

An examination of the role of social factors in the stability of proactive and reactive aggression from  
late childhood to early adolescence

BY

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## Abstract

There is substantial research indicating adverse outcomes associated with childhood aggression. The functions of aggression, proactive and reactive aggression, have been widely examined with distinct correlates associated with each function of aggression. However, research on the stability of the functions of aggression is scarce. Furthermore, factors that may moderate the stability of aggression have not been examined. Understanding the stability of aggression and moderating factors is important for targeted intervention. Thus, the current study examined the 3-year stability of proactive and reactive aggression and examined social factors as potential moderators. The sample included 279 participants (51.6% female) recruited from an elementary school in a small, Midwestern city and consisted of 3<sup>rd</sup>-5<sup>th</sup> graders at Time 1. Data for Time 2 was collected three years later when participants were in 6<sup>th</sup>-8<sup>th</sup> grade. At Time 1, participants completed self-report measures on demographics, proactive and reactive aggression, peer rejection, peer delinquency, and parental psychological control. At Time 2, participants completed self-report measures on proactive and reactive aggression. Results indicated that only reactive aggression was stable across three years. Additionally, among the three social factors across functions of aggression, only peer delinquency was found to moderate the association between T1 and T2 levels of reactive aggression such that T1 reactive aggression was related to T2 reactive aggression when levels of T1 peer delinquency were high. Future research should continue examining moderating factors to further identify points for targeted intervention.

*Keywords: aggression, peer rejection, peer delinquency, parental psychological control*

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An examination of the role of social factors in the stability of proactive and reactive aggression from  
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Aggressive behavior can be defined as behavior that one engages in order to harm, hurt, or injure another individual (Coie & Dodge, 1998). There has been substantial research demonstrating that persistent aggressive behavior has adverse effects on children's development and is associated with a host of long-term difficulties in adjustment and mental health (for reviews, see Fite, Craig, Colder, Lochman, & Wells, 2016; Vitaro & Brendgen, 2011). In order to adequately understand the development and associated outcomes of aggression, it is important to consider the functions of aggression, or what motivates an individual to engage in aggressive behavior. For instance, a child may be motivated to engage in aggression in order to achieve a goal (e.g., bullying) or may be motivated to rid of a negative stimulus such as reacting aggressively to a perceived threat (e.g., defending oneself). Understanding the motivation behind aggressive behavior is beneficial in that it can inform the appropriate way to intervene and prevent further aggressive behavior. Furthermore, distinct motivations and functions of aggression have been differentially associated to childhood outcomes and problem behaviors (e.g., Fite et al., 2016), thus emphasizing the importance of distinguishing functions of aggression for the prevention of subsequent problem behaviors.

Within the literature, researchers have established distinctions between proactive (goal-oriented) aggression and reactive (retaliatory) aggression (Dodge, 1991; Dodge & Coie, 1987). However, much of the knowledge on proactive and reactive aggression is informed by cross-sectional or short-term longitudinal studies (e.g., Fite & Colder, 2007a; McAuliffe, Hubbard, Rubin, Morrow, & Dearing, 2007). An important next step in this area of research is an understanding of the stability of proactive and reactive aggression across developmental periods. At the core of developmental research are questions of stability and change of behaviors as this informs points of developmentally appropriate intervention (Baltes, Reese, & Nesselrode, 1977). There are only a handful of studies that have examined the stability of proactive and reactive aggression over three to

four years (i.e., Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006; Fite, Colder, Lochman, & Wells, 2008), but this literature is still in its infancy. Moreover, to my knowledge, there is no research examining factors that moderate the stability of aggression. To gain more insight into the stability of proactive and reactive aggression, the current study seeks to examine the 3-year stability of proactive and reactive aggression across the developmental period of late childhood and early adolescence (elementary to middle school), a period defined by marked changes in social relationships. Furthermore, the current study examined potential social moderators in the stability of proactive and reactive aggression.

### **Proactive and reactive aggression**

Proactive aggression is defined as planned, goal-directed aggressive behavior (Dodge, 1991; Vitaro & Brendgen, 2011). An individual may engage in proactive aggression with an expectation of reward or to achieve a goal (Crick & Dodge, 1996; Dodge, Lochman, Harnish, Bates, & Pettit, 1997). For example, a child may threaten or bully another child in order to get the child to do what they want. Proactive aggression appears to be best understood within a social learning framework (Bandura, 1973), which posits that engaging in aggressive behavior is learned through modeling and reinforcement of behavior in the environment. Thus, social experiences provide critical opportunities for proactive aggression to be learned. For instance, a child may witness an older sibling use physical aggression with another sibling in order to get a toy back (i.e., modeling). Consequently, according to social learning theory, if this child is successful in obtaining a goal by engaging in physical aggression, they are now reinforced and will be more likely to engage in it in the future (Bandura, 1973). Reactive aggression, on the other hand, is defined as defensive and retaliatory, often in response to a real or perceived threat. For example, a child may hit another child who may have accidentally bumped into them in the hallway. Reactive aggression can be explained by the frustration-anger theory of aggression, which posits that aggression is an angry reaction to frustration (Berkowitz, 1978). Additionally, reactive aggression can be understood under the control of negative

reinforcement, in which behaving aggressively successfully rids of the provocation or threat (Vitaro & Brendgen, 2005).

The conceptual distinctiveness of proactive and reactive aggression is also emphasized by research demonstrating different etiologies for these functions of aggression. Dodge (1991) proposed that proactive and reactive aggression originate from unique social experiences and develop independently. There is evidence to indicate that social experiences such as parenting, peer groups, and community factors are associated with proactive aggression. Proactive aggression may be modeled at home by parents who value the use of aggression to resolve conflict or to advance personal interests (Connor, Steingard, Cunningham, Anderson, & Melloni, 2004). Indeed, there is empirical evidence to suggest that harsh-coercive parenting predicts antisocial behaviors, which include behaviors that are proactive in nature (e.g., Patterson, DeBaryshe, & Ramsey 1989). Additionally, Fite and colleagues (2009; 2010) found, within samples of children in late elementary school (ages 9-12), that neighborhood characteristics (e.g., neighborhood disadvantage, neighborhood safety) are linked to self-reported and teacher-reported proactive, but not reactive, aggression. Negative neighborhood characteristics influence the development of proactive aggression as a result of a modeling mechanism, as neighborhood characteristics such as unsafe neighborhoods provide negative models of aggression. Proactive aggression may also be modeled by peers, with some research suggesting that proactively aggressive children tend to associate with other proactive children (Fite et al., 2007a, 2008). Regarding reactive aggression, research has also indicated that parenting is associated with reactive aggression. Dodge (1991) hypothesized that reactive aggression developed in reaction to harsh and unpredictable environments, particularly abusive, harsh, or cold parenting. In support of this hypothesis, research has found that childhood adversity such as history of physical abuse, harsh/inconsistent parenting, and poor attachment have been associated with reactive aggression (e.g., Connor et al., 2004; Dodge et al., 1997; Dodge, 1991; Shields & Cicchetti, 1998). Within an attachment theory framework, the security of a child's relationship with parents

may shape how a child forms interpersonal relationships throughout their development (Bowlby, 1978). For example, harsh and unpredictable family environments characterized by inconsistent parenting and rejection may influence the ability for children to interpret parenting behavior, thus generalizing to their other social relationships (Luke & Banerjee, 2012). Additionally, experiencing stressful life events has been associated with teacher-reported reactive, but not proactive, aggression among a sample of elementary school-aged children (Brown, Fite, & Poquiz, 2016). Self- and teacher-reported reactive aggression has also been associated with poor emotional regulation (e.g., Rathert, Fite, Gaertner, & Vitulano, 2011; White & Turner, 2014) among samples of children and emerging adults, particularly anger regulation (e.g., Marsee & Frick, 2007). Poor emotional regulation may account for a child's inability to cope and react to a provocation or threat with anger, which causes instability in a child's environment.

In addition to unique etiological models, there is evidence that indicates distinct behavioral correlates linked to proactive and reactive aggression (for reviews, see Card & Little, 2006; Vitaro & Brendgen, 2005). Consistently in the literature, teacher-reported proactive aggression has been more consistently linked with self- and caregiver-reported delinquency among samples of children (e.g., Fite, Colder, Lochman, & Wells, 2008; Vitaro, Brendgen, & Tremblay, 2002), association with delinquent peers (e.g., Poulin & Boivin, 2000), and self-reported substance use (e.g., Fite, Colder, Lochman, & Wells, 2007b, 2008; Fite, Hendrickson, Evans, Rubens, & Johnson-Motoyama, 2014) compared to reactive aggression. Additionally, there is evidence to suggest that these behavioral correlates are stable over time. For example, Fite and colleagues (2008) examined developmental trajectories of the functions of aggression within a sample from a longitudinal study examining the effectiveness of an intervention on childhood aggression. These researchers found that teacher reports of proactive aggression at 6<sup>th</sup> and 8<sup>th</sup> grade predicted increases in caregiver reports of delinquency in 7<sup>th</sup> and 9<sup>th</sup> grade. On the other hand, research has consistently linked reactive, but not proactive, aggression to internalizing symptoms throughout childhood and adolescence (Dodge,

Lochman, Harnish, Bates, & Pettit, 1997; Fite, Stoppelbein, & Greening, 2009; Fite, Rathert, Stoppelbein, & Greening, 2012; Vitaro, Brendgen, & Tremblay, 2002; Fite et al., 2016). For example, reactively aggressive children reported more feelings of sadness, less happiness, and more depressive feelings in social situations compared to proactively aggressive children (e.g., Day, Bream, & Pal, 1992; Dodge et al., 1997; Vitaro et al., 2002). Furthermore, reactively aggressive children are more likely to be rejected by their peers, which may contribute to experiencing negative emotions (e.g., Dodge et al., 1997; Fite, Rathert, Stoppelbein, & Greening, 2012). Researchers have also been examining demographic differences within proactive and reactive aggression. There is research to suggest that males, compared to females, score higher proactive and reactive aggression (e.g., Baker, Raine, Liu, & Jacobson, 2008; Conner, Steingard, Anderson, & Melloni, 2003). Baker and colleagues (2008) have also identified racial and ethnic differences such that Asian American youth were rated lower for reactive aggression compared to most ethnic groups (i.e., Caucasian, Hispanic, African-American), but had similar scores on proactive aggression compared to Caucasian and Hispanic youth. Consistent with previous literature (McLaughlin, Hilt, & Nolen-Hoeksema, 2007), these researchers found that African-American youth had higher reports of both proactive and reactive aggression compared to most other ethnic groups.

In addition to research evidence indicating distinct etiologies and behavioral correlates, factor analytic models have also supported distinguishing between proactive and reactive aggression even if these aggression subtypes statistically overlap and are highly comorbid (e.g., Bushman & Anderson, 2001). Studies have found that aggressive children exhibit both proactive and reactive aggression rather than purely proactive or reactive aggression (e.g., Vitaro & Brendgen, 2005). However, numerous exploratory and confirmatory analyses have yielded two distinct factors consistent with the proactive-reactive dichotomy across informants (i.e., caregiver-, teacher-, and self-reports) and across ages (i.e., elementary school-aged children through emerging adulthood) (Barker, Tremblay, Nagin, Lacourse, & Vitaro, 2006; Crick & Dodge, 1996; Dodge & Coie, 1987; Poulin & Boivin, 2000;

Salmivalli & Nieminen, 2002). Additionally, numerous studies have documented the discriminant validity of these constructs (Crick & Dodge, 1996; Hubbard et al., 2002; Vitaro et al., 1998; Waschbush, Willoughby, & Pelham, 1998).

One area in the field of proactive and reactive aggression that is less studied is the developmental stability of these aggression subtypes. Broadly, research on the developmental course of the functions of aggression suggests that during early childhood, aggressive behaviors may be better classified as proactive, rather than reactive, in nature (e.g., hitting another child to get a toy or object; Cummings, Iannotti, & Zahn-Waxler, 1989) as language and emotion regulation abilities are not fully developed. As children develop and interact with their social environments (e.g., parents, peers, siblings), a number of children continue to exhibit both functions of aggression (Dodge & Coie, 1998). However, there is limited research on the stability of the functions of aggression. There are both clinical and research implications in understanding the stability of the functions of aggression. First, youth who engage in aggression that persists over time may be at risk for more negative outcomes and psychopathology. Second, information regarding the stability of the functions of aggression may help future researchers elucidate the process that contribute to the maintenance or mitigation of aggression. There are studies that have established the one-year stability of caregiver- and self-reports of proactive and reactive aggression within elementary school-age samples (e.g., Fite & Colder, 2007a; McAuliffe et al., 2007) as well as observer ratings of proactive and reactive aggression among a sample of preschool-aged children (i.e., Murray-Close & Ostrov, 2009); however, there are only two studies that have examined the stability of proactive and reactive aggression by following the same, respective samples of youth over more than a year. One study has examined changes in teacher reports of proactive and reactive aggression in late childhood to early adolescence (Fite, Colder, Lochman, & Wells, 2008) and found that mean levels of both proactive and reactive aggression peak at approximately the developmental period of transitioning into early adolescence (6<sup>th</sup> grade) and then declined thereafter. Another study examined the stability of self-

reports of proactive and reactive aggression during adolescence, from ages 13 to 17 (Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006). These researchers found that trajectories of both proactive and reactive aggression were similar; however, similar to the results of Fite and colleagues (2008), both proactive and reactive aggression peak in early adolescence (ages 13-14) and follow a decreasing trajectory through late adolescence. Interestingly, there is also research that indicates that self- and teacher-reported reactive aggression may predict proactive aggression, but proactive aggression does not predict reactive aggression (Camodeca, Goossens, Meerum & Schuengel, 2002; Lansford, Dodge, Pettit, & Bates, 2002; Salmivalli & Helteenvouri, 2007). Reactively aggressive children may be inadvertently reinforced for their aggressive acts, resulting in children starting to use aggression in a more goal-oriented manner (Lansford, Dodge, Pettit, & Bates, 2002).

There is a need for further investigation of the stability of proactive and reactive aggression, particularly from late childhood into early adolescence, as rates of both proactive and reactive aggression appear to peak during this period. This is a critical developmental period with major transitions, particularly the transition from elementary to middle school. This new setting challenges youth to create new social networks, form new social identities, and renegotiate their peer groups (Kelly, Raines, Stone, & Frey, 2010). While the majority of youth navigate this transition and associated changes rather well (Adams, Bartlett, & Bukowski, 2010), still others find it difficult to adjust given the social changes. For instance, research has found that changes in peer relationships during the transition from elementary to middle school have been associated with increases in bullying and peer victimization (Williford, Brisson, Bender, Jenson, & Forrest-Bank, 2011). This emphasizes the need to examine the potential moderating roles social factors have during this developmental period. Thus, the current study examined the stability of self-reports of functions of aggression over time and the potential moderating roles of peer and family factors.

### **Role of social factors**

Research has consistently found associations between proactive and reactive aggression and poor social relationships (e.g., Dodge & Coie, 1987; Price & Dodge, 1989). Ecological systems theory (Bronfenbrenner, 1979) explains that the interaction a child has with their environment influences child development. Specifically, the microsystem, the smallest and most immediate environment in which the child lives, emphasizes the roles peers and family have on the development and adjustment of the child. Social learning theory (Bandura, 1973) emphasizes the importance of social interactions among peers and family on the development of behaviors. Social learning theory draws heavily from the concept of modeling, or the learning of behavior through observation, suggesting that children's behaviors are influenced by their peers' and parents' behavior. Most relevant to the current study and the study sample, the transition from elementary school into larger, middle-level schools is marked by biological (e.g., onset of puberty; Petersen, 1987) and psychosocial changes (e.g., coping, interpersonal relationships, academic expectations; Eccles et al. 1993; Hardy, Bukowski, & Sippola, 2002; Kelly, Raines, Stone, & Frey, 2010). These developmental transitions are also understood within Bronfenbrenner's ecological model, specifically the chronosystem (Bronfenbrenner, 1986), which examines the interaction of environment and biology. For example, the onset of puberty may suggest developmental changes in social relationships (e.g., peer groups) and behaviors (e.g., engagement in more sensation-seeking behaviors), which may be more pronounced in environments that may reinforce maladaptive behaviors (Blakemore, Burnett, & Dahl, 2010). Given this critical developmental transitional period from late childhood to early adolescence and given the current research evidence on the social correlates of proactive and reactive aggression, it is notable that there has been no research examining factors influencing the stability of proactive and reactive aggression as children age into early adolescence. Thus, the current study examined self-reports of both peer (peer delinquency, peer rejection) and family (parental psychological control) factors as potential moderators in the stability of proactive and reactive aggression.

**Peer delinquency.** Peer delinquency is the degree of antisocial or delinquent activity among one's peer group, and affiliation with delinquent peers has been found to be a risk factor for engagement in antisocial behaviors (e.g., Hawkins, Catalano, & Miller, 1992; Erickson, Crosnoe, & Dornbusch, 2000). This association is consistent with the peer socialization model, which posits that delinquent peers influence and encourage their peers to engage in similar delinquent behaviors (Deater-Deckard, 2001). Thus, children learn to engage in delinquent or aggressive behaviors through social learning and peer influence (Bandura, 1973; Fergusson, Swain-Campbell, & Horwood, 2002). The peer selection model further posits that delinquent children select peers who are behaviorally similar, and who provide support for engaging in antisocial and delinquent behaviors (Kandel, 1978; Kandel, Davies, & Baydar, 1990). Therefore, aggressive children seek peers who are similar and support aggressive behavior (Dishion, Patterson, & Griesler, 1994). Examining peer delinquency is particularly important during the developmental transition into adolescence. Warr (1993) suggests that exposure to delinquent peers can be highly stable during adolescence, arguing that delinquent peers, once acquired, are difficult to lose; however, to my knowledge, there is no research that has examined the developmental stability of peer delinquency.

Both selection and socialization processes have been evident in longitudinal research (e.g., Fite, Colder, Lochman, & Wells, 2007b). More specifically, there is research evidence to suggest that proactively, but not reactively, aggressive children tend to associate with other proactively aggressive peers (Poulin & Boivin, 2000) or delinquent peers (Fite et al., 2007b; Fite et al., 2008). For example, Fite, Colder, Lochman, and Wells (2007b) found that high levels of teacher-reported proactive aggression in 5<sup>th</sup> grade were associated with high levels of self-reported peer delinquency in 8<sup>th</sup> grade, which then predicted increases in self-reported substance use in 9<sup>th</sup> grade. However, this association was not evident for reactive aggression. This suggests that peer delinquency mediates the relationship between proactive aggression and substance use, as proactive aggression may lead to a selection into deviant peer groups, who in turn socialize through encouragement and reinforcement

of delinquent or other rule-breaking behaviors such as substance use. However, examining peer delinquency as a moderator of the stability of proactive aggression has not been evaluated. Given that delinquent peers may reinforce proactive aggressive and similar behaviors, it was hypothesized that proactive aggression would be more stable when levels of peer delinquency are high.

**Peer rejection.** Peer rejection can be defined as the extent to which one is actively disliked by one's peers (McDougall, Hymel, Vaillancourt, & Mercer, 2001). Dodge and colleagues (2003) framed peer rejection as a life event and an interpersonal stressor that has an enduring impact on child development and adjustment. Since social relationships provide context for social learning (Bandura, 1973), rejection from peers may prevent a child from learning adaptive social skills and thus influence how a child may react to conflict. Indeed, research has found that peer rejection to be associated with aggressive social problem solving (e.g., Day, Bream, & Pal, 1992), social withdrawal (e.g., Poulin & Boivin, 2000), and poor social skills (e.g., Dodge, Lochman, Harnish, Bates, & Pettit, 1997). Additional empirical results indicate that children who are rejected by their peers tend to exhibit lower academic performance (e.g., Lopes, Cruz, & Rutherford, 2002) and have more academic problems (e.g., lower grade-point averages, increased absenteeism, decreased engagement in activities; Buhs, 2005; Buhs, Ladd, & Herald, 2006; Lopez & DuBois, 2005). Relevant to the current study, there is evidence to suggest that within a sample of Canadian adolescents, peer rejection is stable across the transition from elementary school to middle-level school (Hardy, Bukowski, & Sippola, 2002). This emphasizes the need to understand the role of peer rejection within the current sample, particularly given consistent empirical evidence that has established significant associations between peer rejection and aggression (e.g., Evans, Fite, Hendrickson, Rubens, & Mages, 2015; Fite, Rathert, Stoppelbein, & Greening, 2012).

Within the current literature, it appears that reactive aggression, but not proactive aggression, is more strongly linked with peer rejection (e.g., Evans et al., 2015; Fite et al., 2012). This association can be explained by hostile attributional biases (Nasby, Hayden, & DePaulo, 1980;

Dodge, 2006), which is the tendency to interpret ambiguous or benign behaviors as threatening or hostile. For instance, research has found that reactive aggression was uniquely related to hostile attributions and higher anger responses (de Castro, Merk, Koops, Veerman, & Bosch, 2005). Being quick to anger and having aggressive responses to non-threatening behavior is likely to impact social relationships by creating higher levels of conflict with peers. Additionally, reactively aggressive children may have higher levels of conflict with peers due to lack of social problem-solving skills (Poulin & Boivin, 1999) or adaptive emotion regulation to solve conflict (Trentacosta & Shaw, 2009). The association between reactive aggression and peer rejection is also seen throughout development. For instance, reactively aggressive individuals are perceived to have lower social status and are rejected in early childhood samples ranging from kindergarten to 3<sup>rd</sup> grade among teacher-reports (e.g., Dodge & Coie, 1987; Price & Dodge, 1989). Additionally, studies have found similar results in that reactively aggressive youth were perceived to be socially rejected in middle childhood and adolescence as measured by teacher-reports (e.g., Poulin & Boivin, 2000; Prinstein & Cillessen, 2003). This is in contrast to proactive aggression, which research has indicated is positively associated with high social preference in childhood (e.g., Price & Dodge, 1989) and high levels of popularity in adolescence (e.g., Prinstein & Cillessen, 2003).

Peer rejection has been examined as a moderator of outcomes associated with reactive aggression. Specifically, Fite, Rubens, Preddy, Raine, and Pardini (2014) found that adolescents with high levels of reactive aggression were more likely to have higher levels of internalizing symptoms at high levels of peer rejection. However, peer rejection has not been examined as a moderator in the stability of reactive aggression. Associated characteristics of reactive aggression such as higher levels of peer conflict, lack of social problem-solving skills, or adaptive emotion regulation may influence the stability of reactive aggression. Additionally, reactively aggressive youth are more likely to be rejected by their peers in middle childhood and adolescence. Thus, it was hypothesized that reactive aggression would remain stable over time at high levels of peer rejection.

**Parental psychological control.** One family factor to consider in the stability of aggressive behavior is parenting. Generally, parenting has been established as an important social influence across child development, with previous research literature examining different conceptual understandings of parental control (e.g., parental monitoring, coercive parenting; Barber, 1992; Barber, 1996; Lansford et al., 2006). Specifically, parental psychological control, or attempts to control the psychological and emotional developmental of an individual, has been associated with maladaptive outcomes, including aggression (Barber, 1996; Blossom, Fite, Frazer, Cooley, & Evans, 2016). The use of parental psychological control creates an environment that limits a child's ability to develop self-awareness and perception of emotion and to develop a sense-of-self by limiting exposure to prosocial interactions and adaptive emotional expression (Youniss & Smollar, 1985). Psychological control differs from other parenting practices, such as behavioral control, in that behavioral control consists of parental supervision and monitoring, setting limits to behaviors, and regulating structure. While research has established associations between parental behavioral control (e.g., harsh, inconsistent parenting) and functions of aggression (e.g., Dodge, Lochman, Harnish, Bates, & Pettit, 1997), there is limited research that have examined the associations between parental psychological control and the functions of aggression; thus, the current study sought to address this gap in the literature.

While the majority of research examining the effects of parental psychological control have focused on internalizing behaviors such as depression, withdrawal, and loneliness (for review, see Barber, 2002), there is literature that indicates some evidence that parental psychological control is also associated with externalizing behaviors (Barber 1996; Conger, Conger, & Scaramella, 1997; Gray & Steinberg, 1999). Social learning theory (Bandura, 1973) may be instrumental in understanding how psychological control contributes to the functions of aggression. Specifically, children with psychologically controlling parents are exposed to a manipulative and controlling interaction and communication style, which may model and foster the development of proactive

aggression. Indeed, Rathert, Fite, Gaertner, and Vitulano (2011) found a positive trend between child-reported psychological control and teacher-reported proactive aggression in a sample of 9-12-year-olds; however, it should be noted that the trend was not statistically significant, warranting further examining of this association. However, there may also be a link between psychological control and reactive aggression, which may be understood within an attachment framework (Bowlby, 1969). Children with psychologically controlling parents may fail to understand positive, social relationships, and may be led to interpret social relationships to be antagonistic. This social interpretation may lead to more reactionary, or aggressive responses when confronted with conflict (Michiels, Grietens, Onghena, & Kuppens, 2008; Simons, Paternite, & Shore, 2001).

Given the paucity of research in this area, the current study seeks to extend the current literature by examining the associations between parental psychological control and the functions of aggression. Additionally, parental psychological control has not been evaluated as a moderator in examining the functions of aggression and distinct outcomes. Given the current evidence, it was hypothesized that both proactive and reactive aggression would remain stable over time at high levels of parental psychological control.

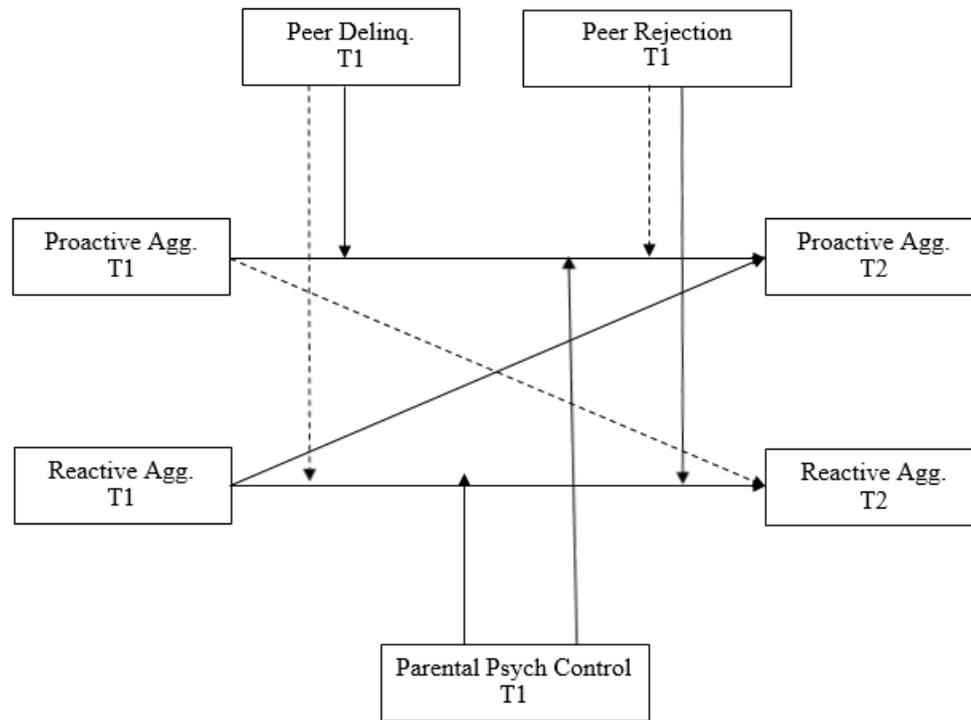
### **Current study**

The current study sought to examine the 3-year stability of proactive and reactive aggression, operationalizing stability as associations between proactive and reactive aggression scores over time. Please see Figure 1 for a visual, conceptual model. Given previous research (e.g., Barker et al., 2006; Fite et al., 2008), moderate to high stability of self-reports of both proactive and reactive aggression was expected across 3 years. Additionally, it was hypothesized that reactive aggression at Time 1 (T1) would predict higher levels of proactive aggression at Time 2 (T2), but not vice versa, consistent with previous research (e.g., Lansford et al., 2002).

Self-reports of social factors (i.e., peer delinquency, peer rejection, and parental psychological control) were considered as potential moderators of the associations between levels of

proactive and reactive aggression at T1 and T2. Given the theoretical distinctions between proactive and reactive aggression (Dodge, 1991; Dodge & Coie, 1987), these social factors were expected to have differential moderating effects on the stability of aggression. Regarding peer delinquency, it was expected to be uniquely associated with proactive, but not reactive, aggression. Furthermore, it was hypothesized that peer delinquency would moderate the relation between T1 and T2 levels of proactive aggression, such that the positive association between T1 and T2 proactive aggression would be stronger for those with higher levels of peer delinquency. Regarding peer rejection, it was expected that it would be uniquely related to reactive, but not proactive aggression. It was also hypothesized that peer rejection would moderate the relation between T1 and T2 levels of reactive aggression, such that the positive association between T1 and T2 levels of reactive aggression would be stronger for those with higher levels of peer rejection. Lastly, it is theoretically plausible parental psychological control may have an association with both proactive and reactive aggression, but the literature examining these associations is sparse. Given the current research evidence, it was expected that both proactive and reactive aggression would be associated with parental psychological control. Additionally, it was expected that parental psychological control would moderate the association between both T1 and T2 proactive and reactive aggression, such that the association between T1 and T2 levels of proactive and reactive aggression would be stronger at higher levels of parental psychological control.

Figure 1. Conceptual Model



## Methods

### Participants

Participants included youth who were in 3<sup>rd</sup> through 5<sup>th</sup> grade in 2013 at a public elementary school in a small, Midwestern community in the United States. The public elementary school was the only elementary school in the school district; thus, the majority of students from elementary school transitioned to the same middle school within the district. Notably, the school district was concurrently implementing Social-Emotional Learning curricula within their elementary school during the time of data collection. Students who were not receiving special education services were recruited for participation (N = 381). Specifically, students who were receiving special education services that removed them from their regular classrooms, as well as student who required paraprofessional support to complete questionnaires, were not recruited. Recruitment was conducted during parent-teacher conferences and by sending consent forms home to caregivers. At T1, consent

forms were returned by 78% of the recruited third through fifth grade students (N = 297). The age range of students from T1 ranged from 8 years old to 12 years old. Of the returned consent forms, 94% of caregivers provided permission for their child to participate in the current study (N = 279). Three years later (T2), data collection occurred in the only middle school of the same school district when participants are in 6<sup>th</sup> through 8<sup>th</sup> grade in 2017. The age range of students in T2 ranged from 12 years old to 15 years old. Consent forms for T2 participation were included in back-to-school registration paperwork. 161 students (51.6% female) of the 297 students from T1 consented for T2 data collection (54%). School records indicated that students are predominantly Caucasian, as less than 20% of the student body identified as a racial/ethnic minority. Socioeconomic information was not available for the participants; however, approximately 35% of the student body was eligible for free or reduced lunch.

## **Measures**

Given the developmental age of the sample as well as the constructs examined, self-reported measures of all constructs were used. Youths' perception of social relationships is particularly valuable, as caregivers and teachers may not be aware of the presence of peer interactions and youth's perceptions of these interactions. Similarly, the functions of aggression are distinguished based on the motivations of engaging in aggressive behaviors; thus, self-reports are utilized given that previous research has also indicated that children and adolescents have been found to be valid and reliable informants of their behaviors (e.g., Cashel, 2003; Darrick et al., 2003).

**Proactive and reactive aggression.** Proactive and reactive aggression were assessed using self-reports of the proactive and reactive aggression questionnaire (Dodge & Coie, 1987), a 6-item questionnaire with three items to assess proactive aggression (e.g., "I get other kids to gang up on somebody that I don't like") and three items to assess reactive aggression (e.g., "When I have been teased or threatened, I get angry easily and strike back"). The six items are rated on a 5-point Likert scale (1 = *Never*, 5 = *Almost Always*). Ratings were averaged to obtain overall scores for reactive and

proactive aggression, where higher scores indicated higher levels of aggression. This measure has been used with youth and has demonstrated good reliability and validity among children and adolescents (e.g., Fite, Stoppelbein, & Greening, 2009). The internal consistencies for both scales were modest at T1 (reactive  $\alpha = .52$ , proactive  $\alpha = .65$ ). T2 internal consistencies were good for both reactive ( $\alpha = .74$ ) and proactive ( $\alpha = .94$ ) aggression.

**Peer delinquency.** Peer delinquency was assessed using self-report on Fergusson, Woodward, and Horwood's (1999) delinquency items. Participants responded to fourteen questions about whether their friends had engaged in various antisocial and deviant behaviors (e.g., "Stolen things from parents or family members?" "Skipped school without parents' permission?" "Purposefully damaged property...?") within the past year. Delinquent behaviors endorsed were summed across items, with higher scores representing greater levels of peer delinquency. Due to the dichotomous response options, internal consistency was not computed for the measure (Cohen et al., 2003).

**Peer rejection.** Peer rejection was assessed via four items on the Youth Self Report (YSR; Achenbach & Edelbrock, 1991). Participants reported on individual experiences with various forms of social rejection (e.g., "I don't get along with other kids," "I feel others are out to get me," "I get teased a lot," "I am not liked by other kids.") on a 3-point Likert scale (1 = *Not true*, 2 = *Sometimes or somewhat true*, 3 = *Very or often true*). Ratings were averaged, with higher scores indicating higher levels of peer rejection. Previous work has provided evidence for the convergent, divergent, and criterion-related validity for this scale (e.g., Fite, Hendrickson, Rubens, Gabrielli, & Evans, 2013; Evans, Pederson, Fite, Blossom, & Cooley, 2015). Previous research has also demonstrated significant correlations between self-report (e.g., Zimmer-Gembeck et al., 2013), peer nominations, and teacher-report of peer rejection (e.g., Cillessen, Terry, Coie, & Lochman, 2002; Sandstrom & Schanberg, 2004). The internal consistency for the peer rejection subscale was adequate ( $\alpha = .53$ ).

**Parental psychological control.** Participants were asked to respond to the 10-item Psychological Control Scale (PCS; Barber, 1996). Each item began with the prompt, “My parent...” and participants were asked to rate items on a three-point Likert scale (1 = *Not like my parents*, 2 = *Somewhat like my parents*, or 3 = *A lot like my parents*). Participants were instructed to rate items based on their current parent(s)/caregiver(s) with whom they currently reside. Items included statements such as “...often interrupts me,” “...blames me for other family members' problems,” or “...brings up my past mistakes when she/he criticizes me.” The PCS is a widely used measure of parental psychological control and has demonstrated both concurrent and predictive validity for a number of youth psychosocial outcomes (Barber, 1996; Bean, Barber, & Crane, 2006). In the current study, mean scores for response ratings were computed, with higher scores indicating greater perceived parental psychological control. Internal consistency for this measure was good in the current sample ( $\alpha = .77$ ).

## **Procedures**

The study was approved by the university’s Institutional Review Board as well as by school administrators. T1 student data collection occurred approximately 12 weeks after the start of the fall semester of 2013. Self-report measures were collected through group administration over the course of 1 week. Students were assured of the confidentiality of their responses and provided verbal assent prior to their participation (100% agreed to participate). During the 30-min testing session, a research assistant read standardized instructions to the students, provided a description of the response scales, and then read each questionnaire item aloud. Trained research assistants circulated through the classroom to answer individual questions and help children who had difficulty reading or understanding particular items. No school personnel, including teachers, were present during T1 data collection in order to emphasize confidentiality and reduce bias and social desirability in students’ responses. All third through fifth grade classrooms received a \$50 donation for school supplies following each data collection.

T2 student data collection occurred approximately three years later in 2017. Similar procedures as with T1 data collection were followed; however, self-report measures were collected through group administration via personal laptop computers provided by the school district. Further, no school personnel were present during T2 data collection in order to emphasize confidentiality and reduce bias in students' responses. No compensation was provided for students for participating in T2 data collection.

### **Data Analysis Plan**

Analyses were conducted using Mplus (version 8; Muthén & Muthén, 2018). Unidimensional statistics were first estimated in order to evaluate descriptive statistics and correlations among study variables. Correlations among variables of interest were calculated to examine bivariate associations. Correlations between potential control variables (i.e., grade, gender) and study variables were calculated in order to determine which control variables will be included in analyses. Gender was included in the model as a control variable given previous research establishing gender differences in proactive and reactive aggression (e.g., Baker et al., 2008) as well as within the literature of social factors such as peer rejection and delinquency (e.g., Hardy, Bukowski, & Sippola, 2002). Similarly, grade was entered as a control variable given research evidence to suggest differences in level of the functions of aggression and social functioning across grades (e.g., Fite et al., 2008).

All variables were standardized prior to analyses to aid in the interpretation of the results. In order to evaluate stability of proactive and reactive aggression, partial correlation analyses between each subtype of aggression were conducted across the two time points. Next, a main effects path model was estimated using Mplus for each dependent variable (i.e., proactive aggression [Model 1], reactive aggression [Model 2]). In Model 1, T2 proactive aggression was regressed onto T1 control variables (i.e., grade, gender), T1 reactive aggression, T1 proactive aggression, T1 peer delinquency,

T1 peer rejection, and T1 parental psychological control. Model 2 was estimated similarly, but with T2 reactive aggression being regressed onto the all T1 variables.

In order to evaluate moderating hypotheses, a series of interaction terms were added to the model. Separate multiplicative interaction terms testing moderations (i.e., T1 proactive aggress X T1 peer delinquency, T1 proactive aggression X T1 peer rejection, and T1 proactive aggression X T1 parental psychological control) were added separately to the model. These series of interaction terms were replicated using reactive aggression as the independent variable. Significant interactions were probed at high (+1 SD) and low (-1 SD) values according to standard procedures (Aiken & West, 1991).

All models were estimated using full information maximum likelihood (FIML) estimation, which estimates a likelihood function for each individual based on the variables present in order to use all available data. FIML has been found to produce unbiased parameter estimates and standard errors compared to other strategies (e.g., listwise deletion, MAR, MCAR) that are used to accommodate up to 50% missing data (Arbuckle, 1996). A statistical power analysis indicated that in order to detect significant moderate to large effect sizes, a sample size of 113 will be required (Cohen, 1988). Previous studies (e.g., McAuliffe et al., 2007; Fite et al., 2008) used samples sizes ranging from 57 to 126 and have been able to detect moderate to large effect sizes.

## **Results**

### **Descriptive Statistics**

Refer to Table 1 for means, standard deviations, ranges of scores, and correlations of all study variables. With the exception of T1 and T2 proactive aggression (skewness=4.3 & 6.0, respectively), skewness of study variables was less than 3, suggesting nonnormality was not a concern in the current sample (Kline, 2005). Correlation analyses indicated that participants who had higher levels of reactive aggression at T1 were more likely to report higher levels of T2 reactive aggression, T1 proactive aggression, T1 peer rejection, and T1 peer delinquency. Participants who

had higher levels of T1 proactive aggression were more likely to report T1 reactive aggression, T1 peer rejection, T1 peer delinquency, and T2 reactive aggression. T1 parental psychological control was not statistically associated with either T1 reactive aggression or T1 proactive aggression. Neither T1 reactive nor proactive aggression were significantly correlated with T2 proactive aggression. T1 peer rejection was positively associated with T1 peer delinquency, such that higher levels of peer rejection were associated with higher levels of peer delinquency. Similarly, a significant association was found between T1 peer rejection and T1 parental psychological control, in that higher levels of peer rejection were associated with higher levels of parental psychological control. Lastly, a significant association was found between peer delinquency and parental psychological control such that high levels of peer delinquency were significantly associated with higher levels of parental psychological control.

### **Stability Analyses**

Partial correlation analyses were conducted to assess the stability of proactive and reactive aggression. With this approach, and consistent with prior research studies, the shared variance between each subtype was considered. Thus, the stability of proactive and reactive aggression was conducted by controlling for the other subtype in each analysis.

Refer to Table 2 for the results of the partial correlations. First, the stability of T1 proactive aggression to T2 proactive aggression was analyzed. T1 and T2 reactive aggression variables were included as control variables. T1 proactive aggression was not significantly associated with T2 proactive aggression ( $r = -.04$ ,  $p = .36$ ). The complementary format was used to assess the stability of T1 reactive aggression to T2 reactive aggression. Contrary to proactive aggression, T1 reactive aggression was found to be significantly associated with T2 reactive aggression ( $r = .20$ ,  $p = .02$ ). Results indicate that, while accounting for the variable attributable to the other subtype of aggression at both time points, reactive, but not proactive, aggression was stable over three years.

Further partial correlations were conducted to assess the associations between T1 proactive aggression and T2 reactive aggression, as well as the converse. Results indicated that T1 proactive aggression was unrelated to T2 reactive aggression when converse subtypes of aggression were included as covariates ( $r = .07, p = .39$ ). Similarly, T1 reactive aggression was found to be unrelated to T2 proactive aggression when the other subtypes of aggression were included ( $r = -.01, p = .88$ ).

### **Path Models**

Path models were conducted to evaluate the unique first-order and interaction effects. The model examining proactive aggression as the dependent variable was first examined (Model 1, see Table 3). T2 proactive aggression was simultaneously regressed on grade, age, gender, T1 reactive aggression, T1 proactive aggression, T1 peer delinquency, T1 peer rejection, and T1 parental psychological control. Neither grade, nor age, nor gender, were significantly related to T2 proactive aggression. Additionally, neither T1 reactive aggression ( $\beta = .02, p = .81$ ) nor T1 proactive aggression ( $\beta = -.05, p = .30$ ) were significantly related to T2 proactive aggression. As anticipated, T1 peer rejection was not related to T2 proactive aggression ( $\beta = .07, p = .31$ ), and surprisingly, T1 peer delinquency was also not found to be related to T2 proactive aggression ( $\beta = .14, p = .32$ ). T1 Parental psychological control was not found to be significantly related to T2 proactive aggression ( $\beta = -.10, p = .23$ ). The interaction terms between T1 proactive aggression and each of the three moderators (i.e., T1 peer rejection, T1 peer delinquency, and T1 parental psychological control) were calculated and added individually to Model 1. Analyses indicated that all three interactions were not statistically significant such that the interaction between T1 proactive aggression and T1 peer rejection was not associated with T2 proactive aggression ( $\beta = .02, p = .82$ ), the interaction between T1 proactive aggression and T1 peer delinquency was not associated with T2 proactive aggression ( $\beta = .01, p = .82$ ), and the interaction between T1 proactive aggression and T1 parental psychological control was not associated with T2 proactive aggression ( $\beta = .04, p = .26$ ).

The first order effects model examining reactive aggression as the dependent variable was examined next (Model 2; see Table 4). T2 reactive aggression was simultaneously regressed on grade, age, gender, T1 reactive aggression, T1 proactive aggression, T1 peer delinquency, T1 peer rejection, and T1 parental psychological control in order to examine unique associations. Neither age nor gender were significantly related to T2 reactive aggression. Grade was found to be significantly related to T2 reactive aggression, such that participants in higher grades were related to higher levels of T2 reactive aggression. Additionally, neither T1 reactive aggression ( $\beta = .20, p = .12$ ) nor T1 proactive aggression ( $\beta = .04, p = .78$ ) were significantly related to T2 reactive aggression. As expected, T1 peer delinquency was not found to be related to T2 reactive aggression ( $\beta = .08, p = .31$ ); however, T1 peer rejection was also not found to be related to T2 reactive aggression ( $\beta = .01, p = .91$ ). Lastly, T1 parental psychological control was not found to be related to T2 reactive aggression ( $\beta = -.12, p = .09$ ). The interaction terms between T1 reactive aggression and each of the three moderators (i.e., T1 peer rejection, T1 peer delinquency, and T1 parental psychological control) were then individually added to the model to examine interaction effects. The interaction between T1 reactive aggression and T1 peer delinquency was found to be significant ( $\beta = .14, p < .05$ ); the association was probed at high and low levels ( $\pm 1SD$ ) of peer delinquency in order to further understand the nature of the interaction. As seen in Fig. 2, T1 reactive aggression was related to T2 reactive aggression when levels of T1 peer delinquency were high ( $\beta = .32, p = .01$ ); however, were unrelated when levels of T1 peer delinquency were low ( $\beta = .04, p = .80$ ). The interactions between T1 reactive aggression T1 peer rejection ( $\beta = -.14, p = .09$ ) and T1 parental psychological control was not associated with T2 reactive aggression ( $\beta = .05, p = .61$ ).

## Discussion

The current study contributes to the literature by examining the stability of the functions of aggression over three years from middle childhood into early adolescence and examining the moderating roles of three social factors (i.e., peer rejection, peer delinquency, and parental

psychological control). Findings from this study were mixed with regards to study hypotheses such that reactive, but not proactive, aggression was found to be stable over three years and only one social moderator, peer delinquency, was found to influence the stability of reactive aggression.

### **Stability of Proactive and Reactive Aggression**

According to previous studies examining stability over one year (i.e., Fite & Colder, 2007a; McAuliffe et al., 2007; Murray-Close & Ostrov, 2009), both proactive and reactive aggression have been found to be moderately to highly stable over time; thus, it was expected that both functions of aggression would be stable over time within the current sample. However, results of the current study indicated that only reactive, not proactive, aggression was stable over three years from late childhood to early adolescence. These results may be better understood within the context of previous studies examining developmental trajectories of the functions of aggression (i.e., Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006; Fite et al., 2008), both of which found that both proactive and reactive aggression peak at the transition to middle school (5<sup>th</sup>-6<sup>th</sup> grade) with decreasing levels thereafter. Barker, Tremblay, Nagin, Vitaro, and Lacourse (2006) found, among a sample of adolescent boys, that reactive aggression was less variable over time compared to proactive aggression and posited that reactive aggression may remain more stable due to social (e.g., negotiating peer groups) and biological (e.g., puberty) developmental transitions between middle childhood and early adolescence that may influence abilities to regulate emotionally-based reactions. Reactive aggression may also be viewed as more common, and in some cases, as an acceptable or tolerable behavior, which may continue to reinforce youth to continue engaging in reactively aggressive behavior (e.g., Useche, Sullivan, Merk, & Orobio de Castro, 2014). It may also be that proactive aggression may be more variable and less stable given the amount of teacher monitoring and contingences on such behavior. Additionally, there have been an increase in a variety of classroom- and school-wide bullying prevention programs implemented in schools (e.g., Jenson, 2010; Farrington & Ttofi, 2009), which may impact overall school climate to discourage proactive aggression (e.g., bullying). It is

noteworthy that previous studies examining stability of proactive and reactive aggression utilized teacher-report of aggression (Fite et al., 2008) or self-report among a sample of older, adolescent boys (Barker et al., 2006). While previous research suggests the use of teacher-reports with younger samples, utilization of self-report among preadolescent and adolescent populations may be valuable given potential less monitoring and supervision by teachers in middle school. Additionally, the functions of aggression are characterized by the motivations of engaging in aggressive behaviors; therefore, it is valuable to utilize self-report to further understand “why” youth may engage in aggressive behaviors. Moreover, past studies that have examined stability and trajectories over one year utilized a high-risk aggressive sample (Fite et al., 2008) or a sample characterized as low socioeconomic adolescent boys (Barker et al., 2006). It is also important to note that the significance of the current findings may lie within the measure of proactive and reactive aggression, which consists of items examining more physical rather than relational forms of aggression and research indicates that while physical aggression decreases, relational aggression increases during this developmental period (Fite & Pederson, 2018). Barker and colleagues (2006) examined forms (i.e., physical and relational) and functions (i.e., proactive and reactive) aggression in their study; thus, it may be important to use measures examining both forms and functions of aggression to further examine stability of aggression across this developmental period. The current study addressed some gaps in the literature by examining the stability of the functions of aggression among a non-clinical, community sample and utilizing self-reports over time. It may be warranted for future studies to examine associations in diverse samples and consider the use of multiple informants in the measurement of the functions of aggression, particularly accounting for the developmental ages of study populations.

Notably, partial correlation analyses indicated that T1 reactive aggression was unrelated to T2 proactive aggression and vice versa, which is consistent with previous research (e.g., McAuliffe

et al., 2007). Additionally, contrary to hypotheses, first-order effects revealed that T1 reactive aggression did not predict levels of T2 proactive aggression. Previous researchers have demonstrated evidence to suggest that reactive aggression predicts proactive aggression (e.g., Camodeca et al., 2002; Salmivalli & Helteenvouri, 2007), with researchers hypothesizing that reactively aggressive children may learn from social experience that engaging in aggressive behaviors is effective in achieving a goal, thus engaging in characteristically proactive aggressive behaviors over time. However, such studies examined other variables such as experiences of bullying and victimization that may have influenced such associations. Additionally, previous studies have utilized external reporters (i.e., caregiver- and teacher-reports) of aggressive behaviors (e.g., Fite & Colder, 2007a; Fite et al., 2008), which also may have accounted for these associations given that proactively aggressive behaviors (e.g., bullying, dominating others) may be more observable and reported by peers and teachers.

### **Peer Delinquency**

The present study further contributes to the literature of peer delinquency and the functions of aggression as it is currently the first to examine peer delinquency as a moderator of the stability of proactive and reactive aggression. Given consistent research indicating significant associations between peer delinquency to proactive aggression (e.g., Fite et al., 2007), it was hypothesized that T1 peer delinquency would be positively associated with proactive, not reactive, aggression and moderate associations between T1 and T2 levels of proactive aggression. Contrary to hypotheses, T1 peer delinquency did not moderate the relation between T1 and T2 proactive aggression. Given that peer delinquency is characterized as engagement in rule-breaking behavior, it may be that socioemotional curriculums, which are becoming more commonplace among schools, may play a role in this finding.

Unexpectedly, T1 peer delinquency was found to moderate the association between T1 and T2 reactive aggression. Previous research suggests associations between proactive aggression and

peer delinquency can be explained by social learning (Bandura, 1973) and peer socialization (Deater-Deckard, 2001). Research also suggests that reactive aggression is linked with negative emotionality and poor emotion regulation (e.g., Trentacosta & Shaw, 2009). It may be that individuals who are reactively aggressive and have some involvement in delinquent peer groups who may not model effective emotion regulation, will continue to engage in reactively aggressive behaviors.

Additionally, associating with delinquent peer groups may foster hypervigilance to threat and punishment cues from delinquent peers, which may maintain and reinforce behavioral characteristics of reactive aggression (e.g., impulsivity, hostile attributions).

### **Peer Rejection**

The present study is also the first to examine the role of peer rejection as a moderator of the stability of proactive and reactive aggression. Given research evidence indicating significant associations between peer rejection to reactive aggression (e.g., Dodge & Coie, 1987; Evans, Fite, Hendrickson, Rubens, & Mages, 2015; Price & Dodge, 1989), it was expected that T1 peer rejection would be significantly associated with reactive, but not proactive, aggression and moderate associations between T1 and T2 levels of reactive aggression. Consistent with hypotheses, T1 peer rejection was not found to be significantly associated with proactive aggression such that individuals who are rejected by peers did not report higher levels of proactive aggression. This is consistent with previous literature showing nonsignificant results in the associations between proactive aggression and peer rejection and general social functioning (e.g., Price & Dodge, 1989; Prinstein & Cillessen, 2003). However, contrary to expectations, T1 peer rejection was not significantly associated with reactive aggression in first-order regression models, suggesting that individuals who are rejected by peers do not report higher levels of reactive aggression. It is important to note that peer rejection was assessed using self-report and only reflects individuals' perception of rejection. However, the experience of peer rejection may be broader than just an individuals' perception and an individual may not recognize other negative, rejecting behaviors from peers that may be more observed from an

external reporter (e.g., teacher, peer). Reactively aggressive behavior may also be perceived as acceptable, which may not lead to being rejected by peers if such behaviors are more commonplace.

The interaction term between T1 reactive aggression and T1 peer rejection was found to be nonsignificant when introduced to the model. It is likely that the stability of reactive aggression may be moderated by social skill deficits (e.g., social problem-solving skills) or underlying emotion dysregulation, which research has also found to be significantly associated with both peer rejection and reactive aggression (e.g., Poulin & Boivin, 1999; Trentacosta & Shaw, 2009). Given that, to our knowledge, this is the first study to examine moderators in the stability of reactive aggression, future research should continue examining other potential moderating factors to continue elucidating points of intervention.

### **Parental Psychological Control**

The literature on parental psychological control and its association with externalizing behaviors such as the functions of aggression is limited. Thus, study hypotheses were exploratory and based on limited research (i.e., Rathert et al., 2011). Given that associations between parental psychological control and proactive and reactive aggression can be understood within a social learning framework (Bandura, 1973), it was expected that psychological control would be positively associated with both proactive and reactive aggression and both proactive and reactive aggression would be stable at high levels of parental psychological control. Results of the study were contrary to hypotheses and indicated that parental psychological control was not associated with either reactive or proactive aggression in first order models. Moreover, interaction terms in each model were found to be nonsignificant. These nonsignificant findings provide evidence to continue further research to elucidate potential associations and pathways between parental psychological control and the functions of aggression. It may be that associations between parental psychological control and the functions of aggression can be explained through complex pathways. For example, research has demonstrated that parental psychological control is associated with poor emotional development and

expression (Barber, 1996; Youness & Smollar, 1985), which are also emotional characteristics used to describe individuals who are reactively aggressive. Additionally, parental psychological control is characterized as a manipulative and controlling communication style, which if socially modeled to children, can be used in a proactively aggressive manner. Research in this area would benefit from exploring such potential underlying factors to continue contributing to the field of parental psychological control and the functions of aggression.

### **Limitations**

Findings of the current study must be considered in the context of study limitations. First, while the measures used have been previously validated and found to be reliable in similar populations, all measures were self-report. The utilization of self-report measures with the age of the current sample is valuable to understand youths' perception of the motivation behind behavior and perceptions of social relationships as caregivers and teachers may not be as accurate reporters. While the decision to utilize self-reports was made given evidence from previous research that indicate that self-reports as valid and reliable informants of behaviors (e.g., Cashel, 2003; Darrick et al., 2003), it is also understood that solely relying on self-report measures may result in mono-informant bias. Utilizing multi-informant (i.e., parent, teacher, peer nominations, self) measures may be beneficial for future researchers to consider when examining similar constructs across different settings and perspectives. For example, with respect to the current study variables, including peer nominations, self-reports, and teacher-reports would likely bolster the validity in the measurement of several constructs such as aggression, peer rejection, and peer delinquency. Additionally, the internal consistencies were low among several measures (e.g., T1 proactive and reactive aggression, T1 peer rejection), which is likely attributable to small number of items associated with the measures (e.g., McAuliffe et al., 2007). While these measures have previously demonstrated good internal consistencies in past research studies (Evans, Pederson, Fite, Blossom, & Cooley, 2015; Fite, Hendrickson, Rubens, Gabrielli, & Evans, 2013; Fite, Stoppelbein, & Greening, 2009), future

research should utilize and further evaluate reliability to ensure the use of psychometrically sound measures.

A second limitation is that this sample was recruited from a small, Midwestern, school and was predominantly comprised of Caucasian youth. Utilizing such a sample limits the generalizability of the findings. Future research should continue examining these relations among other community and clinical samples, including samples from diverse racial/ethnic and socioeconomic backgrounds, in order to better understand these relations across different populations. Moreover, it is important that researchers continue utilizing longitudinal methods to assess and elucidate developmental trajectories between social factors and the functions of aggression. The age of the current study sample also limits generalizability as it focuses on individuals from late elementary school through middle school. It would be important to understand how developmental trends may differ across the lifespan and across important transitional developmental periods such as the entry into structured school settings (e.g., preschool), entering high school, as well as entering college (emerging adulthood). Future research should also focus on underlying mechanisms (e.g., emotion regulation) involved in the associations between various social factors and the functions of aggression.

Third, the functions of aggression was assessed with items asking participants about behaviors more characterized as physical rather than relational forms of aggression, most notably with reactive aggression. Research has found that the forms (i.e., physical and relational) and functions (i.e., reactive and proactive) of aggression are interrelated (e.g., Marsee, Lau, & Lapre, 2014), with the majority of research suggesting significant gender differences in engagement in the forms of aggression (e.g., Crick & Grotpeter, 1995). For example, meta-analytic results indicated that boys are more likely to exhibit physical aggression while girls more likely to exhibit relational aggression (Card et al., 2008). Future studies should assess both the forms and functions of aggressive behavior as a means to understand the stability of aggressive behaviors over time as well

as clarify points of intervention for aggressive behaviors, particularly taking into account potential gender differences in associations.

Fourth, the current study sought to examine important social, contextual factors that may influence the stability of aggressive behaviors. One important context that was not assessed was the school environment, including potential factors such as academic performance and school climate. Previous research has established that both forms and functions of aggression are associated with negative academic outcomes (e.g., Fite et al., 2013; Risser, 2013), as well as associations between peer rejection and academics (e.g., Buhs, Ladd, & Herald, 2006) and delinquency and academics (e.g., Siennick & Staff, 2008). It will be important for future research to consider the role of academic factors on the stability of aggressive behaviors to discover potential points of intervention that may be effective targeting aggressive behaviors among youth.

### **Implications**

Despite the limitations described, the current study extends the current literature by examining the role of three social factors in the stability of proactive and reactive aggression. Particularly, the current student examined the 3-year stability of proactive and reactive aggression across an important developmental period of late childhood into early adolescence. It is important to understand the stability of the functions of aggression as well as potential moderating factors in order to develop relevant and effective interventions during crucial developmental periods. The findings from the current study suggests that reactive aggression, but not proactive aggression, was stable over three years in this study sample. Given the theoretical distinction and unique associations with reactive aggression, it will be important to continue identifying factors that may be maintaining the stability of reactive aggression across this developmental period. Socioemotional curriculums may be beneficial in addressing characteristics unique to reactively aggressive youth. For instance, previous research has documented associations between reactive aggression and emotion regulation (e.g., Trentacosta & Shaw, 2009); thus, teaching appropriate emotion identification and coping may be an

effective point of intervention. Moreover, given that reactively aggressive individuals may hold a negative perception or hostile attribution to social interactions (e.g., Dodge, 2006), it may be beneficial to incorporate practices in perspective taking and social problem-solving skills in socioemotional curriculum. Interventions must also be tailored if targeting proactively aggressive behaviors. Given that proactive aggression is described as goal-oriented and focusing on positive outcomes of engaging in aggressive behaviors (e.g., Dodge et al., 1997), interventions targeting proactive aggression may need to include disciplinary action for aggressive behaviors in order to place a focus on potentially negative outcomes for engaging in aggressive behaviors. Increased monitoring from teachers and school staff may also be beneficial given that being unsupervised may be a risk factor for engagement in problem behavior (Gottfredson, Gottfredson, & Weisman, 2001). It is important to remember that any intervention will likely need to include a combination of strategies due to the frequent co-occurrence of proactive and reactive aggression.

Results also suggested that T1 reactive aggression (3<sup>rd</sup>-5<sup>th</sup> grade) was related to T2 (6<sup>th</sup>-8<sup>th</sup> grade) reactive aggression when levels of T1 peer delinquency were high. These findings indicate that interventions targeting peer delinquency may be beneficial in the prevention of reactive aggression. Strategies and interventions targeted to improving social relationships and development of social problem-solving skills may be beneficial in promoting prosocial behaviors and relationships. For example, social skills groups and encouragement to engage in social activities that promote prosocial interactions may facilitate development of appropriate peer groups. Additionally, efforts to provide structured activities in school and in the community may provide spaces to facilitate positive relationships, mentorship, and supervision to prevent the development of delinquent peer groups and engagement in rule-breaking behaviors.

Results of the current study are important as research has demonstrated early aggressive behaviors may be precursors to more severe rule-breaking and antisocial behavior (e.g., Paradise & Cauce, 2003; Taylor et al., 2002). This emphasizes the importance of early intervention to reduce

aggressive behaviors for the prevention of more severe antisocial behaviors, particularly planning for the transition from elementary school to middle school. One such intervention, Coping Power (Lochman, Wells, & Lenhart, 2008), has been found to be effective in randomized controlled trials and adaptable to be used in school settings (for review, see Powell et al., 2011). Coping Power pulls from cognitive-behavioral techniques to help youth develop skills in emotion identification and coping, as well as with perspective taking and social problem-solving. Future research should continue to accumulate evidence for different mechanisms underlying and maintaining the stability of the functions of aggression as it will hold important implications for the development of targeted preventative interventions.

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## Appendix A: Measures

### Proactive and Reactive Aggression (Dodge & Coie, 1987)

**Instructions:** Please answer the following questions according to the scale below.

	Never	Very Rarely	Sometimes	Often	Almost Always
1. When I have been teased or threatened, I get angry easily and strike back.	1	2	3	4	5
2. I feel that other children are to blame in a fight and feel that they started the trouble.	1	2	3	4	5
3. When someone accidentally hurts me (such as bumping into me), I assume that the peer meant to do it and then react with anger/fighting.	1	2	3	4	5
4. I get other kids to gang up on somebody that I do not like.	1	2	3	4	5
5. I use physical force (or threaten to use physical force) in order to dominate other kids.	1	2	3	4	5
6. I threaten or bully others in order to get my own way.	1	2	3	4	5

Peer Delinquency  
(Fergusson, Woodward, & Horwood, 1999)

**Instructions:** Below are some things that kids do. Give your best guess as to whether your friends did these things in the past year. Make sure you circle *Yes* or *No*.

1. Purposefully damaged property that did not belong to them, not counting property of their family members?	Yes	No
2. Stolen or tried to steal something more than \$50?	Yes	No
3. Purposefully set fire to a building, a car, or other property, or tried to do so?	Yes	No
4. Used alcohol without their parent's permission?	Yes	No
5. Carried a hidden weapon other than a pocket knife?	Yes	No
6. Stolen or tried to steal something worth \$5 or less?	Yes	No
7. Used marijuana or hashish?	Yes	No
8. Sold marijuana or hashish?	Yes	No
9. Attacked someone with the idea of seriously hurting or killing them?	Yes	No
10. Stolen things from parents or family members?	Yes	No
11. Hit or threatened to hit someone (other than a family member)?	Yes	No
12. Smoked cigarettes?	Yes	No
13. Skipped school without parents' permission?	Yes	No
14. Been in trouble with the police?	Yes	No

Peer Rejection  
(YSR; Achenbach & Edelbrock, 1991)

**Instructions:** Below is a list of items that describe children and youths. For each item that describe you now or within the past 6 months, please circle the 3 if the item is very true or often true of you. Circle the 2 if the item is somewhat or sometimes true of you. If the item is not true of you, circle the 1. Please answer all the items as well as you can, even if some do not seem to apply to you.

	Not True	Somewhat or Sometimes True	Very or Often True
1. I don't get along with other kids.	1	2	3
2. I feel others are out to get me.	1	2	3
3. I get teased a lot.	1	2	3
4. I am not liked by other kids.	1	2	3

Psychological Control Scale  
(Barber, 1996)

**Instructions:** Please answer these questions about the parent(s)/caregiver(s) you live with according to the scale below.

	<b>Not like my parents</b>	<b>Somewhat like my parents</b>	<b>A lot like my parents</b>
1. My parent changes the subject whenever I have something to say.	1	2	3
2. My parent finishes my sentence whenever I talk.	1	2	3
3. My parent often interrupts me.	1	2	3
4. My parent acts like she/he knows what I'm thinking or feeling.	1	2	3
5. My parent would like to be able to tell me how to feel or think about things all the time.	1	2	3
6. My parent is always trying to change how I feel or think about things.	1	2	3
7. My parent blames me for other family members' problems.	1	2	3
8. My parent brings up my past mistakes when she/he criticizes me.	1	2	3
9. My parent tells me that I am not a loyal or good member of the family.	1	2	3
10. My parent often changes his/her mood when with me.	1	2	3

Appendix B: Tables and Figures

**Table 1. Correlations & Descriptive Statistics**

	1	2	3	4	5	6	7	8	9	10
1. Grade	-	-	-	-	-	-	-	-	-	-
2. Age	.88**	-	-	-	-	-	-	-	-	-
3. Gender	-.14	-.22**	-	-	-	-	-	-	-	-
4. T1 Reactive Aggression	-.02	.03	-.15	-	-	-	-	-	-	-
5. T1 Proactive Aggression	.01	.06	-.14	.49**	-	-	-	-	-	-
6. T1 Peer Rejection	-.05	-.02	.02	.51**	.22**	-	-	-	-	-
7. T1 Peer Delinquency	.12	.15	-.10	.33**	.17*	.31**	-	-	-	-
8. T1 Parental Psychological Control	.07	.04	-.07	.10	.11	.18*	.19*	-	-	-
9. T2 Reactive Aggression	-.02	.05	-.17	.27**	.16*	.15	.17*	-.05	-	-
10. T2 Proactive Aggression	.08	.08	-.08	.10	.00	.09	.15	-.04	.45**	-
Mean	3.92	9.72	-	1.71	1.14	1.44	.76	1.41	1.66	1.09
Std. Deviation	.82	.98	-	.70	.43	.42	1.46	.36	.73	.32
Minimum	-	8.00	-	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Maximum	-	12.00	-	5.00	4.33	2.75	7.00	3.00	3.67	3.33

\*  $p < .05$

\*\*  $p < .01$

**Table 2. Partial Correlations Assessing Stability of Proactive and Reactive Aggression**

	T2 Proactive Aggression	T2 Reactive Aggression
T1 Proactive Aggression	-.04 <sup>a</sup>	.07 <sup>b</sup>
T1 Reactive Aggression	-.01 <sup>c</sup>	.20 <sup>d*</sup>

*Note.* <sup>a</sup>Controlling for T1 and T2 reactive aggression. <sup>b</sup>Controlling for T1 reactive and T2 proactive aggression. <sup>c</sup>Controlling for T1 proactive and T2 reactive aggression. <sup>d</sup>Controlling for T1 and T2 proactive aggression.

\*  $p < .05$

**Table 3. Full information maximum likelihood estimation path model (Proactive aggression; Model 1)**

	First-order effects		Proactive X Rejection		Proactive X Delinquency		Proactive X Psych Control	
			Interaction effects		Interaction effects		Interaction effects	
	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Grade	.03	.02	.03	.02	.03	.02	.03	.02
Age	.09	.06	.09	.06	.09	.06	.08	.06
Gender	-.05	.10	-.05	.10	-.05	.10	-.05	.10
T1 Reactive Aggression	.02	.10	.02	.10	.03	.10	.05	.10
T1 Proactive Aggression	-.05	.04	-.05	.07	-.05	.06	-.08	.05
T1 Peer Rejection	.07	.07	.07	.07	.08	.07	.07	.07
T1 Peer Delinquency	.14	.14	.14	.15	.13	.13	.13	.14
T1 Parental Psychological Control	-.10	.08	-.10	.08	-.10	.09	-.10	.09
T1 Proactive X T1 Peer Rejection	-	-	.02	.07	-	-	-	-
T1 Proactive X T1 Peer Delinquency	-	-	-	-	.01	.05	-	-
T1 Proactive X T1 Parental Psychological Control	-	-	-	-	-	-	.04	.04

**Table 4. Full information maximum likelihood estimation path model (Reactive aggression; Model 2)**

	First-order effects		Reactive X Rejection		Reactive X Delinquency		Reactive X Psych Control	
			Interaction effects		Interaction effects		Interaction effects	
	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>	$\beta$	<i>SE</i>
Grade	.08	.02	.07	.02	.07	.02	.08	.02
Age	.04	.08	.05	.08	.05	.08	.04	.08
Gender	-.15	.09	-.14	.09	-.17	.09	-.15	.09
T1 Reactive Aggression	.20	.13	.26*	.13	.18	.13	.22	.12
T1 Proactive Aggression	.04	.12	.05	.11	.05	.11	.04	.12
T1 Peer Rejection	.01	.09	.02	.09	.02	.09	.01	.09
T1 Peer Delinquency	.08	.08	.09	.08	-.02	.07	.08	.08
T1 Parental Psychological Control	-.12	.07	-.14	.08	-.11	.07	-.13	.07
T1 Reactive X T1 Peer Rejection	-	-	-.14	.08	-	-	-	-
T1 Reactive X T1 Peer Delinquency	-	-	-	-	.14*	.06	-	-
T1 Reactive X T1 Parental Psychological Control	-	-	-	-	-	-	.05	.10

\*  $p < .05$

Fig. 2 Association between T1 and T2 reactive aggression at high and low levels of T1 peer delinquency

