of theoretically meaningful predictive paths from the latent construct of child aggression in kindergarten to comfort with guns and violence and a path from maternal socioeconomic adversity to kindergarten violence exposure.

Addition of these two paths resulted in a significant improvement in model fit $\Delta\chi^2(2) = 7.23$, $p > .05$, and the new model fit the data well (i.e., $\chi^2(61) = 69.61$, $p = .21$, CFI = .98, RMSEA = .05, CI [.00-.05]), SRMR = .05). Overall, this model explained 2.4% of the variance in power and safety attitudes, 3% of the variance in comfort with guns and violence, and 13.2% of the variance in aggressive response to shame (see Figure 2 and Table 2).

Discussion

The findings of this study support a social-ecologically informed developmental pathway from early risk (i.e., prenatal substance exposure, non-biological care) to child aggression in kindergarten to early adolescents' endorsement of engaging in aggressive responses to shame; bullying perpetration in EA mediated the association between kindergarten child aggression and these attitudes in EA. Victimization by bullying was also related to aggressive response to shame, but not through the anticipated pathway from exposure to violence from infancy through middle childhood. These results highlight both the impact of bullying perpetration and victimization on attitudes toward guns and violence, as well as the aggressive behavior in the school and peer contexts as a potential pathway toward gun violence.

Supporting behavioral teratology models (Mayes, 2002), prenatal substance exposure directly predicted the latent variable of child aggression in kindergarten. Although not examined specifically in the current study, past research has found that maternal aggression, negative affect (Eiden, Schuetze, Colder, & Veira, 2011), and lower sensitivity (Ettekal, Eiden, Nickerson, Molnar, & Schuetze, 2019), as well as lower infant autonomic regulation (Schuetze, Eiden, & Danielwicz, 2011) are processes involved in the relation between prenatal substance exposure and child aggression, in addition to potential direct associations due to increased biological vulnerability. The current study extends the examination of the adverse impact of prenatal risk and childhood aggression into early adolescence, finding that these earlier risks predicted both bullying perpetration and aggressive attitudes supporting gun violence. Supporting an early starter pattern, results indicated a pattern of aggression beginning in early childhood that was sustained across time and contexts (Loeber & Farrington, 2000; Moffit, 2003).

Results of this study respond to calls for research examining the mediating role of bullying perpetration in early aggression and later antisocial outcomes (Rodkin et al., 2015), indicating that aggression in kindergarten is indirectly related to endorsement of gun violence attitudes through bullying perpetration. The only specific attitude this pathway predicted was aggressive response to shame, as previous research has found (Bryant, 2011; Hart et al., 2007). Aligned with the transmission of violence through interpersonal networks theories (Tracy et al., 2016), it is possible that these youth who display ongoing aggressive behavior in schools and with peers have accepted violence as a norm and as a way to achieve goals or cope with stresses. In addition, there was a direct, concurrent association between victimization by peers and endorsement of aggressive responses to shame in EA, consistent with previous research (Esselmont, 2014; Goldstein, Young, & Boyd, 2008). According to strain theory, youth who experience a persistent, negative experience (in this case, peer victimization) may show a proclivity toward violence and guns to cope (Agnew, 2001). The specific relations between bullying perpetration and victimization to aggressive response to shame fits within a larger body of research and theory about hostile attribution biases, which may mediate the association between peer victimization and later externalizing behaviors (Perren, Ettekal, & Ladd, 2013).

Although there was a marginal nonsignificant relation between kindergarten aggression and comfort with guns and violence, bullying perpetration did not relate to this construct and it was marginally but inversely predictive of power/safety attitudes. Taken together, findings from this sample suggest that bullying perpetrators did not endorse proactive or premeditated beliefs (e.g., comfort with guns/violence, power), but viewed violence as a retaliatory coping mechanism (Ahmed & Braithwaite, 2004). Research that assesses functions of aggression (e.g., reactive and proactive) and cognitive processes (e.g., hostile attribution biases) in relation to bullying and gun violence attitudes may be fruitful in further elucidating these processes.

Findings partially supported a stress process model (Foster & Brooks-Gunn, 2009) in that socioeconomic adversity predicted exposure to violence, yet violence exposure to violence did not relate to later adverse outcomes (e.g., bullying, attitudes toward guns and violence). Past research has found associations between exposure to violence with later aggression,

violence, and weapon carrying in youth (Myer et al., 2018; Spano & Bolland, 2013). Our measure of exposure to violence assessed serious and life-threatening events experienced or witnessed by the mother or child (e.g., seeing someone shot, being threatened with serious physical harm) and due to high skewness and kurtosis that persisted despite transformations we used a dichotomous score. It is possible that lack of variability led to the lack of effects. It is also possible that we did not find effects because the direct effect tested was from exposure to violence and bullying, as opposed to gun violence or other aggressive behavior. There is little research on exposure to violence and bullying, and it is possible that other individual and contextual factors are more strongly predictive of bullying (see Cook, Williams, Guerra, Kim, & Sadek, 2010). The association between exposure to violence and bullying may also be moderated by other variables, such as child temperament, parenting, or association with deviant peers.

Implications for Practice, Limitations, and Future Research Directions

Findings about early childhood physical aggression predicting ongoing violence and violence-related attitudes highlight the importance of early identification and prevention. Parent training programs have been found to reduce children's conduct problems while improving prosocial behavior and socioemotional competence (Menting, Orobio de Castroa, & Matthys, 2013; Posthumus, Raaijmakers, Maassen, van Engeland, & Matthys, 2012). For youth in middle childhood and early adolescence, cognitive-behavioral therapy focusing on developing emotional awareness, social problem-solving skills, and anger management can reduce aggression and improve social competence (Lochman, Powell, Boxmeyer, & Jimenez-Camargo, 2011; Sukhodolsky, Kassinove, & Gorman, 2004), which may be particularly relevant given this sample's endorsement of seeing guns and violence as responses to difficult emotions. Aggressive behavior in kindergarten as well as bullying perpetration and victimization were predictors of positive attitudes toward guns and violence, which highlights the importance of multi-tiered bullying prevention and intervention in the school setting (Nickerson, 2019).

Despite the strengths of this study, including the longitudinal design using multiple methods and sources, there are limitations. The relatively small sample size precluded the inclusion of other important potential mediating and moderating variables in the model due to power considerations. For example, we did not examine sex differences or protective factors, which are critical for enhancing our understanding of processes of resilience. Supporting a risk-protective factor model of resilience, individual, peer, and family promotive factors have been found as protective in youth violent behavior for individuals with high cumulative risk (Stoddard et al., 2012).

Future research should focus on different forms (i.e., relational, physical) and functions (e.g., reactive, proactive) of aggression (Ostrov & Godleski, 2013), given potential differential associations with outcomes. Another limitation was that bullying and victimization, as well as gun violence attitudes, were collected via self-report at the same EA assessment. Future work should test this prospective model at different time points and with independent informants to avoid shared method variance concerns. In addition, our design may have missed important intervening changes in peer relations or child behavior as

there were no assessments from roughly ages 5 to 12 years old. Although the missing and non-missing data did not differ on many variables, children in non-biological care were less likely to continue in the study, as it was more difficult to locate these families. Moreover, despite controlling for earlier levels of aggression, future models should test for changes in bullying and victimization as well as gun violence attitudes. More comprehensive models should also incorporate family, peer, school, and neighborhood influences. Although the examination of these attitudes is important, the actual behaviors of weapon carrying and use of guns to perpetuate violence are vital to assess in order to advance our understanding of how gun violence is developed and to guide prevention efforts.

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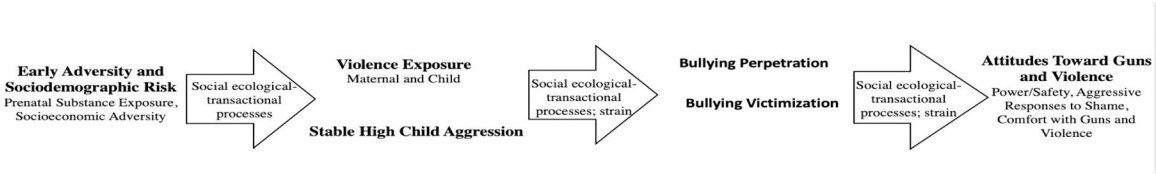

Figure 1.
Theoretical model.

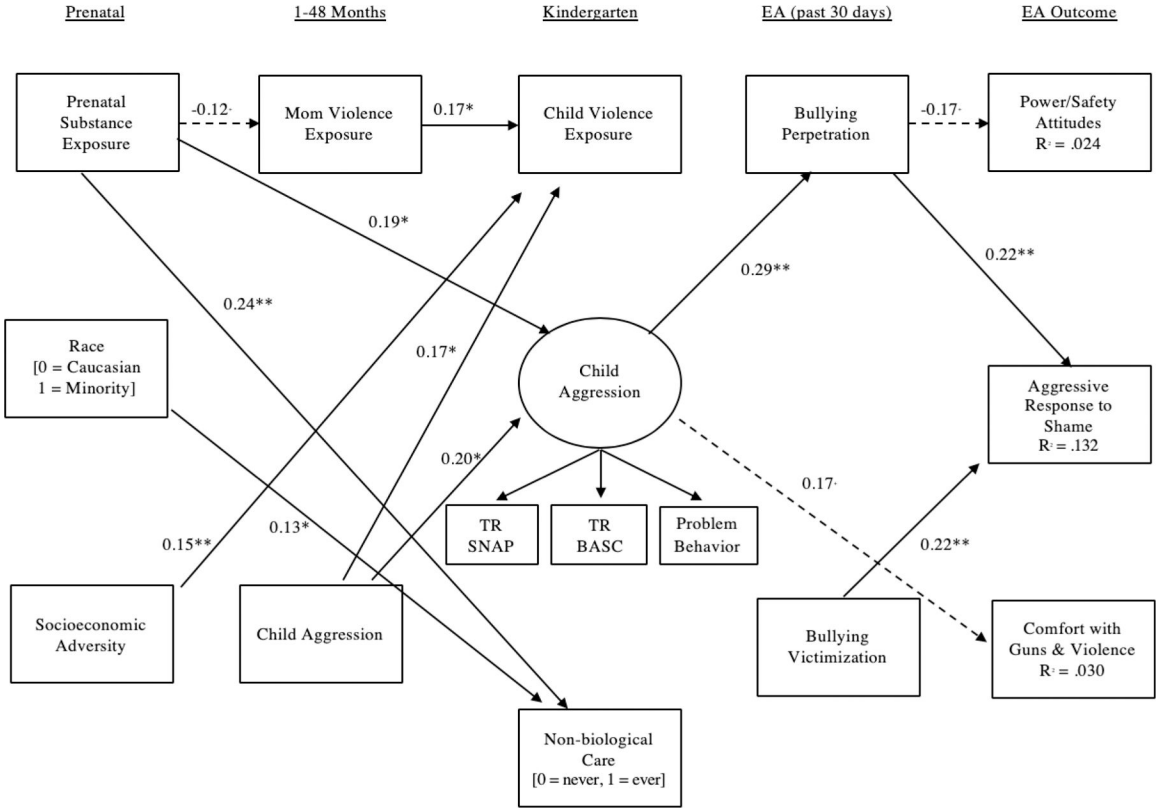

Figure 2.

Results of respecified SEM model. EA = early adolescence; TR = teacher report. Standardized coefficients are presented.

All within time covariances were included in the model, but are not shown for ease of presentation. Significant covariances included prenatal substance use with socioeconomic adversity ($\beta = .227$, $p < .001$), socioeconomic adversity with race ($\beta = .287$, $p < .001$), early childhood aggression with maternal violence exposure ($\beta = .153$, $p = .035$), non-biological care with child aggression ($\beta = -.625$, $p < .001$) and bullying with victimization ($\beta = .416$, $p < .001$). Significant results are denoted by solid lines and marginal results are denoted by dashed lines. Nonsignificant pathways are not included in the figure for ease of presentation, but these estimates are reported in Table 2.

** $p < .01$, *$p < .05$, $^{+}$ $p < .10$

Table 1

Descriptive statistics and bivariate correlations.

	M/%	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Prenatal Substance Exposure	.07	.12	1														
2. Socioeconomic Adversity	.56	.22	.23**	1													
3. Non-biological care (% ever in NBC)	31.5%		.28**	.20**	1												
4. Maternal Race (% minority)	84.2%		.01	.29**	.13+	1											
5. Maternal Exposure to Violence	64.2%		−.13+	−.06	−.08	−.01	1										
6. Child Aggression 18 to 48 months (MR)	2.96	1.69	.07	.04	−.06	.06	.13+	1									
7. Child Exposure to Violence (K – MR) (% exposed)	33.1%		.04	.14+	.11	.01	.18*	.19*	1								
8. Child Aggression (K – TR BASC)	4.86	5.77	.18*	.15+	.09	.17*	.04	.18*	.12	1							
9. Child Aggression/Defiance (K – TR SNAP)	2.51	3.30	.15+	.13	.06	.24*	.09	.11	.09	.85**	1						
10. Classroom Problem Behavior (K – OBS)	8.76	9.75	.03	.05	.13	.17*	.05	.05	.09	.44**	.50**	1					
11. Bully Perpetration (EA - CR)	1.19	.35	.15+	.07	.03	.18*	.04	.19*	.12	.34**	.23**	.08	1				
12. Bully Victimization (EA-CR)	1.32	.46	.04	.02	.06	.10	−.01	.10	.13	−.01	−.01	.10	.38**	1			
13. Power/Safety Attitudes (EA-CR)	4.09	2.31	.12	.10	.13	.05	−.01	−.06	.13	.03	−.02	.07	.16+	.04	1		
14. Aggressive Response to Shame Attitudes (EA-CR)	4.18	3.67	.09	.19*	.09	.19*	−.02	.06	.20*	.12	.11	.12	.30**	.31**	.18*	1	
15. Comfort with Aggression Attitudes (EA-CR)	2.72	2.86	.15+	−.14+	.04	−.12	.02	.01	−.01	.14	.16+	.24**	.02	−.06	−.10	−.09	1

Descriptive Statistics and Bivariate Correlations

Note. NBC = Non-biological care; MR = mother report; K = kindergarten; TR = teacher report; OBS = observation; EA = early adolescence; CR = child report. Maternal race coded 0 = Caucasian, 1 = minority. Sample sizes for correlations ranged from $n = 126$ to 216.

+ $p < .10$

* $p < .05$

** $p < .01$

Table 2

Nonsignificant Model Paths

Path	Standardized Estimate	SE	*p*-value
Prenatal Substance Use to Early Childhood Aggression	0.068	0.071	.338
Race to Early Childhood Aggression	0.045	0.072	.536
Socioeconomic Adversity to Early Childhood Aggression	0.007	0.077	.926
Race to Maternal Violence Exposure	0.005	0.071	.943
Socioeconomic Adversity to Maternal Violence Exposure	−0.034	0.073	.638
Socioeconomic Adversity to Non-biological Care	0.092	0.060	.125
Early Childhood Aggression to Non-biological Care	−0.079	0.068	.242
Maternal Violence Exposure to Non-biological Care	−0.036	0.066	.582
Maternal Violence Exposure to Childhood Aggression (K)	0.112	0.101	.266
Child Violence Exposure (K) to Bullying	0.110	0.080	.166
Non-biological Care to Bullying	−0.011	0.082	.891
Child Violence Exposure (K) to Victimization	0.135	0.089	.129
Childhood Aggression (K) to Victimization	−0.028	0.091	.760
Non-biological Care to Victimization	0.052	0.085	.539
Bullying to Comfort Attitudes	−0.012	0.094	.896
Victimization to Comfort Attitudes	−0.048	0.089	.585
Victimization to Power and Safety Attitudes	−0.026	0.087	.768