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LONGITUDINAL STUDY OF THE RELATIONS BETWEEN CORPORAL PUNISHMENT AND CHILDREN'S AGGRESSION: THE MEDIATING ROLE OF SELF-REGULATION

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BY

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ABSTRACT

The current study looked to expand on established literature on the detrimental outcomes of corporal punishment by examining the long-term longitudinal associations between corporal punishment and children's aggression in gender and racially diverse, low-income samples. Data were collected from 17 sites across the United States, with urban and rural locations included from an Early Head Start Research and Evaluation Project (EHSREP). Lastly, the study aimed to look at self-regulation as a mediator to help explain the relationship between corporal punishment and aggression. The results show an overall positive association between corporal punishment and aggression. This means higher levels of harsh discipline led to higher levels of aggression, and this finding held across both race and gender. Additionally, self-regulation served as an underlying mechanism that helped explain the association between corporal punishment and aggression over roughly 10 years.

As self-regulation was related to corporal punishment, those who experienced more or harsher corporal punishment had lower levels of self-regulation. Results from the present study suggest that children who experience corporal punishment are at higher risk for detrimental outcomes including aggression, which may dispute some researchers who have suggested discipline practices may have fewer negative effects on Black youth compared to European American youth. Discipline severity at 15 months was negatively associated with children's self-regulation skills at 25 months. Additionally, children's self-regulation skills at 25 months were negatively associated with their aggressive behaviors in 5th grade. Findings from the study conclude that parents' use of physical punishment may model emotional dysregulation, which affects children's regulatory abilities.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

Chapter 1: Introduction

Corporal punishment has been a controversial and heated topic of debate for some time, especially amongst parents, teachers, practitioners, and researchers (Berlin et al., 2009). Corporal punishment is using physical force to gain compliance to correct or control behaviors from children or adolescents with the intent of causing pain, but not injury (Lapré & Marsee, 2015; Wang et al., 2016). Corporal punishment may refer to different forms of physical punishment including spanking, handling a child roughly, and hitting with objects such as a belt, hanger, or chord (Neaverson et al., 2020). Other forms may include slapping a child's hand, pulling hair, pinching, and flicking (Taillieu et al., 2014). The clearest distinction is that physical abuse is used to inflict injury and harm, while corporal punishment uses physical punishment to gain conformity, compliance, and control over behavior (Neaverson et al., 2020). Research has expanded on the topic of corporal punishment with several comprehensive studies finding associations between spanking and poorer developmental outcomes (Deater-Deckard & Dodge, 2009; Ferguson, 2013; Finkelhor et al., 2019; Guerra, & Alianan, 2019; Hecker et al., 2014; Taillieu & Brownridge, 2013; Wang et al., 2016). Poor developmental outcomes may include: aggression, lower moral internalization, weak parent and child relationships, and poorer mental and physical health outcomes including cancer, heart disease, and chronic respiratory disease (Deater-Deckard & Dodge, 2009; Ferguson, 2013; Finkelhor et al., 2019; Guerra, & Alianan, 2019; Hecker et al., 2014; Taillieu & Brownridge, 2013; Wang et al., 2015).

In 2018, 37% of overall children were spanked in the United States (Finkelhor et al., 2019). Rates of spanking were 49% for children who were 0-9 years old, and 23% for youth ages 10-17 years old (Finkelhor et al., 2019). Children between the ages of 2–7 years old

received the highest levels of corporal punishment, being the only group where corporal punishment occurred in more than half compared with the other age groups (Finkelhor et al., 2019).

Research has linked corporal punishment with higher levels of externalizing behaviors such as aggression, which has subsequently been linked to negative peer relationships (Aslam et al., 2021; Brajša-Žganec & Hanzec, 2015; Ferguson, 2013; Hecker et al., 2014; Lapré & Marsee, 2015; Taillieu & Brownridge, 2013; Turner & Muller, 2004; Wang et al., 2016). Corporal punishment has also been known to cause disruptions in emotional regulation, as parents may also model dysregulated emotions and behaviors (Eisenberg et al., 2006). Children who experience corporal punishment are at higher risk for more negative peer relationships and social behaviors as they tend to also have more negative inappropriate behavior in these social interactions (Brajša-Žganec & Hanzec, 2015; Colman et al., 2006).

Social Learning Theory

Social Learning Theory explains that showing aggression in front of children can have detrimental effects; being that key developmental processes children learn are through observing, modeling, and imitating the behaviors, attitudes, and emotional reactions they encounter (Bandura, 1978). Children who view aggressive behaviors during childhood are more likely to exhibit similar aggressive behaviors, even if parental warmth is high in the relationship (Bandura, 1978; Ferguson, 2013; Deater-Deckard & Dodge, 2009; Hecker et al., 2014). Research currently available shows little to no positive outcomes for children's development when corporal punishment is used as a discipline practice (Ferguson, 2013;

Hecker et al., 2014). Due to the many negative impacts, many have advocated against the use of corporal punishment, including the American Academy of Pediatrics (Ferguson, 2013).

Despite the many associated negative effects, including increased aggression, (Ferguson, 2013; Deater-Deckard & Dodge, 2009; Hecker et al., 2014), it is a commonly used and widely accepted practice in the United States (Turner & Muller, 2004). Advocates for corporal punishment claim that it is an effective disciplinary practice when conducted in a controlled and calm manner (Tallieu & Brownridge, 2013). However, children may receive mixed signals as acts of aggression may not be implemented with warmth and support or in a calm and controlled manner. Adults implementing the punishment may be in a heightened agitated state and they are more likely to become dysregulated. This would make corporal punishment difficult to implement since harsher punishment would be used when compared to disciplining in a calm state of mind where alternative tactics may be implemented (Tallieu & Brownridge, 2013). Research has also shown that children who are exposed to corporal punishment are more likely to incorporate corporal punishment into their parenting tactics with their children (Turner & Muller 2004).

Discipline Practices and Children's Aggressive Behaviors

Long-term problematic outcomes may arise in children's development concerning corporal punishment (Deater-Deckard & Dodge, 2009; Ferguson, 2013; Fu et al., 2019; Guerra, & Alianan, 2019; Hecker et al., 2014). These may include: lower-quality relationships with parents, lower levels of self-esteem and academic achievement, substance, and drug use, higher levels of stress, aggression, depression, anxiety, social conflict, antisocial behaviors, and peer rejection (Aslam et al., 2021; Deater-Deckard & Dodge, 2009; Fu et al., 2019; Ferguson, 2013; Guerra, & Alianan, 2019; Hecker et al., 2014; Taillieu &

Brownridge, 2013). Of particular interest to this study is the association between corporal punishment and children's later aggressive behaviors.

Corporal Punishment and Aggression

Existing research has linked corporal punishment to externalizing behaviors and, of these, one of the most prominent is aggression (Deater-Deckard & Dodge, 2009; Hecker et al., 2014). Aggression is a behavior that results in personal injury and/or physical destruction. However, not all injurious and destructive acts are judged as aggressive (Bandura, 1978). The deciding factor typically is dependent on the victim's thoughts and feelings about the injurious behavior and what may have caused it to occur. This may include the context in which the injurious and/or destructive acts occurred (Bandura, 1978). At the same time, the more the perpetrator takes personal responsibility for aggressive behavior and the higher the injurious intent is towards the victim, the more likely their behavior will be viewed as aggressive (Bandura, 1978).

Studies done on determinants of aggression in the family have shown that children tend to also follow in parents' footsteps in terms of favoring aggressive solutions as appropriate responses to dealing with others. (Bandura, 1978; Turner & Muller 2004). Children who experience corporal punishment are more susceptible to have and struggle with externalizing problems such as antisocial and disruptive behavior, and physical aggression (Lapre & Marsee, 2015). Children experiencing corporal punishment may have an increase in antisocial behavior due to the negative modeling which is being taught by the caregiver (Bandura, 1978). Children can also learn from caretakers that aggression is appropriate and acceptable behavior to gain compliance and/or conformity from other individuals (Bandura, 1978). Unfortunately, corporal punishment fails to teach children what was wrong with their

behavior, fails to model more appropriate behaviors, and fails to provide opportunity and motivation for child and parent to engage in future co-regulation interaction (Bandura, 1978, Colman et al., 2006). Additionally, caretakers implementing corporal punishment may implement it in a dysregulated state of mind and therefore model for children that using aggression is an appropriate response to becoming dysregulated as well (Neaverson et al., 2020).

Mediating Role of Self-Regulation

Despite growing research that documents the direct negative effects of corporal punishment on social competence, prosocial, and aggressive behavior in addition to several social skills (Žganec & Hanzec, 2014), there is a need for further research on potential underlying mechanisms that may help to explain these relations. One mechanism that might help to explain these relations is self-regulation. Self-regulation is a complex construct that includes a child's ability to regulate emotional, cognitive, and social demands through behaviors that are externalized through appropriate and acceptable behavior (Yu et al., 2020). Self-regulation has been explored and studied through a temperamental lens that bases behaviors on individual differences. It also has been examined through a developmental lens and is impacted by different variables such as corporal punishment (Brajša-Žganec & Hanzec, 2015; Xing et al., 2019).

Previous research has highlighted the negative impacts corporal punishment has on children's aggression and self-regulation (Nuske, et al., 2020; Xing et al., 2019). One explanation may be that children's exposure to corporal punishment for long periods may increase cortisol and overall stress levels (Xing et al., 2019). As a result, children may face over-arousal, or anger due to the impact corporal punishment has on their development and

this may be particularly harmful to young children. This is because children's brains are highly malleable due to brain plasticity at early ages and are therefore highly sensitive to corporal punishment and harsh parenting (Xing et al., 2019).

Research has shown that children with greater self-regulation skills exhibit less aggressive behaviors in everyday interactions with peers, siblings, parents, and teachers and therefore have more positive everyday interactions (Brajša-Žganec & Hanzec, 2015). This helps enable social acceptance compared to children who experience lower self-regulation and exhibit more aggressive behaviors in everyday interactions with peers, siblings, parents, and teachers, which may place them at increased risk for antisocial behavior (Brajša-Žganec & Hanzec, 2015).

Corporal punishment has been known to interrupt the development of self-regulation in children as it first teaches children aggressive behaviors as an acceptable means to gain compliance, conformity, wants, and desires (Bandura, 1978). Corporal punishment has also been associated with stress reactivity (Hackman et al., 2013) as it can activate the body's natural stress response system, the hypothalamic-pituitary-adrenal axis (HPA), and sympathetic adrenomedullary system. The sympathetic adrenomedullary system is a stress response system which triggers a fight or flight response when the body experiences an automatic physiological reaction to an event that may be perceived as stressful, frightening, or traumatic (Hackman et al., 2013). This fight or flight response includes activation from the sympathetic nervous system when physical or psychological threats to well-being are perceived. Then, chemicals such as norepinephrine and epinephrine are released into the bloodstream which helps increase heart rate to better deal with the perceived threat (Hackman et al., 2013). Simultaneously, the HPA helps regulate this fight or flight stress

response by releasing either more or less cortisol (the body's stress hormone) dependent on the perceived threat. Cortisol is useful for a variety of reasons during the stress response, one being that it helps to regulate the body's stress response. If there is perceived stress, cortisol gets released to allow for a prolonged fight or flight response (Hackman et al., 2013). Second, cortisol helps the body to mobilize energy through glucose/sugar being flooded into the bloodstream and therefore, throughout the body. While small doses of cortisol are helpful and sometimes necessary in intensely high or prolonged stress situations, chronic stress can have negative and eroding consequences such as an increased risk for socioemotional difficulties, especially when the stress response systems are activated (Hackman et al., 2013). Meaning that corporal punishment can have a negative impact on self-regulation, especially if self-regulation is needed when the stress response system is activated. Intensely high or prolonged stress can impact aggression in individuals who have experienced corporal punishment as the individual is unable to regulate their emotions, behaviors, and cognitions and may act out irrationally amongst peers (Nuske et al., 2020).

Moderating Role of Gender

Throughout the literature, there is evidence that boys receive slightly higher levels of corporal punishment when compared to their female counterparts (Ellison & Bradshaw, 2009). Girls were punished less when compared to boys, with girls being spanked 34% of the time and boys being spanked 39% (Finkelhor et. al., 2019). In addition, boys tend to exhibit more aggressive behaviors compared to girls while also exhibiting lower self-regulatory skills. Due to boys having higher levels of aggression compared to girls, this continues the negative circle as boys may be punished more often than girls and may be likely to exhibit

continued negative externalizing behaviors such as aggression. Given these existing gender differences, we explored the moderating role of gender in the hypothesized model.

Moderating Role of Ethno-Racial Groups

Culture has a substantial impact on development and how individuals may perceive the world. It is difficult to discuss the impact corporal punishment may have on children and adolescent development without examining this role. During a 2016 nationally representative survey, a slightly higher percentage of Black families believed in corporal punishment as not only an appropriate disciplinary tactic and response to stressors but also necessary compared to white families (Klevens et al., 2019). Black boys receive the highest levels of corporal punishment while their non-Black counterparts have remained steady over time (Klevens et al., 2019). Some studies from the literature reveal that corporal punishment was more strongly associated with normative or acceptable parenting strategies by Black parents, in addition to being more common among the Black population (MacKenzie et al., 2015). Cultural norms are important considerations when looking at the relationship between corporal punishment and behavior problems (externally or internally). Some research suggests that Black parents may conceptualize corporal punishment as a norm; reporting using corporal punishment as an active discipline strategy significantly more than other racial groups, in addition to perceiving corporal punishment as positive (Lapré & Marsee, 2015). Cultural influences on corporal punishment have been hypothesized as necessary for Black youth to help protect and implement positive adjustment, safety, and discipline due to racial disparities faced in the Black community (Lapré & Marsee, 2015). Therefore, we build on previous research by examining these relations over approximately 9 years and in a low-income sample of White and Black youth.

The Present Study

The goals of the current study are to expand on already established literature and examine how corporal punishment is longitudinally linked to child aggressive behavior in a sample of White and Black youth. The study seeks to examine the effect that ethno-racial differences (race and culture) have on discipline practices such as corporal punishment, and how this impacts children's aggressive behaviors. Lastly, this study will look at how gender impacts the relationship between corporal punishment and children's later aggression.

We hypothesize that children who experience corporal punishment will have lower levels of self-regulation, which will lead to higher aggression. We also hypothesized that self-regulation would mediate the relationship between corporal punishment and aggression such that, corporal punishment may negatively impact children's self-regulatory skills, which in turn, would be linked to more aggressive behaviors.

Chapter 2: Methods

Participants

This study uses data from 3,001 mothers and children enrolled in the Early Head Start Research and Evaluation Project (EHSREP). Participants were required to meet the eligibility requirements for Early Head Start services, with a family income at or below the federal poverty level. At study enrollment, participants were randomly assigned to receive Early Head Start services or to a comparison group. Families in the comparison group had the option to access other community services. Data was collected from 17 sites across the United States, with urban and rural locations represented.

Our study sample was restricted to 1,840 participants who self-identified as White (51.2% of the children were girls) or Black (49.2% were girls). This study uses data from three measurement points: at Time 1, White children were on average 15.00 months old (*SD* = 1.29 months), and Black children were on average 15.11 months old (*SD* = 1.60 months). At Time 2, White children were on average 25.21 months old (*SD* = 1.47 months), and Black children were on average 25.01 months old (*SD* = 1.60 months). At Time 3, White children were on average 10.58 years old (*SD* = .50 years), and Black children were on average 10.59 years old (*SD* = .50 years). At the Time 1 visit, White mothers reported an average of 12.01 (SD =1.93) years of education, and Black mothers reported an average of 11.63 (SD =1.68) years of education. Approximately 50.6% of White and 50.2% of Black participants had been randomly assigned to receive Early Head Start Services.

Procedure

Demographic information was collected upon enrollment in the EHSREP between July 1996 and September 1998. In addition, this study relies on data from in-depth home-

based interviews that included observations and assessments when children were approximately 15 months old, approximately 25 months old, and in 5th grade. Around the child's first birthday (15-month visit), mothers reported on their children's temperament and discipline severity. Around the child's second birthday, participants completed a 2-hour home visit. A trained assessor administered the Bayley Scales of Infant Development at this time. During the 5th-grade home visit, children reported on their own delinquent behaviors and parents completed the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000), which was used to assess a number of their children's behaviors.

During the 15-month visit, 78 percent of the original 3,001 mothers completed interviews and 63% of the children participated in the assessments (Administration for Children and Families, 2002). During the 25-month visit, 59.9 percent of the original sample completed the Bayley assessment (Administration for Children and Families, 2002). When children were in 5th grade, 54.4 percent of the original sample participated. In each wave, analyses suggested that there were no systematic patterns of attrition (Administration for Children and Families, 2002; Vogel, Xue, Moiduddin, Kisker, Carlson, 2010).

Discipline severity. During the 15-month-old visit, parents responded to 3 hypothetical parent-child conflict situations (i.e., child throws a temper tantrum in a public place, the child refuses to eat, the child keeps playing with breakable things). Parents then provided open-ended answers to how they would respond to their child; these responses were later coded and categorized to create an index of discipline severity. This scale, developed by Mathematica Policy Research for the EHSREP, ranges from 1 to 5, with a score of 5 indicating that the parent said they would use physical punishment. Parents who indicated that they would not use physical punishment but would shout at their child received a score

of 4. Those who stated that they would threaten their child with punishments received a 3, and a score of 2 was assigned to practices such as sending the child to his/her room, ignoring the transgression, threatening time outs, or loss of privileges. A score of 1 indicates that the parent would try preventing the situation, distracting the child, removing the child, talking to the child, or putting the child in time-out.

Self-regulation. When children were approximately 25 months old, self-regulation was assessed by trained assessors using the self-regulation subscale of the Bayley Scales of Infant Development (BSID) rating scale (Bayley, 1993). This measure assesses children's self-regulation skills as indicated by negative affect, frustration, and ability to change tasks. Children's behaviors were rated on a 5-point Likert scale. All items were mean scored with higher values indicating more positive behaviors. For White children, Cronbach's alpha was .90. For Black children, Cronbach's alpha was .92.

Aggression. When children were in 5th grade, using the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000), parents reported on their children's aggressive behaviors. Parents used a 3-point Likert scale (1 = *not true* to 3 = *very true or often true)* to rate 18 items, including "Gets in many fights." In this study, Cronbach's alpha was .91 for White children and .89 for Black children.

Chapter 3: Results

Preliminary Analysis

The study variables were reasonably well distributed, with skewness and kurtosis values falling within normal distributions (Tabachnick & Fidell, 2013). Attrition analyses were conducted to examine mean level differences in variables for participants who were missing data on all constructs of interest in 5th grade and those who had data available. T-tests demonstrated that participants who were missing partial data at the 5th-grade assessment reported significantly lower maternal education, $t(1,702) = -3.43$, $p = .001$, than participants who had complete data at that time. The proportion of missing data per variable ranged from 9.2 to 38.7. No cases were missing data on all study variables as such cases had been dropped from the sample. Missing data were accounted for using full information maximum likelihood in *M*plus (Muthén & Muthén, 2010).

There were several mean level differences associated with child gender and race. As is presented in Table 1, Black mothers reported using more severe discipline practices and rated their children significantly lower in aggressive behaviors than White mothers. White children were rated significantly higher in self-regulation by observers. There were also several mean level differences linked to children's gender (see Table 2). Observers rated girls higher in self-regulation skills than boys. Boys were rated higher in aggression by mothers and self-reported more engagement in delinquent behaviors. Based on these results, we examined differences in the hypothesized model based on gender and race.

Bivariate correlations among study variables and descriptive statistics are presented in Table 3. As expected, discipline severity at 15 months was negatively associated with children's self-regulation skills at 25 months. Subsequently, children's self-regulation skills

at 25 months were negatively associated with their aggressive behaviors in 5th grade. Discipline severity at 15 months was not significantly associated with children's aggressive behaviors in 5th grade.

Path Analysis

Path analysis was conducted using maximum likelihood estimation in *M*plus version 7.2 (Muthén & Muthén, 2010). The model included direct relations between discipline severity at 15 months and children's aggression in 5th grade. Additionally, self-regulation at 25 months was considered a mediator of these relations. Maternal education, child gender, and race were included as statistical controls in the initial model but are not depicted in Figure 1.

Model fit is considered good if the Comparative Fit Index (CFI) is greater than or equal to .95 (adequate if greater than or equal to .90), the Root Mean Square Error of Approximation (RMSEA) is less than or equal to .06 (adequate if less than or equal to .08), and the Standardized Root Mean Squared Residual (SRMR) is less than or equal to .08 (Byrne, 2010; Hu & Bentler, 1999). The initial hypothesized model fit the data well: χ^2 (2)= 11.38, $p < .01$; CFI = 90, RMSEA = .05, SRMR=.03. Results, depicted in Figure 1, suggest that discipline severity at 15 months was directly and positively associated with children's aggression in 5th grade. Additionally, discipline severity was indirectly associated with aggression via self-regulation.

Multi-Group Analyses. Next, multi-group analyses were conducted to examine if the patterns of associations varied between White and Black families, between boys and girls. In examining moderation by race, a chi-square difference test was conducted to examine

significant changes in the chi-square statistic for the constrained model (Muthén & Muthén, 2010). The unconstrained model [χ^2 (2)= 2.45, CFI = .99, RMSEA = .02, SRMR=.01] and the constrained model [χ^2 (5)= 13.28, CFI = .89, RMSEA = .05, SRMR=.04] were not significantly different as determined by a chi-square difference test [$\Delta \chi^2(3) = 10.83$. p = .09]. In examining moderation by gender, a chi-square difference test was conducted to examine significant changes in the chi-square statistic for the constrained model (Muthén & Muthén, 2010). The unconstrained model [χ^2 (2)= 1,18, CFI = 1.00, RMSEA = .00, SRMR=.01] and the constrained model [χ^2 (5)= 2.53, CFI = 1.00, RMSEA = .01, SRMR=.02] were not significantly different as determined by a chi-square difference test [$\Delta \chi^2(3) = 1.35$. p = .72]

Indirect Effects. Follow-up tests were used to examine the significance of indirect effects (MacKinnon et al., 2002). Bias-corrected bootstrap confidence intervals were conducted to examine self-regulation as a mediator of the relations between discipline severity and aggression. However, this indirect effect did not reach significance (p= .25)

Chapter 4: Discussion

The present study expands the established literature on the detrimental outcomes of corporal punishment by examining the long-term longitudinal associations between corporal punishment and children's aggression in a racially diverse low-income sample. As expected, higher levels of harsh discipline led to higher levels of aggression, and this finding held across races and gender. Moreover, self-regulation served as an underlying mechanism, helping to explain the association between corporal punishment and aggression over roughly 10 years. These findings have important implications for parenting theories and address several gaps in the roles of discipline and self-regulation in White and Black children's later social behaviors.

Our results support previous research suggesting corporal punishment has been related to higher levels of aggression (Deater-Deckard & Dodge, 2009; Ferguson, 2013; Finkelhor et al., 2019; Guerra, & Alianan, 2019; Hecker et al., 2014; Taillieu & Brownridge, 2013; Wang et al., 2016). We found an overall positive association between corporal punishment and aggression. We also found support from previous research for our hypothesis as self-regulation was related to corporal punishment and those who experienced more corporal punishment had lower levels of self-regulation. The better and more developed the self-regulation skills were, the more equipped the child was to better handle adverse outcomes (Lengetti et al., 2020). Self-regulation was also used as a mediator to help explain the relationship between corporal punishment and later externalizing behaviors like aggression.

Corporal Punishment and Aggression

The present study also builds on previous work examining the associations between corporal punishment and children's later aggression across racial groups (Berlin et al., 2009; Gershoff et al., 2012; Lansford et al., 2004). Discipline severity in early toddlerhood predicted more aggressive behaviors when White and Black children were in 5th grade. Some researchers have suggested that discipline practices may have fewer negative effects on Black youth than on European American youth (Deater-Deckard & Dodge, 1997;), but our results suggest that corporal punishment is detrimental for all children included in the current sample. These findings might reflect the very young age (15 months) of the children when corporal punishment was assessed, which may place these children at particularly high risk because the escalation of severity may begin if practices occur too early. Discipline scholars have increasingly argued for long-term longitudinal designs (Gershoff & Grogan-Kaylor, 2016), to examine the effects of discipline more adequately on youth outcomes. However, few studies consider relations from infancy to late childhood.

The Mediating Role of Self-Regulation

Developmental scholars have often noted the importance of examining the intervening mechanisms between both parenting and temperament and children's social development (e.g., Dodge, 2006; Eisenberg et al., 2006; Grusec & Goodnow, 1994). As expected, discipline severity at 15 months was negatively associated with children's self-regulation skills at 25 months. Our findings suggest that parents' use of physical punishment may model emotional dysregulation, which affects children's regulatory abilities (Eisenberg et al., 2006). Further, physical discipline may be linked to children's self-regulation as reflected in aggressive and antisocial behaviors via its effects on children's cognitive processing and interpretations (Dodge, 2006). Therefore, it may be advantageous to consider

the role of self-regulation (i.e., sustaining and shifting attention, modulation of internal states and external stimuli; Derryberry & Rothbart, 1988) as an intervening mechanism through which discipline affects children's antisocial behaviors.

Further, children's self-regulation skills at 25 months were negatively associated with their aggressive behaviors in 5th grade. The results also replicate previous findings that children who are better able to regulate their own behaviors and emotions may have better interactions with their peers and exhibit fewer aggressive behaviors (Eisenberg et al., 2000). The intervening role of self-regulation may be particularly salient during toddlerhood. During this time, children begin to see themselves as more capable of independent and autonomous behaviors (Erikson, 1968). Therefore, the development of self-regulation has become increasingly important during this time, possibly with long-lasting effects (Calkins, 2007; Calkins & Johnson, 1998; Kopp, 1982). Our study would further support previous research that children with greater self-regulation skills exhibit less aggressive behaviors overall and in everyday interactions with peers, siblings, parents, and teachers; therefore, having more positive everyday interactions (Brajša-Žganec & Hanzec, 2015).

Limitations and Conclusions

The present findings should be carefully considered in light of the study's limitations. First, mothers reported on their own discipline practices, which may result in bias. Future research using multiple methodologies (e.g., observational, multiple reports) is desirable to reduce possible reporter biases. Second, our study did not include fathers or other important family members. Future work may benefit from examining the contrasting or complementary roles of mothers and fathers in the hypothesized model. Third, the present study only focuses on White and Black families and tests of this model with other ethnic groups are needed.

In summary, the present study contributes to the current literature on early corporal punishment and individual determinants of children's aggressive behaviors. Many scholars have advocated for study of long-term developmental consequences of corporal punishment and examining these relations within relatively large samples of low-income African Americans and European Americans reduces the common confound of ethnic-minority status and poverty. Such research helps to advance the development of strength-based models of development to better understand well-being and resiliency in low-income, ethno-racially diverse children. The present findings may aid educators and policymakers to focus on reducing the use of corporal punishment as a potential child-rearing technique due to its long-term negative effects.

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Table 1.

Mean-level Differences in Main Study Variable by Racial Group.

Variable	*M (SD)*	*df*	*F*
Discipline Severity (15 months)		1, 1664	140.65***
White	2.00 (1.34)		
Black	2.89 (1.71)		
Emotion Regulation (25 months)		1, 1364	13.86***
White	3.65 (.76)		
Black	3.49 (.84)		
Aggression (5th Grade)		1, 1180	20.89***
White	1.38 (.35)		
Black	1.30 (.30)		
Maternal Education		1,1703	18.95***
White	12.01 (1.93)		
Black	11.63 (1.67)		

Note., $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 2.

Mean-level Differences in Main Study Variable by Child Gender

Variable	*M (SD)*	*df*	*F*
Discipline Severity (15 months)		1, 1664	3.59
Boys	2.50 (1.62)		
Girls	2.35 (1.57)		
Emotion Regulation (25 months)		1, 1364	30.57***
Boys	3.46 (.81)		
Girls	3.69 (.77)		
Aggression (5th Grade)		1, 1180	16.55***
Boys	1.38 (.35)		
Girls	1.30 (.30)		
Maternal Education		1,1721	.15
Boys	11.81 (1.81)		
Girls	11.84 (1.83)		

Note. $^{***}p < .001$

Table 3.

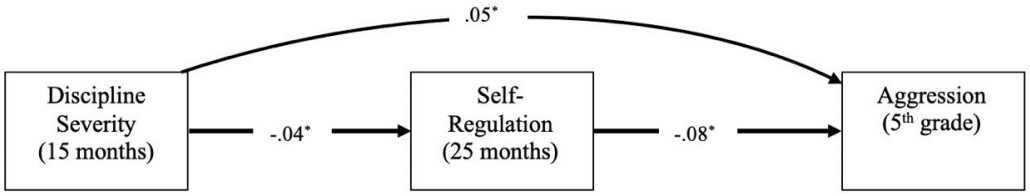
Descriptives and Correlations for Main Study Variables.

	1	2	3
1. Discipline Severity (15 months)	--		
2. Self-regulation (25 months)	-.06*	--	
3. Aggression (5th Grade)	.02	-.07*	--
Mean	2.42	3.59	1.31
Standard Deviation	1.59	.78	.32
Range	1.00-5.00	1.00-5.00	1.00-2.61

Note. $^{*}p < .05$, $^{**}p < .01$.

Figure 1

Relations Between Corporal Punishment and Children's Aggression: The Mediating Role of Self-Regulation



Note. Controlling for maternal education and child race and gender. $\chi^2(2) = 11.38$, $p < .01$; CFI = 90, RMSEA = .05, SRMR=.03.