

Social behavior and academic performance: Examining relations between forms of prosocial behavior and aggression in predicting academic outcomes

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ABSTRACT

Numerous researchers have argued early adolescent behavior patterns are among the best predictors of later achievement and social-psychological adjustment outcomes. In the current study, a secondary data analysis was conducted to determine the extent to which four prosocial behaviors (cooperation, assertiveness, self-control and prosocial behaviors toward peers) and two forms of aggression (overt and relational) influence academic performance (as indexed by GPA and standardized achievement scores). Additionally, the potential moderating role of two school environment variables (perception of school climate and teacher bonding) were also considered in order to further examine the social-emotional environment of middle schools. Examining concurrent relations between grade 5 social behaviors and academic performance revealed all four forms of prosocial behavior were positively related to higher academic performance. Predictive relations between grade 6 social behaviors and academic outcomes at grade 9 indicated that of the four prosocial behaviors and two forms of aggression, cooperation alone predicted the likelihood of later academic achievement. Finally, it was hypothesized that prosocial behaviors, perception of school climate and teacher bonding would serve as moderators between aggression and academic performance; however, this prediction was unsupported. By drawing attention to the limited typology employed in studying prosocial behavior, as well as the methodological challenges that arise when examining these behaviors during adolescence, the hope is to spur research geared towards a more comprehensive understanding of prosocial development.

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## **1.0- Introduction**

On average, a middle school student spends approximately 1,078 hours in the classroom over the course of 175 days of an academic year, truly making school a second home during formative years (Kena et al., 2014). Within this second residence, classrooms function as inherently social environments in which learning occurs in the presence of peers and teachers, challenging individuals to meet expectations of both social and academic growth (Brigman, Webb, & Campbell, 2007; Green, Forehand, Beck, & Vosk, 1980; Wentzel, 1991, 1993). Although there is significant interest in early predictors of developmental trajectories, the social component, or “soft skills,” of a child’s school tenure is often deemed of secondary importance to curricula geared more exclusively toward core academic outcomes, or “hard skills.” This is often due to resource limitations, time constraints and the pressure of federal mandates (e.g., No Child Left Behind)(Cohen, 2006; Elias, 2009).

The past three decades, however, have produced a noticeable surge in research studies designed to hone in on relations between various aspects of social behaviors and academic achievement. Investigators provide a compelling argument of the broader range of skills and behaviors affecting a student’s academic trajectory. Social development no longer serves as a desired outcome in and of itself, but as an integral component of the development of cognitive abilities and acquisition of knowledge, both of which catapult students toward academic success (Malecki & Elliot, 2002; Wentzel, 1993).

Furthermore, whereas previous research in the educational context has predominately focused on adverse outcomes of antisocial behaviors (e.g., aggression) (Barth, Dunlap, Dane, Lochman, & Wells, 2004; Henry et al., 2000; Thomas & Bierman, 2006), more recent investigations have explored the role of prosocial behaviors promoting positive interactions with

others and the subsequent effects on academic achievement (Berkowitz & Bier, 2004 ; Martin, Martin, Gibson, & Wilkins, 2007; Wentzel & Caldwell, 1997).

Far fewer studies, however, have examined the two forms of behavior- positive/prosocial and aggression- within the same individual, therefore limiting an understanding of developmental links. And of the limited findings drawn from parallel examination of the constructs, it remains unclear whether subdimensions of prosocial and antisocial behaviors emerge as unique predictors of academic performance, share similar correlates, or if prosocial behaviors operate in a protective role. Finally, looking beyond the student, further clarification is needed regarding which aspects of the school environment (e.g., perception of school climate, student-teacher relationships) function as moderators in the link between social behavior and academic performance.

By focusing on the concurrent and longitudinal relations between social behavior and academic outcomes, two areas of development often studied in isolation, the current study hopes to shed light on these gray areas and identify the contributing individual and collective factors at play during adolescence.

### **1.1- Early adolescence**

Early adolescence is marked by ongoing changes in physical, hormonal, familial, relational and educational processes, as well as an actual relocation from the typically more intimate, elementary school context into a more impersonal, larger-scale secondary school (Simmons & Blyth, 1987). Naturally, the social development of a child is shaped by these numerous transitions. This is a particularly important age period for understanding prosocial development given the opportunities for, and diversity of, prosocial behaviors tend to increase as a result of: 1) cognitive and emotive development, 2) changes in interpersonal relations, and 3)

changes in the social context (Carlo, Eisenberg, & Knight, 1992; Carlo, Fabes, Laible, & Kupanoff, 1999; Fabes, Laible, & Kupanoff, 1999).

*Cognitive and emotive development.* Adolescents undergo a series of changes in sociocognitive and socioemotive skills, including affective labeling, moral reasoning, perspective taking, sympathy, and empathy, all of which have been conceptually and empirically linked to the development of prosociality (Eisenberg & Fabes, 1998; Hoffman, 1991; Roberts & Strayer, 1996; Selman, 1980). Several studies have demonstrated the impact these developments may have on the manner in which prosocial behaviors are displayed and the frequency in which they occur. For example, adolescents scoring higher on prosocial moral reasoning were rated by teachers as more generous and helpful towards others (Carlo, Koller, Eisenberg, Da Silva, & Frohlich, 1996). Similarly, adolescents reporting higher levels of perspective taking (i.e., understanding another's thoughts feelings, and situation) showed a greater propensity to respond prosocially (Estrada, 1995; Roberts & Strayer, 1996). Employing a social information-processing (SIP) model, Nelson and Crick (1999) found that when compared to their group peers, prosocial adolescents were less likely to attribute hostile intent in hypothetical provocation situations and were more likely to endorse relational rather than instrumental goals in response. Collectively, these findings point to evidence of specific social-cognitive patterns and unique emotional regulation associated with adolescent prosocial behavior.

*Changes in interpersonal relations.* Distinctive features in interpersonal relations that emerge during adolescence also have implications for both academic and social developmental outcomes. A well-documented shift occurs in which parental guidance is no longer sought after and a heavy reliance on peers becomes salient (Roeser, Eccles, & Sameroff, 1998). This is unsurprising given that the amount of time, and inevitably the importance adolescents place on

peer relationships, dramatically increases in the transition to young adulthood (Larson, Wilson, Brown, Furstenberg Jr., & Verma, 2002). The more equal social status shared between peers is unique from the relationship shared between adolescents and adults (Bukowski & Sippola, 1996). While the latter is an inherently hierarchical relationship, the former is more likely to be one of cooperation. It follows then, that cycles of prosocial exchanges are more likely to occur between peers than between adolescents and adults (Bukowski & Sippola, 1996). Looking more closely at the motives driving the behaviors in each relationship, prosocial behavior directed towards adults was found to be less frequently motivated by other-oriented reasons and more often motivated by a desire to comply, whereas the opposite was true for actions directed toward peers (Eisenberg, Lundy, Shell, & Roth, 1985). By the same token, Piaget argued this perception of peer equality increases the likelihood that children and adolescents adopt peer perspectives and view themselves as responsible partners in social exchanges. Empirical evidence has also supported these theoretical assertions, in that, peers engage in more frequent and positive social interactions facilitating moral development (Damon & Killen, 1982; Nelson & Aboud, 1985) and those who observe prosocial behavior are likely to behave similarly (Hartup, 1983).

Nevertheless, the question of what *drives* peer influence, as well as the extent to which it impacts adolescent behavior continues to be a topic of great debate. And although several studies have provided compelling evidence that prosocial and aggressive behaviors are embedded within the peer group, the literature examining the causal role of peer influence in the development of delinquency and aggression (Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997) is far more voluminous than studies focusing on how prosocial behavior operates as a function of this increased reliance on peer networks.



With greater emphasis placed on interactions outside the home, it becomes evident that peer groups not only wield a great deal of influence on prosocial development (Barry & Wentzel, 2006), but also on a student's achievement (Roseth, Johnson, & Johnson, 2008; Ryan, 2001; Wentzel & Caldwell, 1997). Given the social and academic domains are inextricably connected within the school setting, an individual's peer network may promote or undermine a student's learning experience, and ultimately influence their academic performance. For example, examining peer relationship variables concurrently and over time showed group membership to be a consistent predictor of sixth- and eighth- grade GPA (Wentzel & Caldwell, 1997). Similarly, Nichols and White (2001) provided evidence that affiliation with a particular clique served as a potential predictor of achievement in both low- and regular- track classes. Applying social network analysis, Liu and Chen (2003) revealed clique members had higher levels of academic achievement than members of reciprocated dyads, and dyad members outperformed isolates. Finally, delving deeper into the nature of these peer interactions, prosocial-cooperative relations have been linked to higher achievement (Chen, Rubin, & Li, 1997; Welsh, Parke, Widaman, & O'Neil, 2001), whereas affiliation with deviant peers has often shouldered the blame for poorer academic performance (Fulgini, Eccles, Barber, & Clements, 2001) and early withdrawal from school (Vitaro, Larocque, Janosz, & Tremblay, 2001).

*Changes in social context.* In some ways, schools serve as a microcosm of the larger social system students will soon embark upon. Next to the home environment, school is the primary institution in which the development of children and adolescents can be directed and shaped. Yet, society has historically organized school systems in a manner that generates academic and social disruptions, requiring shifts from elementary school to middle school, and then again to high school (Blyth, Simmons, & Carlton-Ford, 1983). Although the timing and

number of school transitions may fluctuate across communities and within districts, most involve similar structure and process changes including: an increase in school population size (coinciding with a more departmentalized and impersonal environment), frequent classroom changes, stricter and more competitive grading practices, unfamiliar teaching expectations, greater accountability for individual work, significant increases in workload, as well as disruption to social regularities and necessary social role restructuring (Alvidrez & Weinstein, 1993; Pearlin, 1983; Seidman, 1988). The nature of each transition and its contended poor fit in matching the developmental needs of adolescents, has often been deemed the culprit in the observed decline of motivation, attitude toward school, perception of ability and academic achievement (Eccles, Lord, & Midgley, 1991; Simmons & Blyth, 1987). Simmons and Blyth (1987) suggest these effects may be powerful and long-lasting, noting observed problems in middle school transitions were predictive of those later to emerge at the high school level. So although middle school may have originally been conceived as an “innovative means of easing the transition of early adolescents to secondary education by providing a social and academic environment that is appropriate” (Simons-Morton, Crump, Haynie, & Saylor, 1999), schools are often tasked with the seemingly impossible challenge of recapturing “lost” adolescents who due to struggles in social conditions are more likely to experience lower levels of achievement, declines in motivation to learn, and/or displays of poor conduct (Carnegie Council on Adolescent Development, 1989). The negative outcomes pertaining to school transitions have been widely documented. More limited work, however, has examined how positive variables (i.e., prosocial behavior, positive perception of school climate, strong student-teacher relationships) are linked to the shift from primary to secondary education. And even less attention has been directed towards uncovering the potential changes that may occur in the display or frequency of prosocial

behaviors as a result of encountering different “targets” and unique situations in the new environment.

## **1.2- Operationalizing prosocial behavior**

As noted by Epps, Park, Huston, and Ripke (2005), “Positive or prosocial behaviors can include social skills for relating to peers and adults, empathetic and helpful actions, responsibility, autonomy and self-control” (p.163). Narrowing in on this rather broad definition, researchers have typically referred to *social skills* as discrete, goal-directed behaviors enabling individuals to interact effectively with others in his or her environment (Sheridan & Walker, 1999). This is somewhat different from what is referred to as social competence, which generally reflects the quality of an individual’s social interactions as perceived by others in the environment (Gresham, 1986; McFall, 1982).

Distinguishing between *positive* and *prosocial behaviors*, however, is more difficult. Even Wispé (1972) who originally proposed the term “prosocial” seemed hesitant to commit to formal definitional properties and used the terms “prosocial” and “positive social behavior” interchangeably. Since the publication of her chapter, however, researchers have typically associated “prosocial” with behaviors of altruism, sharing and caring or empathetic helpful actions (Eisenberg & Miller, 1987; Mussen & Eisenberg-Berg, 1977) and “positive social behaviors” with indicators of social competence such as cooperation, responsibility, self-control, and autonomy (Bierman, Miller, & Stabb, 1987; Wentzel, 1991). One of the primary goals of the current study is to more accurately delineate between types of prosociality and move beyond the restricted range of behaviors often included in adolescent studies. Therefore, measurement items were drawn from two well-validated measures in order to incorporate both “positive” (i.e., cooperation, assertiveness, self-control) and “prosocial” behaviors (kindness towards others,

comforting behaviors, empathetic concern, helpful actions)(Gresham & Elliott, 1990; Ladd & Profilet, 1996). To avoid potential confusion “prosocial behavior” will be used henceforth to denote both positive social behaviors and prosocial behaviors.

Current theory and research on prosocial behavior has already covered a diverse array of behaviors and includes complexities and distinctions, all of which may be meaningful to parents and educators seeking to promote its development (Knafo & Plomin, 2006; Krevans & Gibbs, 1996; Solomon, Watson, Schaps, Battistich, & Solomon, 1990; Solomon, Watson, Delucchi, Schaps, & Battistich, 1988). However, difficulty in operationalizing the construct persists when researchers attempt to cast a net around the broad set of behaviors often encompassed in the definition including, but not limited to, *helping* (Hampson, 1984), *sharing* (Bryant & Crockenberg, 1980; Mussen & Eisenberg-Berg, 1977), *caring*, (Mussen & Eisenberg-Berg, 1977), *comforting* (Eisenberg-Berg & Hand, 1979), *perspective taking*, *altruism* (Johnson, Johnson, Johnson, & Anderson, 1976), and *acting sociably* (Eisenberg-Berg & Hand, 1979). Additional challenges are faced in discerning behaviors more appropriately classified as social conventions or etiquette (e.g. politeness, respect, courtesy, etc.) (Eisenberg et al., 1985; Talwar, Murphy, & Lee, 2007), learning-related behaviors (e.g., cooperating with peers and teachers, following instructions, containing frustration when faced with difficult tasks) (Coolahan, Fantuzzo, Mendez, & McDermott, 2000), and effectively taking into account the environment in which they are performed (e.g. home, school, team sport, etc.) (Berndt & Bulleit, 1985; Rutten et al., 2007; Strayer & Roberts, 1989).

The lack of an organized framework for the various forms prosocial behavior becomes even more apparent when one looks at the taxonomy of aggression and the extent to which it has been developed. It is rare in contemporary research to come across a study that does not specify the

distinct form and function of the aggressive behavior being examined (Little, Henrich, Jones, & Hawley, 2003; Prinstein & Cillessen, 2003; Sijtsema et al., 2010). Prosocial behavior, on the other, has long been conceptualized as a global construct despite acknowledgement among even the earliest researchers that different forms of prosocial behavior have uniquely associated antecedents and correlates (Hartshorne, May, & Shuttleworth, 1930). More alarming is the fact that the last attempt to create an exhaustive taxonomy of prosocial behavior was over 30 years ago (Pearce & Amato, 1980; Smithson & Amato, 1982).

### **1.3- Measuring prosocial behavior**

*Global versus situation-specific measures.* Historically, two distinct approaches have been employed in the study of prosocial behavior: the use of global measures, capturing the tendency to exhibit prosociality across contexts and motives (Green, Shirk, Hanze, & Wanstrath, 1994; Swisher, Shute, & Bibeau, 1984; Weir & Duveen, 1981) and situation-specific assessments geared towards capturing current behavior (Carlo & Randall, 2002). The current study uses the Social Skills Rating Scale (SSRS) which defines social skills as “the interaction between individuals and the environment and the tools used to initiate and maintain vital interpersonal relations” (Elliott & Gresham, 1987; Phillips, 1978). The authors specify three components of social skills: *peer acceptance* (i.e., is the child accepted by peers?), *behavior* (i.e., appropriateness of behaviors exhibited in specific settings and situations), and *social validity* (i.e., behaviors exhibited in specific situations that help determine a child’s attitude on social outcomes; e.g., in a school setting, a social outcome may include teacher acceptance) (Elliot & Gresham, 1987). Another important feature of the Social Skills Rating Scale (SSRS) is the teacher’s report which asks for responses in accordance to how important a behavior is for the child’s success in a specific setting (in this case, the classroom). Thus the instrument requires

judgments about “appropriateness” of reactions in social situations (e.g., “appropriately expresses feelings when wronged” or “appropriately questions rules that may be unfair”). As Epps et al. (2005) notes, “This conceptualization serves an appropriate guideline for developing assessments because it specifies all the features of behavior necessary to label it prosocial.”

Similarly, the SECCYD “Child Behavior with Peers” data collection instrument also isolates different contexts asking parents and teachers to report on the presence of prosocial behaviors (e.g., being kind toward peers, offering to help/comfort children) in their respective environments. This instrument, however, is more conducive to honing in on the more empathetic and caring aspects of prosocial behavior that are salient in relations with peers and teachers.

*Age-related changes.* With increasing cognitive capacities and emotional development, more ability and willingness to help, as well as widening social environments, adolescents are expected to exhibit age-related increases in prosocial behaviors (Carlo, Hausmann, Christiansen, & Randall, 2003; Fabes et al., 1999). However, of the minimal work done, most research has used cross-sectional data and findings have been mixed, leaving little room for consensus on the nature and timing of these changes throughout prosocial development (Eisenberg & Fabes, 1998). A meta-analysis conducted by Eisenberg and Fabes’ (1998) indicated prosociality increased with age, however, Kokko and colleagues (2006) reported a general tendency for prosocial behavior to decrease over time. The former was largely based on cross-sectional studies, each employing different instruments at different ages. The latter used a homogenous sample drawn from a low SES background. The few longitudinal findings have also yielded inconsistent patterns of change in prosocial development. For instance, in an effort to understand what could be driving these age-related changes, Barry and Wentzel (2006) suggested the

increase in frequency of prosocial behavior may be related to the decreasing role of hedonistic reasoning in prosocial moral judgment. Yet other findings have indicated the coinciding increase in self-reflection makes the high costs of helping even more apparent and thus hedonistic reasoning once again rises in later adolescence (Damon & Killen, 1982).

Empirical evidence has also suggested unique developmental trajectories for different *types* of prosocial behavior (Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006). Looking at prosociality between 18 months to 3 years old, Hay et al. (1999) found spontaneous sharing behavior to decline, while sharing by request increased. Jackson and Tisak (2001) reported younger children shared more than older children, however, cooperating and comforting showed more curvilinear associations between 7 to 12 year olds. Adolescents were found to be better at judging complex issues of justice (Wainryb, Brehl, & Matwin, 2005), however, prosocial reasoning does not seem to improve much during this time period. In fact, as mentioned earlier, adolescents may be even more hedonistic and no more other-oriented than younger children (Carlo, Koller, Eisenberg, Da Silva, & Frohlich, 1996; Janssens & Deković, 1997). In some ways, becoming more aware of the costs of prosocial behavior allows them to protect their self-interests better.

Beyond the competing hypotheses and inconsistencies in findings, one final point of concern is the limited range of behaviors often included in adolescent studies. Bergin, Talley, and Hamer (2003) conducted a focus group with sixth-graders who described several categories of prosocial behavior experienced among their peers that are often neglected in global measures of prosocial behavior (e.g., helping others to develop skills, being inclusive, standing up for others, being humorous). Neglecting to take into account how new forms of prosocial behavior may emerge within this age group or how “old behaviors” (i.e., those seen at previous stages of development)

may fluctuate in frequency, presents a skewed and limited description of the complexity of adolescent prosociality.

#### **1.4- Prosocial behavior and aggression**

As noted by Seligman and Csikszentmihalyi (2000), “Psychology is not just the study of pathology, weakness and damage, it is also the study of strength and virtue.” Yet heavy emphasis is often placed on the costly effects of maladaptive social behavior in comparison to the benefits of its counterpart, prosocial behavior. This is particularly true of studies examining the adolescent population, a developmental stage often demonized in the literature for its suboptimal choice behavior. The expansive literature focused on aggressive behavior has consistently showed high stability of aggression over time, with significant attention directed toward establishing the developmental course of the construct (Broidy et al., 2003; Greenbaum et al., 1996; Hartup, 1974; Loeber & Hay, 1997) and the heterogeneity of behaviors in children and adolescents. For example, several subgroups have been identified, including popular-aggressive (Rodkin, Farmer, Pearl, & Van Acker, 2000), depressed-aggressive (Brendgen, Vitaro, Turgeon, & Poulin, 2002) and even prosocial-aggressive (Hawley, Little, & Card, 2007) . The latter remains poorly understood due to the fact that prosocial and aggressive behavior were originally conceived as markers of a single continuum, mutually exclusive and negatively correlated (Eron & Huesmann, 1984; Feshbach & Feshbach, 1986). More recent findings have been mixed, suggesting the two could belong to two orthogonal dimensions. As Hay (2009) noted, “Preschoolers who share are also likely to snatch,” referring to his finding that highly prosocial preschoolers are often highly aggressive as well. Similarly, employing a person-centered approach, Hawley’s (2003) cross-sectional study identified “bistrategics,” a group of early adolescents using both prosocial and coercive strategies, thereby challenging the notion that



aggressive children are less socially competent or morally undeveloped. However, varying relationships between aggressive and prosocial behaviors have been reported (Bryant & Crockenberg, 1980; Crick, 1996; Yarrow et al., 1976), each finding most likely contingent on the specific prosocial behavior employed.

Considerable research has also documented the influence of both prosocial and aggressive behaviors in academic trajectories. Investigating at the elementary level, Malecki and Elliott (2002) reported social skills as a significant predictor of concurrent levels of achievement. Similarly, a longitudinal study examining the impact of early prosocial behaviors on academic achievement found prosocialness in third grade to be a better predictor of later academic achievement (eighth grade) than third grade academic achievement (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000). Shifting over to middle school, Wentzel (1993) found a positive relationship in middle school prosocial behavior and grade point average, as well as a negative relationship between antisocial behavior and grade point average. Other studies influencing the present investigation were conducted by Teo and colleagues. They provided evidence that prosocial and antisocial behaviors operate as independent predictors of students' grade point average among middle school students. Additionally, prosocial behavior was found to be an independent predictor of students' standardized test scores (Teo, Carlson, Mathieu, Egeland, & Sroufe, 1996).

Fabes et al. (1999) argued, "To examine one set of behaviors without examining the other set presents a skewed and limited description of the complexity of adolescents" (p. 13). The current study employs longitudinal analyses in an effort to address the lopsided mass of research fixated exclusively on antisocial behaviors and to further disentangle the relationship between these two constructs.

### **1.5- Social behavior, academic performance and school context**

Theoretically, a student who is well-adjusted, socially accepted and who exhibits a positive orientation to his/her school is more likely to remain academically engaged and less likely to encounter behavioral difficulties (Dryfoos, 1990). Additionally, teachers often report valuing nonintellectual student characteristics, and often work toward creating an environment and promoting rules that elicit socially responsible forms of behavior. Students displaying more conducive classroom behaviors are therefore more likely to feel a stronger sense of connection to their school and share more positive relationships with their teachers. With this comes several benefits as research findings have consistently shown positive perceptions of school climate and quality of relations with teachers are significantly associated with better academic outcomes, reduced frequency of problem behaviors, decreased student absenteeism, and other dimensions of psychological and academic adjustment in middle and high school (Crosnoe, Johnson, & Elder, 2004; Gregory & Cornell, 2009; Jia et al., 2009; Wang, Selman, Dishion, & Stormshak, 2010).

*Perception of School Climate.* An individual's relationship to school is shaped by the patterns of norms, goals, values and interactions experienced throughout the ongoing teaching and learning processes, all of which contribute to one's overall perception of school climate (National School Climate Council, 2007). Although the importance of school climate has been recognized for over 100 years (Perry, 1908), systematic investigation of the construct did not occur until the 1950s. Since that time, researchers have struggled with the development of sound assessment tools and utilized a wide range of expressions (i.e., atmosphere, feelings, tone, setting or milieu) when referring to aspects of environmental quality (Freiberg, 1999; Tagiuri, 1968). Regardless of the overlapping and interchangeable lexicon of terms, researchers have recognized

the profound impact of various components of the school setting on an individual's experience and academic performance. Compelling arguments have been made to establish a student's relationship to school as a predictive factor of academic outcomes (Cohen, McCabe, Michelli, & Pickeral, 2009; Pallas, 1988). Throughout these studies, common themes emerged in how students described a positive school climate, including respect for all members of the school community, fair and consistent discipline policies, attention to safety issues, and positive relationships with teachers (Haynes, Emmons, & Comer, 1993; Kuperminc, Leadbeater, Emmons, & Blatt, 1997).

*Teacher bonding.* The extant literature provides evidence that beyond cognitive functioning and classroom behavior, a student's ability to form relationships with their teachers forecasts later academic and behavioral adjustment in school. Two different approaches have emerged in trying to capture the quality of a relationship between a student and teacher. Either the bond between the two individuals is nested within measures of school climate, attachment and belonging (Kuperminc, Leadbeater, & Blatt, 2001; Payne, Gottfredson, & Gottfredson, 2003) or the relationship is examined as an entirely separate variable in which students report on the extent to which they feel teachers care about them (Rosenfeld, Richman, & Bowen, 2000; Ryan & Patrick, 2001). Using the NICHD SECCYD data collection instrument, "What my school is like," the current investigation employs both approaches: the former is captured with items such as "Teachers at my school treat students fairly," (perception of school climate subscale) and the latter focuses on student-teacher relations with items such as "I feel close to at least one of my teachers" (teacher bonding subscale).

Irrespective of which approach is used, there is widespread consensus that students experiencing more positive relationships with teachers benefit from a source of support and

guidance in learning tasks relative to peers without such compensatory supports (Roeser et al., 1998; Rubin et al., 2006). Such relationships have been found to be related prospectively to decreases in externalizing problems among highly aggressive children (O'Connor, Dearing, & Collins, 2011), more positive work habits, fewer disciplinary infractions (Hamre & Pianta, 2001), as well as gains in academic skills (Vitaro et al., 2001) and achievement (O'Connor & McCartney, 2007).

### **1.6- Social behavior, academic performance and gender**

Males and females have been found to display behaviors stereotypically associated with them:- "...girls are sugar and spice and everything nice, whereas boys are snakes and snails and puppy dog tails" (Serbin, Powlishta, & Gulko, 1993, p. 90). Studies of aggression have yielded consistent findings indicating boys display more acts of overt aggressive behavior than girls (Knight, Fabes, & Higgins, 1996; Ruble, Martin, & Berenbaum, 2006). Girls, on the other hand, have been found to engage in social or relational aggression (i.e., behaviors intended to harm other's friendships through purposeful manipulation or damage to relationships and social status) more than they engage in physical aggression, however it remains uncertain whether they perform these behaviors more than boys do (Underwood, Scott, Galperin, Bjornstad, & Sexton, 2004). Not surprisingly then, overt aggression tends to be most effective in damaging what is valued in boys (dominance-oriented goals), whereas girls who typically value the establishment of close relationships, are more susceptible to relational aggression, which is aimed at harming friendships (Block, 1983; Crick & Grotpeter, 1995).

Unfortunately, the evidence for gender differences in prosocial behavior is not as strong or consistent. Differences found tend to be small and appear to vary as a result of study characteristics (Eisenberg & Fabes, 1998; Eisenberg, Martin, & Fabes, 1996): girls exhibited

more helping behavior than boys (Eisenberg & Fabes, 1998) , but the opposite was true in adult studies (Eagly & Crowley, 1986). Helping behaviors that could be described as more chivalrous were displayed more by males, however helping behaviors within relational contexts tipped in favor of females (Eagly & Crowley, 1986). Studies examining sex differences and the potential impact they may have on prosocial development have indicated girls are more accurate in decoding others' emotions, show a greater propensity for perspective taking (Eisenberg et al., 1996) and appear to be more socially expressive and responsive (Ruble et al., 2006). With regard to friendships and preferences in play, gender tends to influence the opportunity for and likelihood of different forms of prosocial behavior occurring. For example, girls place greater priority on relationship goals (e.g., wanting to maintain a friendship) than boys do and regard “friendships” as higher in positive qualities (i.e., intimacy and closeness). It is this higher level of intimacy in female relationships that ultimately lends itself to vulnerability in relational aggression (e.g., divulging confidential information during conflict). Boys, on the other hand, strive to seek control (Rose & Asher, 1999) and show preferences for competitive (but not cooperative) games as well as for larger group interactions (as opposed to dyads) (Benenson, Nicholson, Waite, Roy, & Simpson, 2001).

Finally, although there are no sex differences in overall intellectual ability, boys and girls appear to differ on specific subject abilities, with these differences again varying by type and age. Hyde, Fennema, and Lamon (1990) found a large gender difference favoring boys on the SAT math scores, yet girls receive higher grades in all classes (including math) than boys. Females also demonstrate slight superiority in language learning during early childhood, however boys quickly catch up by age 6 (Hartup, 1983). Meta-analyses indicate males exhibited

a tendency to perform better on analogies ( $d=.22$ ), while females outperformed their male counterparts in other verbal skills ( $d=-.11$ ) (Hedges & Nowell, 1995).

### **1.7- Theoretical Underpinnings**

The present longitudinal research applies an ecological perspective of sociocognitive theories to examine the link between social behavior and academic achievement within the classroom, a prominent social context for adolescent development. Drawing upon Vygotsky's espoused theories of learning and human behavior, this study stressed the fundamental role social functioning plays in the development of cognition and acquisition of knowledge (Vygotsky, 1962, 1978). Vygotsky called attention to the ways in which social environments influence learning, proposing the idea that learning and development emerge from interactions children have with peers, as well as with teachers and other adults. This guided learning includes teacher scaffolding of children's cognitive, emotional and social skills, all of which have implications on children's moral and prosocial moral reasoning. Central to this notion in Vygotsky's work was the theoretical construct of the zone of proximal development which proposed an individual's immediate potential for cognitive growth is bounded on the lower end by what an individual is able to accomplish alone and by the upper end by what an individual can accomplish with the help of someone more competent (in the classroom context of this study, such an individual may be a peer or teacher). In other words, the distance within this particular region reflects the current or actual level of development of a learner and the next level attainable "as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Holding this to be true, individuals equipped with superior prosocial behaviors would be able to minimize the gap within the zone of proximal development and likely benefit from subsequent cognitive growth.

Complementary to Vygotsky's theory is Bandura's work on social learning, also emphasizing the interaction between a child, his or her behavior, and the environment (Bandura, 1997). Bandura argued the development of complex forms of social behavior are shaped by the interaction between social forces and an individual's changing cognitive capacities (Bandura, 1986). More specifically, prosocial and antisocial behaviors are acquired either by direct experience or observing others, both of which provide a set of concepts for understanding and describing beliefs and expectations that guide behavior (Bandura, 1983, 2001; Mischel, 1973). According to this theory, social feedback not only initiates change, it also shapes the nature of change itself. Expanding on this notion, it seems plausible a specific type of prosocial behavior and the frequency in which it occurs during adolescence may be partly attributed to the extent to which it is positively or negatively reinforced by peers and teachers within the classroom context.

In summary, Vygotsky's zone of proximal development provides a robust theoretical base from which to understand the potential contributions of prosocial behaviors to cognitive development, while Bandura's theory suggests that learning is a social process in which all types of behaviors (including different forms of prosociality) are mediated by environmental influences.

Although the intersecting path of academic and social development has been well established, the mechanism by which academic performance is promoted or hindered by social behaviors is still in question. Wentzel (1993) proposed three possible explanations: First, the relationship between positive social behaviors and academic performance may be due to their strong association with other academically-relevant types of behavior conducive to learning (e.g., compliance with rules, cooperation, self-control). Second, positive social behaviors may serve as

direct and independent contributors to academic performance. And finally, appropriate or inappropriate social conduct within the classroom may influence teachers' preferences, which in turn, may impact the quality of instructional exchanges.

Evidence of all three of these possibilities have already been found in research focusing on antisocial behavior: reading attainment has been found to predict later conduct disorder (Williams & McGee, 1994), aggressive behavior has demonstrated a negative impact on achievement (Arnold, 1997; Hinshaw, 1992; Tremblay et al., 1992) and children identified as aggressive have developed more negative relationships with their teachers (Hamre & Pianta, 2001; Ladd & Burgess, 1999).

The current study examines academically-oriented prosocial behavior (e.g., cooperation, self-control and assertiveness) in conjunction with prosocial interactions with peers in order to determine the degree to which both are related and/or are differential predictors of academic performance. Two forms of aggressive behavior, overt and relational, were also assessed as separate constructs because antisocial behavior tends to be highly salient and yield a stronger impact on teacher perceptions than prosocial behavior (Safran & Safran, 1985).

### **1.8- The Present Study**

In an effort to expand on previous work conducted by Caprara et al. (2000), the present study examined the unique and common relations of six forms of adolescent social behaviors (four types of prosocial and two forms of aggression), as well as aspects of school environment (perception of school climate and teacher bonding) in the prediction of academic outcomes (standardized achievement scores and overall GPA). Given gender may moderate the relationships between social behaviors and academic outcomes, differences in the hypothesized relationships between boys' and girls' data were also assessed. Based on prior research and a



developmental contextual perspective, the following hypotheses were formed: (1) Prosocial behaviors are predicted to be positively correlated with one other, as well as with both indicators of academic performance. Both forms of aggression are predicted to be positively correlated with each other and negatively correlated with academic performance. Given that boys are more likely to exhibit higher levels of overt aggression (Crick & Grotpeter, 1995) and females are more likely to exhibit higher levels of prosocial behavior and relational aggression, these relations are expected to differ for boys and girls. (2) Different forms of prosocial and aggressive behavior are predicted to show some overlapping as well as independent statistical prediction of academic performance at grade 9. No a priori hypotheses were made regarding the main effects of cooperation, assertiveness and self-control compared with one another, given the limited systematic investigation comparing types of prosocial behavior during adolescence. (3) Prosocial behavior is expected to moderate the relationship between aggression and academic performance. More specifically, higher levels of prosocial behaviors will attenuate the adverse effect of aggression on academic performance. (4) Measures of school environment (perception of school climate and teacher bonding) are predicted to moderate relations between social behaviors and academic outcomes. That is, the inverse relationship between both forms of aggression and academic performance will be attenuated to the extent that adolescents perceive a positive school climate and experience higher levels of teacher bonding, and exacerbated to the extent that they perceive a negative school climate and experience lower levels of teacher bonding. Conversely, positive school climates and high levels of teach-bonding will strengthen the relation between prosocial behaviors and later academic achievement.

## **2.0-Method**

### **2.1- Participants**

The National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD) is a 16-year long prospective longitudinal investigation designed to address questions regarding the relationships between childcare experiences and developmental outcomes in children and youth. Participants were recruited shortly after birth from ten sites across the United States and followed until age 15, collecting information over four time intervals: ages 0-3 (phase I, 1991-1994), through 1<sup>st</sup> grade (phase II, 1995-1999), through 6<sup>th</sup> grade (phase III, 2000-2004), and through 9<sup>th</sup> grade (phase IV, 2005-2007).

Study participants came from diverse ethnic, demographic and economic backgrounds though they averaged higher income (three times the poverty threshold), higher education and were less likely to be of minority race or ethnicity than the general population (NICHD ECCRN, 2005). Participant families included 13% African American, 6% Hispanic, and 5% Asian, Native American or other ethnicities. Additionally, 11% of mothers did not complete high school and 14 % were single parents. No significant differences in attrition were found in the current study sample comparing participants at age 15 to those in grade 6. However, comparisons of the age 15 sample to those in the birth cohort sample did indicate a notable trend in attrition. Nonparticipants were more likely to be male (52% vs. 50%), more likely to score lower at 4.5 years on a test of math skills (97.8 vs. 102.5); and have less educated mothers (13.4 years vs. 14.3) who provided lower quality parenting (-.25 standardized parenting score vs. -.02 standardized parenting scores) (NICHD ECCRN, 2005).

## 2.2- Procedure

A secondary analysis was conducted using data from the NICHD SECCYD project in order to determine if specific types of social behaviors make shared and/or independent contributions to academic performance, while also examining the potential moderating roles of perception of school climate and teacher bonding.

## 2.3- Measures

Children in the SECCYD were studied from birth to age 15, with assessments occurring at 1, 6, 15, 24, 36, and 54 months old; when they were in kindergarten, and Grades 1, 2, 3, 4, 5 and 6; and at age 15. Listed below are specific measures employed in the present analyses and the time points of administration (Table 1), however additional information on all study instruments may be found at:

<https://www.nichd.nih.gov/research/supported/seccyd/Pages/overview.aspx#instruments>.

**Academic performance.** Coded school transcripts for each adolescent enrolled in the study were collected via the study instrument, “Transcript Questionnaire,” which included overall grade point average at age 15. Additionally, composite achievement scores from subtests of the Woodcock-Johnson Tests of Achievement (WJ-R) (Woodcock & Johnson, 1989) were included as a second index of academic performance. This is a widely used, comprehensive collection of tests measuring levels of achievement in reading, mathematics, written language and knowledge. Typically, raw scores are converted to standard scores with a mean of 100 and standard deviation of 15, however the for the current study purposes, *W* ability scores were included in order to more easily document change over time.

**Control variables.** Although there are a large number of potential control variables to consider, three were selected that have been previously examined and known to correlate with

social and academic outcomes: child ethnicity (Steinberg, Dornbusch, & Brown, 1992), maternal education (Davis-Kean, 2005; Sirin, 2005), and family income-to-needs ratio (Dearing, McCartney, & Taylor, 2001). Due to the majority of students in the sample identifying as White/non-Hispanic, a binary variable to represent ethnicity was created (1=white/non-Hispanic, 0 otherwise). Maternal education was coded on an ordered metric representing the number of years of education/highest degree. Family income was calculated from parent reports at each data collection point (here, grades 5, 6 and age 15) and included earnings of the mother, earnings of her resident husband/partner, as well as all other sources of household income (e.g., public assistance). An income-to-needs ratio was then computed by dividing the total family pre-tax income by the poverty threshold for each family size, with higher scores indicating higher income.

**Cooperation, assertiveness, self-control.** Using the Social Skills Rating Scale- Teacher Form (SSRS-T; Gresham & Elliot, 1990) , the present investigation examined teacher assessment of social behavior in secondary students. This scale consists of three subdomains of social skills: *cooperation* (e.g., attends to your instructions, invites others to join activities, uses time appropriately while waiting for help, shares materials), *assertion* (e.g., initiates conversations with peers, appropriately questions rules that may be unfair, joins ongoing activity/group without being told, makes friends easily, gives compliments to peers, volunteers to help peers with classroom tasks), and *self-control* (e.g., responds appropriately to peer pressure, controls temper in conflict situations with peers, responds appropriately to teasing, accepts peers ideas in group activities). Each item is rated on a 3-point scale reflecting how often the child displays a behavior. The SSRS-T correlates with other measures such as the Social Behavior Assessment, the Child Behavior Checklist (CBCL) and the Harter Teacher Rating Scale (NICHD, 2010).

**Overt Aggression.** Overt child aggression was defined as aggression that harms others through harm (or threat of harm) to another's physical or psychological well-being, including behaviors such as bullying, physically attacking, threatening, and teasing others (Crick, Casas, & Mosher, 1997; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996). Teachers reported on participants' overtly aggressive behavior using the Aggressive Behavior narrow-band subscale on the Child Behavior Checklist (CBCL-TRF; Achenbach, 1991). Modeled on the CBCL/4-18 (Achenbach & Edelbrock, 1991), the TRF is a widely used and well-validated standardized assessment of problems in children from 4-18 years of age, designed to obtain teachers' assessment of a student's adaptive functioning and problems. In addition to the scales created for this measure by the Achenbach scoring program, the Fast Track Project designed eleven narrow-band scales to measure other constructs, including *overt aggression* (Rains, 2003). For the purpose of this study, the six items from the aggression subscale reflecting overt aggression were selected which included: (a) cruelty, bullying, meanness to others, (b) gets in many fights, (c) physically attacks people, (d) teases a lot, (d) threatens people, (e) bragging, boasting (Rains, 2003). This scale showed adequate internal consistency with coefficient alphas ranging from .81-.83. Overt aggression items were chosen over general indices of disruptive behavior because previous research has suggested distinct forms of stable aggression uniquely predict social-psychological adjustment and are related to academic outcomes (Bongers, Koot, van der Ende, & Verhulst, 2004; Crick, 1996; Crick et al., 1997; Huesmann & Eron, 1984).

**Perception of school climate and teacher bonding.** During grade 6, students completed a data collection instrument in the NICHD SECCYD study, "What my school is like," which included self-reported items evaluating school attachment and environment. For the purposes of the current investigation, two of the four subscales were used to measure perceptions of school

climate and teacher bonding. Adapted from the New Hope Study, the NICHD measure has a four-point scale (1 = not at all true, 2 = not very true, 3 = sort of true, 4 = very true) instead of five-point scale (1=not true at all, 5=always true). Perception of school climate was measured with five items: “I am happy to be at my school,” “Teachers at my school treat students fairly,” “I feel close to others at my school,” “I feel safe at my school,” and “I feel like I am part of my school.” An overall score was calculated by averaging responses. Similarly, teacher bonding was measured using three items: “My teacher(s) treat me fairly,” “I care what my teacher(s) think of me,” “I feel close to at least one of my teachers” and again, responses were averaged.

**Prosocial Behavior and Relational Aggression.** Both constructs were measured using items from the “Child Behavior with Peers,” a data collection instrument in the NICHD SECCYD study. Teachers completed a questionnaire designed to measure the study child’s relationships and behaviors with peers in sixth grade. Adapted from the revised Child Behavior scale (Ladd & Profilet, 1996), this instrument includes 9 items measuring prosocial behavior with peers (e.g., seems concerned when other children are distressed, kind toward peers, friendly toward other children, shows concern for moral issues such as fairness and welfare of others) ( $\alpha = .88$ ). For relational aggression, a total score was obtained from six items (e.g., spreads rumors or gossips about some peers; when mad at a peer, gets even by excluding the peer from the group, threatens to stop being a peer’s friend in order to hurt the peer or to get what is wanted from the peer) ( $\alpha = .87$ ).

### **3.0- Results**

Results are reported in three sections. First, relations between social behaviors (prosocial and aggressive) and academic performance (achievement scores and overall GPA) are described. Next, findings from multiple regression analyses assessing the relative contribution of social

behaviors and demographic variables on academic performance are presented. Finally, aspects of the school environment (perception of school climate and teacher bonding) are investigated as potential moderators in the relationship between social behaviors and academic performance.

### **3.1- Preliminary Analyses**

As in most longitudinal studies, missing data occurred as a result of participant attrition, item nonresponse, and inability to locate individuals at follow-up time points. To account for these missing data in the analyses, the Analysis of Moment Structures program (AMOS; Arbuckle, 2007) was used to estimate parameters, incorporating full information maximum likelihood (FIML) methods, which allows for inclusion of data from all individuals regardless of the missing data pattern. FIML has several advantages over more commonly used methods such as listwise deletion (which decreases sample size and may yield biased estimates) or mean/median substitution (which restricts variance in the data). With FIML, incomplete data are assumed to be missing at random (MAR) allowing for non-random patterns of missing data *between* particular subsamples (e.g., ethnic groups), but requiring that patterns of missing data are random *within* subsamples.

Next, regression diagnostics were conducted to determine whether any predictor variables were influential outliers (Cook's d statistic) and whether multicollinearity among predictor variables, as assessed by the variance inflation factor (VIF), was problematic (Fox, 1991). Cook's d values ranged from (.00 to .06), indicating no influential outliers in any of the regression models. All VIFs were also within an acceptable range (1.10-2.91).

Descriptive statistics indicated that almost all variables were normally distributed and within acceptable limits of skewness and kurtosis. The two exceptions included income-to needs-ratio and the overt aggression subscale from the TRF. The former was calculated from

poverty thresholds based on household size and log transformed to adjust for a positively skewed distribution. The latter was also non-normally distributed with a skewness of 1.8 (SE = .02) and kurtosis 6.4 (SE = .04). This is unsurprising however, given that screening measures are often faced with this challenge and previous studies have also noted TRF scores skewed toward the lower end of the scale when looking at community samples of school-age children (Achenbach, 1991).

Finally, when testing for interaction and main effects simultaneously in regression models with correlated predictors, it is recommended that continuous independent variables be centered to reduce multicollinearity problems (Aiken & West, 1991). All continuous independent variables were standardized in the regression analyses to follow in order to facilitate comparisons among them.

#### Correspondence between Parent's and Teachers' Reports

In the current study, only teacher reports were used to assess adolescent social behavior, however, analyses of interrater agreement between three types of informants (mother, father, and teacher) were performed. Certain discrepancies were revealed in how parents and teachers perceived adolescent behaviors. Tables 2 and 3 report correlation analyses, as well as a comparison of mean ratings for all social behavior subscales. All correlations between informants were significant at the level of  $p < .01$ . In concordance with past studies of interparental agreement (Achenbach, McConaughy, & Howell, 1987; Duhig, Renk, Epstein, & Phares, 2000), mothers and fathers were similar in reporting lower scores of prosocial behaviors and higher scores of aggressive behaviors than teachers. Agreement was moderate between mothers and fathers (.51-.57) and low between parents and teachers (.22-.31). Application of Meng et al's (1992) procedure to compare correlated coefficients revealed that the agreement in



ratings between parents and teachers was significantly lower than agreement between mothers and fathers for both prosocial and aggressive behaviors: cooperation (mother,  $z=6.29$ ,  $p<.001$ ; father,  $z=5.28$ ,  $p<.001$ ), assertiveness (mother,  $z=5.21$ ,  $p<.001$ ; father,  $z=5.77$ ,  $p<.001$ ), self-control (mother,  $z=-6.41$ ;  $p<.001$ , father,  $z=-6.26$ ,  $p<.001$ ) and overt aggression (mother,  $z=-5.50$ ,  $p<.001$ ; father,  $z=-4.29$ ,  $p<.001$ ).

#### Internal consistency of social behavior subscales.

The internal consistency of each social behavior subscale was estimated with Cronbach's alpha (Table 2). Alphas for all six subscales were moderate to high in magnitude, with teacher reports showing higher consistency (particularly with aggression subscales) as compared to mother- and father- reports. This coincides with results generated by Coie and Dodge (1988) indicating teachers are often capable of a more a differentiated perception of negative behavior (e.g., discriminating between aggressive and withdrawn behavior) and can report on more qualitative aspects a student's prosocial behavior. This, taken in combination with the fact that the current study resides in the school setting, ultimately led to the decision of using teacher-reports exclusively.

### **3.2- Hypotheses Testing**

#### Hypothesis 1 and 2: Interrelations among study variables

Table 4 shows the means, standard deviations and mean-level differences for each of the study variables. Looking at only the prosocial subscales of the SSRS in the total sample, higher levels of cooperation and self-control were reported than assertiveness. Analysis of variance (ANOVA) results indicated, when compared with boys, girls were more cooperative and assertive, exhibited greater self-control, and performed more prosocial behavior toward peers. Therefore, as hypothesized, and generally consistent with previous research, interrelations between the main study variables showed female students exhibiting more prosocial behaviors

and relational aggression, whereas higher levels of overt aggression were reported for boys (Archer, 2004; Brodzinsky, Messer, & Tew, 1979; Coie & Dodge, 1998). Additionally, scores on achievement testing were approximately equal across gender (523 vs. 522 in boys and girls, respectively), although girls obtained slightly higher overall GPAs (2.93 vs. 3.15).

*Concurrent relations between grade 5 study variables.* Examination of the zero-order correlations (Table 5) showed low to moderate correlations for prosocial behaviors promoting academic performance and forms of aggression hindering the outcomes (i.e., inverse relationship). In grade 5, academic achievement was significantly and positively correlated with cooperation ( $r = .30$  and  $.29$ ,  $ps < .01$ ), assertiveness ( $r = .18$  and  $.20$ ,  $ps < .01$ ), self-control ( $r = .24$  and  $.20$ ,  $ps < .01$ ), and prosociality with peers ( $r = .13$  and  $.21$ ,  $ps < .01$ ) in boys and girls, respectively. Academic achievement was also significantly and negatively correlated with overt aggression ( $r = -.13$  and  $-.12$ ,  $ps < .01$ ) in boys and girls, respectively, however it was only significantly and negatively correlated with relational aggression in girls ( $r = .15$ ,  $ps < .01$ ). Again in grade 6 (Table 6), all prosocial behaviors were significantly and positively correlated with one another ( $r = .37-.60$  and  $r = .28-.48$ ,  $ps < .01$ ) for boys and girls, respectively. All four prosocial behaviors were also significantly and negatively correlated to overt aggression ( $r = -.18- .51$ ,  $ps < .01$ ) and relational aggression ( $r = -.11- .44$ ,  $ps < .01$ ) in boys. In girls, however, assertiveness showed a nonsignificant relationship with both forms of aggression. Finally, perception of school climate ( $r = .12-.20$ ,  $ps < .01$ ) and teacher bonding ( $r = .17-.24$   $ps < .01$ ) showed low to moderate correlations with each of the prosocial behaviors in girls. In boys, however, cooperation was nonsignificant with either school environment variable and assertiveness was only significantly related to perception of climate ( $r = .16$ ,  $p < .01$ ), but not teacher bonding. In addition, the separately conducted correlations for boys and girls were compared using Fisher's

*r*-to-*z* transformations (McNemar, 1969). Significant differences between boys and girls in the school environment variables were only found in cooperation and perception of school climate ( $z=-1.96$ ,  $p<.05$ , one-tailed) and cooperation and teacher bonding ( $z= 2.47$ ,  $p<.05$ , one-tailed)

*Predictive relations between grade 5 and 6 study variables.* Results in Tables 6 (grade 6) and 7 (grade 7) show cooperation, self-control, and prosociality with peers were all significantly and positively correlated with both academic achievement and overall GPA in grade 9. Assertiveness, however, was only significantly related to achievement scores (but not overall GPA) in girls. Of the four types of prosocial behavior, cooperation showed the strongest relationship with academic outcomes, in both boys and girls. School environment variables (perception of school climate or teacher bonding) were only significantly correlated to achievement scores and overall GPA in girls. Additionally, comparison of social environment variables and later achievement in boys and girls indicated a significant difference in perception of school climate ( $z=-2.09$ ,  $p<.05$ , one-tailed) but not in teacher bonding. All study variables yielded correlations in the expected directions.

*Regression analyses.* One goal of the study was to determine whether distinct forms of prosocial and aggressive behaviors were predictors of academic outcomes. As an initial step toward this end, academic performance was simultaneously regressed on all the social behavior variables to examine the predictive power of each construct, holding the others constant (Table 8). This was done to control for their co-occurrence and observe the unique relationships of each to the outcome measures. Of the six social variables entered, only cooperation emerged as a significant predictor of academic achievement and overall GPA in the total sample (achievement:  $\beta = .14$ ,  $p<.001$ , GPA:  $\beta = .20$ ,  $p<.001$ ), for boys (achievement:  $\beta = .19$ ,  $p<.001$ , GPA:  $\beta = .27$ ,  $p<.001$ ), and for girls (achievement:  $\beta = .19$ ,  $p<.001$ , GPA:  $\beta = .25$ ,  $p<.001$ ).

### Hypotheses 3 and 4: Moderation analyses

*Prosocial behavior as moderator of aggression and academic performance.* Next, a series of hierarchical linear regressions was conducted entering background variables (Step 1), grade 6 prosocial behaviors (Step 2), grade 6 aggressive behaviors (Step 3), and two-way interactions between prosocial and aggressive behaviors (Step 4). The prosocial x aggressive behavior interactions were added in order to evaluate the possibility of prosocial behavior moderating the relationship between both forms of aggression and academic performance. The results, including the standardized regression weights ( $\beta$ ) at entry into the equation and the incremented  $R^2$ , are shown in Table 9. Achievement scores and overall GPA were higher for students with higher family incomes and moms reaching higher levels of education (from step 1 of the hierarchical regression); together these accounted for 18% ( $p < .001$ ) of the variance in achievement scores and 12% of the variance in overall GPA. Inclusion of cooperation (Step 2) incremented explained variance by 3% in achievement ( $p < .001$ ) and 5% in GPA ( $p < .001$ ), whereby teacher reports of more frequent cooperative behaviors were found for students with better academic performance. No interaction terms between prosocial behavior and aggression were significant.

*School environment as moderator of social behavior and achievement.* Additional hierarchical regressions were performed to explore the possibility of the school environment serving as a moderator in the relationship between social behavior and academic outcomes. In all regression equations, background variables were entered first, followed by a block containing social behaviors, and a block containing the school environment variables. The final block contained two-way interactions between perception of school climate and teacher bonding with each of the social behaviors (run separately for achievement and overall GPA). As suggested by

Holmbeck (1997), a moderation effect would be evident if the interaction of a school environment variable and any of the social behaviors were a significant predictor of academic performance when the two main effects had been controlled for. Hierarchical regression analyses revealed that this was not the case for either perception of school climate or teacher bonding. In fact, nonsignificant interaction effects were found across all combinations of school environment and social behaviors (Table 10).

#### **4.0- Discussion**

The goal of the present study was to evaluate and expand upon previous research on distinct forms of prosocial and aggressive behavior within the adolescent school environment in order to better understand their impact on academic trajectories. Four hypotheses were tested and only two were partially supported by the data. First, findings indicated that prosocial behaviors were moderately positively correlated with one another and to academic performance. Consistent with previous literature, teachers also reported higher levels of prosocial behavior (all forms) and relational aggression in girls, as well as higher levels of overt aggression in boys. Although the interrelations of teacher-reported student behavior were weak to moderate, there is a suggestive pattern, with academically-oriented positive social behaviors (e.g., cooperation and self-control) showing stronger ties to school success than prosocial behaviors that are more interpersonal in nature (e.g., comforting a friend, being friendly towards others, etc.). This of course makes intuitive sense: within the classroom setting, academically-oriented positive social behaviors are more likely to create an environment conducive to learning and therefore tap into a student's academic performance.

Second, with multiple indices of prosocial and aggressive behavior, an attempt was made to examine to tease apart the explained variance produced by each. Only cooperation was revealed

to be a significant predictor. Perhaps this is partially a reflection of the expectations within the environment. Of the three subscales included in the SSRS, it would seem that recognition of and adherence to routine, as well as getting along with peers (all items included in the cooperation subscale) may be more valued in a classroom setting than assertion skills, such as “appropriately questioning rules that may be unfair.” The latter is not necessarily as rule-bound and may be less reinforced by a teacher than a parent. Thus, a teacher “bias” towards cooperation and self-control may not necessarily align with parents’ expectations in the home where greater value may be placed on assertion skills (e.g., demonstrating independence, initiating conversations with siblings and parents, etc.). There are also methodological challenges to consider given the unique aspects inherent in classroom settings. The sheer number of opportunities to perform prosocial acts may be limited as middle school classrooms (when compared to elementary school) are characterized by a “greater emphasis on teacher control and discipline, and fewer opportunities for student decision making, choice, and self-management” (Eccles et al., 1993).

Another explanation as to why cooperation alone predicted academic performance may be due to the nature of the behavior itself. Falling in line with Bandura’s proposed link of social behaviors and cognitive self-development, Damon and Phelps (1989) and Webb (1982) both suggest that positive interactions with peers, particularly when engaged in academic activities, promote cognitive development and intellectual problem solving. Therefore, cooperative interactions that strengthen academic exchanges allow for sharing of valuable intellectual resources, assistance when difficulties are encountered on a task, additional clarification and interpretation of a teacher’s instructions, exchange of resources such as notes and books, and overall modeling of academic skills (Schunk, 1987) . If this is indeed the case, cooperation may have emerged as a unique predictor as a result of its ability to tailor more successful academic

exchanges.

In summary, evidence extracted from the testing of the first two hypotheses further endorse the relationship between prosocial behavior and academic achievement, and is in accord with the ecological perspective of sociocognitive theories (Bandura, 1997; Vygotsky, 1962). These findings suggest a student's intellectual development may be partially influenced by the social relations in which it is embedded and specific types of prosocial behavior (i.e., cooperation) are capable of fostering cognitive self-development by enlisting academic support and guidance from more knowledgeable peers and adults.

Contrary to expectations, no evidence was found in support of the third and fourth hypotheses. Results revealed a null effect of early aggression on later academic performance. This is inconsistent with several findings indicating a concurrent and predictive association of middle school physical and verbal aggression with academic outcomes (Hinshaw, 1992; Tremblay et al., 1992), however, it does replicate findings by Caprara et al. (2000) in which aggression had no utility in predicting later achievement. In addition, no form of prosocial behavior moderated the relationship between aggression and academic performance and neither measure of the school environment played a significant role in the relationship between social behaviors and academic outcomes. This was also surprising given prior evidence that negative perception of school and lack of teacher bonding exacerbate the behavioral problems of aggressive children, thereby increasing their vulnerability to academic difficulties. Perhaps this is due to the fact that adolescence is characterized by a subjective sense of attaining adulthood, and identity explorations (Moffitt, 1993), therefore individual characteristics (such as prosocial behavior) may play a more decisive role once they escape the turbulence of this development stage (Kokko et al., 2006; Moffitt, 1993)).

Another potential reason for why forms of prosociality and school environment variables did not share strong links with academic performance may be due to the distinctive features of adolescent interpersonal relations or contextual changes that have implications for developmental social outcomes. For example, in addition to having every minute of the day predetermined by a fixed schedule, the changing of classrooms for each academic subject, as well as new instructors and classmates each period, poses a challenge for adolescents in their attempts to form close bonds and engage socially (Simmons, Carlton-Ford, & Blyth, 1987). Teachers are seeing students for briefer amounts of time (as compared to elementary school) and may have fewer opportunities to witness prosocial acts. More generally, the size of a school ultimately determines how often students may encounter familiar faces. There has been evidence suggesting prosocial behavior is less likely to occur when individuals are unfamiliar with one another (Eisenberg, 1986). Along the same lines, larger schools often face a more difficult challenge in fostering a sense of belongingness. Feeling lonely within school walls may affect an individual's empathy and/or perspective taking of others, which in turn, may influence his/her, prosocial development. Although significant strides have been made in recognizing the needs for comprehensive models of prosocial development, several aspects of social and contextual influences remain unclear.

Despite these unexpected findings, there are several strengths in the present attempt to better understand the development of distinct forms of aggression and prosociality in adolescence and the links to later academic performance. These hypotheses were guided primarily by the work of Caprara et al. (2000), although several notable differences allow for unique contributions to be made: (a) The study conducted by Caprara et al. (2000) employed an Italian sample, limiting cross-cultural generalizability. Although it is noted in their work that the basic findings were



supported by research in American children by Wentzel (1993), the latter employed a cross-sectional, rather than longitudinal study, and took into account teacher preference in relation to academic success. Here, the relationship between prosocial/aggressive behaviors and academic achievement is examined both concurrently and predictively across a four year time span, and both perception of school climate and teacher bonding are considered; (b) The central strength of this study was the simultaneous and hierarchical assessment of multiple forms of prosocial behavior (four total, including those defined as both “positive” and “prosocial”) and aggression (overt and relational), in order to determine their independent and overlapping contributions to academic achievement. Caprara and colleagues included teacher- and self-reports of the Prosocial Behavior (PB) scale (Caprara & Pastorelli, 1993) which includes only 10 items, all of which are mostly focused on empathetic and caring actions; (c) In the current study, predictions were assessed with a sample of older middle and high school adolescents rather than the more typically studied elementary school students. The sample included in Caprara et al. was substantially smaller (N=294) and collected data at two time points- third grade and eighth grade (d) In this study, both standardized scores on an achievement test and overall GPA were included as indices of academic performance. Using five levels of gradation, Caprara et al. utilized a composite measure of teacher grades across six academic courses.

Equivalent grades in different courses do not represent equivalent performances. A student's academic performance reflects a variety of factors, including personality aspects that can enhance or interfere with optimal functioning in settings where conformity or independence are differentially rewarded.

It is important to expand on this last note. Although both standardized achievement tests and overall GPA are designed to gauge students' academic skills and knowledge, they actually

differentially reflect student competencies (Duckworth & Seligman, 2006; Willingham, Pollack, & Lewis, 2002). GPAs are a more direct assessment of curricula students have been exposed to and are subject to variable factors such as classroom conduct, its alignment with teacher's values and the amount of effort put forth (Brookhart, 1994; McMillan, Myran, & Workman, 2002). Although it is commonly used as a dependent variable in studies of academic achievement, one of its acknowledged shortcomings is a lack of inherent stable meaning (Chansky, 1964). The more objective standardized tests on the other hand, offer assessment of cognitive abilities and achievement with documented, empirical evidence of reliability and validity, and without potential noncognitive covariates (i.e., classroom behaviors, teacher preferences). Grounded in the Cattell-Horn multiple intelligences theory of fluid (*Gf*) and crystallized abilities (*Gc*) (Horn, 1965, 1968, 1986, 1994; Horn & Noll, 1997), the WJ-R used in the current investigation has become one of the most frequently used achievement batteries. This is partly due to the widespread belief that the latest two revisions employed test design blueprints based on the most empirically supported and theoretically sound model of the structure of human intelligence. This, combined with empirical evidence suggesting performance on standardized measures of achievement can be used to accurately estimate IQ scores (Frey & Detterman, 2004; Rohde & Thompson, 2007), suggests cooperation may be tapping into a more basic capacity. Although modest, the similar effect size of cooperation across both indicators of achievement (.17 and .21 for WJ-R scores and overall GPA, respectively) and its incremental prediction beyond maternal education and income-to-needs ratio alludes to the possibility that cooperation's reach extends beyond the classroom. With ties to both GPA and test performance, it can no longer be assumed that behaving in a socially appropriate and learning conducive way within the classroom is the single driving factor

promoting academic performance. This finding aligns with some recent work suggesting altruistic and cooperative behaviors may serve as a signal of intelligence in that greater intellectual resources are employed to recognize long-term benefits of such prosocial behaviors (Millet & Dewitte, 2007; Van Vugt, Roberts, & Hardy, 2007). Millet and Dewitte (2007) not only found utility in differentiating between cooperative and altruistic behavior (further reiterating the need to subtype prosocial behaviors in future empirical work), but also provided evidence that individuals willing to contribute more than their fair share to a public good or who possessed a dispositional tendency to value joint benefits more than their own, scored higher on intelligence tests.

One final comment regarding cooperation emergence as a sole significant predictor among the four types of prosocial behaviors in the hierarchical analyses conducted. The consideration and inclusion of gender in the first step of regression analyses allows for a more stringent test of the power of the social predictors. As table 4 indicates, there is a difference of almost one standard deviation for cooperation favoring girls, the largest difference among the four prosocial behaviors. Yet despite controlling for gender in step 1 (Tables 9 and 10), cooperation carried a predictive effect in both indicators of academic performance. Once again, this points to the strength of cooperation's explanatory power of achievement, showing predictive validity beyond what is accounted for by gender differences.

### Limitations

Although this study contributes to the understanding of prosocial development and its associations with academic performance, several important limitations should be acknowledged. To begin, when initial hierarchical analyses were conducted, grade 5 academic performance was entered in the first step in order to control for stability effects. Too little variance, however, was

left to be explained once this was done and thus the prosocial/aggressive behaviors were unable to account for any change in achievement. Therefore, the subsequent analyses (reported above) did not control for this factor.

Secondly, although one of the primary goals of the current study was to focus on prosocial behaviors occurring within the classroom and driving academic performance, the sole use of teacher assessments may lead to biased results due to shared method variance as a single informant was used to measure key study variables. Moreover, teachers may introduce an “adultomorphic” perspective that carries with it value judgments regarding social behaviors. In other words, their unique viewpoint effectively prevents them from seeing a student the way his or her peers do. So although no single source can substitute for all others, the goal of the current investigation was to reveal more regarding adolescents’ social behavior in a particular context (i.e., the school) as it relates to academic performance, hence why teacher reports were used.

Thirdly, though from a large and geographically diverse sample, the adolescent participants included were relatively homogenous in terms of race/ethnicity (the majority identifying as White/non-Hispanic). Additionally, the mean income-to-needs ratio for the sample was 4.78 (SD = 4.32), indicating the average family was roughly four times higher than the poverty threshold, yet the large standard deviation indicates considerable diversity in income. Nevertheless, this subset of data is not a fair representation of the race/ethnic or socioeconomic distribution in the United States. It is also important to note that results are drawn from families living within the communities in which data was collected and who agreed to participate in the study, therefore the sample cannot be described as “nationally representative” according to standards set by statisticians (National Institute of Child Health and Human Development, 2006). Little can be said about how prosocial and aggressive behaviors are related to academic

performance in different races/ethnicities or social class groups and even within the sample, prosocial and aggressive behavior showed limited variation in the levels of social behavior reported by teachers. That is, the majority of students in the sample demonstrated relatively low levels of overt and relational aggression and high levels of all four prosocial behaviors. This skewed and restricted range of scores reduces the ability to detect differences in social behaviors related to academic achievement. Results therefore may be compromised by underrepresentation of more highly aggressive/less prosocial students.

Finally, although longitudinal designs are presumed to offer opportunities to examine causal processes, the results presented here preclude conclusions concerning direction of effects. Practically speaking however, one may expect that achievement outcomes influence classroom behavior in that positive evaluation of academic effort and work may provide incentives for students to behave in a positive manner. It is also feasible that the reverse is true, in which engaging with others appropriately and remaining on task maximizes instructional time within the classroom and fosters a supportive relationship with teachers, both of which may contribute to academic outcomes. This notion extends to intervention work where it is often reported that interventions designed to promote social behaviors often lead to improvements in both academic and social domains, however it is unlikely to produce the same effect in interventions geared towards cultivating academic skills. Similarly, results here indicated that cooperation related significantly and independently to standardized test scores. Given these scores are rarely reported to students, it seems unlikely that performance on these tests would directly impact the frequency or display of prosocial behavior in the classroom.

#### Future Directions

The above limitations notwithstanding, the current study's initial findings suggest

potential utility in more carefully applying a typological approach when studying prosocial behavior. In the future, it would be useful to examine other prosocial behaviors unique to adolescence (e.g., inclusive behaviors, bystander behaviors, humor, etc.) that are more likely to occur outside the classroom or with different targets (e.g., siblings, parents, friends, strangers, teammates, co-workers, and family members). The structured setting in which teachers engage with students (i.e., the classroom) may not reflect the levels of adolescent prosocial behavior displayed in less structured settings. Probing beyond academically-oriented behaviors is needed to identify the relational nuances that help or hinder prosocial development across different contexts and relations in adolescence.

Along these same lines, the lack of behavior-specific and target-specific methodological approaches hinders the establishment of real-world applications for intervention development (i.e., designing an intervention with the goal of increasing cooperative behaviors may differ from one aimed at fostering empathetic-based behaviors). It is therefore imperative to take into account and systematically investigate the diversity of types of prosocial behavior that may emerge in adolescence, as well as how preexisting ones take on new meanings. Differentiations among the forms and functions of prosocial behavior, has great potential to facilitate future intervention efforts aimed at providing more effective support during a student's tenure

Finally, although direct evidence on how cooperation relates to cognitive test performance (an often used proxy for IQ testing) is lacking, the small but consistent associations between cooperation and both indicators of achievement provide sufficient indirect evidence to warrant further speculation. Do benefits accrued from cooperative interactions generalize to a student's subsequent individual performance? Are there features of cooperative interactions that are promoting learning? And finally, given the differences between test-based and GPA-based

achievement indicators, how is it that cooperation was able to hold its own in explaining individual differences?

### Conclusion

This study joins the smaller mound of research informing teachers, school administrators and teacher trainers about the value of focusing on positive behaviors for students. These findings point to the potential impact cooperation may have in a student's academic trajectory. But much remains to be done to clarify the relationship between prosocial behaviors and academic performance, over and above other contributing factors, as well as to thoroughly tease apart the broad array of prosocial behaviors specific to adolescence.

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**Table 1***Overview of measurement time points*

Variables	Grade 5	Grade 6	Age 15
Prosocial Behaviors			
Cooperation	X	X	
Assertiveness	X	X	
Self-control	X	X	
Prosocial with peers	X	X	
Aggression			
Overt	X	X	
Relational	X	X	
School Environment			
Perception of school climate		X	
Teacher bonding		X	
Achievement			
Overall GPA			X
WJ Achievement Tests			X

**Table 2***Cronbach's alphas as an indicator of internal consistency for each grade 6 social behavior subscale*

<b><u>Social Behavior</u></b>	<b><u>Cronbach's alpha</u></b>			<b><u>Mean (sd)</u></b>			<b><u>Range</u></b>
	<i>Mother</i>	<i>Father</i>	<i>Teacher</i>	<i>Mother</i>	<i>Father</i>	<i>Teacher</i>	
Cooperation (SSRS)	.81	.82	.91	12.0 (3.4)	11.6 (3.4)	15.7 (4.1)	0-20
Assertiveness (SSRS)	.77	.76	.85	14.7 (2.7)	16.5 (2.8)	12.5 (4.1)	0-20
Self-Control (SSRS)	.83	.86	.87	13.9 (3.6)	13.9 (3.4)	15.3 (3.8)	0-20
Prosocial toward peers (CBwP)	.80	-	.87	1.66 (.32)	-	1.49 (.40)	0-2
Overt Aggression (CBCL/TRF)	.66	.69	.83	.141 (.21)	.156 (.23)	.127 (.28)	0-2
Relational Aggression (CBwP)	.78	-	.84	.302(.33)	-	.285 (.38)	0-2

*Note:* Social Skills Rating Scale-Mother (SSRS): n=1021; SSRS-Father: n=724; SSRS-Teacher: n=842;

Child Behavior with Peers- Mother (CBwP): n= 1022; CBwP-Teacher: n=821; Child Behavior Checklist-Mother (CBCL)= 1022;

CBCL-Father: n=724; Teacher Report Form (TRF): n=855.

**Table 3**

*Correlations between mother-, father- and teacher-report of different forms of prosocial and aggressive behavior*

	<u>Mother/Father</u>	<u>Mother/Teacher</u>	<u>Father/Teacher</u>
SSRS Cooperation	.53	.26	.28
SSRS Assertiveness	.51	.29	.24
SSRS Self-Control	.57	.30	.29
Prosocial toward peers	-	.31	-
Overt Aggression	.52	.28	.22
Relational Aggression	-	.26	-

*Note.* All correlations were significant at level  $p < .01$ .

**Table 4***Descriptive statistics for predictor and outcome variables*

	Total Sample		Boys		Girls		F
	M	SD	M	SD	M	SD	
Cooperation (SSRS)	15.8	4.4	14.7	4.6	17.0	3.7	40.3***
Assertiveness (SSRS)	12.5	4.3	12.0	4.3	13.1	4.1	2.21
Self-Control (SSRS)	15.3	3.7	14.6	4.0	16.0	3.4	139***
Prosocial with peers (CBS)	1.49	.40	1.41	.42	1.58	.36	10.1**
Overt aggression (CBCL)	.128	.28	.180	.32	.070	.20	75.4***
Relational aggression (CBS)	.285	.38	.268	.38	.296	.37	.035
Perception of school climate	3.45	.52	3.38	.54	3.54	.46	5.25*
Teacher bonding	3.39	.62	3.29	.64	3.50	.56	8.10**
Grade 9 Achievement	522	12	523	12	522	12	.507
Grade 9 Overall GPA	3.03	.70	2.93	.70	3.15	.68	.757

*Note.* \* p<.05; \*\* p<.01; \*\*\* p<.001

Total Sample (N=1028), Boys (N=509), Girls (N=519)

**Table 5***Concurrent associations: Zero-order correlations for all grade 5 study variables*

Variable	1	2	3	4	5	6	7
1. Cooperation	-	.44**	.57**	.49**	-.24**	-.30**	.30**
2. Assertiveness	.41**	-	.49**	.50**	-.11*	-.21**	.18**
3. Self-Control	.48**	.42**	-	.65**	-.32**	-.50**	.24**
4. Prosocial with peers	.42**	.47**	.54**	-	-.27**	-.44**	.13**
5. Overt aggression	-.11**	-.03	-.25**	-.19**	-	.23**	-.13**
6. Relational aggression	-.28**	-.12*	-.48**	-.38**	.22**	-	-.08
7. Grade 5 Achievement	.29**	.20**	.20**	.21**	-.12*	-.15**	-

*Note.* Results for boys (n=509) are presented above the diagonal. Results for girls (n=519) are presented below the diagonal. \*p<.05; \*\*p<.01

**Table 6***Concurrent associations: Zero-order correlations for all grade 6 study variables*

Variable	1	2	3	4	5	6	7	8
1. Cooperation	-	.37**	.51**	.49**	-.37**	-.28**	.08	.09
2. Assertiveness	.28**	-	.43**	.49**	-.18*	-.11**	.16**	.07
3. Self-Control	.46**	.40**	-	.60**	-.51**	-.44**	.12*	.10*
4. Prosocial with peers	.40**	.40**	.48**	-	-.48**	-.38**	.13*	.16**
5. Overt aggression	-.29**	-.10	-.34**	-.32**	-	.56**	-.03	-.06
6. Relational aggression	-.27**	-.10	-.36**	-.29**	.38**	-	-.04	-.04
7. Perception of school climate	.20**	.12*	.17**	.15**	-.10	-.13**	-	.61**
8. Teacher Bonding	.24**	.17**	.20**	.21**	-.18**	-.14**	.54**	-

*Note.* Results for boys (n=509) are presented above the diagonal. Results for girls (n=519) are presented below the diagonal. \*p<.05; \*\*p<.01



**Table 6**

*Longitudinal associations: Zero-order correlations for all grade 5 predictive variables and grade 9 outcome variables*

Variable	<i>Total</i>		<i>Boys</i>		<i>Girls</i>	
	WJ Achievement	GPA	WJ Achievement	GPA	WJ Achievement	GPA
Cooperation	.18**	.19**	.28**	.25**	.23**	.21**
Assertiveness	.13**	.09**	.17**	.13*	.17**	.10
Self-Control	.16**	.12**	.23**	.14*	.21**	.17**
Prosocial with peers	.12**	.14**	.16**	.16**	.18**	.16*
Overt aggression	-.13**	-.09*	-.18**	-.10	-.17**	-.09
Relational aggression	-.12**	-.06	-.16*	-.04	-.16**	-.13*
Grade 5 achievement	.50**	.20**	.60	.22	.70*	.33**

*Note.* Total (N=1,364), Boys (N=509), Girls (N=519).  
\*p<.05; \*\*p<.01

**Table 7**

*Longitudinal associations: Zero-order correlations for all grade 6 predictive variables and grade 9 outcome variables*

Variable	<i>Total</i>		<i>Boys</i>		<i>Girls</i>	
	WJ Achievement	GPA	WJ Achievement	GPA	WJ Achievement	GPA
Cooperation	.19**	.24**	.26**	.31**	.27**	.26**
Assertiveness	.10**	.12**	.17**	.19**	.10	.08
Self-Control	.15**	.16**	.20**	.18**	.19**	.19**
Prosocial with peers	.10*	.12**	.14**	.16**	.13*	.10*
Overt aggression	-.09*	-.10**	-.16**	-.11*	-.14*	-.09
Relational aggression	-.11*	-.07*	-.12*	-.09	-.17**	-.15**
Perception of school climate	.05	.11**	.00	.10	.13*	.13*
Teacher bonding	.06	.09**	.02	.06	.14**	.11*

*Note.* Total (n=1028), Boys (N=509), Girls (N=519).

\*p<.05; \*\*p<.01

**Table 8**

*Results of simultaneous regressions of grade 9 WJ achievement scores and overall GPA on grade 6 prosocial and aggressive behaviors*

	<u>Total Sample</u>		<u>Boys</u>		<u>Girls</u>	
	<i>WJ</i>	<i>GPA</i>	<i>WJ</i>	<i>GPA</i>	<i>WJ</i>	<i>GPA</i>
Cooperation	.14***	.20***	.19***	.27***	.19***	.25***
Assertiveness	.05	.04	.09	-.04	.01	-.02
Self-Control	.06	.07	.06	.02	.07	.10
Prosocial toward peers	-.02	-.01	-.07	-.04	-.02	-.05
Overt Aggression	-.01	-.04	-.05	-.02	-.04	-.03
Relational Aggression	-.07	-.04	-.02	-.02	-.08	-.08

*Note.* \*\*\*  $p < .001$

The tabled values are standardized regression coefficients estimated simultaneously (i.e., controlling for all other effects, thus each social behavior effect is unique)

**Table 9**

*Hierarchical linear regression predicting academic outcomes from prosocial and aggressive behaviors*

Predictor	Grade 9 Achievement		Grade 9 Overall GPA	
	$\beta$	$R^2\Delta$	$\beta$	$R^2\Delta$
Step 1: background variables				
Income-to-needs	.11*		.04*	
Maternal education	.36***		.29***	
Child ethnicity	.01		-.02	
Child gender	-.06	.18	.15	.12
Step 2: prosocial behaviors				
Cooperation	.17**		.21**	
Assertiveness	.04		.04	
Self-Control	.06		.06	
Prosocial towards peers	-.04	.21	-.03	.17
Step 3: aggressive behaviors				
Overt	-.20		.16	
Relational	-.18		.23	.17
Step 4: interactions				
Cooperation x Overt	-.17		-.19	
Cooperation x Relational	.08	.21	-.22	
Assertiveness x Overt	-.03		.02	
Assertiveness x Relational	.08		.15	
Self-Control x Overt	-.02		-.05	
Self-Control x Relational	.01		.14	
Prosocial x Overt	.05		.05	
Prosocial x Relational	-.15	.21	-.35	.18

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table 10***Hierarchical linear regression predicting academic outcomes from school environment and social behaviors*

Predictor	Grade 9 WJ Achievement		Grade 9 Overall GPA	
	$\beta$	$R^2\Delta$	$\beta$	$R^2\Delta$
Step 1: background variables				
Income-to-needs	.11***		.04*	
Maternal education	.36***		.29***	
Child ethnicity	.01		-.02	
Child gender	-.06	.18	.15	.12
Step 2: school environment				
Perception of school climate	-.04		.08	
Teacher Bonding	.07	.18	.03	.13
Step 3: social behaviors				
Cooperation	.16***		.21***	
Assertiveness	.04		.04	
Self-Control	.04		.06	
Prosocial towards peers	-.06		-.03	
Overt aggression	-.03		.04	
Relational aggression	-.05	.21	-.03	.17
Step 4: interactions				
Cooperation x Attachment	.02		-.07	
Cooperation x Teacher	.03		.11	
Assertiveness x Attachment	-.06		-.02	
Assertiveness x Teacher	-.01		-.01	
Self-Control x Attachment	.09		.09	
Self-Control x Teacher	-.05		-.01	
Prosocial x Attachment	.05		.02	
Prosocial x Teacher	-.06		-.01	
Overt x Attachment	.05		.04	
Overt x Teacher	.09		.07	
Relational x Attachment	-.01		-.01	
Relational x Teacher	-.06	.22	-.02	.18

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$