Longitudinal examination of family violence, posttraumatic stress, social skills, and aggression: an exploratory analysis

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LONGITUDINAL EXAMINATION OF
FAMILY VIOLENCE, POSTTRAUMATIC STRESS,
SOCIAL SKILLS, AND AGGRESSION:
AN EXPLORATORY ANALYSIS

by

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Abstract

Aggression in adolescence is associated with many negative outcomes both during adolescence and later in adulthood. In order to properly prevent and treat aggression, it is important to understand what factors are associated with the development of aggression. This study examined how exposure to family violence, posttraumatic stress, and social skills were related to both parent- and adolescent-rated aggressive behavior. This study was comprised of two components. First, a series of mediation models were examined using structural equation modeling. Second, exploratory analyses of the moderating effects of adolescent race and gender were conducted using multiple regression. The sample consisted of 583 Black, Latino, and White adolescents aged 11 to 14 who participated in the second National Survey of Child and Adolescent Well-Being (NSCAW II) and were assessed with 3 waves of data over 36 months. Results from the first component of the study found that the base model that consisted of autoregressive effects and within-wave correlations provided a good fit to the data with important differences found between the parent and adolescent models. None of the mediation models were supported for either the parent or adolescent models. Results from the second component of the study found that race and gender substantially impacted the predictive relationships between the different factors and later aggression, and that these findings also differed based on whether the parent or adolescent was the informant. These findings further our understanding of how trauma-related factors and social skills relate to aggression longitudinally, which has important implications for interventions.
Longitudinal Examination of Family Violence, Posttraumatic Stress, Social Skills, and Aggression: An Exploratory Analysis

Adolescent aggressive behavior is associated with many negative outcomes. Indeed physical aggression in childhood and early adolescence was identified as the best predictor of all externalizing problems (e.g. opposition, status violations, property violations) for late adolescence substance use and risky sexual behavior (Timmermans, van Lier, & Koot, 2008). Aggression in adolescence can also negatively impact future success. For example, aggressive youth are at an increased risk of dropping out of school (Farmer et al., 2003) and aggression in adolescent is associated with outcomes such as delinquency, violence, and substance use in adulthood (Fite, Raine, Stouthamer-Loeber, Loeber, & Pardini, 2010).

Aggressive adolescents use disproportionately more services compared to adolescents without aggressive problems, and thus become an economic burden to the public. In one study that examined the public cost of aggression, expenditures for adolescents with conduct disorder (characterized by severe aggressive acts) were nearly $70,000 more compared to adolescents without aggressive problems who came from similar socioeconomic backgrounds (Foster, Jones, & Conduct Problems Prevention Research Group, 2005). This is due in part to adolescents with conduct disorder using more inpatient and outpatient mental health services and being more involved with the juvenile justice system compared to adolescents without aggressive problems (Foster et al., 2005). As adolescent aggression is associated with many negative outcomes, it is important to understand factors that predict aggression. By understanding these etiological factors, researchers and clinicians will be better able to create and implement interventions that prevent or decrease aggression in adolescence.
Two factors associated with adolescent aggressive behavior are exposure to family violence and posttraumatic stress. However, the interrelationships between these three factors still need to be better understood. Social skills are one potential explanatory factor that can help explain adolescent aggressive behavior in the context of family violence and posttraumatic stress. The influence of social skills on aggressive behavior has long been established. Models such as the social skills deficit model of aggression have been proposed and social skills training is a popular intervention for aggression. Thus, while social skills are associated with aggression, it is unclear how they relate to aggression in the context of exposure to family violence and posttraumatic stress.

This study examined the mediating influence of social skills on the relationships between exposure to family violence, posttraumatic stress, and aggressive behavior. In addition, exploratory analyses were conducted to examine whether the proposed model might be moderated by adolescent racial-ethnic identification and gender. The sample for this study consisted of adolescents from the second National Survey of Child and Adolescent Well-Being (NSCAW II) dataset. The NSCAW II dataset consists of a national longitudinal sample of adolescents who have come into contact with the child welfare system. This study specifically used a subset of the dataset that examined families who have been investigated by Child Protective Services. Before the specific aims of this study are discussed, some relevant background literature will be highlighted.

**Exposure to Family Violence and Aggression**

Adolescents are frequently exposed to family violence. Family violence will be defined here as comprising intimate partner violence (also called inter-parental violence, marital violence, and domestic violence) and child maltreatment (physical abuse, sexual abuse,
emotional abuse, and neglect). Intimate partner violence is defined as violence amongst adult partners or ex-partners. These acts of violence are often witnessed by youth in the household. The national prevalence for youth-witnessed intimate partner violence ranges from 9% (Zinzow et al., 2009) to 30% (McDonald, Jouriles, Ramisetty-Mikler, Caetano, & Green, 2006). When adolescents witness violence, it is associated with many negative outcomes including aggression.

Several meta-analyses have been conducted examining the relationship between exposure to intimate partner violence and youth outcomes. A meta-analysis by Kitzmann, Gaylord, Holt, and Kenny (2003) examined psychosocial outcomes of 118 studies of youth exposed to intimate partner violence. Results of the analyses demonstrated that youth witnesses to intimate partner violence had more externalizing problems compared to both nonwitnesses and witnesses of verbal aggression (Kitzmann et al., 2003). While witnesses did not differ in externalizing problems compared to physically abused children, youth who both witnessed intimate partner violence and were physically abused did have worse outcomes than witnesses (Kitzmann et al., 2003). When examining aggression specifically, no witness status was differentially associated with aggression, although examination of this was not always possible due to small numbers of studies that specifically measured aggression (Kitzmann et al., 2003). Maternal reports of youth outcomes indicated significantly more problems than youth self-report measures when comparing intimate partner violence witnesses to non-witnesses (Kitzmann et al., 2003). This might suggest the need to consider multiple sources when examining youth outcomes, in order to gain a more accurate picture of youth functioning. In this meta-analysis, gender did not moderate psychosocial outcomes for adolescents and the impact of adolescent race or ethnicity was not examined.
In a separate meta-analysis examining the impact of childhood exposure to intimate partner violence, the relation between exposure to intimate partner violence and externalizing symptoms had a moderate effect size (Evans, Davies, & DiLillo, 2008). Examination of age and gender as moderators found that the relationship between exposure to intimate partner violence and externalizing symptoms was stronger for boys than it was for girls (Evans et al., 2008). There was no significant difference between boys and girls when specifically looking at adolescents (Evans et al., 2008), although as the confidence intervals were large, this may indicate instead that there was a lack of power to detect any effects. The effects of adolescent race and ethnicity were again not examined.

Taken together, there appears to be conflicting evidence with regards to the influence of adolescent gender on the association between exposure to intimate partner violence and later externalizing behavior. Kitzmann and colleagues (2003) did not find any gender effects, while Evans and colleagues (2008) did. Evans and colleagues (2008) explain that this may be due to their inclusion of 21 additional studies not examined in the Kitzmann et al. (2003) meta-analysis. In addition, Evans and colleagues (2008) state that their meta-analysis is stronger methodologically as it focused on studies published after 1990, as advocated by Fantuzzo and Lindquist (1989), due to severe methodological limitations of first generations studies. Regardless, more research clearly needs to be conducted to determine the influence of gender on the relationship between exposure to intimate partner violence and externalizing behavior, and aggressive behavior specifically.

In addition to being exposed to intimate partner violence, adolescents are frequently victims of child maltreatment. National estimates of maltreatment for adolescents include 28.4% for physical assault, 11.8% for physical neglect, and 4.5% for sexual abuse (Hussey, Chang, &
Kotch, 2006). It is important to study both exposure to intimate partner violence and child maltreatment as they frequently co-occur. In a review of the literature, intimate partner violence and child physical abuse is conservatively estimated to co-occur 40% of the time (Appel & Holden, 1998). While there are differences in terms of the strength of the relationship, largely due to differences in sampling characteristics, studies consistently show that youth exposed to intimate partner violence are at increased risk for child maltreatment (Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008). These studies highlight the importance of assessing for both intimate partner violence and child maltreatment when examining adolescent exposure to family violence.

Exposure to child maltreatment is associated with many negative adolescent sequelae including aggressive behavior. Using a national longitudinal sample, supervisory neglect, physical neglect, physical assault, and sexual abuse, were all associated with adolescent physical violence (Hussey et al., 2006). In a review of the literature of youth exposure to violence, aggression and other externalizing problems were identified as negative outcomes that often occur after exposure to both child maltreatment and intimate partner violence (Margolin & Gordis, 2000). Exposure to child maltreatment, intimate partner violence, or dual exposure (i.e. both child maltreatment and intimate partner violence) in childhood increased adolescent risk of externalizing problems (Moylan et al., 2010). When specifically examining aggressive behavior, only dual exposure was associated with aggressive behavior after accounting for related factors including gender, race, age, and parental personal problems (Moylan et al., 2010). In another study, the impact of witnessing intimate partner violence and physical abuse victimization on adolescent behavior was examined (Bourassa, 2007). Analyses showed that adolescents who both witnessed intimate partner violence and were physically abused had greater externalizing
problems than adolescents who only witnessed the violence (Bourassa, 2007). In turn, adolescents who witnessed intimate partner violence had greater externalizing problems than adolescents who neither witnessed intimate partner violence nor were physically abused (Bourassa, 2007).

One type of child maltreatment, psychological violence (also called emotional abuse, verbal violence, psychological abuse), has received less attention than other forms of maltreatment yet research shows that it is also associated with negative outcomes. For example, after taking into account other forms of maltreatment, psychological violence was associated with both PTSD symptomatology and dating violence for child protective services-involved youth (Wekerle et al., 2009). When examining child behavior problems at age 4 and 6, child psychological aggression victimization, minor physical violence victimization, witnessing psychological aggression, and witnessing physical aggression were all associated with child aggressive behavior (Litrownik, Newton, Hunter, English, & Everson, 2003). Ultimately this body of research shows that exposure to family violence is broadly associated with externalizing problems, including aggression. The goal of future research then is to better understand the mechanisms through which this relationship exists.

Social learning theory (Bandura, 1973) provides one potential framework to understand how exposure to violence leads to later aggression. In addition to direct learning from experience, social learning theory states that individuals can learn by observing others who model specific behaviors. Therefore, adolescents who are observing family violence may be learning that aggression is an appropriate way to resolve conflict. According to this model, adolescents exposed to family violence would be more likely to engage in their own aggressive behavior. Indeed, research supports the social learning explanation of the intergenerational
transmission of violence for both boys and girls (e.g. Foshee, Bauman, & Linder, 1999; Snethen & Van Puymbroeck, 2008). Using social learning theory as a theoretical basis for this study, exposure to family violence consisting of aggressive acts that can be directly observed and modeled by adolescents is hypothesized to predict later aggressive behavior.

**Posttraumatic stress and Aggression**

Family violence often leads to posttraumatic stress reactions in youth (for reviews see Margolin & Vickerman, 2007; Kearney, Wechsler, Kaur, & Lemos-Miller, 2010). For example, a meta-analysis of the effects of intimate partner violence found a large effect size for the relation between exposure to intimate partner violence and trauma symptoms (Evans et al., 2008). However, posttraumatic stress is not the only effect of violence exposure. Broadly, exposure to trauma is associated with many different reactions including changes in affect and impulse regulation, alterations in relations with others, and alterations in self-perception (van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). Thus aggression can be understood as one potential posttraumatic reaction in addition to posttraumatic stress. The question then becomes, how are exposure to violence, posttraumatic stress, and posttraumatic aggression related?

Generally, the relationship between exposure to violence and aggression appears to be mediated by posttraumatic stress symptoms. Examining trauma exposure more broadly, Marsee (2008) examined how adolescent reactions to Hurricane Katrina could lead to reactive aggression. The study demonstrated that the association between exposure to Hurricane Katrina and reactive aggression was mediated by PTSD symptoms and emotion dysregulation (Marsee, 2008). In a study examining dating aggression in undergraduate students, trauma exposure (e.g. physical and sexual abuse, natural disasters, motor vehicle accidents) had an indirect relationship on physical dating aggression via PTSD symptoms (Taft, Schumm, Orazem, Meis, & Pinto,
2010). Taken together, these two studies suggest that posttraumatic stress symptoms mediate the relationship between broad exposure to trauma and aggression.

The same pattern of findings is found when specifically examining exposure to family violence. Using a sample of adult men and their partners, the influence of exposure to family violence on relationship abuse perpetration was examined and several mediators, including PTSD symptoms, were assessed (Taft, Schumm, Marshall, Panuzio, & Holtzworth-Munroe, 2008). Of the trauma measures, only childhood parental rejection and adult trauma exposure, not childhood exposure to intimate partner violence or childhood physical abuse, were associated with PTSD symptoms (Taft et al., 2008). These PTSD symptoms were then directly associated with physical abuse perpetration (Taft et al., 2008). Measurement of PTSD symptoms was important as none of the exposure to violence factors were directly associated with abuse perpetration (Taft et al., 2008). In a separate study, the relationship between child maltreatment and dating violence perpetration during adolescence was mediated by trauma-related symptoms, but was not mediated by attitudes justifying dating violence or empathy and self-efficacy in dating relationships (Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004). PTSD symptoms also mediated the relationship between psychological violence and adolescent dating violence (Wekerle et al., 2009). These studies clearly demonstrate the importance of posttraumatic stress in understanding aggressive behavior.

Posttraumatic symptoms were included in the structural model of this study to examine the mediating role they play in understanding the development of aggressive behavior. In particular, this study examined whether posttraumatic stress negatively impacted social skills, which subsequently impacted aggressive behavior. Relevant research to this area will be examined, but first social competence and social skills will be outlined and described.
Social Competence and Social Skills

Social skills are the primary interest of this study, yet little research has been conducted on social skills and the related construct of social competence. Indeed, sometimes these two constructs are used interchangeably, but a distinction between them will be drawn here. Sroufe, Cooper, and Dehart (1996, p. 378) defined social competence as “a child’s ability to engage and respond to peers with positive feelings, to be of interest to peers and be highly regarded by them, to take the lead as well as follow, and to sustain the give-and-take of peer interaction.” Youth with good social competence will engage in cooperative and pro-social behavior, initiate and maintain peer friendships, and successfully manage conflict with others (Squires, 2002).

Social competence is an important construct to examine as it is related to other important outcomes. For example, social competence in early childhood predicts externalizing behaviors during late childhood and middle adolescence (Bornstein, Hahn, & Haynes, 2010). Earlier prosocial behavior is predictive of better academic achievement and social ratings by peers, whereas earlier aggression is not associated with either of these outcomes (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000). Thus, while social competence may be associated with aggression, these two constructs appear to be differentially related to outcomes, supporting the distinction between the two latent constructs. In addition, reviews of adolescent resilience literature typically highlight social competence and functioning as important individual resources that protect against negative outcomes such as aggressive behavior, substance use, and risky sexual behavior (e.g. Fergus & Zimmerman, 2005; Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003).

Social competence can be described as a construct composed of social adjustment, social performance, and social skills (Cavell, 1990). Social skills refer to “specific abilities that enable
one to perform competently within social tasks” (Cavell, 1990, p. 118). Social skills are thought to consist of overt social behaviors, social cognitive skills, and emotion regulation skills (Cavell, 1990). According to Michelson, Sugai, Wood, and Kazdin (1983), important elements of social skills include: they are learned, composed of specific verbal and non-verbal behaviors, include initiations and responses, optimize social reinforcement, interactive, influenced by personal attributes and context, and can be targeted for interventions.

In a review of studies that examined the factor structure of youth social skills, five behavioral dimensions occurred consistently (Caldarella & Merrell, 1997). These five behavioral dimensions were labeled: Peer Relations, Self Management, Academic, Compliance, and Assertion. The Peer Relations dimension is composed of behaviors such as complimenting or praising peers, offering help to peers when needed, inviting peers to play, and participating in extended talks with peers. The Self Management dimension is composed of behaviors such as remaining calm when problems arise, following rules, compromising with others when appropriate, and receiving criticism well. The Academic dimension is composed of behaviors such as completing tasks or assignments independently, listening to and following teacher instructions, and producing work at an acceptable quality. The Compliance dimension includes behaviors such as following instructions or directions, following rules, appropriately using free time, and sharing toys or belongings. Lastly, the Assertion dimension includes behaviors such as initiating conversations with others, acknowledging compliments from others, inviting peers to play, and saying or doing nice things for oneself. As is apparent, there is some overlap between the dimensions and the behaviors that map onto each.

Social skills appear to mediate the relation between family factors and peer relationships for adolescents (Engels, Deković, & Meeus, 2002). These family factors include parental
responsiveness, autonomy, cohesion, and parental attachment (Engels et al., 2002). Aspects of peer relationships affected include the degree of peer activity, attachment to peers, and perceived social support from peers (Engels et al., 2002). Thus, there is evidence that family factors directly impact adolescent social skills and that these social skills in turn impact how adolescents interact with others. As previously stated, the primary interest for this study is the influence of social skills. However, because limited research has examined how social skills explain the link between exposure to violence and aggression, the social competence literature will also be examined.

**Aggression, Social Competence, and Social Skills**

The social skills deficit model is a useful way to understand the development of aggression. The social skills deficit model states that negative behaviors, including aggression, are the result of a lack of skills needed to competently negotiate conflict and influence peers. This model is based on work by Crick and Dodge (1994) who stated that biases in social information processing lead to behaviors that influence interactions with peers. It is theorized that different components of the model, including causal and intent attributions, arousal regulation, response evaluation, and outcome expectations, all impact how successfully youths navigate social situations.

Also supporting the centrality of social skills in the perpetration of aggression is the popularity of social skills training (SST) as a useful treatment for youth aggression. As outlined by Nangle, Erdley, Carpenter, and Newman (2002), SST is based on the social skills deficit model and assumes that aggression is often an outcome of youths not possessing the skills necessary to competently negotiate conflict and influence peers. SST often teaches social skills such as effective cooperation and communication through instruction, modeling, and role
playing. Other interventions based on cognitive-behavior skills training, which places a greater emphasis on changing maladaptive cognitions, have also been demonstrated to reduce aggression.

One example of this type of intervention is social problem-solving skills (SPSS) training as created by Spivak and Shure (1974). This treatment was supported by Kazdin, Esveldt-Dawson, French, and Unis (1987), who conducted SPSS training with older children who were hospitalized for severe antisocial behavior including aggression. Kazdin and colleagues (1987) provided individualized instruction in problem-solving skills that were then practiced in session using modeling, role playing, corrective feedback, and social reinforcement. Compared to nondirective relationship therapy and an attention placebo control, SPSS resulted in significantly reduced aggression and overall behavior problems at home and at school, as well as increased prosocial behavior and overall adjustment, both immediately post-treatment and at 1-year follow-up (Kazdin et al., 1987).

Interventions that target social competence have been found to reduce youth aggressive behavior. For example, a school-based study that sought to promote social competence by increasing children’s social information-processing and emotion regulation skills had lower posttest social and overt aggression scores and higher ratings of social competence compared to a control group (Fraser et al., 2005). Thus, improving a child’s social-emotional skills appears to produce beneficial decreases in aggressive behavior. Another intervention called Second Step, which similarly targets social competence through empathy, social problem solving skills, and anger management, found posttreatment decreases in physical aggression, verbal hostility, and increases in prosocial behavior (Frey, Hirschstein, & Guzzo, 2000).
The mediating and moderating effects of social competence on behavior problems was examined with an intervention called Aggression Replacement Training (ART) that aimed to increase social competence in Norwegian children (Langeveld, Gundersen, & Svartdal, 2012). Findings of the study demonstrated that an increase in social competence mediated the relationship between the intervention and decreased behavior problems post-treatment (Langeveld et al., 2012). This study also examined potential moderators of the intervention effects. The results demonstrated that pre-treatment social competence and behavior problems acted as a moderators, where children with high levels of pre-treatment behavior problems and low levels of pre-treatment social competence benefitted the most from the intervention (Langeveld et al., 2012). This is not surprising, as these children had the most to benefit from the treatment, and the other children likely had restricted ranges in terms of total change possible. Gender was also examined as a moderator; girls had higher social competence and fewer behavioral problems at pre-test, although gender did not seem to greatly impact the effect of the intervention (Langeveld et al., 2012). These findings support the examination of gender differences in social skills and aggressive behavior as was conducted in this study.

**Exposure to Family Violence, Social Competence, and Social Skills**

As summarized in the previous section, social competence and social skills are related to aggression. The next question to be examined is whether exposure to family violence affects an individual’s social functioning or whether these processes largely operate independently of exposure to violence. Essentially the question is, will social skills mediate the relationship between exposure to family violence and aggression, or will the impact of social skill functioning be largely separate from exposure to family violence. Research does support the relationship between exposure to family violence and social competence. In a meta-analysis of
the effects of witnessing intimate partner violence, witnessing intimate partner violence was associated with social competence problems and this effect size was not found to differ compared to other outcomes, including internalizing problems, externalizing problems, and academic problems (Kitzmann et al., 2003). However, as stated previously there may be methodological problems with this meta-analysis that would encourage replication of the results before this relationship can be accepted with confidence.

In a review paper of the factors associated with aggression during adolescence and early adulthood, social-cognitive deficits and exposure to family violence were both identified as factors related to adolescent aggression (Dahlberg, 1998). Using a sample of African American mothers of Head Start children, exposure to community violence predicted lower levels of child social skills as rated with the Social Skills Rating System (SSRS; Gresham & Elliott, 1990), specifically the self-control and cooperation subscales (Oravecz, Koblinsky, & Randolph, 2008). In this study, intimate partner violence did not predict any of the social skills subscales (Oracecz et al., 2008). Altogether, there is a lack of research that has explicitly examined the relationship between exposure to family violence and adolescent social skills. What little research has been done with related constructs appears to be inconsistent. Therefore, more research needs to examine how exposure to family violence is temporally related to adolescent social skills.

Posttraumatic Stress, Social Competence, and Social Skills

Similar to the lack of research examining adolescent exposure to violence and social skills, little research has been conducted examining the relationship between posttraumatic stress and social skills or social competence. This is surprising given that social support has been identified as one of the most important factors determining the severity of posttraumatic stress post-trauma exposure (e.g. Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012; Guay,
Billette, & Marchand, 2006; Davis & Siegel, 2000; Bal, Crombez, Van Oost, & Debourdeaudhuij, 2003; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2008). Thus, while we know that social support is important to posttraumatic functioning, it is unclear how social functioning and posttraumatic stress are related to each other temporally. The few studies conducted in this area will be briefly reviewed.

Kaniasty and Norris (2008) compared two explanations for the associations between social support and PTSD symptoms with victims of a natural disaster in Mexico. The first explanation is called “social causation” where negative social environmental factors, such as low social support, contribute to the development of psychological problems including PTSD. The second explanation is termed “social selection theory” which states that mental disorders, such as PTSD, contribute to individuals having worsening social environments. Both explanations were ultimately supported although, only social causation was supported earlier in the study (6 to 12 months post-disaster), both social causation and social selection were supported mid-study (12 to 18 months post-disaster), and only social selection was supported at the end of the study (18 to 24 months post-disaster; Kaniasty & Norris, 2008). While this study did not measure social skills, the findings may generalize to social skills, which are important in acquiring social support (Engels et al., 2002, Riggio, Watring, & Throckmorton, 1993; Cohen, Sherrod, & Clark, 1986; Sarason, Sarason, Hacker, & Basham, 1985). Kaniasty and Norris’s (2008) findings suggest that social skills not only affect posttraumatic stress levels, but also are influenced by posttraumatic stress levels, showing a bidirectional relationship between the two constructs.

In addition to social support, posttraumatic stress is associated with interpersonal functioning. Adolescents exposed to trauma and who developed PTSD had more interpersonal problems than both adolescents exposed to trauma who did not develop PTSD and adolescents
who did not experience any trauma (Giaconia et al., 1995). Interpersonal psychotherapy has been successfully used to treat PTSD by targeting the interpersonal sequelae of PTSD (Bleiberg & Markowitz, 2005). As this type of therapy focused solely on interpersonal difficulties related to PTSD and resulted in a reduction of PTSD, this provides support for the strong association between PTSD and social processes. Thus, while posttraumatic stress appears to be related to social processes, it is unclear what the temporal relations are between these two constructs.

Only one previous study examining constructs similar to those in the present proposed study was found. Taft and colleagues (2008) examined PTSD symptoms and social information processing deficits as mediators of the relationship between exposure to family violence and later physical and psychological abuse perpetration using a sample of abusive men and their partners. Social information processing deficits were measured by having the participants determine the negative intentions of individuals in ambiguous vignettes as well as describe how they would solve interpersonally challenging situations. The responses were then rated by coders for competency and can be seen as an estimation of the participants’ social competency. The study demonstrated that PTSD symptoms were indirectly associated with physical abuse perpetration and psychological abuse perpetration via social information processing deficits (Taft et al., 2008). None of the family violence factors (intimate partner violence exposure, physical abuse victimization, and parental rejection) or adulthood trauma exposure were directly related to social information processing in this study (Taft et al., 2008).

It is hypothesized that the presence of posttraumatic stress symptoms can interfere with typical functioning, inhibiting adaptive responses to future stressors, and thus further promote maladjustment. Therefore, posttraumatic stress may interfere with later social skill functioning, which will then increase adolescent aggressive behavior. However, good social skill functioning
may also help reduce later posttraumatic stress levels by increasing an individual’s ability to have positive relationships with others. This reduction of posttraumatic stress will then result in a reduction of adolescent reduce aggressive behavior. This means that there are potentially bidirectional effects between these two constructs, both of which were examined in the present study. By better understanding how these two factors relate to each other and in turn aggressive behavior, interventions can be better tailored to target the important constructs.

**Ethnicity and Gender as Moderators**

While it is important to understand how exposure to family violence, posttraumatic stress, social skills, and aggressive behaviors are all related to each other, it is also important to examine whether these relationships are moderated by other factors. In particular, much of the research described already has found gender effects with these constructs. For example, there is some evidence that social learning theory of violence in childhood and adolescence is more salient for females than it is for males (Mihalic & Elliott, 1997). Previous research has shown that the relationship between exposure to violence and aggression is stronger for boys than it is for girls (Evans et al., 2008). Due to well documented gender difference in levels of posttraumatic stress, with girls reporting higher levels of posttraumatic post-violence exposure (e.g. Davis & Siegel, 2000; Tolin & Foa, 2006; Olff, Langeland, Draijer, & Gersons, 2007), the relationship between exposure to violence and posttraumatic stress is expected to be stronger for girls than boys. Additionally, based on previous research, social skills may be more strongly related to aggression for girls as opposed to boys (Weaver, Borkowski, & Whitman, 2008), although because this is not a well-documented effect it is unknown if this will be replicated.

Less research has been conducted on racial or ethnic differences related to the constructs in the proposed study. However, there is research to suggest that constructs such as posttraumatic
stress and exposure to family violence are influenced by racial and ethnic differences. For example, Roberts, Gilman, Breslau, Breslau, and Koenen (2011) examined racial and ethnic differences in constructs related to PTSD with the United States general population. These researchers found that Black adults had higher prevalence rates of PTSD than did Latino or White adults (Roberts et al., 2011). Child maltreatment exposure rates also differed by race and ethnicity; Black and Latino adults had higher rates of witnessing intimate partner violence than did White adults whereas Latino and White adults had higher rates of physical abuse victimization than did Black adults (Roberts et al., 2011). In addition, among adults exposed to trauma, Black adults had a higher risk of PTSD compared to White adults (Roberts et al., 2011).

When assessing children exposed to intimate partner violence, children of minority status had different risk and protective factors associated with posttraumatic stress compared to children of majority status (Graham-Bermann, DeVoe, Mattis, Lynch, & Thomas, 2006). For majority status (i.e. White) children, the best predictors for posttraumatic stress were maternal mental health and maternal low self-esteem (Graham-Bermann et al., 2006). However, for minority status (i.e. non-White) children, the best predictors were the amount of violence exposure, maternal low self-esteem, and coming from a low income background (Graham-Bermann et al., 2006). These findings indicate that racial-ethnic identification may moderate the relationship between trauma exposure and PTSD.

There may also be racial and ethnic differences with regards to adolescent aggression. Using a sample of adolescents in middle school (grades 6 to 8), aggression was found to be the highest for Black adolescents amongst the boys and for Latino adolescents amongst the girls (McLaughlin, Hilt, Nolen-Hoeksema, 2007). The only significant difference found for overt aggression was that Black boys had higher levels of aggression compared to Latino boys.
No other significant interactions with racial or ethnic differences and gender were found (McLaughlin et al., 2007). However, not all of the constructs being used may have racial or ethnic differences. Specifically, Jaffee and Gallop (2007) examined the first National Survey of Child and Adolescent Well-Being (NSCAW I) and found no racial or ethnic differences with regards to adolescent social skills. Despite this, enough of the constructs may be impacted by adolescent race or ethnicity to warrant further examination. Indeed, in a review of studies that examined the impact of stressors on mental health symptoms for youth, seventy-four percent of the studies examined found that race or ethnicity moderated this relationship (Grant et al., 2006). This study indicates the importance of including race and ethnicity as moderators, particularly given the lack of research conducted in this area involving the constructs of the proposed study. Given the lack of previous research examining the constructs in this study no specific hypotheses were made. Instead, adolescent gender and race were examined as moderators in an exploratory manner.

**Influence of informant**

The use of multiple informants for measuring psychopathology is important given the at times low agreement across informants. There is also evidence that inter-informant agreement differs by adolescent race and ethnicity. In one study examining agreement for the Achenbach behavior rating scales, White parents and adolescents had smaller difference scores for externalizing problems compared to Black, Hispanic, and Asian parent-adolescent dyads (Lau et al., 2004). When examining the difference scores, Black, Hispanic, and Asian adolescents reported more externalizing symptoms compared to their parents, whereas White parents reported more externalizing symptoms compared to their adolescents (Lau et al., 2004). In a separate study examining Dutch parent and adolescent scores with the Achenbach behavior
rating scales, discrepancy scores between the parent and adolescents predicted adverse adolescent outcomes, above the effects of the parent and adolescent individual scores (Ferdinand, van der Ende, & Verhulst, 2004). When examining the Aggressive Behavior scale specifically, parents and adolescent scores correlated at .53 for the overall sample (Ferdinand et al., 2004). In addition, difference scores on the Aggressive Behavior scale predicted later adolescent drug use (Ferdinand et al., 2004). Therefore, parent and adolescent agreement is strong with regards to adolescent aggressive behavior, however differences in scores do frequently occur and can indicate worse future functioning.

Informant differences can directly relate to exposure to violence and psychopathology. For example, a study by Lewis and colleagues (2010) found that youth reported more witnessed violence compared to their caregivers. However, caregivers reported more internalizing and externalizing behavior problems compared to the youth (Lewis et al., 2010). In addition, the association between witnessed violence and internalizing behaviors was greater when the information was caregiver-reported as opposed to youth-reported (Lewis et al., 2010). Furthermore, mothers appeared more aware of children’s externalizing problems, whereas children appeared more aware of their internalizing problems in a study of Israeli children (Sternberg, Lamb, Guterman, & Abbott, 2006). Contrary to the previous findings, the relationship between concurrent behavior problems and abuse group was strongest when children were the informants (Sternberg et al., 2006). It is the hope that by using both adolescent and caregiver ratings, a more balanced view of developmental processes can be examined.

As there is significant evidence supporting the use of multiple informants for rating behavior (for a review see De Los Reyes & Kazdin, 2005), the present study used both parent and adolescent reports of aggressive behavior. This allowed the examination of the influence of
informant source on the research findings. These comparisons were exploratory given the lack of informant research related to the specific factor interrelationships used in this study.

**Present Study**

This study had two primary components. The first component consisted of structural equation modeling that examined the interrelationships between exposure to family violence, posttraumatic stress, social skills, and aggressive behavior. This was analyzed longitudinally across three waves of data. There were four specific mediation models and an overall model that were tested:

1) The first model examined was called the base model (Model 1) and consisted of autoregressive effects (e.g., Wave 2 aggressive behavior regressed on Wave 1 aggressive behavior) and within-wave correlations. It was hypothesized that each of the factors would have significant autoregressive effects between each wave. In addition, for the within-wave correlations, it was hypothesized that: a) aggressive behavior and exposure to family violence would have a significant positive relationship at each wave; b) aggressive behavior and posttraumatic stress would have a significant positive relationship at each wave; c) aggressive behavior and social skills would have a significant negative relationship at each wave; d) exposure to family violence would have a significant positive relationship with posttraumatic stress at each wave; e) exposure to family violence would have a significant negative relationship with social skills at each wave; and f) posttraumatic stress would have a significant negative relationship with social skills at each wave.

2) The second model examined was called the traumatic stress mediation model (Model 2). This model hypothesized that Wave 2 (W2) posttraumatic stress would mediate the
The relationship between Wave 1 (W1) exposure to family violence and Wave 3 (W3) aggressive behavior, based on past research (e.g. Marsee, 2008; Taft et al., 2008). The relationships between these three factors were hypothesized to be positive.

3) The third model examined was called the social learning theory mediation model (Model 3). Based on social learning theory, it was expected that exposure to family violence would predict worse adolescent social skills as appropriate ways of interacting with others had not been learned. This decrease in social skills would then be associated with more aggressive behavior. Based on this theory, it was expected that W2 social skills would mediate the relationship between W1 exposure to family violence and W3 aggressive behavior. It was hypothesized that the relationship between exposure to family violence and social skills was negative. It was hypothesized that the relationship between social skills and aggressive behavior was negative. Lastly, it was hypothesized that the relationship between exposure to family violence and aggressive behavior was positive.

4) The fourth model that was examined was called the trauma impairment model (Model 4). Based on previous research (e.g. Taft et al., 2008), it was expected that the presence of posttraumatic stress would impair proper use of social skills, which would in turn lead to more aggressive behavior. Based on this research, it was hypothesized that W2 social skills would mediate the relationship between W1 posttraumatic stress and W3 aggressive behavior. It was hypothesized that the relationship between posttraumatic stress and social skills was negative. It was hypothesized that the relationship between social skills and aggressive behavior was negative. Lastly, it was hypothesized that the relationship between posttraumatic stress and aggressive behavior was positive.
5) The fifth model that was examined was called the social skills buffering model (Model 5). Based on previous research (e.g. Kaniasty & Norris, 2008) it was hypothesized that better social skills would lead to less posttraumatic stress, which would in turn help prevent aggressive behavior. Based on this research it was hypothesized that W2 posttraumatic stress would mediate the relationship between W1 social skills and W3 aggressive behavior. It is hypothesized that the relationship between social skills and posttraumatic stress was negative. It was hypothesized that the relationship between posttraumatic stress and aggressive behavior was positive. Lastly, it was hypothesized that the relationship between social skills and aggressive behavior was negative.

6) The final model took all of the pathways outlined in the previous 5 models and examined them simultaneously in an overall model (Model 6). This overall model allowed for direct comparisons of the different models. As these different models have never been examined simultaneously before in the literature, it was not known how the strength of these pathways would change. Put differently, there is no a priori evidence to suggest that any particular mediation model would provide a significantly better fit to the data. As the mediation models did not hypothesize conflicting relationships between the factors, it is hypothesized that all the pathways would be significant and in the directions outlined in the previous model hypotheses.

This first component of the study was an examination of how these constructs are associated with each other using the overall sample. The analyses were conducted twice to examine the influence of the informant on the findings. The analyses were run once with parent-rated aggressive behavior as part of the model and once with adolescent-rated aggressive behavior as part of the model. The second component of the study was an examination of potential
moderators of these relationships. Specifically, adolescent race and gender were examined as potential moderators using multiple regression. Multiple regression was used instead of the structural equation modeling due to limitations in sample size that would result in underpowered models. These analyses were exploratory as little research has examined cultural differences regarding the factors included for this study.

Methods

Participants

This study used participants from NSCAW II. NSCAW II is a national longitudinal study of families who came into contact with the child welfare system within a 15-month window, starting in February 2008. A total of 5,872 children from the age of birth until the age of 17.5 were recruited as part of the study. All of these children came from families investigated by child protective services (CPS). Baseline data collection began in March 2008 and was completed in September 2009. The second wave of data was collected 18 months after the close of the NSCAW II index investigation. The third wave of data was collected approximately 36 months after the close of the NSCAW II index investigation. Detailed information about sampling strategies used can be found elsewhere (e.g. Dowd et al., 2014; Dolan, Smith, Casanueva, & Ringeisen, 2011).

Participants for the study consisted of 583 adolescents 11 to 14 years old who participated in the second National Survey of Child and Adolescent Well-Being (NSCAW II). The age restriction from 11 to 14 was made as this age marks the onset of early adolescence and measures such as posttraumatic stress symptoms were not collected until the age of 11. By limiting the analyses to one developmental period (early adolescence), the effects will not be confounded by developmental effects. The mean adolescent age for this sample was 12.34
(SD=1.13) and the breakdown of age was as follows: 155 adolescents are age 11, 140 adolescents are age 12, 144 adolescents are age 13, and 144 adolescents are age 14. In addition, the adolescents were restricted in terms of racial and ethnic identification. Only adolescents who were identified as Black and non-Hispanic or Latino (henceforth referred to as Black; n=181), Hispanic or Latino of any race (henceforth referred to as Latino; n=159), or White and non-Hispanic or Latino (henceforth referred to as White; n=243) were used in the study. The inclusion of racial and ethnic identification allowed for exploratory analyses to be conducted to determine their possible role as moderators for the factors of interest. Other racial-ethnic groups were too small to be analyzed based on the power analysis (discussed later) and were thus not included in the analyses. Overall, 52.3% of the adolescents (n=305) were female.

**Measures**

Below is a description of the measures used in this study. Cronbach alpha values for all of these measures separated by wave and adolescent race are displayed in Table 1. All Cronbach alpha levels were greater than .80, indicating good internal consistency for all measures at all waves.

**Demographics.** Adolescent age, gender, race, and ethnicity were all reported by the adolescent and verified by the adolescent’s parent. Adolescent SES was measured with parental responses, where a value of 1 was given to adolescents who lived in a household above the federal poverty level and a value of 0 was given to adolescents who lived in a household below the poverty level.

**Exposure to family violence.** Exposure to family violence was measured with the Violence Exposure Scale for Children (VEX-R; Fox & Leavitt, 1995). The validity of the VEX-R was supported by its ability to discriminate between low-violence and high-violence school
communities (Raviv, Raviv, Shimoni, Fox, & Leavitt, 1999). Children who reported more exposure to violence with the VEX-R also reported higher levels of emotional distress (Raviv et al., 1999). Similarly, greater exposure to violence as rated with the VEX-R was associated with higher levels of distress symptoms in a sample of older children in foster care (Stein et al., 2001). The VEX-R uses a 4-point Likert scale and the intensity of the violence was scored as ‘Never’ = 0, ‘One Time’ = 1, ‘A Few Times’ = 2, and ‘A Lot of Times’ = 3. The VEX-R assesses both violence in the home as well as criminal behavior in the home (e.g. witnessing adults selling drugs, witnessing adults stealing things). For the proposed study only the items related to violence in the home were of interest. Accordingly, an index was created of whether the adolescent saw or experienced in their home: an adult throwing an object, pushing or shoving, slapping, beating-up, pointing a knife or gun, stabbing, or shooting another individual. The index was the mean intensity score for the listed items. This approach is consistent with past research that has similarly only examined the violence items of the VEX-R (e.g. Coohey, 2010).

**Posttraumatic stress symptoms.** Posttraumatic stress symptoms were measured with the Trauma Symptom Checklist for Children – PTSD section (TSCC-PTSD; Briere, 1996). The TSCC-PTSD scale contains 10 items that ask whether specific PTSD symptoms happen to the youth. The TSCC-PTSD scale is scored with a 4-point Likert-type scale (0 = never, 1 = sometimes, 2 = lots of times, 3 = almost all of the time). The TSCC was normed on a sample of 3008 racially and economically diverse youth (Briere, 1996). A review of the literature indicates that the TSCC is an excellent measure that demonstrates high internal consistency, strong construct validity, convergent and discriminant validity, and criterion validity (Strand, Sarmiento, & Pasquale, 2005). In the present study, PTS raw scores were converted to $T$-scores
using the look-up tables in the Normative Data (Raw- to T-score Conversions) for TSCC Scales and Subscales chart (Briere, 1996).

**Social skills.** Social skills were assessed using the Social Skills Rating System (SSRS) Social Skills Scale (Gresham & Elliot, American Guidance Service, 1990). This scale was completed by the child’s caregiver. Children over the age of 11 were assessed with the Secondary Level version of the questionnaire. The Social Skills Rating System (SSRS) was created by Gresham and Elliot (1990) and assesses behaviors that impact parent-child relations, teacher-student relations, and peer relations. The overall form is separated into 3 different scales: Social Skills, Problem Behaviors, and Academic Competence. For the NSCAW study, only the Social Skills scale was measured. In a review of best-practices for evaluating social skills, the Social Skills Rating System (SSRS) was a recommended measure to use given its good psychometric properties (Merrell, 2001).

**Aggressive behavior.** Aggressive behavior was assessed with both the caregiver and the adolescent’s perspective using the Achenbach System of Empirically Based Assessment (ASEBA). Caregivers rated adolescent aggressive behavior using the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) Aggressive Behavior Scale. Adolescents self-rated their aggressive behavior using the Youth Self-Report (YSR; Achenbach, Achenbach & Rescorla, 2001) Aggressive Behavior Scale, which was completed by adolescents 11 years old or older. The YSR and CBCL both have good 1-week test-retest reliabilities in the .80s and .90s, specifically .90 for the CBCL Aggressive Behavior scale and .88 for the YSR Aggressive Behavior scale (Achenbach & Rescorla, 2001). The cross-informant agreement for the CBCL and YSR Aggressive Behavior scale is moderate, with $r$ equaling .52 (Achenbach & Rescorla, 2001). The CBCL has good stability over longer periods, the Aggressive Behavior scale has a
12-month \( r \) of .82 and a 24-month \( r \) of .81 (Achenbach & Rescorla, 2001). The YSR has moderate stability over longer periods with a 7-month \( r \) of .55 for the Aggressive Behavior scale (Achenbach & Rescorla, 2001).

**Data Analytic Plan**

**Power analysis.** A power analysis was conducted to determine the minimum sample required for the structural equation modeling using Preacher and Coffman’s (2006) RMSEA online calculator. Given an alpha level of .05, .80 power, a null RMSEA of .05, an alternative RMSEA of .08, and 37 degrees of freedom, the minimum sample size is 267 participants. For multiple regression, G*Power Version 3.1.9.2 was used to determine the necessary sample sizes. With a medium effect size (\( f^2 = .15 \)), \( \alpha = .05 \), power = .80, and 11 predictors, the minimum sample size is 123 participants.

**Statistical analyses.** Structural equation modeling was conducted consistent with Cole and Maxwell (2003) who outlined a series of modeling steps to determine evidence of longitudinal mediation. As this study only had 2 factors per latent construct for exposure to family violence and aggressive behavior, it was decided that path analysis would be conducted given documented difficulties with model stability when conducting structural equation modeling using factors with only 2 indicators (e.g., Ding, Velicer, & Harlow, 1995). The influence of informant bias was examined by conducting the model separately with both the parent-rated CBCL Aggressive Behavior and the adolescent-related YSR Aggressive Behavior. The exposure to family violence factor was comprised of the adolescent’s rating of witnessed and experienced physical violence in the home using the VEX-R. The posttraumatic stress factor was comprised solely on the adolescent’s TSCC-PTSD score. The social skills factor was comprised of the parent’s rating of adolescent social skills using the SSRS.
Structural equation modeling was conducted with a series of 6 models. First, a base model (Model 1) was examined consisting of autoregressive effects (e.g., Wave 2 aggressive behavior regressed on Wave 1 aggressive behavior) and within-wave correlations (see Figure 1). This model allowed for the examination of stability and same-wave interrelationships of the different factors over time. This model also served as the comparison model to determine whether the mediation models provide an improved fit to the data. Next, the mediation models were examined. These models used the base model and examined a specific longitudinal mediation relationship. In the mediation model figures, the covariances and pathways used in the base model are not shown for visual clarity but these pathways will be included in the statistical analyses. The four mediation models examined were: the traumatic stress mediation model (Model 2; see Figure 2), the social learning theory mediation model (Model 3; see Figure 3), the traumatic stress impairment model (Model 4; see Figure 4), and the social skills buffering model (Model 5; see Figure 5). The figures provided label pathways consistent with mediation analyses (e.g. Baron & Kenny, 1986). Specifically the pathways from the independent (also known as causal) variable (i.e. X) to the mediator (i.e. M) is labeled ‘a’. The pathways from the mediator (M) to the outcome variable (i.e. Y) is labeled ‘b’. The pathway from the independent variable (X) to the outcome variable (Y) is labeled ‘c’. Lastly, the pathways of these four separate mediation models were combined into an overall model (Model 6; see figure 6) to see if this model provides an improved fit to the data and to examine which pathways remain significant when the different mediation models were examined simultaneously.

Model fit was determined with fit indices including the root mean square error of approximation (RMSEA; Steiger, 1990), the standardized root mean square residual (SRMR; Bentler, 1995), the Bentler comparative fit index (CFI; Bentler, 1990), and the Tucker-Lewis
Index (TLI; Tucker & Lewis, 1973) which is also known as the Nonnormed Fit Index (NNFI). These indices of fit have been recommended by other researchers to assess structural equation models (e.g. Schermelleh-Engel, Moosbrugger, & Müller, 2003; Iacobucci, 2010). Recommended values for the fit indices based on common cutoff values (e.g. Schreiber, Nora, Stage, Barlow, & King, 2006; Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999; Schermelleh-Engel et al., 2003) are as follows: a non-significant $\chi^2$ $p$-value, a RMSEA value less than .05, a SRMR value less than .08, a CFI value higher than .95, and a TLI value higher than .95. To compare the different nested models, the Satorra-Bentler scaled chi-square difference test was used. Non-significant values indicate that the “smaller” model (i.e., the base model) is acceptable. Maximum likelihood estimation with robust standard errors was used as the estimation model for all structural equation modeling analyses.

As part of the exploratory analyses, multiple regressions were run with separate models for Black, Latino, and White adolescents in addition to the overall sample. The dependent variable for these multiple regressions was Wave 2 aggressive behavior. As both the parent and the adolescent rated the aggressive behavior, multiple regression models were run separately using both parent- and adolescent-rated aggressive behavior as the dependent variable. Therefore, a total of 8 multiple regression models were run. For example, one model was conducted for Black adolescents using the Wave 2 CBCL Aggressive Behavior scale as a dependent variable and another model was conducted with Black adolescents using the Wave 2 YSR Aggressive Behavior scale as a dependent variable. Predictors in the models included adolescent gender, SES, Wave 1 aggressive behavior (same informant), Wave 1 exposure to family violence, Wave 1 posttraumatic stress, Wave 1 social skills, and interaction terms for gender and exposure to violence, posttraumatic stress, and social skills.
Descriptive data and multiple regression analyses were analyzed using SPSS Version 22. All structural equation modeling was conducted using MPlus Version 3.0. Both the structural equation modeling and multiple regression analyses used weights that reflected the probability of selection and were adjusted for nonresponse and overcoverage across the three waves of data. Complete details regarding the weighting procedures can be found with Dowd and colleagues (2014).

Results

Descriptive information for the key variables for the overall sample, as well as separated by adolescent race, is presented in Table 2. Correlations between the key variables in the study for the overall sample and Black adolescents are presented in Table 3. Correlations between key variables in the study for Latino adolescents and White adolescents are presented in Table 4.

Structural Equation Modeling

CBCL Aggressive Behavior. Structural equation modeling was conducted for each of the 6 hypothesized models using the parent-rated CBCL Aggressive Behavior scale to measure adolescent aggression. Table 5 presents a summary of the fit indices for the 6 hypothesized models that included CBCL Aggressive Behavior. Figure 7 shows significant standardized coefficients for the CBCL Model 1 (base model). This model provided a strong fit for the data based on fit indices including the RMSEA, SRMR, CFI, and TLI values. In this CBCL Model 1, aggressive behavior had a moderate to strong negative relationship with social skills across the three waves of data. Both of these factors also had strong autoregressive relationships (e.g., Wave 2 aggressive behavior regressed on Wave 1 aggressive behavior) across the three waves of data. Exposure to violence had a moderate positive relationship with posttraumatic stress across the three waves of data. These two factors had moderate autoregressive relationships across the
three waves of data. Wave 1 exposure to family violence had a small negative relationship with Wave 1 social skills. A similar relationship was not significantly present for Waves 2 or 3. Wave 1 aggressive behavior had a small positive relationship with Wave 1 posttraumatic stress. This relationship was not present for Waves 2 or 3. No significant relationship was present between exposure to family violence and aggressive behavior at any wave. All of these effects were in the hypothesized directions.

Figure 8 shows the significant standardized pathways for the CBCL Model 2 (traumatic stress mediation model). Similar to CBCL Model 1, results supported the same autoregressive and within-wave correlations. None of the hypothesized mediation pathways were significant. Figure 9 shows the significant standardized pathways for the CBCL Model 3 (social learning theory mediation model). The results were similar to CBCL Model 1 and none of the hypothesized mediation pathways were significant. Figure 10 shows the significant standardized pathways for the CBCL Model 4 (traumatic stress impairment model). The results were similar to CBCL Model 1 and none of the hypothesized mediation pathways were significant. Figure 11 shows the significant standardized pathways for the CBCL Model 5 (social skills buffering model). The results were similar to CBCL Model 1 and none of the hypothesized mediation pathways were significant. Figure 12 shows the significant standardized pathways for the CBCL Model 6 (overall model). The results were similar to CBCL Model 1 and none of the hypothesized mediation pathways were significant. Based on the fit indices, including the AIC, BIC, SSBIC, and Satorra-Bentler scaled chi-square difference test scores, the CBCL Model 1 provided a better fit to the data compared to CBCL Models 2 through 6.

**YSR Aggressive Behavior.** Structural equation modeling was again conducted with the 6 models, this time using with the adolescent-rated YSR Aggressive Behavior Scale as a measure
of adolescent aggression as opposed to the parent-rated CBCL Aggressive Behavior Scale. The other factors included in the model including the adolescent-rated exposure to family violence, the adolescent-rated posttraumatic stress symptoms, and the identical parent-rated social skills used in the CBCL models. Accordingly, relationships between these three factors remained relatively unchanged from the previous models.

This section will focus on highlighting the differences between the CBCL and YSR models. Table 6 shows the model fit results for the YSR structural equation models. Figure 13 shows the statistically significant standardized pathways for the YSR Model 1 (base model). This model was a good fit for the data based on the RMSEA, SRMR, and CFI values. However, the TLI value of .94 was just below the .95 cut-off score.

Examination of the significant pathways show that adolescent-rated aggressive behavior had moderate stability over time, which appeared slightly less stable across waves compared to parent-rated aggressive behavior used in CBCL Model 1. Other differences in the models were also noted. Specifically, adolescent-rated aggressive behavior had a moderate negative relationship with social skills at Wave 1 but at no other wave. This is contrasted with the consistent moderate negative relationship at each wave between parent-rated aggressive behavior and social skills. Instead, a significant positive moderate relationship between adolescent-rated aggressive behavior and posttraumatic stress was found at each wave. The relationship between parent-rated aggressive behavior and posttraumatic stress was small and only significant at Wave 1. Another important difference was that adolescent-rated aggressive behavior had a moderate to small positive relationship with exposure to family violence at Waves 1 and 2. The relationship between parent-rated aggressive behavior and exposure to family violence was not significant at
any wave. The other relationships between the factors were similar across models. All effects were in the hypothesized directions.

Figure 14 shows the significant standardized pathways for the YSR Model 2 (traumatic stress mediation model). The results were similar to YSR Model 1 and none of the hypothesized mediation pathways were significant. Figure 15 shows the significant standardized pathways for the YSR Model 3 (social learning theory mediation model). The results were similar to YSR Model 1 and none of the hypothesized mediation pathways were significant. Figure 16 shows the significant standardized pathways for the YSR Model 4 (traumatic stress impairment model). The results were similar to YSR Model 1 and none of the hypothesized mediation pathways were significant. Figure 17 shows the significant standardized pathways for the YSR Model 5 (social skills buffering model). The results were similar to YSR Model 1 and none of the hypothesized mediation pathways were significant. Figure 18 shows the significant standardized pathways for the YSR Model 6 (overall model). The results were similar to YSR Model 1 and none of the hypothesized mediation pathways were significant. Examination of the AIC, BIC, SSBIC, and Satorra-Bentler scaled chi-square difference test indicate that YSR Model 1 provided a better fit for the data compared to YSR Models 2 through 6.

**Multiple Regression Analyses**

Multiple regression analyses were conducted using SPSS Version 21 to examine racial and gender differences between the key Wave 1 predictors and Wave 2 aggressive behavior. The Wave 1 predictors used were Wave 1 aggressive behavior, adolescent gender, SES, Wave 1 exposure to family violence, Wave 1 posttraumatic stress, and Wave 1 social skills. In addition, interaction effects between adolescent gender and Wave 1 exposure to violence, posttraumatic stress, and social skills were examined to better determine the influence of gender on these
factors. These analyses were run separately for Black, Latino, and White adolescents in addition to the overall sample. The overall sample was included to allow more explicit comparisons between the different groups. Models were run with both Wave 2 CBCL Aggressive Behavior and Wave 2 YSR Aggressive Behavior as dependent variables for a total of 8 multiple regression analyses. All analyses were weighted using the same weighting variable used in the structural equation analyses.

**CBCL aggressive behavior.** The factors used in the analyses were examined for skewness and kurtosis and transformations were conducted as appropriate. Transformations included square root, log, and inverse transformations in order from least to most severe. The least severe transformation was used that obtained absolute values for skewness less than .80 and absolute values for kurtosis less than 3.0. For Black adolescents the following transformations were used: the square root of Wave 1 CBCL aggressive behavior and the square root of Wave 1 exposure to family violence as predictive factors with the log of Wave 2 CBCL aggressive behavior as the dependent variable. For Latino adolescents the following transformations were used: the log of Wave 1 CBCL aggressive behavior and the square root of Wave 1 exposure to family violence as predictive factors with the log of Wave 2 CBCL aggressive behavior as the dependent variable. For White adolescents the following transformations were used: the square root of Wave 1 CBCL aggressive behavior and the square root of Wave 1 exposure to family violence as predictive factors with the log of Wave 2 CBCL aggressive behavior as the dependent factor. Factors included in the models that were not mentioned were not transformed. Variance Inflation Factor (VIF) values were examined for indications of multicollinearity; all VIF values were less than 2.0, indicating that multicollinearity was not present in the models.
Table 7 shows the results of the multiple regression analyses using Wave 2 CBCL Aggressive Behavior as the dependent variable. The overall models predicted approximately the same amount of variance for Black and Latino adolescents \( (R^2 = .60\) and \(.65\) respectively) and predicted less variance for White adolescents \( (R^2 = .40\) and the overall sample \( (R^2 = .42\). This indicates that by using the overall sample, the models lost predictive power for Black and Latino adolescents. Results show that different predictive factors are associated with aggressive behavior depending on adolescent racial identification. For example, for Black adolescents, exposure to family violence was the strongest predictor of later aggressive behavior \( (\beta = -.23, p < .001)\) whereas for Latino adolescents, social skills were the strongest predictor of later aggressive behavior \( (\beta = -.33, p < .001)\). These factors would have effectively been hidden by the overall sample, whose strongest predictor was social skills \( (\beta = -.17, p < .001)\). Interaction terms between gender and exposure to family violence, posttraumatic stress, and social skills were then examined. Due to large degrees of freedom related to the weighting variable, all of the interaction effects were statistically significant. However, not all of the beta weight sizes for these interactions were large. Due to the large number of interaction effects, only interactions with beta weights greater than \(.10\) were graphed, although all interactions were visually examined.

First, interaction terms for Black adolescents were examined. Figure 19 shows the interaction between gender and exposure to family violence for Black adolescents. Based on this figure, at low levels of exposure to violence, male and female Black adolescents had similar levels of aggressive behaviors. However, at high levels of exposure to violence, aggressive behaviors increased for females and decreased for males. This effect is in the hypothesized direction for females (more exposure to violence predicting higher levels of aggression) but in
the opposite direction for males. Figure 20 shows the interaction between gender and social skills for Black adolescents. Based on this figure, social skills did not influence later aggressive behavior for males but increased social skills were associated with decreased aggressive behavior for females.

Next, interaction terms for Latino adolescents were examined. Figure 21 shows the interaction between exposure to family violence and aggressive behavior for Latino adolescents. Based on this figure, at low levels of exposure to violence, males and females had similar levels of aggressive behavior. At high levels of exposure to violence, aggressive behavior increased for males and decreased for females. There was a hypothesized positive relationship between exposure to family violence and social skills, consistent with the results for Latino adolescents but opposite to the results for Latina adolescents. Figure 22 shows the interaction between gender and social skills for Latino adolescents. Based on this figure, aggressive behavior remained constant for Latino females regardless of how good their social skills were. This would not be expected based on the hypothesized negative relationship between social skills and aggressive behavior. However, for Latino males, aggressive behavior decreased as their social skills improved, consistent with the hypothesized relationship.

Interaction terms for White adolescents were then examined. Figure 23 shows the interaction between gender and posttraumatic stress for White adolescents. Based on this figure, posttraumatic stress predicted greater aggressive behavior for White females. This is consistent with the hypothesized positive relationship between posttraumatic stress and aggressive behavior. However, aggressive behaviors remained constant for White male adolescents regardless of level of posttraumatic stress. This is inconsistent with the hypothesized positive
relationship between posttraumatic stress and aggressive behavior. No interactions for the overall sample were greater .10 and thus were not graphed.

**YSR aggressive behavior.** Similar to the CBCL multiple regression models, multiple regression analyses were run for Black, Latino, and White adolescents, in addition to the overall sample, using YSR Wave 2 aggressive behavior as the dependent variable and including YSR Wave 1 aggressive behavior in the model. Otherwise the YSR multiple regression models were unchanged from the CBCL multiple regression models. Similar to the CBCL multiple regression models, the factors used in the analyses were examined for skewness and kurtosis and transformations were conducted as appropriate.

Transformations included square root, log, and inverse transformations in order from least to most severe. The least severe transformation was used that obtained absolute values for skewness less than .80 and absolute values for kurtosis less than 3.0. For Black adolescents the following transformations were used: the log of Wave 1 YSR aggressive behavior and the square root of Wave 1 exposure to family violence as predictive factors, with the log of Wave 2 YSR aggressive behavior as the dependent factor. For Latino adolescents the following transformations were used: the log of Wave 1 YSR aggressive behavior and the square root of Wave 1 exposure to family violence as predictive factors, with the log of Wave 2 YSR aggressive behavior as the dependent factor. For White adolescents the following transformations were used: the square root of Wave 1 exposure to family violence as a predictive factor and the log of Wave 2 YSR aggressive behavior as the dependent factor. Factors included in the models that were not mentioned were not transformed. VIF values were examined for indications of multicollinearity; all VIF values were less than 2.0, indicating that multicollinearity was not present in the models.
Table 8 shows the results of these YSR models. The YSR multiple regression model explained a similar amount of variance for Black adolescents ($R^2 = .58$) compared to the CBCL multiple regression model for Black adolescents ($R^2 = .60$). The YSR multiple regression model also explained a similar amount of variance for White adolescents ($R^2 = .40$) compared to the CBCL multiple regression model for White adolescents ($R^2 = .41$). The YSR multiple regression model explained less variance for Latino adolescents ($R^2 = .40$) compared to the CBCL multiple regression model for Latino adolescents ($R^2 = .65$). The overall sample remained relatively unchanged from the CBCL multiple regression model ($R^2 = .42$) to the YSR multiple regression model ($R^2 = .39$).

Racial differences existed for the predictors. Based on the YSR multiple regression analyses, previous aggressive behavior was moderately associated with later aggressive behavior for Latino adolescent and strongly associated with later aggressive behavior for Black and White adolescents. Similar to the CBCL multiple regression models, SES was moderately associated with later aggressive behavior for Latino adolescents, but not for Black or White adolescents. Adolescent social skills was the factor most related to adolescent-rated aggressive behavior for Black adolescents ($\beta = -.33, p < .001$). This is in contrast to the CBCL multiple regression analysis, where exposure to family violence was the factor most strongly associated with aggressive behavior for Black adolescents. Exposure to family violence was the factor most strongly associated with later aggressive behavior for Latino adolescents. For White adolescents, all of the factors were relatively weakly associated with later aggressive behavior, with the strongest factor being social skills ($\beta = -.15, p < .001$). For the overall sample, social skills were again the factor with the strongest relation to later aggressive behavior ($\beta = -.15, p < .001$).
Similar to the CBCL multiple regression models, interaction terms with beta weights greater than .10 were graphed to examine direction of the relationships.

First, the interactions for Black adolescents were examined. Figure 24 shows the interaction between gender and posttraumatic stress for Black adolescents. Based on this figure, high levels of posttraumatic stress were associated with reduced aggressive behavior for both males and females. However, aggressive behavior decreased more for female adolescents compared male adolescents. This relationship is in the opposite direction of the hypothesized positive relationship between aggressive behavior and posttraumatic stress. Figure 25 shows the interaction between gender and social skills for Black adolescents. Based on this figure, increases in social skills were associated with decreases in aggressive behavior for both males and females. However, this decrease was greater for female adolescents compared to male adolescents.

Next, the interactions for Latino adolescents were examined. Figure 26 shows the interaction between gender and exposure to family violence for Latino adolescents. Based on this figure, males and females had similar levels of aggressive behavior at low levels of violence exposure. However, high levels of violence exposure predicted more aggressive behavior for females compared to males. This finding was in the hypothesized direction of exposure to family violence predicting more aggressive behavior. Figure 27 shows the interaction between gender and posttraumatic stress for Latino adolescents. Based on this figure, male aggressive behavior was not impacted by posttraumatic stress severity level. Female aggressive behavior decreased as posttraumatic stress increased, opposite to the hypothesized positive relationship between aggressive behavior and posttraumatic stress. As none of the interaction terms were greater than .10 for White adolescents or the overall sample, no interaction terms were graphed.
Discussion

Structural equation modeling findings

Using structural equation modeling, multiple theoretical models that related to adolescent aggressive behavior were tested. Identical models were run for both parent-rated adolescent aggressive behavior (the CBCL models) and self-rated adolescent aggressive behavior (the YSR models) to examine the presence of informant-specific findings. These two series of models used the same exposure to family violence, posttraumatic stress, and social skills values and only differed in terms of who rated the aggressive behavior (i.e. parent or adolescent). The initial model analyzed was an autoregressive model that included within-wave correlations and served as a base model (Model 1) for both parent- and adolescent-rated aggressive behavior.

Examination of model results found similarities between the parent and adolescent base models. When examining the model fit indices, both the parent- and adolescent-rated base models fit the data well. Therefore, the significant Model 1 pathways were examined for both the parent- and adolescent-rated models. First, the autoregressive effects are discussed, which examined the factors regressed on their previous wave values (e.g., Wave 2 aggressive behavior regressed on Wave 1 aggressive behavior). For both the parent- and adolescent-rated models, aggressive behavior, exposure to family violence, posttraumatic stress, and social skills all had moderate to strong stability over time as measured with the autoregressive effects.

These findings regarding factor stability are consistent with previous research. For example, in a large longitudinal study of aggressive behavior during childhood, aggressive behavior was highly stable with genetic factors accounting for 65% of the variance in aggression (van Beijsterveldt, Bartels, Hudziak, & Boomsma, 2003). In another study examining developmental trajectories of physical aggression, youth aggression changed over time, although
children low in aggression typically remained low in adolescence, and children high in aggression typically remained high in adolescence (Brame, Nagin, & Tremblay, 2001).

Similarly, posttraumatic stress appears to be stable over time. In a study examining the course of PTSD in adolescents and young adults, 52% of the PTSD cases experienced remission over 34-50 months and 48% of PTSD cases showed no remission over this same time period (Perkonigg et al., 2005). Given the stability of these constructs, it is important for researchers to account for previous levels of functioning to better predict future functioning.

Another similarity between the parent- and adolescent-reported models was the small to moderate positive relationship between exposure to family violence and posttraumatic stress at each wave. This finding is consistent with meta-analyses that have consistently linked exposure to violence and other traumatic experiences to posttraumatic stress (e.g., Evans et al., 2008; Trickey et al., 2012). In addition, both models found a small but significant negative relationship at Wave 1 between posttraumatic stress and social skills. This relationship was not supported at Wave 2 or 3 for either the parent- or adolescent-rated models. Similar to the findings regarding posttraumatic stress, a small negative relationship between exposure to family violence and social skills was found at Wave 1, but not Wave 2 or 3, for both the parent- and adolescent-rated structural equation models. This is consistent with the literature that has found a negative relationship between family violence and social competence (Kitzmann et al., 2003). Therefore, the structural equation modeling provides some support for the relationship between posttraumatic stress and social skills and the relationship between exposure to family violence and social skills. Given that significant relationships between these factors were found for Wave 1 but for no other wave, future research should examine the relationships between these factors prior to early adolescence (the developmental stage participants were in at Wave 1). It may be
that these factors are mutually influenced to a greater extent in childhood as opposed to adolescence.

There also were significant differences between the parent- and adolescent-rated base models. For example, in the parent-rated Model 1, aggressive behavior was negatively related to social skills at all waves. This relationship was present for Wave 1 of the adolescent-rated Model 1 but not for Waves 2 or 3. Social skills were parent-rated regardless of the model used, indicating that some of the relationship between social skills and parent-rated aggressive behavior may be due to them both being rated by the same individual. Therefore, the hypothesis that social skills are related to adolescent aggression is strongly supported when assessed by parents but is less strongly supported when taking into account the adolescent’s perspective. In addition, the adolescent-rated Model 1 had consistent positive relationships between aggressive behavior and posttraumatic stress. This relationship was present for Wave 1 of the parent-rated Model 1, but not at Waves 2 or 3. This provides strong support for the relationship between aggression and posttraumatic stress from the adolescent’s perspective, but less support when using the parent’s view of adolescent aggression. Similarly, the adolescent-rated Model 1 had significant positive relationships between aggressive behavior and exposure to family violence for Waves 1 and 2, but not Wave 3. No significant relationship between these two factors was found for the parent-rated Model 1 at any wave. As exposure to family violence and posttraumatic stress were both adolescent-rated regardless of the model used, this again indicates the importance of taking the informant into account when examining relationships between factors.

Next, the mediation models (Models 2 to 6) were examined. These models hypothesized longitudinal relationships between the different factors. Contrary to the study hypotheses, none
of the parent- or adolescent-rated Models 2 through 6 had any significant pathways supporting the hypothesized mediation models. Indeed, Models 2 through 6 looked nearly statistically identical to Model 1 for both parent- and adolescent-report, demonstrating the low statistical influence of the hypothesized longitudinal relationships. This indicates that once autoregressive and within-wave correlations are accounted for, the predictive power of the exposure to family violence, posttraumatic stress, and social skills on later aggressive behavior is low. One potential explanation for these findings is that the time between each wave (18 months) was too long to find significant effects. There is some support for this, as the study completed by Kaniasty and Norris (2008), which found that posttraumatic stress and social support mutually predicted each other, had waves that were only 6 months apart. While the Kaniasty and Norris (2008) study used a different social construct and was conducted with adults, the shorter time between waves may be partially responsible for the lack of predictive relationships in the structural equation models. Future studies should examine these factors with smaller intervals to determine whether there are significant effects that are more time sensitive.

It is important for researchers to ensure that measurement invariance of the factors exists, particularly when these factors are examined with different groups and across multiple waves of data collection (Pentz & Chou, 1994). This study did not examine measurement invariance due to the insufficient sample size for the structural equation models when separated by adolescent race. Future studies should examine whether the factors used in this study were invariant across groups and time points. While the measures used in this study have frequently been used with diverse samples, measurement invariance has not often been examined. Additionally, research studies in which measurement invariance has been examined indicate that these measures may not be invariant across racial groups. For example, research examining the factor structure of the
Youth Self-Report (1991 version), found that a shorter version of the measure, with a different factor structure than the full length Youth Self-Report, was invariant across racial groups (O’Keefe, Mennen, & Lane, 2006). Interestingly, this study found that two of the seven factors supported by the exploratory and confirmatory factor analyses were physical aggression and verbal aggression (O’Keefe et al., 2006). This has important implications for the present study given the use of the Youth Self-Report, the use of adolescents from different racial groups, and the examination of overall aggressive behavior as opposed to aggression identified as verbal or physical aggression. Similar work should be investigated with the other measures included in this study.

One of the strengths of this study was the use of both parent- and adolescent-rated aggressive behavior. Each informant source contributed to the understanding of the relationships between the examined constructs. For example, by using parent-reported aggressive behavior, the relationship between social skills and aggressive behavior was highlighted. Using adolescent-reported aggressive behavior had been used, the relationships between exposure to family violence, posttraumatic stress, and social skills were highlighted. As a consequence, this study was able to support both the importance of social skills and the importance of trauma factors when examining adolescent aggression. As there presently does not exist a “gold standard” to objectively measure most psychological factors, including the ones used in this study, research must include multiple perspectives (i.e., informants) and attempt to integrate these perspectives to understand adolescent functioning as best as possible (De Los Reyes & Kazdin, 2005).

In addition to the use of multiple informants, this study also used multiple statistical methods to examine aggressive behavior. Multiple regression was used next to examine race and
gender effects among the different factors for both parent- and adolescent-reported aggressive behavior.

**Multiple regression findings**

The second component of the study examined how exposure to family violence, posttraumatic stress, and social skills were associated with later aggressive behavior, separated by adolescent race and probed for gender interaction effects. This component of the study found that there were frequently race and gender differences on the influence of the factors examined in this study. The factors differed depending on who rated the aggressive behavior and the direction of the effects were not always in the expected direction. Further discussion of the findings is provided below.

Overall, the multiple regression models explained from 40 to 60% of the variance of both parent- and adolescent-rated later aggressive behavior. The models explained more variance for Black adolescents than White adolescents and the overall sample regardless of who rated the aggressive behavior. The models explained more variance for Latino adolescents when aggressive behavior was parent-rated as opposed to adolescent-rated. These findings suggest that factors other than the ones included in this study may also influence later aggressive behavior, particularly for White adolescents, and Latino adolescents when using adolescent report. Future research should examine how other factors, including parent, peer, and school factors, influence aggressive behavior. For example, in a study using a nationally representative sample of adolescents, factors such as parental communication, social isolation and classmate relationships were associated with bullying across adolescent ethnicity (Spriggs, Ianotti, Nansel, & Haynie, 2007). However, other factors did differ by adolescent ethnicity. For White adolescents only, living with two biological parents was protective against bullying involvement (Spriggs et al.,...
In addition, school satisfaction and performance was negatively associated with bullying for Latino and White adolescents but not for Black adolescents (Spriggs et al., 2007). Understanding why these factors differ in their relationships across adolescent race is an important and understudied area of research.

Related to this, future research should also clarify why Latino parents and adolescents differed more than Black or White parents and adolescents in explaining later aggression. Very little research has examined concordance rates of parents and youth separated by race or ethnicity. However, previous researchers found that White parent-adolescent dyads had more concordance compared to Black or Latino parent-adolescent dyads on measures of perceived mental health, life satisfaction, happiness, interpersonal problems at home, and problems at school (Roberts, Algeria, Roberts, & Chen, 2005). As there is some support that parent-adolescent concordance differs by adolescent race, the question then becomes why these differences exist.

One potential explanation is the acculturation status of the parents, which was not examined in the present study. The importance of acculturation status on Latino adolescent health has been well established. For example, greater differences in acculturation for Latino parents and adolescents are associated with an increased risk of adolescent substance use, which is mediated by increases in family stress and decreases in effective parenting (Martinez, 2006). It is possible that Latino adolescents were more likely to have parents not born in the United States compared to Black or White adolescents. If this is true, then Latino parents with low acculturation status may see aggressive behavior differently compared to parents with high acculturation status. At this point, these hypotheses are merely speculation and future research should examine how factors such as acculturation status impacts agreement between informants.
When examining the specific factors that made up the multiple regression models, the findings show that previous parent- and adolescent-rated aggressive behavior scores were moderately to strongly associated with later aggressive behavior scores, regardless of adolescent race. This is consistent with the structural equation modeling findings that demonstrated aggressive behavior had moderate to strong stability across waves. Previous aggressive behavior was the strongest predictor of later aggressive behavior in this study and accordingly accounted for the greatest amount of statistical variance in the multiple regression models. Overall, this study supports that aggressive behavior is stable over time, consistent with past research (e.g., van Beijsterveldt et al., 2003; Brame et al., 2001).

Given the strong relationship between previous aggressive behavior and later aggressive behavior, this study strongly supports the need for studies to include previous levels of aggressive behavior as a control measure. Controlling for stability effects, such as previous levels of aggressive behavior, is presently seen as the gold standard in longitudinal developmental research (e.g., Adachi & Willoughby, 2015). While including these stability effects reduce the amount of variance that will be accounted for by other factors, even small effects can have clinical significance (Adachi & Willoughby, 2015). The multiple regression analyses found several moderate to small relationships between the different factors and later aggressive behavior, which will be discussed below.

SES was an important predictor of later parent- and adolescent-rated aggressive behavior scores for Latino adolescents but not for Black or White adolescents. However, the effect was in the opposite expected direction, with living above the federal poverty line being associated with an increase in later aggressive behavior for Latino adolescents. While most research has found negative relationships between SES and aggression (Grant et al., 2003; Scaramella, Neppl, Ontai,
& Conger, 2008), not all research has supported this relationship. When examining mental health functioning among low-income families, SES was positively associated with youth aggressive behavior, delinquency, and anxious/depressed symptoms, which was also opposite to the hypothesized relationship (Santiago, Wadsworth, & Stump, 2011). Therefore, the relationship between SES and externalizing behavior may not be as straightforward as originally believed. Instead, it is possible that a curvilinear relationship exists between SES and aggression where very low SES levels and very high SES levels are associated with less aggressive behavior and low to moderate SES levels are associated with more aggressive behavior. More research should be done to examine whether this might be the case.

The influence of exposure to family violence, posttraumatic stress, and social skills on later aggressive behavior differed both by who the informant was (parent or adolescent) and by adolescent race. In addition, the direction of these relationships were sometimes opposite to the hypothesized relationships. For example, exposure to family violence had a negative relationship with later aggressive behavior for Black and White adolescents when parent report was used. However, only positive relationships between exposure to family violence and later aggressive behavior were found when adolescent report was used, regardless of adolescent race. These are interesting findings, particularly given the lack of a significant relationship between exposure to family violence and parent-rated aggressive behavior in the structural equation models.

It is possible that parents of adolescents exposed to family violence rate the aggressive behavior as being less severe given the presence of worse aggression in the household. An alternate explanation is that parents perhaps downplay the aggressive behavior given the presence of clear stressors (i.e. family violence). Presently, these explanations are purely speculative, as little research has examined such causes. What is known is that parental and
adolescent factors impact ratings of behavior, including cross-informant agreement of symptoms. For example, maternal depression and stress is associated with ratings of adolescent externalizing and internalizing symptoms in addition to parent-adolescent score discrepancies (Youngstrom, Loeber, & Stouthamer-Loeber, 2000). A better understanding of the causal mechanisms between parental depression and stress to ratings of externalizing and internalizing symptoms could lead to better parent interventions for adolescents exposed to trauma.

The influence of posttraumatic stress on later parent-rated aggressive behavior was trivial. This is consistent with the parent-rated structural equation modeling, which found a small positive relationship between these two factors at Wave 1 only. The relationship between posttraumatic stress and adolescent-rated later aggressive behavior was trivial for the overall sample, Latino adolescents, and White adolescents. Black adolescents had a small negative relationship between posttraumatic stress and later adolescent-rated aggressive behavior. This effect was the opposite of the hypothesized direction, and not consistent with the moderate positive relationship between adolescent-rated aggressive behavior and posttraumatic stress in the structural equation modeling. It is possible that posttraumatic stress inhibits aggressive behavior for some subgroups, while increasing the risk for aggressive behavior in others.

Future research should examine what specific components of posttraumatic stress relate to an increase or decrease in aggressive behavior. For example, if using the criteria for PTSD based on the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; American Psychiatric Association, 2013), it is possible that some groups of individuals are more prone to negative alterations in cognitions or mood and some individuals are more prone to marked alterations in arousal and reactivity (hyperarousal). It has previously been demonstrated in a sample of veterans that hyperarousal symptoms were positively associated with aggression.
whereas avoidance and numbing symptoms were negatively associated with aggression (Taft et al., 2007). Research should clarify whether similar associations exist with adolescents and whether certain subpopulations of adolescents are more or less prone to meeting specific PTSD criteria.

Social skills had a consistent negative relationship with both parent- and adolescent-rated later aggressive behavior. Indeed, the relationship between social skills and later aggressive behavior was stronger and more consistent compared to exposure to family violence and posttraumatic stress. Given these findings and the structural equation modeling findings, this study provides strong support for using social skills as a point of intervention for later aggressive behavior. There was some variability in how strongly social skills were related to later aggressive behavior, particularly for Black parents and adolescents. Black parents had a trivial positive relationship between social skills and later aggressive behavior whereas Black adolescents had a moderate negative relationship between social skills and later aggressive behavior. This finding for Black parents is interesting given the consistent relationship between social skills and aggressive behavior in the structural equation models. It would be interesting to determine whether there are racial differences in the rating of social skills or in the self-rated importance of social skills on functioning.

While gender on its own was not strongly associated with later aggressive behavior, it often interacted with other factors to predict later aggressive behavior. The factors that gender interacted most strongly with depended on adolescent race. When examining the interaction effects, factors often had opposite relationships with later aggressive behavior depending on adolescent gender. For example, when examining the interaction between gender and exposure to family violence that predicted parent-rated later aggressive behavior for Black adolescents, high
levels of exposure to family violence was associated with more aggressive behavior for females but was associated with less aggressive behavior for males. These relationships are consistent with the hypothesized relationship (i.e., a positive relationship between exposure to family violence and aggressive behavior) for females, but the opposite of the hypothesized relationship for males. Similarly, when examining adolescent-reported aggressive behavior, high levels of posttraumatic stress were associated with more aggressive behavior for Latino males but less aggressive behavior for Latino females.

Other interaction effects found more change for females than for males. For example, with parent-rated aggressive behavior for Black adolescents, high levels of social skills were associated with a decrease in aggressive behavior for females but were not associated with a change in aggressive behavior for males. It may be that male aggressive behavior is less influenced by other factors. Indeed, previous research has shown that genetic influences on aggression were greater for boys and shared environmental factors influenced aggression more for girls (van Beijsterveldt et al., 2003). Such findings indicate that males would be less impacted by interventions that target contextual factors compared to females.

It is important for future studies to replicate these interaction effects before firm conclusions can be drawn. Based on the many different interaction effects found in this study, it appears likely that there is significant within-population heterogeneity regarding the relationships between these different factors. This indicates that future studies should examine both variable-centered analyses, such as structural equation modeling and multiple regression, in addition to person-centered analyses, such as growth mixture modeling. Variable-centered approaches take the assumption that the population is homogenous with regard to how predictors relate to outcomes (Laursen & Hoff, 2006). Person-centered approaches on the other hand, take the
assumption that the population is heterogeneous with regard to how predictors relate to outcomes (Laursen & Hoff, 2006). Therefore, person-centered approaches allow researchers to examine groups of individuals that are similar to each other, but dissimilar to other individuals within the same population. Given the different interaction effects found in this study, it would be interesting to determine whether specific classes of individuals could be identified and whether these classifications relate to adolescent race and gender.

These findings are the beginning of the examination of racial and gender effects for the factors included in this study. However, more work needs to be done to understand why cultural differences were found. It is presently not known what cultural factors are influencing these differences. This will be an important area for future research so that interventions can be tailored to accommodate or target these cultural factors. Future research should also be more specific regarding the race and ethnicity of the participants. For example, there are well-established differences between African Americans and Caribbean Americans, both of whom would be identified as Black (e.g., Joe, Baser, Breeden, Neighbors, & Jackson, 2006). Similarly, there is an incredible diversity of cultural experiences for individuals from Hispanic and Latino backgrounds that can impact mental health outcomes (Guarnaccia et al., 2007). As such, studies that target specific ethnicities will further our understanding of cultural influences of aggressive behavior.

**Clinical implications**

There are several clinical implications of the findings for this study. These clinical implications are discussed while acknowledging that this study did not examine causal relationships. First, as social skills were negatively associated with aggressive behavior, social skills interventions are likely to reduce aggressive behavior. This supports the substantial
literature demonstrating the effectiveness of social skills interventions on youth aggression (Nangle et al., 2002). However, social skills were generally only moderately associated with adolescent aggressive behavior, thus other factors should also be considered when implementing social skills interventions.

Second, as posttraumatic stress and exposure to family violence were associated with aggressive behavior, interventions for aggressive behavior should be trauma-informed, particularly for at-risk samples, such as the one used for the present study. This is consistent with the youth trauma literature that has supported an association between trauma exposure and aggressive behavior (e.g., Evans et al., 2008; Kitzmann et al., 2003; Margolin & Gordis, 2000). Articles, such as one written by Cohen, Berliner, and Mannarino (2010), detail how to conduct evidence-based treatments for trauma-exposed children who have co-occurring behavioral problems.

While not all aggressive adolescents have a trauma background, interventions targeting aggressive behaviors should assess for trauma exposure to examine the potential influence of previous life experiences on current functioning. Previous research shows that measures that assess trauma experiences better predicts adolescent girl offending compared to diagnostic measures of PTSD (i.e., did the adolescent meet partial or full criteria for PTSD; Smith, Leve, & Chamberlain, 2006). As such, adolescent self-rated experiences of trauma are likely to provide important information about later aggression, and should be routinely assessed prior to interventions targeting aggression. Given the overlap between PTSD hyperarousal symptoms and aggression (Taft et al., 2009), for some adolescents, targeting the trauma symptoms may reduce the severity of aggressive behaviors. Therefore, interventions for aggressive behaviors should be flexible in incorporating trauma-informed components to the adolescent when applicable.
A third clinical implication from this study’s findings is that multiple reporters should be used to determine adolescent functioning and progress in treatment. This is consistent with recommendations of treatment for oppositional defiant disorder, which includes aggression problems, for youth (Steiner & Remsing, 2007). Steiner and Remsing (2007) recommend including both parent and youth perspectives on the externalizing behavior, and additionally suggest that clinicians consider incorporating other informants to better determine functioning. While these authors acknowledge that it is difficult to know how to assimilate responses from different informants, particularly when the informants disagree, the benefits of having multiple sources of information outweigh the costs (Steiner & Remsing, 2007). Presently, assimilating information from different informants in a clinical setting is largely done with clinical judgment. Hopefully, in the future, research will better detail procedures for handling situations where informants disagree about factors such as adolescent aggression.

Lastly, as the findings in this study differed by adolescent race and gender, treatments for adolescent aggressive behavior should be sensitive to cultural factors and personal experiences. It is presently not well understood why the findings differed based on adolescent characteristics, but it is clear that adolescents should not be considered a homogenous group. This is consistent with treatment recommendations for flexibility within fidelity when completing evidence-based treatments with youth (Kendall & Beidas, 2007). For some adolescents, previous trauma experiences will be more related to their expression of aggressive behavior, and for others, their lack of good social skills will be more related to the aggressive behavior. While not studied here, it is expected that some adolescent behavior will be more strongly affected by other factors, such as peer influences. Researchers and clinicians need to carefully consider how diverse adolescent experiences are, and allow for this diversity when implementing interventions.
Overall conclusions

This study examined how adolescent aggressive behavior is influenced by exposure to family violence, posttraumatic stress, and social skills using structural equation modeling and multiple regression. These analyses were conducted cross-sectionally and longitudinally to determine how these different factors are related to each other. The analyses were conducted separately with parent- and adolescent-reported aggressive behavior to examine whether the results differed by informant. Lastly, the study explored race and gender effects to determine whether these factors moderated the examined relationships.

One of the novel components of this study was the examination of the influence of social skills on aggressive behavior. While social skills interventions have long been used to target aggressive behavior, relatively little research has been done on factors that relate to social skills. Overall, the positive influence of social skills on aggressive behavior was supported, although the strength of this relationship depended on the informant, adolescent race, and adolescent gender. In terms of other factors related to social skills, both exposure to family violence and posttraumatic stress were negative associated with social skills, but these relations were limited to Wave 1. It is presently not known whether these effects are time-limited and/or whether these effects have only a small effect size.

Contrary to the study hypotheses, no predictors of social skills were found, although this was only examined in the structural equation models. This finding is inconsistent with past research. Past research has shown that factors, such as contextual risk (a composite of risk factors including poverty, being an ethnic minority, living in a single parent household, etc.), directly relate to later social competence and indirectly relate to later social competence through parenting factors, such as parental warmth (Lengua, Honorado, & Bush, 2007). Other researchers
have found that parental factors such as adolescent attachment security and parental autonomy are associated with adolescent social competence (Allen et al., 2002). Given the connection between parental factors and adolescent social functioning, it is important for future research to better understand the differential influence of parental factors and different forms of family violence on adolescent social skills.

The influence of both exposure to family violence and posttraumatic stress on aggression was supported in this study, although again the strength of these relationships depended on the informant, adolescent race, and adolescent gender. Regardless, trauma is an important factor to consider when treating aggressive behavior. These findings are consistent with past research that has found that child maltreatment directly predicts dating violence perpetration and indirectly predicts dating violence perpetration via trauma symptoms (Wolfe et al., 2004). Attitudes towards domestic violence and empathy and self-efficacy were cross-sectionally related to dating violence perpetration but did not predict dating violence perpetration (Wolfe et al., 2004).

However, this previous study by Wolfe and colleagues (2004) used a composite of 10 different subscales of trauma symptoms (e.g., anger, anxiety, posttraumatic stress) and combined multiple forms of child maltreatment (e.g., emotional abuse, physical abuse, sexual abuse). As research in this area develops, it will be important to increase the specificity of the findings. For example, determining what specific types of trauma symptoms mediate the relationship between specific forms of youth maltreatment or family violence and later aggressive outcomes. Knowing this will help interventions to be tailored to the most salient forms of trauma exposure and posttraumatic reactions.

Another important aspect of this study was the comparison of effects separated by parent or adolescent informant. In contrast with the SEM models, where factors that were most
consistently associated with each other were typically rated by the same individual, findings from the multiple regression analyses did not have consistent relationships based on rater. For example, for Black adolescents, adolescent-rated exposure to family violence was the factor most strongly related to parent-rated later aggressive behavior and parent-rated adolescent social skills was the factor most strongly associated with adolescent-rated later aggressive behavior. Previous researchers have examined why informants differ in terms of their view of behavior.

De Los Reyes and Kazdin (2005) hypothesize that this is due to informant attributions and perspectives with what they call the Attribution Bias Context Model (ABC Model). According to this model, parents are more likely to attribute behavior to the youth’s disposition and downplay the influence on context on the behavior (De Los Reyes & Kazdin, 2005). On the other side, youth are more likely than parents to attribute their behavior to contextual factors and discount dispositional factors (De Los Reyes & Kazdin, 2005). These different perspectives may help explain differences in behavioral ratings when completed by two different informants (e.g., a parent and an adolescent). Greater examination of not only similarities and dissimilarities in scores when completed by two informants, but also of the attributions of the behaviors would be beneficial in terms of both understanding factors influencing the behavior but also potential targets for intervention.

One of the most intriguing findings was that adolescent exposure to family violence, social skills, and posttraumatic stress did not have consistent relations with later aggressive behavior across adolescent race and gender. These factors differed in their relation with later aggressive behavior both in terms of strength of the association but also in terms of the direction of the relationship. Sometimes the hypothesized relationships were supported and other times the opposite effects were found. It is possible that factors not included in the study are influencing
these relationships. Future studies should examine how other influences such as whether an adolescent sought treatment or changed households affects the relationships between the different factors in this study. Past research has shown that only one-quarter of youth involved with the child welfare system and who had significant mental health symptoms actually received mental health treatment in the previous year (Burns et al., 2004). In addition, other factors impacted whether or not youth received mental health services. Identifying as Black and living at home were associated with a decreased chance of receiving mental health services, whereas having a parent with severe mental illness increased the likelihood that the youth received mental health services (Burns et al., 2004). Thus, there are other contextual factors that can influence development. While no one study can examine all of these factors simultaneously, hopefully more research will be conducted in this area to explore some of these contextual factors in more detail.

There are multiple strengths of this study including: the use of a nationally representative sample, examining data longitudinally, examining the influence of informants, and examining racial and gender differences. As this study used a nationally representative sample, this increases the generalizability of the findings. Therefore, more broad conclusions can be drawn from the present findings, although replication is still advised. This study also used longitudinal data to predict later functioning. Based on the structural equation modeling and multiple regression analyses, previous experiences significantly predicted later experiences. For example, previous aggressive behavior was moderately to strongly associated with later aggressive behavior. This examination of factors over time is consistent with models of development, including ecological-transactional models of development (Cicchetti & Lynch, 1993). Ecological-transactional models incorporate the nested models as outlined in ecological systems
theory (e.g., the influence of school, parents, neighborhood), in addition to emphasizing the role of change over time for youth and the context in which they live (Cicchetti & Lynch, 1993). Such models allow for a more complex understanding of how youth development changes over time and allows for the examination of predictors of behavior.

Another strength of this study was the ability to examine the influence of informants on the findings. This was helpful for determining the consistency of the relationships found. A final strength of this study is the examination of both the overall sample in addition to examining racial and gender differences with smaller subsample groups. Most studies use overall samples based on the population, without examining differences by race, ethnicity, and/or gender. This study explored the sample for potential differences and found that significant differences based on race and gender often existed, indicating that using the overall sample is not sensitive to the substantial within-population heterogeneity.

There are also several limitations to the present study. Due to limitations in sample size, this study did not directly compare the structural equation modeling by adolescent race. Future research will need to collect large enough samples to allow for advanced statistical methods that can be analyzed with separate subgroups. This is undeniably a difficult endeavor, given the limited resources typically available to researchers. However, research consistently shows that results differ for individuals depending on their race, ethnicity, gender, etc. Thus, researchers must balance the logistic feasibility of collecting large samples with the lower validity of their results when using smaller samples. Another limitation of this study was that adolescents and parents did not both rate all of the factors included in this study. Future research should examine all constructs assessed by both individuals to determine the extent of the influence from the
informant. While it is known that parents and adolescents are often discordant in their ratings of behaviors, research that explains these differences in still in its infancy.

Future research could expand upon the current study by examining how other contextual factors (e.g., peer, school, neighborhood, family) relate to adolescent aggression. For example, other forms of violence such as community violence exposure are associated with negative outcomes such as posttraumatic stress and aggression (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009) and less prosocial social cognition (Bradshaw & Garbarino, 2004). In addition, the influence of negative peer relationships on adolescent aggression and delinquency has been well documented (Snyder et al., 2005, Barnow, Lucht, & Freyberger, 2005, Capaldi, Dishion, Stoolmiller, & Yoerger, 2001). Other neighborhood factors such as collective efficacy are associated with adolescent externalizing behavior in the context of child maltreatment (Yonas et al., 2010). Lastly, school-related factors such as school engagement might be protective of negative adolescent outcomes including aggression (Li & Lerner, 2011). As many contextual factors influence adolescent aggression, it will be important for future research to understand how these factors relate to adolescent aggression given the presence of other contextual factors. This more nuanced approach will enable a clearer understanding of how aggression develops and changes over time.

Future research should also incorporate person-centered approaches such as growth mixture modeling, which can examine longitudinal changes in variables among subpopulations. This approach is a logical next step for the present research given the findings that differed by adolescent race and gender, sometimes in directions opposite to the hypothesized relationships. In addition, this study used adolescent aggressive behavior, which combined different types of aggression including physical and verbal aggression. Given that past research has found
differences between different forms of aggression based on youth gender and/or race (e.g., Card, Stucky, Sawalani, & Little, 2008; Spriggs et al., 2007), future research should increase the specificity of the present findings by separating the analyses by different forms of aggression. It is possible that some of the hypothesized relationships in this study will exist for certain types of aggression and not for others, although presently this is unknown.

A brief summary of the main findings of this overall study is as follows:

- The findings were dependent on who rated the aggressive behavior (parent or adolescent). Therefore, studies should always consider who the informant is for study measures and determine the possibility of informant-specific findings.
- There was support for the negative relationship between aggressive behavior and social skills. Therefore, targeting social skills during interventions may help reduce aggressive behavior.
- There was support for the relationship between aggressive behavior and posttraumatic stress as well as between aggressive behavior and exposure to family violence. Therefore, interventions that target aggressive behavior should also consider incorporating trauma-informed components to help reduce aggression.
- Findings were dependent on adolescent race and gender. Therefore, interventions that target aggression should be culturally sensitive and flexible. More research is needed to determine how consistent these cultural effects are.

It is hopeful that the findings of this study can be used to inform clinical treatment of aggression by providing a better understanding of factors that influence aggressive behavior,
including the influence of trauma and social skills. There is still a significant amount of research that needs to be conducted related to the factors examined in this study, but the findings here offer an important step towards better understanding the mechanisms that influence adolescent aggression.
References


Table 1. Cronbach's alpha values for study variables separated by the total sample and by adolescent race.

<table>
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<th></th>
<th>Total</th>
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<th>White</th>
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## Table 3. Correlations between key variables for the overall sample and Black adolescents.

|        | VEX-R W1 | VEX-R W2 | VEX-R W3 | PTS W1 | PTS W2 | PTS W3 | SSRS W1 | SSRS W2 | SSRS W3 | CBCL W1 | CBCL W2 | CBCL W3 | YSR W1 | YSR W2 | YSR W3 |
|--------|----------|----------|----------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| VEX-R W1 | -        | 0.49     | 0.43     | 0.33   | 0.55   | 0.54   | -0.15   | -0.12   | 0.02    | -0.17   | 0.04    | 0.06    | 0.09    | 0.07   |
| VEX-R W2 | 0.30     | -        | 0.33     | 0.11   | 0.37   | 0.21   | -0.01†  | -0.10   | -0.04   | 0.02    | 0.04    | 0.10    | 0.16    | 0.15   | 0.20   |
| VEX-R W3 | 0.21     | 0.38     | -        | -0.12  | 0.25   | 0.47   | -0.18   | -0.22   | -0.03   | -0.04   | -0.14   | 0.13    | -0.02   | 0.08    | 0.04   |
| PTS W1  | 0.27     | 0.01     | 0.16     | -      | 0.35   | 0.30   | -0.05   | -0.10   | -0.06   | 0.08    | -0.03   | -0.05   | 0.35    | 0.08    | 0.17   |
| PTS W2  | 0.16     | 0.27     | 0.25     | 0.44   | -      | 0.73   | -0.21   | -0.13   | 0.11    | 0.01    | -0.04   | -0.01   | 0.20    | 0.47    | 0.32   |
| PTS W3  | 0.22     | 0.12     | 0.38     | 0.42   | 0.54   | -      | -0.03   | -0.06   | 0.23    | -0.15   | -0.20   | -0.16   | 0.05    | 0.25    | 0.33   |
| SSRS W1 | -0.22    | -0.11    | -0.22    | -0.21  | -0.18  | -0.04  | -0.03   | -0.06   | 0.23    | -0.15   | -0.20   | -0.16   | 0.05    | 0.25    | 0.33   |
| SSRS W2 | -0.13    | -0.05    | -0.10    | -0.16  | -0.08  | 0.01   | 0.72    | 0.62    | -0.46   | -0.47   | -0.42   | -0.15   | -0.23   | -0.10   |
| SSRS W3 | -0.06    | -0.08    | -0.02    | 0.01   | 0.01   | 0.52   | 0.55    | -0.52   | -0.37   | -0.62   | -0.18   | -0.06   | 0.00†   | 0.00    |
| CBCL W1 | 0.16     | 0.12     | 0.17     | 0.17   | 0.09   | 0.09   | 0.62    | -0.49   | -0.42   | 0.76    | 0.53    | 0.44    | 0.20    | 0.11    |
| CBCL W2 | 0.05     | 0.08     | 0.13     | 0.10   | 0.08   | 0.11   | 0.41    | -0.54   | -0.37   | 0.71    | -       | 0.62    | 0.37    | 0.20    |
| CBCL W3 | 0.03     | 0.08     | 0.18     | 0.03   | 0.08   | 0.06   | 0.37    | -0.39   | -0.57   | 0.57    | 0.63    | -       | 0.13    | 0.07    |
| YSR W1  | 0.32     | 0.18     | 0.03     | 0.35   | 0.12   | 0.16   | -0.38   | -0.34   | -0.21   | 0.41    | 0.31    | 0.20    | -       | 0.56    |
| YSR W2  | 0.20     | 0.32     | 0.14     | 0.12   | 0.32   | 0.23   | -0.28   | -0.23   | -0.14   | 0.25    | 0.28    | 0.23    | 0.68    | -       |
| YSR W3  | 0.17     | 0.15     | 0.16     | 0.21   | 0.21   | 0.45   | -0.16   | -0.14   | -0.19   | 0.23    | 0.28    | 0.26    | 0.43    | 0.50    |

Note. Values under the diagonal represent correlation coefficients for the overall sample. Values above the diagonal represent correlation coefficients for Black adolescents. † = p > .05, all other values are significant at p < .001. VEX-R = Violence Exposure Scale for Children, PTS = Trauma Symptom Checklist for Children - PTSD Section, SSRS = Social Skills Rating System, CBCL = Child Behavior Checklist Aggressive Behavior Scale, YSR = Youth Self-Report Aggressive Behavior Scale, W1 = Wave 1, W2 = Wave 2, W3 = Wave 3.
Table 4. Correlations between key variables for Latino and White adolescents.

<table>
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<tr>
<th></th>
<th>VEX-R W1</th>
<th>VEX-R W2</th>
<th>VEX-R W3</th>
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<th>PTS W2</th>
<th>PTS W3</th>
<th>SSRS W1</th>
<th>SSRS W2</th>
<th>SSRS W3</th>
<th>CBCL W1</th>
<th>CBCL W2</th>
<th>CBCL W3</th>
<th>YSR W1</th>
<th>YSR W2</th>
<th>YSR W3</th>
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<td>0.43</td>
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<td>0.00†</td>
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Note. Values under the diagonal represent correlation coefficients for Latino adolescents. Values above the diagonal represent correlation coefficients for White adolescents. † = p > .05, * = p < .05, all other values are significant at p < .001. VEX-R = Violence Exposure Scale for Children, PTS = Trauma Symptom Checklist for Children - PTSD Section, SSRS = Social Skills Rating System, CBCL = Child Behavior Checklist Aggressive Behavior Scale, YSR = Youth Self-Report Aggressive Behavior Scale, W1 = Wave 1, W2 = Wave 2, W3 = Wave 3.
Table 5. Structural Equation Modeling Results for Parent-Rated Aggression.

<table>
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<th>$\chi^2$ difference test</th>
<th>df</th>
<th>$p$</th>
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<th>SRMR</th>
<th>CFI</th>
<th>TLI</th>
<th>AIC</th>
<th>BIC</th>
<th>SSBIC</th>
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<td>-</td>
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<td>0.07</td>
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<td>0.97</td>
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<td>14041</td>
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<td>0.03</td>
<td>0.06</td>
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<tr>
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<td>0.06</td>
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<td>14068</td>
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<tr>
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<td>5</td>
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<td>0.96</td>
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<td>14068</td>
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Table 6. Structural Equation Modeling Results for Adolescent-Rated Aggression

<table>
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<th>p</th>
<th>χ² difference test</th>
<th>df</th>
<th>p</th>
<th>RMSEA</th>
<th>SRMR</th>
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*Note.* Values show unstandardized (B) and standardized (β) beta coefficients. † p > .05. All coefficients are significant at p < .001 unless otherwise noted. VEX-R = Violence Exposure Scale for Children, PTS = Trauma Symptom Checklist for Children - PTSD Section, SSRS = Social Skills Rating System, CBCL = Child Behavior Checklist Aggressive Behavior Scale.
Table 8. Factors Predicting Adolescent-Rated Aggression

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<th>White</th>
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Note. Values show unstandardized (B) and standardized (β) beta coefficients. * p < .05. All coefficients are significant at p < .001 unless otherwise noted. VEX-R = Violence Exposure Scale for Children, PTS = Trauma Symptom Checklist for Children - PTSD Section, SSRS = Social Skills Rating System, YSR = Youth Self-Report.
Figure 1. Model 1: Base model with autoregressive effects and within-wave correlations.
Figure 2. Model 2: Traumatic stress mediation model.
Figure 3. Model 3: Social learning theory mediation model.
Figure 4. Model 4: Trauma impairment model.
Figure 5. Model 5: Social skills buffering model.
Figure 6. Model 6: Overall model.
Figure 7. Standardized coefficients for the base model (Model 1) using Parent-Rated Aggression. Note. Broken lines indicate pathways with $p$-values $> .05$. 
Figure 8. Standardized coefficients for the trauma stress mediation model (Model 2) using parent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 9. Standardized coefficients for the social learning theory mediation model (Model 3) using parent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 10. Standardized coefficients for the trauma impairment model (Model 4) using parent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 11. Standardized coefficients for the social skills buffering model (Model 5) using parent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 12. Standardized coefficients for the overall model (Model 6) using parent-rated aggression. *Note.* Broken lines indicate pathways with \( p \)-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 13. Standardized coefficients for the base model (Model 1) using adolescent-rated aggression. Note. Broken lines indicate pathways with p-values > .05.
Figure 14. Standardized coefficients for the trauma stress mediation model (Model 2) using adolescent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 15. Standardized coefficients for the social learning theory mediation model (Model 3) using adolescent-rated aggression. *Note.* Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 16. Standardized coefficients for the trauma impairment model (Model 4) using adolescent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 17. Standardized coefficients for the social skills buffering model (Model 5) using adolescent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 18. Standardized coefficients for the overall model (Model 6) using adolescent-rated aggression. Note. Broken lines indicate pathways with $p$-values > .05. Non-significant values from the base model were included in the statistical analyses but were deleted from the figure for visual clarity.
Figure 19. Interaction between gender and exposure to family violence for Black adolescents.
Figure 20. Interaction between gender and social skills for Black adolescents.
Figure 21. Interaction between gender and exposure to family violence for Latino adolescents.
Figure 22. Interaction between gender and social skills for Latino adolescents.
Figure 23. Interaction between gender and posttraumatic stress for White adolescents.
Figure 24. Interaction between gender and posttraumatic stress for Black adolescents.
Figure 25. Interaction between gender and social skills for Black adolescents.
Figure 26. Interaction between gender and exposure to family violence for Latino adolescents.
Figure 27. Interaction between gender and posttraumatic stress for Latino adolescents.