

Social Capital, Self-Control, and Academic Performance in School-Age Children and
Adolescents: Patterns Associated with Race/Ethnicity

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Abstract

Children's abilities to control behaviors and emotions continue to grow from childhood to adolescence. The thesis examined the degree to which the social capital in family and school contexts shaped self-control among four racial/ethnic groups (i.e., Caucasian, African American, Hispanic, Asian American), and whether self-control served as a mediator of the relationship between social capital and academic performance. It consisted of two studies using two major datasets (Early Childhood Longitudinal Study – Kindergarten: 2011 and Minnesota Student Survey). Study 1 analyzed a nationally representative sample of children who entered kindergarten during the school year of 2010-2011, following them through second grade. Study 2 analyzed a statewide sample of adolescents in secondary schools (8th, 9th, and 11th grader) between 12 to 18 years old in 2016. In the investigation of racial/ethnic differences, first the measurement equivalence of family/school social capital, self-control, and academic performance were established in each study. Then multi-group Structural Equation Modeling (SEM) was conducted to assess whether racial/ethnic membership moderates proposed associations for children and adolescence. Study 1 found that family social capital positively predicted self-control and academic achievement for Caucasian and Hispanic children, while school social capital was not significant for any group. Self-control was a partial and positive mediator of the relationship between family social capital and academic achievement for the Caucasian and Hispanic children. Study 2 found positive associations from family and school social capital to self-control, and self-control partially and significantly mediated associations between social capital and academic achievement for adolescents across racial/ethnic groups. Implications for prevention, intervention, and public policy for different populations of interest are provided.

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Chapter 1: Introduction

As a crucial intrapersonal process to achieve long-term goals, self-control refers to the capacity to override impulsivity and alter responses to meet prosocial standards and social expectations (Baumeister, Scheichel, & Vohs, 2007). In the past two decades, extensive research has suggested that self-control in childhood and adolescence is an important prerequisite for a wide spectrum of positive outcomes, including greater psychological well-being, more positive interpersonal relationships, higher academic achievement, lower chance of engaging in transgressive acts, and higher likelihood of employment in adulthood (Bub, Robinson, & Curtis, 2016; Daly, Delaney, Egan, & Baumeister, 2015; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Fergusson, Boden, & Harwood, 2013; Tangney, Baumeister, & Boone, 2004; Vazsonyi, Mikuška, & Kelley, 2017). More self-controlled individuals are more likely to inhibit undesired impulses, make rational decisions, and take prosocial actions, resulting in healthier and more productive lives. In light of its importance, considerable interdisciplinary research has examined the etiology of self-control: socialization processes (e.g., Bernier, Carlson, Deschenes, & Matte-Gagne, 2012; Brumariu, 2015; Cullen, Unnever, Wright, & Beaver, 2008), neuropsychological functioning (e.g., Gajos, & Beaver, 2015), and interaction of gene and environment (e.g., Belsky, & Beaver, 2011; Beaver, Ratchford, & Ferguson, 2009). Contrary to much of the contemporary neurocognition and clinical psychology research, which tend to focus on brain development and neurocognitive abilities (e.g., executive functioning; Dishion, 2016), the present thesis considers the power of social experiences in forging individual self-control.

Frameworks of social capital theory (Coleman, 1990) and social control theory (Hirchi, 1969) are applied here to provide informative guidance on the hypotheses and methodology. Social control theory emphasizes the importance of social bonds and emotional attachment to others in shaping prosocial behaviors (Hirchi, 1969). Social capital theory highlights the protective roles of resources embedded in social relationships in the pursuit of individual positive development (Coleman, 1990). It has been suggested that a basic function of social capital is a source of social controls that foster conventional and moral values and internalization of these values (Portes, 1998). This mechanism is particularly relevant in examining self-control because children and adolescents are socially constrained, and self-control is often a collaborative process involving two or more individuals when people make decisions. Little effort has been made to integrate these two closely related theories relating specifically to effects of family and school-related factors on self-control abilities. In this thesis, both theories are applied to advance knowledge of the significance of family and school contexts in shaping self-control abilities, and to provide potential strategies that could be implemented to promote cognitive ability and academic performance.

In the current self-control literature, the majority of studies have emphasized parenting socialization and social control within families (e.g., Cecil, Barker, Jaffee, & Viding, 2012; Pratt, Turner, & Piquero, 2004). There remains a need for understanding the influence of other social contexts, schools in particular, to inform the development of self-control and prosocial behaviors. Understanding human development requires including the entire ecological system in which personal relationships, institutions, and social settings influence the developmental trajectories independently and interactively

(Bronfenbrenner & Evans, 2000). In the socio-ecological model on the context of development (Bronfenbrenner & Morris, 2006), the family and school are both placed in the microsystem and are considered to be of equal importance. In addition, school-aged children and adolescents spend much of their time at school in companionship with teachers and peers (Eccles & Roeser, 2003). Compelling evidence also supports that both educational environments and parental practices actively support growth in social competence (see Biglan, 2015). Consistent with this idea, this thesis places an emphasis on the role of socialization processes in both families and schools to understand self-control in childhood and adolescence.

The attainment and accumulation of social capital from families and schools is a central component of social control, which can promote self-control abilities in both childhood and adolescence. It is hypothesized here that multiple social environments (i.e., family and schools) and interactions between them (i.e., parent-school contact and involvement) together affect individual development. Guided by social capital theories and empirical evidence, various forms of social capital in either families or schools are considered. In addition, ample evidence has demonstrated the positive relationship between social capital and academic achievement (McNeal, 1999; Stanton, Salazar and Dornbush, 1995) as well as the positive relationship between self-control and academic achievement (Duckworth & Kern, 2011; Sawyer et al, 2014). Thus, another component of the proposed framework posits that self-control may mediate the relationship between social capital and academic achievement.

The pathways through which forms of socialization processes and social controls operate remain largely understudied and thus poorly understood between and/or with

U.S. racial/ethnic groups. Both the percentage of racial/ethnic minorities in the U.S. (Colby & Ortman, 2015) and the percentage of students of color enrolled in U.S. public elementary and secondary schools (i.e., increased from 42% in fall 2004 to 50.5% in fall 2014; U.S. Department of Education, 2017) are on the rise. It is imperative that research considers the demographic shift and growing populations. Furthermore, substantial evidence points to a set of economic and academic disparities between ethnic minority children and Caucasian children in the U.S. (Musu-Gillette et al., 2017). The diversity of race/ethnicity, cultural forces, and socioeconomic disadvantages induces differential experiences and exposures. As a result, it would be expected that culturally important contexts including families and schools would operate in differential manners with regard to self-control and academic outcomes among racial/ethnic groups. Different rates of self-control development and academic achievement across racial/ethnic groups requires research to explore patterns in the association of social capital from multiple contexts that may be driving these differences.

In the field of self-control and deviance, there is increasing culturally comparative research (Botchkovar, Marshall, Rocque, & Posick, 2015; Cretacci & Cretacci, 2012; Heimpel, Qian & Song, 2018; Vazsonyi & Belliston, 2007), and research within certain ethnicity groups in the context of the United States, such as African Americans (Cunningham, Kliewer, Garner, 2009), Latino (Shekarkhar & Gibson, 2011), Chinese Americans (Liew, Kwok, Chang, Chang, & Yeh, 2014). However, little research has pursued a comparative approach highlighting differences and similarities among different groups. Thus, instead of assuming a universal applicability of the hypothesized

associations, this thesis examined model equivalence across racial/ethnic groups (i.e., Caucasian, African American, Hispanic/Latino, and Asian Americans).

Another purpose of this thesis is to increase the confidence and generalizability of the hypothesized model. Only about 1/3 of the psychological studies in highly prestigious journals replicate; and the non-replication is a particularly pronounced problem for social psychology (Open Science Collaboration, 2015). This disturbing problem calls for more replication studies to validate previously identified theoretical relationships. Generally, there are two types of replications: exact replication and conceptual replication (Schmidt, 2009). Exact replication refers to exactly recreating scientific methods used in the conditions of a previous study. Conceptual replication refers to the attempt to confirm the previous findings using different a different set of methods and measures and testing the same hypothesis. It offers insights into how generalizable of the findings. As an attempt of conceptual replication, two studies using different data sources with different methods and measures were included.

Overview

In Chapter 2, I critically review the concepts of social capital, self-control, and academic achievement. I start by defining self-control and its measurement. Next, I introduce the concept of social capital and review evidence concerning social factors in families and schools that influence self-control development. In particular, I highlight the role of parental involvement and school relationships in establishing self-control in childhood and developing self-control in adolescence. Then there is brief review on the direct association between social capital and academic achievement, as well as the

association between self-control and academic achievement. Finally, I review evidence built on samples from cultures or racial/ethnic minority groups. Before moving to the next chapter, I introduce the two studies, their purpose, and provide my hypothesis for both studies.

In Chapter 3, I describe the method, results, and discussion for Study 1. I give an overview of the sample and data. Then I describe the measures by explaining how I operationalized family social capital, school social capital, self-control, and academic performance. A detailed procedure for conducting analyses is provided. In Chapter 5, I report results and the discussion.

In Chapter 5, I describe the sample and measures in Study 2, following the same format. Results and discussion of Study are presented in Chapter 6.

In Chapter 7, I provide a general discussion for the thesis, implications, limitations and directions for future research.

Chapter 2: Literature Review

Understanding Self-Control

Definition. Besides self-control, psychologists and sociologists have embraced many terms to describe the psychological processes underlying self-controlled behaviors, including self-regulation, self-discipline, delay of gratification, willpower, effortful control, ego strength, and inhibitory control (Duckworth & Kern, 2011). Despite the nuances in the use of different terms, self-control here refers to the capacity to voluntarily control over one's inappropriate emotions, thoughts, and behaviors to act in alternative and favorable ways in the face of temptations and impulses (Baumeister, Vohs, & Tice, 2007). Specifically, self-control emphasizes volitional and self-directed actions so that individuals pursue long-term goals (Duckworth & Steinberg, 2015). It highlights one's dispositional capacity to handle dilemmas and conflicts efficiently (De Ridder, Kroese, & Gillebarrt, 2017). Individuals exercise self-control when they experience conflicting urges that are more potent in the moment but detrimental to the long-term goals (Hofmann, Baumeister, Förster, & Vohs, 2012). The resolution of dilemmas may involve several strategies, including inhibition of an undesired behavior, limiting the availability of temptations, initiation of a desired behavior, or a combination of both (Fujita, 2011).

Measures of self-control. Various measures of self-control have been developed in survey studies across disciplines (Duckworth & Kern, 2011). To date, scholars still have not reached a consensus regarding the application of measures, though some have noted that different measures are essentially interchangeable (De Ridder et al., 2012). Generally, attitudinal and behavioral indices of self-control are often used to measure

self-control abilities. Attitudinal scales assess individual preference for simple tasks, tendency of risk seeking, impulsivity, and ability to effectively set, pursue, and monitor goals (Hoyle & Davission, 2016). Behavioral scales consist of indicators pertaining to acts that resemble poor self-control (Walters, 2016).

Both measures have come under criticism. The dimensionality (e.g., single or multiple factors) of attitudinal scales for self-control is still debated (DeCamp, 2015; Gibson, 2014; Ward, Nobles, & Fox, 2015). Regarding behaviors measures, there is no consensus on these scales, and they often yield weak internal consistency in literatures (Tittle, Ward, & Grasmick, 2003). In addition, a meta-analysis found a low level of convergence ($r = .24$) between attitudinal and behavioral measures (Walters, 2016). It has been suggested that measures with convergent validity less than $r = .50$ should not be used interchangeably because they are too distinct (Carlson & Herdman, 2012). The convergence between attitudinal and behavioral measures reported above apparently falls below the lower bound. To advance the debate, some scholars have supported the application of both attitudinal and behavioral indicators in the measure of self-control. For instance, using the measures of self-control in two nationally representative datasets, Wolfe and Hoffman (2016) found that a second-order factor structure that accounts for the correlation between attitudinal and behavioral factors best represented the measure of self-control.

Social sources of self-control. Self-control originates from inside the person but is also susceptible to environmental factors. Gottfredson & Hirschi's (1990) theorize positive socialization processes, especially parenting practices and family climate, as a fruitful approach to meaningful changes in the ability to develop self-control in the first

decade of life. An attachment relationship with parents and teachers suggests that the child is likely to be more supervised and could attain more investment from parents than children who are less attached. Hirschi (1969)'s social control theory predicts that strong social bonds with others, including family members, teachers, and peers in and out of the school, would inhibit the expression of delinquency and encourage people to behave in accordance with the expectations and goal that others have for them, which increases the ability to self-control. Empirical evidence across different samples provides support that socialization practices from parents and other socializing agents, including teachers and peers in schools, and the quality of relations between the child and agencies play important roles in the development of self-control in both childhood and adolescence (e.g., Burt, Simons, & Simons, 2006; Hay & Forrest, 2006; Na & Paternoster, 2012; Piquero, Jennings, Diamond, Farrington, & Reingle Gonzalez, 2016; Vazsonyi & Huang, 2010). Both theories and empirical evidence suggest that individual variability in self-control seems to follow socialization efforts. From an early age, children's behaviors are primarily controlled by external forces, particularly from their parents; over time children internalize the prosocial rules, norms, and expectations transmitted from others at home and educational institutions, which is a necessary step to build their own self-control skills (Jun & Chi, 2013). Levels of self-control can vary in response to the transitions of social relationships (Fitzsimons & Finkel, 2011). The concept of social capital and its application highlight the role of social relations in shaping human behaviors. As relationship-embedded resources, social capital emphasizes the quality, content, and structure of social relationships that heighten role reciprocity and obligations, which in turn provide informal social control (Sampson & Laub, 1993; Wright, Cullen, & Miller,

2001). The following section will adopt concepts within the social capital theory and take a closer look at how social relationships in two major settings – family and school- potentially facilitate the development of self-control in childhood and adolescence.

Social Capital as Sources

A number of scholars have developed concepts and definitions of social capital that reflect their own disciplinary backgrounds, mainly including Bourdieu (1986), Coleman (1988), and Putnam (1993). Bourdieu (1986) prioritizes the social obligations and supports embedded in social networks that increase the ability of an individual to advance his/her interests. Coleman (1988) formulates social capital as productive resources and bonding mechanisms of the social relations that exist at both micro and macro levels so that individuals can achieve goals. Putnam (1993, p.35) describes social capital as “features of social organizations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit”. For Putnam, social capital is a collective trait functioning at the aggregate level. Despite a lack of clarity regarding the definition of social capital, there is consensus that the elements of social relations, including mutual trust and social norms of reciprocity that cause interpersonal bonding and social cohesion, can lead to positive social, emotional, and behavioral development in children and adolescents. Individuals accumulate social capital through their social relationships that exists in social structures, such as educational institutions, communities, or workplaces (Kawachi, Takeo, & Subramanian, 2013).

In this context of young people, the volume of social capital and the quality to resources is central to achieve positive outcomes. Here, social capital theory is used to

inform the examination of the factors that facilitate children and adolescents to develop self-control and protect them from involvement in delinquent behaviors. For children and adolescents, according to this position, social capital operates through factors identified by social control theories and explains the socialization processes by which social ties between children and other actors, including parents and teachers, foster and encourage internalization of conventional and moral values in children (Dufur, Hoffmann, Braudt, Parcel, & Spence, 2015; Portes, 1998). The process entails investment from parents and schools with the expectation of a return on that investment due to a sense of trust and obligation. Given this framework, when parents and schools invest in instilling norms, obligations, and moral values in their children through adolescence, the young people are likely to accept those social controls and constrain their own behaviors and exercise self-control to achieve goals (Coleman, 1990; Portes, 1998).

Even though social capital theory only infrequently has been systematically applied, a group of scholars has examined whether social capital attained within the family, the school, or the interaction between the two contexts, explains children's academic achievement (Parcel & Dufur, 2009; Dufur, Parcel, & Troutman, 2013), behavior problems (Dufur et al., 2015; Dufur, Parcel, & Mckune, 2008), adolescent violence (Hoffmann & Dufur, 2008), and adolescent use of alcohol and marijuana (Dufur, Parcel, & Mckune, 2013). However, the contribution to the field of self-control is still limited. Thus, this thesis aims to extend prior research by asking whether social capital in two key contexts – family and school – is a source of the development of self-control in childhood and adolescence. As a multifaceted construct, it is conceptualized in this thesis to produce positive social and behavioral outcomes as has been suggested

(Coleman, 1990; Islam, Merlo, Lindstrom, & Gerdtham, 2006). In order to operationalize a comprehensive definition of social capital, it is informative to review the evidence of previous research on the associations between self-control and various forms of social capital that emphasize social relations and social controls for children and adolescents.

Family social capital and self-control. Family social capital reflects the family relational resources that facilitate the process and success of socialization (Dufur, Parcel, & McKune, 2013). It refers to the time and attention that parents/guardians invest in their interactions with children, monitoring children's activities, and promoting prosocial behaviors (Coleman, 1990; McNeal, 1999). As children move through the educational system, parents play a key role in delivering social norms of behaviors and achievement expectations to their children. They have the social responsibility to educate and socialize their children by modifying children's behavior to make it fall within the consensual norm, and punishment is necessary at times (Larson, 1983). Evidence has demonstrated that parental support/involvement as social capital (McNeal, 1999) has positive effects on adolescents' social and emotional functioning, commitment to school, and their academic performance regardless of ethnicity (El Nokali, Bachman, & Votruba-Drzal, 2010; LeFevre & Shaw, 2012; Pomerantz, Mooroman, & Litwack, 2007).

In relation to self-control and under-controlled behaviors, multiple indicators of family social capital have been supported in the literature. Specifically, parental monitoring and discipline (e.g., reasoning) over their children's behaviors are effective practices in the transmission of values and self-control (Meldrum, 2008; Janssen, Eichelsheim, Deković, & Bruinsma, 2016; Teasdale & Silver, 2009; Unnever, Cullen, & Pratt, 2003). For instance, parents' increased knowledge about children's whereabouts

and their interventions in rule-breaking behaviors were significantly related to the growth in adolescents' self-control over a period of two years (Janssen et al., 2016). In addition, parental involvement in children's academic and daily activities provides an opportunity for the parents to develop relationships trust with children, and parental involvement in school-based activities promote parent-school contact (Dika & Singh, 2002). These familial and extra-familial ties (e.g., with children's teachers, peers, and peers' parents) strengthen social control through increased monitoring in that parents are able to get additional information about their children and effectively intervene with children's problematic behaviors in and out of school (Aneshensel & Sucoff, 1996; McNeal, 1999, 2001).

Positive parent-child relationships are associated with higher levels of self-control and lowered delinquency in children and adolescents (e.g., Brumariu, 2015; Drake, Belsky, & Fearon, 2014; Hovee et al, 2012). For instance, a previous study has suggested that children's early attachment security at 15 and 36 months old predicts later social self-regulation in elementary school (from first to fifth grade; Drake, Belsky, & Fearon, 2014). As hypothesized in social control theory (Hirchi, 1969), children from a highly cohesive family care about what their parents think of them and how their parents may be affected by their misconduct (Cullen et al., 2008). Closeness and warmth in family relationships facilitate the transmission of values and norms, and distant relationships deter the process (Eisenberg, Smith, & Spinrad, 2011). Previous research has revealed that children who experienced high-level warmth from parents were more able to internalize emotion regulation strategies taught by their parents whether or not parents are present (Brumariu, 2015). In addition, parental warmth and attachment encourage

children's self-disclosure to parents and responsiveness to parenting (Hope & Chapple, 2004). Whether the child can benefit from family social capital in part depends on his/her willingness to share experiences with parents (Kerr & Stattin, 2000).

A positive parent-child relationship can encourage parents to play an active role in children's lives (Dishion, Nelson, & Bullock, 2004). Social control theory (Hirschi, 1969) also argues that affection and secure attachment for the child are considered as the principal motivation for parents to meet the conditions of effective parenting and to invest in the child. When parents perceive a high level of attachment to their children, they are more likely to adopt effective discipline strategies (e.g., clear communication about the rules) and invest more time with their children (Teasdale & Silver, 2009). On the other hand, a poor child-parent relationship leads to parental disengagement from adolescents' activities or over control of adolescents' decision-making, which likely hinders the children's adaptation to the developmental challenge for autonomy (Dishion, Nelson, & Bullock, 2004; Galalmbos, Barker, & Almeida, 2003).

Overall, these programs of research suggest that individual levels of self-control are shaped by various types of family social capital in both behavioral (i.e., parental monitoring, discipline, and involvement) and relational fashion (i.e., quality of parent-child relationships). Positive parent-child relationships affect the development of self-control by increasing the efficacy of parenting practices, including parental monitoring, discipline, and involvement. This also conforms to a social-control model in that certain forms of social capital inhibit problematic behaviors. Hypothetically, the close social bond between children and parents encourages children to behave in line with parents' expectations. Based on the well-established evidence on parental socialization, the

current thesis considers parent-child relationships, parental discipline, and parental involvement as the main elements of family social capital that may exert favorable effects on children and adolescents' capacity of self-control.

School social capital and self-control. School social capital refers to “the bonds between parents, children, and schools that support educational attainment and should have implications for social adjustment” (Parcel, Dufur, & Zito, 2010, p.831). It is typically determined by the connections between different stakeholders, including students, their parents, peers, school teachers and personnel, and community members (Dufur, Parcel, & Troutman, 2013). Effective socialization efforts that takes place within schools are similar to those occurring in other institution, especially the family. School teachers and personnel are given the authority to monitor students' behaviors, maintaining orders and disciplining students to keep a favorable learning environment (Turner, Piquero, & Pratt, 2005). Adults in schools can pose extra social control by regulating students' behaviors, including educating students on behavioral norms and expectations, using proactive strategies to manage students' behaviors, and establishing predictable routines (Downer, Sabol, & Hamre, 2010; Hamre, Hatfield, Pianta, & Jamil, 2014). Thus, while arguably family is most important in the early formative years, school and classroom is a potentially important socialization setting and a sociocultural context where self-control can be learned and exercised (Grusec & Goodnow, 1994).

Students' connectedness and attachment to schools improves the efficacy of school socialization, which in turn improves students' levels of self-control (Resnick et al, 1997). A strong bond with the school community encourages students to conform to conventional norms and decreases the likelihood of engagement in delinquent behaviors.

Specifically, students' close relations to schools and teachers are channels of information on how to adjust to the environment (Greene, Miller, Crowson, Duke, & Akey, 2004), set learning goal orientation (Garcia & Pintrich, 1996), and follow norms that reinforce appropriate behaviors (Crosnoe, 2004). Prior research has revealed that a lack of feeling connected to school was associated with higher prevalence of problematic behaviors at school (Edwards & Mullis, 2001; Wilson, 2004) and with students' delinquency over time (Liljeberg, Eklund, Fritz, & af Klinteberg, 2011).

School climate plays a critical role in promoting students' bonding with schools and shaping students prosocial behaviors (Roffey, 2013; Wang & Degol, 2016). It refers to "norms, values, and expectations that support people feeling socially, emotionally, and physically safe" (National School Climate Council, 2007, p.4). A positive school climate, characterized by a strong and inclusive school community and high clarity and fairness of school rules, provides a shared vision and purpose that is meaningful and motivational to all students (Roffey, 2013). Cross-sectional studies found that positive school climate (either at school level or students' perception was associated with decreased school-level disorder and students' externalizing behaviors, such as aggression, delinquency, and school violence (Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Want & Dishion, 2012). A longitudinal study also found that declines in ratings of school climate were related to more antisocial behaviors at school (e.g., breaking rules and telling lies) from sixth to eight grade (Way, Reddy, & Rhodes, 2007). A recent meta-analysis review with a focus on longitudinal literature also confirmed a small yet significant relationship (effect size was -.20) between school climate and problem behaviors over time (Reaves, McMahon, Duffy, & Ruiz, 2018).

Positive relationships between students and teachers is another important context to attain social capital. Multiple studies have demonstrated that the quality of the school (e.g., school cohesion and student-teacher relationship) is a protective factor in relation to mental health and problematic behaviors in children and adolescents (see McPherson et al., 2014 for a review). Warm interactions with supportive and caring teachers provide a foundation for children to exercise autonomy and take responsibility (Cadima, Verschueren, Leal, & Guedes, 2016; Downer, Sabol, & Hamre, 2010; Jennings & Greenberg, 2009). Respect and care from teachers provide children with emotional resources that may support children in being self-directed and autonomous (Rudasill & Rimm-Kaufman, 2009). In contrast, conflictual teacher-student relationships are associated with lower self-regulation skills over the elementary school years (Berry, 2012; Burt, Simons, & Simons, 2006).

Another indicator of school social capital is students' involvement in extracurricular activities or after-school programs (Onyx & Cullen, 2000). Extracurricular activities are a protective factor that reduces unsupervised time in childhood and adolescence, which further reduces the likelihood of involvement in delinquent behaviors. Additionally, purposely designed after-school programs of high quality (e.g., that facilitate productive relationships and attachment to the institution) can provide a promising intervention for students' problematic behaviors and build meaningful relationships with peers, teachers, and community members, which expand access to social capital (Miller, 2011). It has been suggested that engagement in structured physical activities (e.g., team sports; Diamond & Lee, 2011) and nonathletic activities (e.g., music lessons; Barko & Eccles, 2003; Fredricks & Eccles, 2006) may

promote self-control skills in children and adolescents, which could be transferred to the young people's life in other contexts, such as in the classroom. Children and adolescents can gain a sense of belonging through special extracurricular groups (e.g., a baseball team, an art class, or an academic club), which share common goals and highlight rules and responsibilities (Piché, Fitzpatrick, & Pagani, 2015). Thus, students can benefit from participating in a variety of extracurricular structured activities if available in schools and communities.

Overall, sufficient evidence in the literature supports the perspective that students' school experiences and perceptions of the school environment matter in the prevention of antisocial proclivity and fostering self-control abilities. Entering schools is a milestone for the young child because it represents a shift from the family to school as the dominant socializing agency. As a dominant extra-familial setting in the early life course, school is an interactive social environment in which students spend a great part of their time and develop interpersonal relationships. This thesis hypothesizes that schools are in a good position to exert informal social control and teach students self-control. Although school social capital is rarely applied in the field of self-control, based on the brief review above, three types of social capital in schools are considered - school climate, teacher-student relationships, and extracurricular activities.

In the case of comparing the effects of social capital available in young people's families and schools, it is still debatable to what extent schools have independent effects on children and adolescents' social and behavioral development or if their impacts are mainly dependent on family factors. Given social capital at home is related but distinct from the capital accrued at school, social capital in either setting is expected to provide

unique contributions to explaining self-control and shaping behaviors during childhood and adolescence. The effects of family and school-based capital can be additive or interactive (Parcel, Dufur, & Zito, 2010). Findings regarding the relative importance of these two locations of capital are informative as we consider the best ways to enhance self-control abilities and prosocial behaviors.

Social Capital, Self-Control, and Academic Performance

In addition to the effect on self-control, the social capital generated by interpersonal relationship in families and schools also plays a key role in promoting youth attainment of knowledge and academic skills and protects them from dropping out of school (Dufur, Parcel, & Troutman, 2013; McNeal, 1999). It has been used to explain educational achievement and attainment in multiple empirical studies (e.g., Crosnoe, 2004; Dufur, Parcel, & Troutman, 2013; Kao & Rutherford, 2007; Parcel & Dufur, 2009). For example, a study by Parcel and Dufur (2009) on 5- to 14-year olds found that both family and school social capital was consequential in improving children's math and reading achievement, with family social capital exerting stronger effects than school social capital. The same pattern was also found in another study by Dufur, Parcel, and Troutman (2013) on a sample of 12th graders. In addition, the association between parental involvement/investment in families and schools as social capital and academic achievement has been well established through meta-analyses (Castro et al., 2015; Wilder, 2014). In a sample of adolescents, Crosnoe (2004) found significant main effects of both family and school social capital on academics, a boosting effect that greater social capital at home positively interacted with greater social capital at school, and a

compensating effect that students' bonding with teachers at school offset the effect of emotional distance between parents and adolescents.

When summarizing results from the studies linking social capital to academic achievement, the evidence suggests that social capital at home and school are powerful predictors of academic performance for both children and adolescents (Parcel, Dufur, & Zito, 2010). However, how and why relationship-based resources influence academic achievement has been far from clear. This thesis proposes self-control abilities as a mediating mechanism for the following reasons. First, self-control has been demonstrated as a determinant of academic outcomes, even stronger than other aspects of personality (Duckworth & Allred, 2012; Duckworth & Carlson, 2013) and cognitive abilities and intelligence (Duckworth, Quinn, & Tsukayama, 2012; Duckworth & Seligman, 2005). Although the measures of self-control vary, the solid relationship between self-control and academic performance exists across different educational stages, including during preschool years (McClelland et al., 2007; Sektnan et al., 2010), in the transition to school (Morrison, Ponitz, & McClelland, 2010), and across primary and secondary school (McClelland, Acock, & Morrison, 2006; Duckworth, Quinn, & Tsukayama, 2012).

In educational institutes, the establishment of self-control during childhood and adolescence gives students skills from learning what is taught to them, completing homework, and conducting positive behaviors in classroom, all of which may lead to long-term success (Duckworth, Quinn, & Tsukayama, 2012). For school-aged children and adolescents, self-control supports the use of learning mechanisms (e.g., problem solving and study habits) and helps students focus on the academic task in the presence of distractions. Students with higher self-control are generally better at resisting temptations,

are more likely to keep their attention focused on the current academic task without letting leisure activities interfere with work, and tend not to procrastinate on schoolwork (Friese & Hofmann, 2009). The ability to coordinate situations of school-leisure conflict through advanced planning instead of deferring schoolwork for attractive leisure activities is crucial to acquiring academic skills and knowledge through formal instructions.

Some studies have focused on the mediating role of self-control in the association between family socioeconomic characteristics, such as income (Evans & Rosenbaum, 2008), and children's academic achievement. As for relational factors, the evidence is limited. On one hand, parental involvement, either parental expectations for their children's academic performance or assistance on homework, is positively and consistently associated with academic achievement regardless of grade level and ethnicity (Wilder, 2014); on the other hand, over-controlling parental monitoring of schoolwork has been found to lower motivation and achievement (Gonida & Cortina, 2014). These different academic outcomes may be because different characteristics of the parent-child relationship induce different levels of self-control in children and adolescents.

Hypothetically, children who are able to derive high quality social capital from families and schools are more likely to establish stronger self-control abilities, which may in turn promote their academic outcomes. Considering the centrality of family and school in the lives of school-aged children and adolescents and the significance of social capital and self-control for academic achievement, it is not only important to examine the direct links among them simultaneously, but also to search for the underlying mechanism(s) that can explain the relationship between social capital and academic performance, such

as self-control in this case.

The Role of Race/Ethnicity Membership

Closing the achievement gap is a goal in both national and state policies. Regarding racial/ethnic disparities in academic achievement, results of the 2015 National Assessment of Educational Progress (NAEP) reported that, though diminishing to some degree, the White-Hispanic and White-Black achievement gaps still exist in reading, math, and science scores among 4th, 8th, and 12th graders (U.S. Department of Education, 2017). Given that the ability to control and sustain attention is an important dimension of behavioral school readiness, an effective way to reduce children's income-based academic achievement gap may be to build self-control abilities (Crook & Evans, 2014; Evans & Rosenbaum, 2008). Unfortunately, evidence on the effect of self-control on academic outcomes for the ethnic minority children and adolescents is still limited. Even though previous studies used collectively representative and ethnically diverse samples (e.g., Duckworth & Seligman, 2005, Duckworth, Quinn, & Tsukayama, 2012), multigroup analyses need to be conducted to determine if race/ethnicity membership is related to differential self-control benefits.

Race/ethnicity and self-control. Racial/ethnic differences in self-control are not straightforward. A previous study on preschool and kindergarten children found that, compared to the Caucasian group, racial/ethnic minority status (including African American and Hispanic) was associated with lower self-control abilities, measured by behavioral regulatory skills (Sektnan et al., 2010); however, no mean difference in self-control was detected after controlling for family income. This study also revealed that

stronger behavioral regulation at 54 months and in kindergarten was associated with higher reading and math achievement. However, it did not examine whether the strength of the association was the same across the racial/ethnic groups included in the sample. Another study using a nationally representative sample of young children (from 8 months to 7 years old) from English-speaking households did not find racial/ethnic differences in self-regulatory skills between minority children who were identified as Latino, African American/non-Latino, Asian American, and Native Americans and White non-Latino children after adjusting for family characteristics including language, family income, and household composition (Piotrowski, Lapierre, & Linebarger, 2013). Those findings may be interpreted as suggesting that racial/ethnic status per se may not relate to self-control abilities but rather with the contextual factors that matter and that are associated with race/ethnicity membership, such as family income. Alternatively, one could argue that it is because of race/ethnicity that individuals end up with lower income and fractured families, and that controlling these variables eliminates what really are racial differences.

Racial/ethnic minority status is considered as a family risk factor in that it is often associated with poverty, low social class, and social and economic segregation. Especially when compared to the Caucasian children and adolescents, minority children and adolescents are more likely to experience various adverse conditions including a lack of resources at home, language barriers, low-quality schools, and disorganized neighborhoods. Poverty and experience of financial strain has adverse effects on building behavioral regulation and self-control capacities for children (Evans & Kim, 2013; Lengua et al., 2015) and adolescents (Evans & Li, 2013; Evans & Rosenbuam, 2008). Children and adolescents' self-control abilities depend on having the resources and

opportunities to exert self-control and practice relevant behaviors, which may be insufficient in high-risk contexts, such as impoverished and unsafe neighborhoods (Evans & Rosenbaum, 2008). In addition, growing up with minority status may create a set of behavioral strategies in children that may be adaptive in certain contexts (e.g., neighborhoods with high crime levels), but unacceptable in classroom settings. The prolonged exposure to risk factors may make it difficult for racial/ethnic minority children to learn to control their behaviors and emotions in ways that contribute to achieving long-term goals and success in classroom.

Beyond income-related risk factors, a body of previous work has discussed the possibility that social capital differentially affects individuals based on their race and immigrant status (e.g., Crosnoe 2004; Pong, Hao, & Gardner, 2005; Goyette & Conchas, 2002; Stanton-salazar, 1997), which indicates that ethnicity may influence who receives more or less benefit from social capital in regards to the development of self-control. To unpack the association between social capital and ethnicity membership, sociocultural contexts should be highlighted in explaining social relations in depth. The growing ethnic diversity of families in the United States encompasses a diversity of family norms, traditions, and extensive family networks. Ogbu's (1981) cultural-ecological perspective provides a culturally specific framework that posits causal relations from children's outcomes that are desired in a population to socialization practices that caregivers adopt to ensure children attain those competencies. Overall, the efforts of uncovering the source of self-control for individual racial/ethnic groups, should be context-specific.

Race/ethnicity and family social capital. Children possess varied levels of family social capital specific to their racial/ethnic group (Hannum & Fuller, 2002; Zhou,

1997; Zhou & Bankston, 1998). Specifically, a study by Sui-Chu and Willms (1996) revealed that Hispanic, Black, and Asian adolescents reported more parent supervision than their White peers; Hispanics and Asians reported lower parent participation in school activities than Whites; and Whites reported levels of parent-child discussion and parent-school communication similar to Hispanics, and higher than corresponding levels in Native Americans and Asians (Sui-Chu & Willms, 1996). Kao and Rutherford (2007) analyzed a nationally representative sample and found that Asian and Hispanic adolescents reported lower levels of parent-school involvement than their White and Black counterparts did. More importantly, they suggested that the same amount of social capital did not exert the same effect on all students' school outcomes by revealing that compared to White students, Black students benefited more from parent-school involvement while Asian students benefited less. Clearly, various forms of social capital do not translate into the same benefits for different racial/ethnic groups.

The different distributions of social capital available in a family may be explained by different cultural beliefs and social norms across racial/ethnic groups. Positive family socializations in general promote self-control abilities across cultural clusters (Botchkovar et al., 2015; Smith & Crichlow, 2013). However, members of culturally defined social groups tend to share common values and beliefs, which may be different from those of other groups (Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002). Culture may be a salient factor influencing the choice of parenting strategies in families as well as children's responses to the same parenting strategies.

Culturally, obedience is greatly valued among African American families (Dodge, McLoyd, & Lansford, 2005). Research showed that African American parents were more

likely to use firm control and less likely to support the expression of negative emotions, such as anger and sadness, compared to European American parents (Nelson, Leerkes, O'Brien, Calkins, & Marcovitch, 2012). In addition, long exposure to discrimination from the majority ethnicity has made their culture more adaptive to the mainstream and led African Americans to appreciate emotional self-control and limited self-disclosure (Dodge, McLoyd, & Lansford, 2005). Other research finds that African Americans are more likely to believe the display of negative emotion is not acceptable for their children (Nelson, et al, 2012). A study on African American school-aged children from moderate-high violent neighborhoods found that emotional socialization practices, measured by caregivers' awareness and acceptance of her own and her child's emotions and strategies for responding children's emotions, were strongly related to emotional regulation for boys but not for girls, which in turn predicted fewer internalizing behaviors (Cunningham, Kliewer, & Garner, 2009).

Hispanic American families are characterized as more collectivistic, specifically more strongly emphasizing affiliation, cooperation, and harmony in social relationships (Halgunseth, Ispa, & Rudy, 2006). Compliance with the authority of parents and primacy of family interests are the main parental goals, which determine parental practices within daily routines (Fuller & Garcia Coll, 2010). Latino children and adolescents understand family obligations and respect for adults through engaging in family activities, such as family dinners and household chores. A variety of family activities help Hispanics to establish a strong attachment with their family. This is often referred as *familism* (Desmond & Lopez Turley, 2009), which is a common value held by the Latino community that highlights family support, solidarity, and commitment to family above

and beyond oneself (Galindo & Fuller, 2010; Harwood et al., 2002). It has been hypothesized that parents in households characterized by high levels of familism express more warmth and provide broader emotional support, which in turn promotes self-regulation in their children and fosters better overall socioemotional adjustment (Li-Grining, 2012).

Like Hispanic Americans, Asian Americans also hold collectivistic beliefs. Guided by Confucian beliefs, Asian American parents, especially those from East Asian countries, place an emphasis on education, proper behaviors, respect for authority, and social obligations to ensure that their children develop closeness with their families (Ho, 1996). When children reach school age, parental control becomes common and acceptable in Asian American families, while Caucasian parents tend to limit external control over their children to encourage autonomy, assertiveness, and self-expression from an early age of their children (Wang, Pomerantz, & Chen, 2007). In addition, Asian American parents have high expectations for their children's academic achievement, which motivates them to make special sacrifices to meet children's academic needs (Chao & Kaeochinda, 2010; Wu & Chao, 2017). This may involve high levels of parental investment in providing instrumental support for children's daily life by putting the child's needs before their own by sacrificing their own interest and pleasure (Leung & Shek, 2011).

Asian American families value harmony in social relationships, which encourages parents to engage in their children's lives to foster a good relationship with their children (Cheah, Leung, Tahseen, & Schultz, 2009). Interestingly, a study found cultural variation in the demonstration of parental warmth between European and Chinese American

parents, even though both of them perceived warmth to their children to be similarly important (Cheah, Li, Zhou, Yamamoto, & Leung, 2015). Specifically, Chinese immigrant parents were less directly and outwardly demonstrative in expressing warmth and love to their children than European American parents were (Cheah et al, 2015; Wu & Chao, 2017). A study showed that the Chinese American adolescents perceived lower levels of open communication from their parents when discussing their feelings or emotions than European American adolescents did (Wu & Chao, 2017). These findings cast doubt on whether the measures of parent warmth or parent-child interactions in the existing literature measure the same thing across race/ethnicity, especially in the investigation of group differences.

In summary, overt emotional expression is an individualistic characteristic of European Americans, whereas emotions tend to be suppressed in a collectivist and familial oriented culture, mainly among racial/ethnic minority groups (Markus & Kitayama, 1991). Scholars in the field of self-control should acknowledge that cultural dimensions of family processes shape children's self-control abilities (Carlson, 2009; Trommsdorff & Cole, 2011). The quality and meaning of parent-child relationships should be evaluated and interpreted through a cultural framework. In the consideration of race/ethnicity membership, the research needs to be advanced to answer the question of whether social capital has similar or different impacts on children from different races and ethnicities in the United States.

Race/ethnicity and school social capital. It has been demonstrated that social capital at school is a critical resource that facilitates desired outcomes in children and adolescents. The value of one's school social capital is dependent on the school's

collective efficacy in socializing students, which may help or hinder youth to achieve social mobility and identity. Even though the student population continues to diversify, the teaching force remains homogenous as 80% White and 75% female (Kober, 2010). Consequentially, educational institutions, particularly schools, often fail to recognize the diversity of social capital that minority children have attained from their families and communities. Institutional efforts toward normalization impose dominant beliefs and values upon all members of the school community so that the child conforms to a culture of compliance (Arriaza, 2003). Schools usually socialize all students toward sanctioned behaviors and expectations that reflect mainstream cultural values. However, ethnic communities share a set of traditional values, beliefs, and behavioral norms, as well as contain well-established social institutions and interpersonal networks that are maintained by group members (Zhou & Kim, 2006). Students of color may resist such forces by affirming their own cultural norms and engaging in social conflicts, which induces challenges of fitting into the host culture after entering educational institutions.

Minority students face difficulties in schools partly because of the perceived cultural discontinuity between their home experience and their learning environments at school (Tyler et al., 2008). The ethnic minority students' expression of cultural value-based behaviors, particularly those formed throughout their home socialization experiences, is discouraged, which may result in interpersonal conflicts with teachers and peers and disconnection with schools. To reduce the inconsistency between children's cultural norms and behavioral modes, it is important to foster a sense of cross-cultural understanding among teachers and personnel in schools in order for them to development healthy relationships with students. Schools should provide a culturally relevant

pedagogy for teachers to nurture and value the variety of cultures represented by students from different races and ethnicities. Teachers need to understand their students in the context of the norms and communities where they grew up and establish classroom rules based on relational patterns in children's home cultures (Gay, 2002).

Ethnic minority members, especially African American and Latino Americans, tend to hold distrust toward local school systems in part due to "color-blind racism" and cultural ignorance (Yull, Blitz, Thompson, & Murray, 2014). African American parents were more concerned about the issue of race and potential for racial discrimination directed at their children than other racial/ethnic parents were (Horvat, Weininger, & Lareau, 2003; Lareau, 2002). Prior research has shown that African American boys are more likely to be punished for misbehaviors and are perceived to be more threatening than girls or boys from other ethnicities (Stevenson, Herrero-Taylor, Cameron, & Davis, 2002). Additionally, the process of normalization may lead to a departure of youth from traditional values, which may upset parents and cause family conflicts. Studies have found that parent-children disagreements over values and parenting practices contribute to parent-child conflicts, which is associated with children's poor adjustment outcomes (Hwang, Wood, & Fujimoto, 2010; Juang, Syed, & Cookston, 2012; Kim, Chen, Li, Huang, & Moon, 2009). This further detaches students from the school and discourages their parent's productive involvement and contact with the school (Stanton-Salazar, 1997).

To better service racial/ethnic minority students and their parents, purposeful school-based assistance is an important way of improving school social capital. For instance, in a study on Latino youth, teachers and counselors played a key role in

promoting academic performance by providing students information regarding the opportunities the school presents (Stanton-Salazar, 1997). A qualitative study of a charter school (predominately African American population) by Farmer-Hinton and Adams (2006) also demonstrated the important role played by counselors who provided appropriate curricular choices, resources beyond schools through social service, and assistance in college searches and application. Adults at school effectively play their protective agency role when they have high expectations and care toward their students. Their efforts help the minority children and adolescents to better understand the educational system. This may be especially important for students who lack social capital at home.

As with self-control, the distribution of social capital is an outcome of a family's physical characteristics and socioeconomic contexts. Both qualities of schooling and parent socialization processes are situated within socioeconomic contexts (Yeung, Linver, & Brooks-Gunn, 2002). For instance, children from families facing financial stress and adversity experience less sensitive caregiving at home (Dearing, Berry, & Zaslow, 2006). Therefore, the availability and benefits of social capital may not be equitably distributed across races/ethnicities. Evidence has shown that racial/ethnic minority families from middle and upper classes have access to less social capital than do White families from the same social classes (Caldas & Cornigans, 2015). Educational institutions also offer unequal opportunities to their students based on the status of social group membership (Lin, 2000). Students enrolled in low achieving and poor schools tend to have lower levels of social capital as compared to their peers in high achieving and advantaged schools (Salloum, Goddard, & Larsen, 2017). Given that minority groups are

more likely to have disadvantaged backgrounds, it is fallacious to make universal assumptions about the associations among social capital, self-control, and academic achievement without considering the race/ethnicity membership. Scholars should ask whether social capital predicts self-control and academic achievement and the degree to which social capital itself may be explained by contextual factors. It is hypothesized that different distributions and qualities of social capital across groups may facilitate or inhibit self-control abilities and educational outcomes.

The majority of work on social capital neglects race/ethnicity membership, despite the fact that some have argued that a social capital framework may be particularly useful in the study of racial and ethnic minorities (Kao & Rutherford, 2007; Stanton-Salazar, 1997). It is urgent to understand the forms of social capital that can be accessed by children and adolescents and their benefits. In addition, sociocultural forces may constrain the development of social relations, requiring minority children and youth to conduct effective coping behaviors and execution of problem solving strategies (Stanton-Salazar, 1997). In order to build psychological abilities for them to negotiate cultural conflicts and exclusion, the importance of social capital from both family and school in the development of self-control should be addressed. It will provide deeper insight into the sociological and psychological literature about minority adaptation.

A growing number of studies have explored individual differences in self-control within racial/ethnic minority groups, including Chinese Americans (Liew, Kwok, Chang, Chang, & Yeh, 2014; Cheah, Leung, Tahseen, & Schultz, 2009), African Americans (Burt. Sweeten, & Simons, 2014; Cunningham, Kliewer, & Garner 2009), and Hispanic adolescents (Alvarez-Rivera & Fox, 2010; Galindo & Fuller, 2010; Li-Grining, 2012).

While these studies provide a glimpse into the individual differences in self-control and how self-control operates within a racial/ethnic minority sample, single group analyses are unable to compare one group with other groups to assess whether there are differences in the way in which the social capital variables are able to explain self-control among different groups. To further tease out the effects of race/ethnicity, the use of multiple group analysis research can determine if relations between the social capital, self-control, and achievement are similar for different ethnic groups in the sample. The differences across racial/ethnic groups require further verification of validity of measures of self-control for all groups before we can be confident that the differences are not simply due to cultural differences in the levels of self-control expected of young children (Ng-Knight & Schoon, 2017).

Overview of the Present Studies

Given what has been discussed about the various forms of social capital that children and adolescents can accrue in families and schools and their influence on the development of self-control, it is time to put various factors together and test a multi-factor theory of the sources of self-control among adolescents. In general, the current thesis examined the direct association from social capital to self-control and academic achievement, between self-control and academic achievement, as well as the mediating role of self-control on the relation between social capital and academic performance among school-age children and adolescents from four racial/ethnic groups (see Figure 1 for the proposed model). It was expected that social capital would be associated with higher levels of self-control, reflected by better social skills and lower delinquency,

which in turn would promote academic achievement. Given the heterogeneous patterns seen in social experiences and individual outcomes across racial/ethnic groups, the moderating role of race/ethnicity membership was also tested in the aforementioned relations. The new definition of race and ethnicity from the Integrated Postsecondary Education Data System (see <https://nces.ed.gov/ipeds/report-your-data/race-ethnicity-definitions>) suggest that individuals indicate ethnicity first (i.e., Hispanic/Latino or not), and then one or more races (i.e., White, Black, and Asian, and others). Given this definition, racial/ethnic groups used here included non-Hispanic Caucasian, non-Hispanic African American, Hispanic/Latino, and Asian American in the United States. Analyses of within-group variance and model fit for children in Native American, Hawaiian/Pacific Islander racial/ethnic groups or more than one racial/ethnic category are equally important but not included in this thesis.

The test of the moderating role of racial and ethnic membership provided preliminary evidence on whether relationships between predictors and outcomes are similar (i.e., whether model equivalence exists) across race and ethnic groups. First, it was important to establish measurement invariance for measures of social capital, self-control, and academic achievement across racial/ethnic groups. Establishing measurement equivalence brought great accuracy – reducing the risk of introducing a large amount of error into the model testing (Perreira, Deeb-Sossa, Harris, & Bollen, 2005). It ensured that a given set of measures taps latent constructs similarly across groups such that meaningful inferences across the groups can be made. Confirmatory factor analysis (CFA) was used to test the measurement invariance of social capital and self-control across the four racial/ethnic groups. Assuming measurement invariance, the

second step was to test model invariance and conduct separate analyses yielding parameter estimates for each of the ethnic groups. Multi-group structural equation modeling (SEM) was applied. This step answered the question of whether structural models of family and school social capital, self-control, and academic performance appeared to fit differently or similarly for Caucasian, African American, Hispanic/Latino, and Asian American children and adolescents.

Regarding the measure of family and school social capital, multiple variables that were treated as conceptually and analytically separate relationship-based constructs in previous work were integrated into a second-order construct separately for family social capital and school social capital. The second-order structure is a correlated-factor model that considers the latent variables as unique, yet correlated manifestations of underlying constructs. It is designed to account for the correlations among the specific factors with a single second-order factor (Chen, Sousa, & West, 2005). Although the unique contribution of each element appears uneven, it is misleading to consider different types of social capital in isolation given that they are culturally dependent and apparently interrelated with each other. Otherwise redundancy of predictors may occur, which leads to undercutting the importance of certain good resources. This has raised problems in a previous study (Vazsonyi & Belliston, 2007) in which family closeness and support were treated as separate predictors (i.e., Closeness became insignificant after adding support). Additionally, adopting a broader concept of family and school social capital may explain more variation in self-control. For instance, a meta-analysis found that a combination of parental attachment and parental control (indicated by parental supervision and rules establishing) was more influential on children's behaviors than parental attachment alone

regardless of age (Hoeve et al., 2012). More importantly, treating social capital as a higher-order construct offered a comprehensive assessment and improves the accuracy of the measure. The creation of second-order factors not only facilitates interpretation in the final models, but also allows for a clear comparison of effects of family and school social capital on self-control and academic achievement.

Two studies were conducted on two populations from different developmental stages – primary school-age *children* (pre-adolescence; Study 1) and *adolescents* (Study 2). There were two main reasons for studying children and adolescents separately. First, despite a powerful tendency toward stability, self-control development is a dynamic process that continues throughout childhood and adolescence. A number of studies found evidence of malleability in self-control beyond the first decade of life (e.g., Burt, Sweeten, & Simons, 2014; Meldrum, Young, & Weerman, 2012; Na & Paternoster, 2012; Ray, Jones, Loughran, & Jennings, 2013). Second, the types and amount of social capital may vary with age. A study showed that parent support and friend support were equally important for 9- to 15-year-olds, but friend support surpassed parent support from 16 to 18 years old (Bokhorst, Sumter, & Westenberg, 2010). Perceived support from teachers was lower in 13- to 18-year-olds than in 9- to 12-year olds, whereas classmate support was perceived equal across age groups. Also, parents support more autonomy for their children in adolescence by increasing empowerment in them compared to when they were in childhood. Therefore, it is important to study the impact of these sources on self-control and academic achievement from a developmental perspective. The following sections provide a detailed discussion of these two studies.

Chapter 3

Study 1: ECLS-K Dataset

Data and Sample

The Early Childhood Longitudinal Study, Kindergarten Class of 2010-2011 (ECLS-K:2011) was sponsored and designed by the National Center for Education Statistics (NCES) within the Institute of Education Sciences (IES) of the U.S. Department of Education. The *ECLS-K:2011* provided child-level data of children from both public and private schools who entered kindergarten in the 2010-2011 school year. Children and various respondents associated with the children, including their parents/guardians, teachers, and schools administrators, completed the child assessments and questionnaires. It was a longitudinal study in which the same children were followed from kindergarten through the fifth grade. Data collection was conducted in the fall and spring of kindergarten (2010-11), the fall the spring of first grade (2011-12), the fall and spring of second grade (2012-13), the spring of third grade (2014), the spring of fourth grade (2015), and the spring of fifth grade (2016). To date, data from kindergarten to fourth-grade have been released.

The baseline information was collected from a nationally representative sample of 18,174 children. Sampled children who moved out of the school districts or did not participate in the base year were not recontacted for later rounds of data collection, and no new students were added to the study sample after the based year. Thus, only a subsample (approximately 13,850) of the original sample was included in data collection of the spring of second grade. For the purpose of this study, children who were identified as non-Hispanic Caucasian, non-Hispanic African American, Hispanic, and Asian

American were included in the study. This resulted in a final sample consisted of 11,986 children.

The analysis sample had an average age of 73.59 months ($SD = 4.41$) in the spring of kindergarten and 97.53 months ($SD = 4.42$) by the spring of second grade. About with 51% of the sample were boys. Children's racial ethnicity included 52% Caucasian/non-Hispanic, 28% Hispanic, 12% African American/non-Hispanic, and 8% Asian American. About 72% of the children came from two-parent families (biological or adoptive), 26% from single-parent families, and 2% living with other guardians. About 95% of the children went to the kindergarten for the first time during the year 2010-2011. These sample characteristics were not much different from the baseline sample in terms of age (kindergarten: $M = 73.44$ months, $SD = 4.47$) and gender composition (51% boys). The racial ethnicity composition of the sample were 47% Caucasian/non-Hispanic, 22% Hispanic, 13% African American/non-Hispanic, 9% Asian, and 9% others (including Native Hawaiian/Pacific Islander, American Indian/Alaska Native, and two or more races). About 72% of the children came from two-parent families, with the additional 26% in single-parent families and 2% in non-parent families.

Measures

In the ECLS-K dataset, measures of family- and school-related social capital used in this study were collected in the fall or spring of kindergarten, and children's self-control and academic achievement measures were collected in the spring of second grade. Brief descriptions and internal consistency coefficients for family- and school-related first-order variables, measures of self-control, and academic achievement, as well as

control variables were provided below. When appropriate, internal consistency coefficients are first presented for the full sample (α_F), and followed by subgroups – Caucasians (α_W), African Americans (α_B), Hispanics (α_H), and Asian Americans (α_A). Details regarding the wording of all items are provided in Table 1.

Exploratory factor analyses (EFA) were performed for each measure to identify the most suitable observed indicators to uncover the underlying structure of key latent variables. Results were reported under each variable for the entire sample. Principal axis factoring (PAF) with oblique rotation (i.e., Promax with Kaiser normalization) was used to estimate factor loadings and unique variances of the model. PAF was chosen because it could be used when the assumption of normality was violated (Costello & Osborne, 2005). EFA used listwise deletion when dealing with missing values.

Outcome variables.

Self-control. This construct consisted of four scales that were collected during the spring of second grade. Two of the scales were subscales from the Social Skills Rating System (SSRS; NCS Pearson, 1990). One measured the child's ability to exercise self-control in social interactions, by four items. The other one measured externalizing problem behaviors (e.g., fighting, arguing, anger) by five items. Both scales were based on a 4-point scale from "Never" to "Very Often". The last two scales were subscales from the Temperament in Middle Childhood Questionnaire (TMCQ; Simonds and Rothbart 2004). One was the attentional focus measure that consisted of 6 items on a 5-point scale from "almost always untrue" to "almost always true" with a middle option of "sometimes true, sometimes untrue". The other scale assessed the ability of inhibitory control, including six items adapted from TMCQ measures and one item from Children's

Behavior Questionnaire (CBQ; Putnam & Rothbart 2006). The TMCQ items were rated on the same 5-point scale as the attentional focus measure. The CBQ item was rated on a 5-point scale ranging from “extremely untrue” to “extremely true” with a middle option of “neither true nor untrue”. All scales were reported by the child’s teacher. However, the item-level data of those subscales were not provided by ECLS-K dataset due to copyright restrictions. Instead the composite scores were used as indicators of the self-control measure. PAF yielded a one-factor structure that explained 70% of the variance, with factor loadings ranging from .79 to .91. The Cronbach’s α coefficients were as follows: $\alpha_F = .88$, $\alpha_W = .88$, $\alpha_B = .88$, $\alpha_H = .87$, and $\alpha_A = .86$.

Academic achievement. In the spring of the second grade, teachers were asked to rate students’ academic levels in reading, writing, oral language, mathematics, science, and social studies based on curriculum standards for the student’s current grade level (1=Below grade level, 2 = About on grade level, 3 = Above grade level). The initial PAF results showed a low factor loading of social studies (< .30), which was removed from the measure. The final PAF yielded a factor that explained 64% of variance for the five items, with factor loadings ranging from .75 to .84. The Cronbach’s α coefficients were as follows: $\alpha_F = .89$, $\alpha_W = .89$, $\alpha_B = .89$, $\alpha_H = .90$, and $\alpha_A = .88$.

Family social capital variables.

In keeping with the theory regarding social capital, indicators of interconnection and the transmission of norms were highlighted. To tap family social capital, items that conceptually measured parent warmth, discipline, control, and involvement were used. Because social capital may also be embedded in the resources parents and children draw

from their schools, parent involvement was measured by two scales that tap parent-home involvement and school involvement. All measures were parent-report.

First, all items were included in an EFA model. Even though the results generated a solution of the five latent factors as expected, two items in the measure of school involvement (i.e., attending parent advisory group and attending parent-teacher conference) were excluded due to the low factor loadings ($< .30$). The refined EFA model was estimated and yielded acceptable factor loadings of all items ranging from .32 to .67. This structure for family social capital explained 28% of the variance in items. These first-order variables were combined using confirmatory factor analysis to create a second-order factor for family social capital.

Parent warmth. The child's parent/guardian reported the relationship with the child in the spring of kindergarten. Responses were based on a 4-point scale (0 = Not at all true, 1 = Completely true, 2 = Somewhat true, and 3 = Mostly true). Some examples of the statements were, "Child and I often have warm, close times together"; "Most of the time I feel that child likes me and wants to be near me". A total of 4 items yielded internal consistency coefficients as follows: $\alpha_F = .65$, $\alpha_W = .64$, $\alpha_B = .69$, $\alpha_H = .67$, and $\alpha_A = .62$. Despite of the low internal consistency, the removal of any item resulted in lower coefficients.

Parent discipline. This variable was assessed during the spring of first-grade. Parents responded to three items on a 5-point scale (1 = Never, 2 = Almost never, 3 = Sometimes, 4 = Often, 5 = Always). An example of the items was, "You threaten to punish the child and then do not actually punish him/her". Because the items were worded in negative directions, the responses were recorded into 1 = Always, 2 = Often, 3

= Sometimes, 4 = Almost never, 5 = Never. The internal consistency coefficients of the three-item scale were as follows: $\alpha_F = .71$, $\alpha_W = .70$, $\alpha_B = .71$, $\alpha_H = .71$, and $\alpha_A = .69$.

Parent control. Parents/guardians responded three items about whether they had family rules for the child's TV watching (1 = Yes, 0 = No), including TV programs, hours of TV watching, and the time of TV watching. This measure used here was collected in the spring of kindergarten. Because items were dichotomously scored, the scale resulted in relatively poor internal consistency ($\alpha_F = .52$, $\alpha_W = .46$, $\alpha_B = .52$, $\alpha_H = .60$, and $\alpha_A = .62$).

Home involvement. The parent-home involvement was first collected in the fall of kindergarten. A total of 10 questions asked parents about the frequency of child's activities (e.g., reading books, telling stories, and singing songs) with family members in a typical week using a 4-point scale (1 = Not at all, 2 = Once or twice a week, 3 = 3-6 times a week, 4 = Every day). This measure had good internal consistency ($\alpha_F = .70$, $\alpha_W = .72$, $\alpha_B = .74$, $\alpha_A = .81$, and $\alpha_H = .73$).

School involvement. Parents/guardians were asked to respond whether they had any type of involvement with the child's school during the 2010-2011 school year in the spring of kindergarten (1 = Yes, 0 = No), such as attending an open house or a back-to-school night, attending a school or class event, and participating in fundraising for the child's school. Originally, there were seven school activities. These items were dichotomous. As mentioned above, two items were removed based on the suggestion of the EFA results. The internal consistency coefficients of the final five items were as follow $\alpha_F = .59$, $\alpha_W = .57$, $\alpha_B = .62$, $\alpha_H = .57$, and $\alpha_A = .59$.

School social capital variables.

School social capital was modeled with items that conceptually measured school climate, school-parent contact, student-teacher relationship, teaching efficacy, teachers' job satisfaction, and out-of-school activities. High levels of school climate indicate the schools where adults and students work to create a positive environment and build close social bonding between schools and students. School-parent contact benefits the children by granting them resources through the social connections between schools and families. Teachers' report of their relationships with children, job satisfaction, and teaching efficacy provide additional indicators of social bonding. Positive relationships, high satisfaction, and high efficacy are linked to greater ties to other adults and students in schools, providing greater school social capital which students can access. Children's participation in out-of-school activities provided more opportunities to build ties with teachers and peers. All the measures were collected from either teachers or parents during the spring of kindergarten.

To discover whether the items tapped these core variables, EFA was performed on all of school social capital items. The results showed a six-factor structure with factor loadings of each item ranging from .32 to .81. The model explained 38% of the variance in items. Thus, these variables were included as first-order factors in a second-order confirmatory factor analysis for school social capital.

School climate. Twelve items asked for the teacher's perceptions on the school environment using a 5-point scale (1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree). Some examples included, "Teachers in this school are continually learning and seeking new ideas", " I feel accepted and respected as a colleague by most staff members". Three items were worded in the negative direction,

and were reverse coded before conducting any analysis. The internal consistency coefficients of the scale were $\alpha_F = .77$, $\alpha_W = .76$, $\alpha_B = .77$, $\alpha_H = .75$, and $\alpha_A = .76$.

School-parent contact. Parents/guardians reported how well the school reached out to parents about the students and school activities during the 2010-2011 school year (1 = Doesn't do this at all, 2 = Just OK, 3 = Does this very well). It consisted of six items. For example, "The school lets you know between report cards how the child is doing in school". The internal consistency reliabilities of the scale were $\alpha_F = .57$, $\alpha_W = .55$, $\alpha_B = .62$, $\alpha_H = .68$, and $\alpha_A = .57$.

Student-teacher relationship. Using the Student-Teacher Relationship Scale (STRS; Pianta, 2001), the teacher was asked to indicate the degree to which each statement applied to his/her relationship with the student using a 5-point scale ranging from 1 (definitely does not apply) to 5 (definitely applies). The *Closeness* subscale (7 items) measured the affection, warmth, and open communications that the teacher experienced with the student; the *Conflict* subscale (8 items) measured the teacher's perception of the negative and conflictual aspects of their relationship with the student. The information on individual items was not provided due to the copyright restriction. Internal consistency could not be estimated for the sample used in this study. For the original sample in the spring of kindergarten, the internal consistency coefficient of teacher-report Closeness was as .89, and the one of Conflict was .89 (Tourangeau et al., 2017). The composite scores of the two scales were used to indicate the quality of teacher-student relationship. The correlation between closeness and conflict was $-.37$ ($p < .001$).

Teacher efficacy. Six teacher-level items measured teachers' confidence in their ability to promote student learning. Teachers were asked to what extent they agreed or disagreed with these statement (e.g., "If I try really hard, I can get through even to the most difficult or unmotivated students"; "If some students in my class are not doing well, I feel that I should change my approach to the subjects") based on a 5-point scale, from "Strongly Disagree" to "Strongly Agree". The internal consistency coefficients of the scale were $\alpha_F = .72$, $\alpha_W = .71$, $\alpha_B = .75$, $\alpha_H = .74$, and $\alpha_A = .71$.

Teacher's job satisfaction. Three teacher-level items asked teachers whether they enjoyed their teaching job based on a 5-point scale (from "Strongly Disagree" to "Strongly Agree"). For example, "I really enjoy my present teaching job". The internal consistency coefficients of the scale were $\alpha_F = .74$, $\alpha_W = .72$, $\alpha_B = .78$, $\alpha_H = .77$, and $\alpha_A = .75$.

Out-of-school activity. This variable was measured by parents' report on their children's participation in activities after school hour and outside the home. The parents responded *Yes* (1) or *No* (0) to 4 activities, including organized athletic activities, organized clubs or recreational programs, volunteer work/community service, and religious activities or instruction. The internal consistency coefficients were estimated as follows: $\alpha_F = .43$, $\alpha_W = .36$, $\alpha_B = .34$, $\alpha_H = .40$, and $\alpha_A = .42$. The poor coefficients could be because the items were dichotomous and the distributions varied across items.

Control variables. A set of personal characteristics included here were controlled in the model, including (1) children's gender (0=Female, 1 = Male); (2) family SES reported in the spring of kindergarten, a continuous variable that was indicated by parents/guardians' highest levels of education, parents/guardians' occupation, and household income; (3) school racial/ethnic diversity, which was measured by the

proportion of students of color enrolled in the 2010-2011 school year; and (4) whether living with two parents during the spring of kindergarten (1 = Yes, 0 = No), either with biological or adoptive parents.

Analytic Strategies

The first step was to conduct confirmatory factor analysis (CFA) in Mplus 7.4 (Muthén & Muthén, 2012) to test the measurement models of second-order family social capital, second-order school social capital, first-order self-control, and first-order academic achievement separately. The mean and variance adjusted weighted least squares (WLSMV) was used for family social capital because some of the measures involved categorical variables (e.g., items of the parent control measure). The robust maximum likelihood estimator (MLR; Yuan & Bentler, 2000) was used for the models of school social capital, self-control, and academic achievement because their indicators were continuous variables. Both of them did not make distributional assumptions about the observed variables (Li, 2016) and perform well in situations when the amount of missing data is not substantial or when MAR assumption is plausible (Asparouhov & Muthen, 2010). CFA models for each construct were fit first for the full sample to find the most parsimonious and best-fitting model to the data. Then the baseline model was estimated for each racial/ethnic subgroup independently. The criteria used to judge model fit included the comparative fit index ($CFI > .90$; Kline, 2005), the root-mean-square error of approximation ($RMSEA < .07$; Kline, 2005; Steiger, 2007), and the standardized root-mean-square residual ($SRMR < .10$; Kline, 2005) if applied.

After determining the baseline model for each measurement model, the measurement invariance across the four racial/ethnic groups was established. It examined the extent to which the measurement of latent constructs replicated across groups. The standard procedure of measurement invariance of a factor structure involved a series of hierarchically nested models (Chen, Sousa, & West, 2005; Meredith, 1993). First, a multigroup CFA without constraining parameters to be equal was conducted to test configural invariance (i.e., equivalency of factor structure across groups). Second, a constrained model in which factor loadings were constrained to be equal, referred to as a test of metric invariance, was compared to the configural invariance, which was a less parsimonious model where parameters were free to vary. The last step was investigating the equivalency of item intercepts across groups, which was referred to as scalar invariance. Then the scalar invariance model was compared to the metric invariance model. To achieve strong measurement invariance that allows the comparisons of latent mean differences across groups, equal factor loadings and equal item intercepts across groups must be in place (Cheung & Rensvold, 2002; Widaman & Reise, 1997). When testing for invariance including a higher order factor model (here referred to as the family and school social capital), equality constraints were placed on both the first- and higher-order factor loadings, as well as on intercepts of both the observed variables and the first-order factors (Chen, Sousa, & West, 2005).

This procedure made the assumption that the overall structure of the model was the same for all subgroups, which was very strict when there are more than two groups (Kern, McBride, Laxman, Dyer, & Santos, 2016), such as this case. In other words, even though the scalar invariance could be established between two groups, the same structure

might not be present in the third group. When the equivalency across groups was not supported, partial invariance tests were performed (Byrne, Shavelson, & Muthén, 1989). Partial invariance tests examined which part of the factor model contributed to failure to find measurement invariance by relaxing constrained parameters sequentially until the model reached adequate fit. Modification indices were used to determine which parameter was set free first. The Chi-square difference test and changes in alternative fit indices were used to evaluate factorial invariance. Specifically, a non-significant change in chi-square values and trivial changes (.01 or less) in other fit indices, including CFI, RMSEA, and SRMR, were considered as evidence of invariance (Chen, 2007; Cheung & Rensvold, 2002).

Structural equation modeling (SEM) analyses in Mplus 7.4 (Muthén & Muthén, 2012) were conducted to examine the proposed model (see Figure 1). An initial model test examined the model fit for the entire sample to find a baseline structural model. Then the model was estimated for individual groups by adding direct paths from the control variables, including children's gender, family SES, school racial/ethnic diversity, and living with two parents, to all the latent constructs. The next step was to conduct a multigroup SEM where all structural paths were allowed to vary across groups while applying the measurement invariance established above. In this model, to isolate the indirect association of self-control, a bootstrapping resampling procedure was used to obtain percentile bootstrap confidence intervals (95% CIs) for all estimates of indirect relations (Preacher & Hayes, 2008); 1000 resampled datasets were used in this analysis. The bootstrapping approach generally produces preferable confidence intervals and standard error for the indirect relations (Fritz, Taylor, & MacKinnon, 2012).

Last, standard procedures were followed to establish structural invariance (i.e., equivalence of path coefficients) across groups, which involved a comparison between a structural model where the structural paths were set free and a less parsimonious model where imposing constraints on the structural paths across groups. The comparison employed the chi-square difference test and changes in model fit (same standards as mentioned above). If the result supported model equivalence, it indicated that race/ethnicity membership did not moderate the associations examined in the model. However, if the latent constructs were non-equivalent at the measurement level across the racial/ethnic groups, the following SEM analyses were not comparable across groups. Instead of inferring differences in parameter estimates when differences might lie at the measurement level, the hypothesized model was then tested for each racial/ethnic group separately (Kenny, 2002).

Chapter 4

Study 1: Results and Discussion

The Multidimensionality of Family Social Capital

It was hypothesized that there was a second-order factor structure, with parent warmth, parent discipline, parent control, parent-home involvement, and parent-school involvement as the first-order factors, and family social capital as the second-order factor. WLSMV was used to estimate the fit of the measurement model. Prior to identifying a baseline model of family social capital, a first-order CFA was first tested with the five factors to determine that items would have nonzero loadings on them. The five-factor measurement model fit the data well ($\chi^2 = 1986.54$, $df = 309$, $p < .001$, RMSEA = .022, CFA = .946), with all the factor loadings of observed indicators above .30.

Test of baseline model. For the full sample, a second-order CFA model was initially estimated with all five first-order factors, which reached a good model fit ($\chi^2 = 1495.81$, $df = 270$, $p < .001$, RMSEA = .020, CFA = .959). However, the factor loading of parent discipline was .24, which indicated a low correlation between the lower-order factor and the higher-order factor. The second-order CFA model was re-estimated without parent discipline, yielding a good model fit ($\chi^2 = 1354.67$, $df = 205$, $p < .001$, RMSEA = .023, CFA = .956) with acceptable first-order and second-order factor loadings (> 3.0). Then the same CFA model was tested within each racial/ethnic group. A summary of fit index statistics is presented in Table 2. Those results showed that the baseline model of family social capital revealed a good fit to the data for all groups.

Test of invariance. Multi-group CFAs were conducted to test the measurement

invariance across groups. The configural invariance model (Model 1) was estimated first by constraining the pattern of fixed and freed parameters to be equal but allowing for different estimates of the factor loadings in different groups. Second, the second-order factor loading invariance model (Model 2) placed constraints on all the first-order and second-order factor loadings to be equal across groups. Third, the intercept invariance model (Model 3) placed constraints on the intercepts of measured indicators and the first-order latent factors to be equal across groups. The fit index statistics for each model are presented in Table 3.

The results indicated that Model 1 had an adequate fit to the data. The chi-square difference test between the Model 1 and Model 2 was significant ($\Delta\chi^2 = 183.30$, $\Delta df=54$, $p < .001$). However, the changes in the CFI score (.002) and in the RMSEA score (<.001) was trivial, indicating a equivalent fit between the two models. The results indicated that the strengths of the associations between the observed measures and their underlying latent variables as well as between the first-order factors and the second-order factor were the same across the groups. The Model 3 that additionally constrained intercepts of measured variables and the first-order latent factors to be equal across the groups was compared to Model 2. The chi-square difference between Model 2 and 3 was significant ($\Delta\chi^2 = 2414.05$, $\Delta df=72$, $p < .001$). The value of CFI also decreased substantially (.950 vs. .858). This indicated that Model 3 did not fit, and that some parameters needed to be allowed to be freely estimated based on the modification indices while other parameters could be constrained to be equal to achieve a model with no substantial changes in fit from Model 2.

A partial invariance approach was adopted by freeing parameters (intercepts) that

were constrained in Model 3. Based on the values of the modification index, the Caucasian group had some forms of partial invariance with the African American group. Specifically, the estimate of the intercept of an observed variable in the measure of parent-school involvement (i.e., attending PTA meeting) was freely estimated first for the African American group first because it produced the largest modification index. Following this procedure, some other parameters were estimated differently across groups until a model with no substantial differences from Model 2. These parameters included (1) an intercept of a first-order latent factor (i.e., school involvement) that were freely estimated for the African American group; (2) intercepts of three observed measures (i.e., attending PTA meeting, rules for TV programs, and rules for hours of watching TV) that were freely estimated for Hispanic and Asian American groups; and (3) two first-order latent factors (i.e., school involvement and home involvement) that were estimated freely for Hispanic and Asian American group. The modified model (Model 3P) indicated a significant variation of chi-square values ($p < .001$) but an insignificant change of the CFA scores (.950 vs. .940). Overall, the second-order construct of family social capital reached a partial invariance across groups after some intercepts were estimated independently.

The Multidimensionality of School Social Capital

MRL was used to estimate the fit of the measurement model. A first-order CFA model was estimated involving six school social capital variables – school climate, school-parent contact, student-teacher relationship, teacher efficacy, teachers' job satisfaction, and out-of-school activities for the full sample. Results showed that the six-

factor model fit the data well ($\chi^2 = 3679.27$, $df = 305$, $p < .001$, RMSEA = .031, CFA = .952) and the factor loadings of observed measures were acceptable (above .30).

Test of baseline model. A second-order CFA was conducted with all six factors for the full sample, which resulted in a good model fit ($\chi^2 = 3518.01$, $df = 314$, $p < .001$, RMSEA = .029, CFA = .955). However, the factor loadings on school social capital were unacceptable for out-of-school activities (.09) and parent-school connection (.08). Thus, both of them were removed from the model. A refined second-order CFA model was estimated. Results showed a good model fit ($\chi^2 = 2368.28$, $df = 125$, $p < .001$, RMSEA = .040, CFA = .962, SRMR = .029) and acceptable both first-order and second-order factor loadings (above .30). The same model fit the data for individual racial/ethnic group (see Table 2). It is worth noting that the Asian American and African American groups relatively had poorer model fit than the other two groups by comparing their CFI and RMSEA scores.

Test of invariance. A summary of fit index statistics of each model is presented in Table 4. Results showed that the chi-square difference between Model 1 and Model 2 was statistically significant ($\Delta\chi^2 = 201.44$, $\Delta df = 52$, $p < .001$), but no substantial difference in CFI (.948 vs. .946). Thus, there was no appreciable difference in the first- or second-order factor loadings across groups. However, the test of intercept invariance by comparing Model 2 and Model 3 yielded a significant chi-square ($\Delta\chi^2 = 648.57$, $\Delta df = 63$, $p < .001$) with a CFI score decreasing by .012. This result indicated that there was not complete invariance of the intercepts across the groups. Following the recommendation of modification indices, Model 3 was modified by freeing the intercepts for two observed measures (i.e., teacher-student conflicts for the African American group and teacher-

student closeness for the Caucasian group). The resulting modified model (Model 3P) reached a CFI that had a trivial difference from the one for Model 2 (.946 vs. .939). Thus, there were invariant factor loadings and invariant intercepts across the groups, except for the intercepts of two observed indicators.

Measures of Self-Control and Academic Achievement

Measures of self-control and academic performance were put in one CFA model. MRL was used to estimate the fit of the measurement model. Because teacher-report self-control skills and externalizing behavior problems belonged to the same instrument (i.e., SSRS), a residual covariance between them was added in the model.

Test of baseline model. The initial test of the CFA model for the full sample showed a good fit to the data ($\chi^2=3288.04$, $df=25$, $p<.001$, RMSEA = .10, CFA = .954, SRMR = .055). A high RMSEA value was probably due to the relatively low number of degree of freedom (Kenny, Kaniskan, & McCoach, 2014), especially with a large sample size as the case under study. The same baseline model was run within each racial/ethnic group, which yielded similar fit index statistics (see Table 2).

Test of invariance. A summary of fit statistics of each model is presented in Table 5. The chi-square difference between the configural invariance and factor loading invariance was significant ($\Delta\chi^2 = 143.40$, $\Delta df=21$, $p <.001$). Once again, given that there was no substantial difference in CFI (.948 vs. .946), it could be concluded that there was no appreciable difference in the factor loadings across groups. Likewise, comparing the Model 2 and Model 3, the result indicated that the intercepts of measured indicators were invariant across groups.

Test of the Full Measurement Model

Before moving to final analysis, a full measurement model including all the latent constructs was tested. To build construct validity, both convergent and discriminant validity should be examined (Hoyle, 2012). Convergent validity was achieved when all items in a measurement model have statistically significant factor loadings. Discriminant validity indicated that the model was free from redundant items. These two requirements has been fulfilled by following the model testing procedure above. Another requirement of discriminant validity was that the exogenous constructs were not redundant. Specifically, in this case, the correlation between family and school social capital should not exceed .85, which otherwise might indicate a problem of multicollinearity. The main purpose of the test for a full measurement model was to meet the second requirement of discriminant validity by detecting whether there was a multicollinearity problem.

Results of the full-sample CFA model revealed a good model fit to the data ($\chi^2=8030.49$, $df=1281$, $p<.001$, RMSEA = .022, CFA = .942). The correlation between family and school social capital was .09 ($p <.001$). Then the multi-group CFA in which parameters were allowed to vary across groups also showed good fit index statistics ($\chi^2=11035.67$, $df=5128$, $p<.001$, RMSEA = .021, CFA = .942). The correlations between family and school social capital were .08 ($p <.001$), .14 ($p =.008$), .01 ($p =.800$), and .17 ($p =.023$), respectively for Caucasian, African American, Hispanic, and Asian American groups. These correlation coefficients indicated that exogenous variables in this measurement model were not redundant.

Descriptive Statistics

Table 6 presents the descriptive statistics of the key latent variables for the full sample and by racial/ethnic groups, including means, standard deviations, minimum, maximum, and the proportions of missingness. The composite scores for each latent variable were computed when respondents (teacher or parents) provided a rating on a minimum number of items that composed the scale: at least 2 out of 2, 2 out of 3, 3 out of 4, 3 out of 5, 4 out of 6, 4 out of 7, and 5 out of 8, 5 out of 9 items, 6 out of 10 items, 6 out of 11 items, or 7 out of 12 items. The proportions of missing values for each variable were computed using the sample size of 11,986 as the denominator. In general, the parent-report variables contained higher proportions of missing data than the teacher-report ones did. This indicated lower response rates from parents compared to those from teachers.

Group differences on key variables. Since the measurement invariance (at least partial invariance) has been established for each latent variable, the next task was to get an estimate of difference in the latent factor means across groups. Alignment optimization (Asparouhova & Muthén, 2014) was applied to study group differences in factor means without requiring exact measurement invariance. The reference group was determined by the smallest absolute factor mean values, which was the Caucasian group in this case. Unfortunately, this function was not allowed when the model contained second-order factors. The means of second-order constructs could not be directly compared. Thus, only the first-order factor means were estimated by the alignment method (see Table 7). Groups with factor means that were significantly different at the alpha level of .003 (based on the Bonferroni correction).

Results of factor mean comparisons revealed that the self-control of the African American children (Factor mean = $-.48$) in the second grade was rated significantly lower by their teachers than were the self-control of other children, while the Asian American students (Factor mean = $.29$) ranked the highest among the groups studied. Caucasian and Hispanic children showed similar levels of self-control. Regarding academic achievement, the result revealed teacher rated that Asian American second-graders had better academic achievement (Factor mean = $.14$) in comparison to students from other racial/ethnic groups. African American (Factor mean = $-.48$) and Hispanic children (Factor mean = $-.41$) were rated by teachers as underachieving compared to their Caucasian and Asian peers.

Significant group differences also occurred in latent factor means of family social capital variables collected in the Kindergarten. Asian American (Factor mean = $-.24$) and Hispanic (Factor mean = $-.28$) children experienced lower levels of parent warmth from their parents than Caucasian and African American children did. Racial/ethnic minority parents reported more control and family rules over TV watching than the parents of Caucasian did, while insignificant differences were found among the minority groups. Parents of Caucasian children were more involved with their children at home than parents of the racial/ethnic minority children. Among the racial/ethnic minority groups, parents of Hispanic (Factor mean = $-.37$) and Asian American children (Factor mean = $-.34$) also reported significantly lower levels of home involvement than the parents of the African American children did. Parents of the Caucasian children reported higher levels of involvement in school activities than parents of minority children did. No significant

differences in levels of school involvement were detected among racial/ethnic minority groups.

Regarding the school social capital variables, Kindergarten teachers perceived a significantly more positive relationship with their Caucasian students than with African American (Factor mean = $-.85$), Hispanic (Factor mean = $-.18$), and Asian American students (Factor mean = $-.17$). Further, they reported a less positive relationship with African American students than with Hispanic and Asian American students. At teacher level, teachers of Hispanic students reported a lower level of school climate (Factor mean = $-.23$) than the teachers of Caucasian (Factor mean = $.00$) and Asian American students (Factor mean = $-.04$). Regarding teaching efficacy, teachers of African American (Factor mean = $.14$) and Hispanic students (Factor mean = $.10$) reported a higher level of efficacy in classroom management and improving their students' learning than teachers of the Caucasian students did. Teachers of African American students (Factor mean = $-.12$) felt less satisfied with their teaching job than teachers of Caucasian students. No significant difference was found in rating job satisfaction between teachers of Caucasian, Hispanic, and Asian American students.

Unstandardized Associations between Social Capital, Self-Control, and Academic Achievement

An analytic model with second-order family social capital and school social capital as independent variables, academic achievement as dependent variable, and self-control as mediator variable was tested using SEM. Children's gender, family SES, two-parent household, and school racial/ethnic diversity (i.e., percentage of students of color)

were included in the model and controlled for the path coefficients (see Figure 3). The initial model yielded a poor model fit ($\chi^2=13036.88$, $df=1288$, $p<.001$, RMSEA = .029, CFA = .899). To improve the model, following the modification indices, three residual covariance (i.e., among teacher-student conflict and teacher-report self-control/externalizing behavior problems) were added. The respecified model reached an acceptable model fit ($\chi^2=8505.49$, $df=1284$, $p<.001$, RMSEA = .023, CFA = .938). This model was used as the baseline model and estimated for each racial/ethnic group separately (see Table 8). A multi-group SEM was conducted in which the measurement invariance model was applied. Initially, path coefficients of the relationships were estimated independently for each group (i.e., an unconstrained structural model). Unstandardized coefficients are reported here given the multiple populations. Table 9 presents the unstandardized results of the unconstrained multi-group model for the Caucasian, African American, Hispanic, and Asian American groups.

Predicting self-control. The model examined the degree to which self-control was predicted by family social capital and school social capital after adjustment for a set of control variables. Family social capital present in Kindergarten emerged as a significant predictor of children's levels of self-control in second-grade for Caucasian ($B = .60$, $SE = .17$, $p < .001$) and Hispanic groups ($B = .30$, $SE = .15$, $p = .046$), whereas it was not the case for the African American or Asian American groups. School social capital was positively associated with self-control only for the Caucasian group ($B = .07$, $SE = .03$, $p = .006$).

The relationships of control variables with self-control were relatively consistent across groups. Specifically, girls had better self-control abilities than boys ($B_W = -.24$,

$B_B = -.22$, $B_H = -.22$, $B_A = -.23$, $ps < .001$). Living in a two-parent household was positively associated with self-control for the Caucasian ($B = .13$, $SE = .02$, $p < .001$), African American ($B = .13$, $SE = .03$, $p < .001$), and Hispanic children ($B = .11$, $SE = .02$, $p < .001$). Family SES was also a positive predictor in the model for Caucasian ($B = .07$, $SE = .01$, $p < .001$), African American ($B = .06$, $SE = .02$, $p = .006$), and Asian American children ($B = .07$, $SE = .02$, $p < .001$). School racial/ethnic diversity had no significant association with children's levels of self-control in any group.

Predicting academic achievement. The second component of the model examined the degree to which social capital and self-control were predictive of children's academic achievement after adjustment for control variables. Results revealed that the associations between self-control and academic performance were consistent across groups: higher levels of children's self-control predicted better academic achievement ($B_W = .68$, $B_B = .74$, $B_H = .75$, $B_A = .72$, $ps < .001$). Notably, there was substantial consistency across groups in the direct association of family social capital with academic performance (see Table 9); increases in family social capital were associated significantly with increases in academic performance. Even though the association was not statistically significant for the Asian American children ($B = 1.08$, $SE = .56$, $p = .053$), its strength and direction were comparable to other groups. Taken together, the findings from this model suggest that family social capital and self-control may have unique additive effects on adolescents' self-report GPAs. However, school social capital was not significantly associated with academic achievement in any group. In addition to the direct effects relations of self-control and social capital, family SES was positively related to children's academic achievement in all groups (see Table 9). Gender was only significant in the

Caucasian sample ($B = .06, SE = .02, p < .001$), with girls rated slightly lower in achievement in the second grade. Neither living with two parents nor school racial/ethnic diversity mattered in terms of children's academic achievement for any groups.

Indirect effects. In the investigation of whether self-control mediated the association between family/school social capital and academic performance, results revealed that family social capital was positively related to second-grade achievement through its positive relationship with self-control for the Caucasian and Hispanic groups. In the Caucasian sample, after accounting for self-control, the unstandardized association between family social capital and academic achievement decreased from .97 ($p < .001$) to .57 ($p < .001$). Self-control indirectly affected the relationships between family social capital and children's academic achievement (indirect: $B = .41, SE = .12, p < .001$). In the Hispanic sample, the association between family social capital and academic achievement decreased from 1.26 to 1.03. The indirect association of self-control with academic achievement was significant ($B = .23, SE = .11, p = .047$). Given that both total and direct paths were significant, the association between family social capital and academic performance was partially yet significantly mediated by its positive association with self-control, although it only occurred in the Caucasian and Hispanic samples. The overall model accounted for 28% of the variance of academic achievement for the Caucasian children, 35% for the African American children, 29% for Hispanic children, and 27% for Asian American children.

Model equivalence. To test whether the associations were moderated by the race/ethnicity membership, invariance of the path estimates across groups was tested. A constrained structural model in which all paths were constrained to be equal across

groups was estimated and compared against the unconstrained structural model where all the paths were estimated independently across groups. In the constrained model, both factorial structure and structural paths were constrained to be equal across groups. Because the interest was the potential differences in the structural paths, the path coefficients of control variables were also constrained to be equal across groups. The fit of the constrained model was significantly different from that of the unconstrained model ($\Delta\chi^2 = 246.58, \Delta df = 68, p < .001$). CFI scores, however, did not show an appreciable shift (.933 vs. .933). These results supported the acceptance of the constrained multi-group model in which all structural paths were fixed across groups. It indicated no significant moderation of race/ethnicity membership on the associations of interest in the model. Figure 3 displays the unstandardized coefficients from the estimation of the constrained model.

Discussion of Study 1

Self-control is an important indicator of school readiness for early school-age children, which allows them to engage in school activities and facilitates their process of adjustment to school environment (Blair & Raver, 2015). It is highly malleable in the first decade of life (Gottfredson & Hirschi, 1990; Vazsonyi & Jiskrova, 2017). Using a nationally representative sample of school-age children, the goal of Study 1 is to refine the understanding of how social investment and relationships affects self-control abilities and academic achievement, considering the context in which social capital is established and used. The multigroup analytic strategies applied here allowed for group comparisons

across four racial/ethnic groups: Caucasian, African American, Hispanic, and Asian American children.

The first main finding revealed levels of self-control differed across different racial/ethnic groups. Here self-control involves the ability to focus and shift one's attention, the ability to inhibit behaviors one wants to engage in, the ability to avoid problem behaviors, and social skills demonstrated during interaction with others. Specifically, Asian American children demonstrated the highest rated self-control in second grade compared to other racial/ethnic children, while African American children had the lowest rated self-control; no substantial difference was detected between Caucasian and Hispanic children. The high self-control demonstrated by Asian American children may be attributed to their unique experiences of socialization and cultural processes (Jaramillo, Rendon, Munoz, Weis, & Trommsdorff, 2017). A previous study that included a sample of four-year-old children in the context of U.S. found that Chinese children outperformed other ethnic minority groups (i.e., African American, Dominican, and Mexican) on inhibitory control (Ng, Tamis-LeMonda, Yoshikawa, & Sze, 2015). In contrast, racial/ethnicity minority status, particularly African American and Hispanic, often reflects low family income, poor educational attainment, and living in single-parent families (Hirschman, Alba, & Farley, 2000), which to some extent could explain relative low self-control of African American children compared to their Caucasian and Asian American peers. Prior studies did not find that minority children and Caucasian children had different levels of self-control after controlling for family socioeconomic status (Piotrowski, Lapierre, & Linebarger, 2013; Sektnan et al., 2010).

However, using racial/ethnic gaps in family income and other socioeconomic conditions to explain the group differences in self-control abilities is not sufficient here in that Hispanic children were found to have the same level of self-control as their Caucasian peers. This study provides support for the role of family social capital as a promotive factor for Caucasian and Hispanic children's self-control over a period of two years. A family characterized with greater parent warmth and an active role of parents in the child's lives of was associated with higher self-control in children. The finding suggesting that a higher level of family social capital helps foster early school-age children's self-control abilities is consistent with other studies of children's self-control abilities and delinquent behaviors in general, such as studies linking positive family relationships (Drake, Belsky, & Fearon, 2014; Hovee et al., 2012) and parent involvement at both home and school (Beaver, Wright, & Delisi, 2005; McNeal, 1999). Previous studies have suggested that parent control is often detrimental to children's cognitive and noncognitive development when it refers to intrusiveness, pressure, or domination (Grolnick & Pomerantz, 2009). However, parent control over TV watching is considered necessary to limit noneducational TV time and increase children's engagement in other activities beneficial for children's development (Huston, Wright, Marquis, & Green, 1999). The current literature has demonstrated that effective parent supervision and control plays a crucial role in facilitation self-control (Meldrum, 2008; Janssen et al., 2016).

Even though the estimation of the structural invariance model showed a significant relationship between family social capital and self-control across groups, neither African American children nor Asian American children benefited from family

social capital as did their Caucasian and Hispanic peers in the model where the paths were estimated independently across groups. These findings may suggest that parental socialization practices and parental involvement may contribute to different levels of self-control across racial and ethnic groups. A previous study on a sample of African American children at their late childhood (10-12 years old) found that effective parenting practices (i.e., authoritative parenting), which emphasized warmth, support, and consistent discipline, predicted improvement in self-control over a period of two years (Burt, Simons, & Simons, 2006). The inconsistent findings with previous research may be due to the different dimensions of parenting included in the analysis. The racial/ethnic differences in latent factor means revealed that even though parents of African American children provided both high levels of parent warmth and parent control, they also demonstrated relatively low levels of involvement in their children's home school activities compared to Caucasian parents. In addition, a previous study showed that African American parents attended PTO meetings or parent-teacher conferences as much as Caucasian parents but were less likely to communicate with teachers informally during the school year (Robinson & Harris, 2014). It is possible that involvement of African American parents does not provide sufficient resources to transmit necessary information and knowledge to their children, which failed to improve their children's self-control abilities.

It is difficult to explain why family social capital did not benefit Asian American children in terms of their self-control. Asian American and Hispanic children likely attain similar level of family social capital, characterized by relatively low warmth, high control, and low involvement in children's schooling and daily activities from their

parents. Based on some shared cultural values and norms between the Hispanic and Asian American communities (e.g., an emphasis on family obligations and relationships), one would expect family social capital to have a similar strength of relationship with children's development of self-control between these two groups. One speculation is that other aspects of family social capital may be more influential in facilitating the Asian American children's self-control than the ones examined here. For instance, although both European and Chinese American parents perceive expressing warmth to be similarly important, there is cultural variation in the demonstration of parental warmth (Cheah, Li, Zhou, Yamamoto, & Leung, 2015). European American parents demonstrate warmth to their children in a direct and outward way, whereas Chinese immigrant parents are less physically and emotionally demonstrative in expressing warmth and love to their children (Cheah et al, 2015; Wu & Chao, 2011). The unique features of parental warmth among the Chinese American parents may provide some insights about why family social capital exerts differential impact on children from different racial/ethnic groups. These findings are in accordance with the notion that both independence and interdependence values are important in any culture, but they differ in various ways in which parents socialize their children according to the cultural context.

Another main finding revealed that children with higher self-control had substantially better academic achievement. This finding was remarkably consistent across the racial/ethnic groups. It once again underscores the influential role of self-control in shaping the academic performance, which is consistent with previous studies on preschool children (Fitzpatrick McKinnon, Blair, & Willoughby, 2014; Sawyer et al., 2015) and on school-age children (Duckworth & Kern, 2011; Valiente, Lemery-Chalfant,

Swanson, & Reiser, 2008). Comparison of children's academic achievement revealed that in this sample, Asian American children were generally more advanced than children from the other three ethnic groups in the second grade, which could be explained, in part, by their relatively advanced self-control. These findings highlight the role of self-control in children's academic performance and the need for greater attention to ethnic variations in self-control during the early school age.

More importantly, self-control plays a significant mediation role in the association between family social capital and academic achievement for the Caucasian and Hispanic children. The study provides support that family social capital is related positively to school-aged children's self-control, which in turn is positively related to academic achievement. Although the predictive strength of self-control was substantial, it was only partially accounted for the association between family social capital and academic achievement for the two groups. Thus, both self-control and family social capital should be explored further as important factors for increasing children's chances to do well. In addition, self-control and academic achievement were assessed during the same time (spring of second-grade). The partial mediation may be due to the inability of the available data to estimate a bidirectional relationship from self-control to academic achievement. Future research should use longitudinal data to confirm the mediation effect found in this study.

Surprisingly, this study found little support for school social capital as a positive predictor of either self-control or academic achievement. By comparing the strength of social capital in various contexts, it was found that family social capital had a stronger relationships with self-control and academic achievement than did school social capital.

This is consistent with previous studies on social adjustment of a sample of children from first through eighth grades (Dufur, Parcel, & McKune, 2008) as well as academic achievement and behavior problems of a sample of 12th graders (Dufur, Parcel, & Troutman, 2013).

The insignificance of school social capital does not mean it is not important to improve teacher-student relationships and school climate. It is possible that family social capital exerts more influence on self-control and academic performance during the early school years. Once the children reach to a certain age, the presence of school social capital becomes more salient in youth development. Unfortunately, this study is not able to investigate how the effect of social capital may shift across time. Future studies are needed to study children across age groups, especially during and after their transition to adolescence. In addition, schools might be a site where collective stores of social capital are available for children to draw upon, especially when their teacher or parents do not help to create that capital. Future research could examine the way social capital is created and used collectively at the school level. Overall, the findings on school social capital are useful because it helps to shed some light on identifying the more salient social environment in influencing self-control during the early school years. It may help practitioners in tailoring intervention policies and programs that focus resources where they will have the greatest benefit.

It is worth noting that this study found unequal perceived distributions of social capital at school across racial/ethnic groups as early as in kindergarten. African American and Hispanic children experienced relatively negative relationships with their teachers, characterized by low closeness and high conflict, and poor school climate, compared to

their Caucasian and Asian American peers. Previous studies also confirm that after entering elementary schools, teachers perceived less positive relationships with students of color, which in turn is detrimental to school climate (Gregory, Bell, & Pollck, 2014; Losen, Hewitt, & Toldson, 2014). Many studies have suggested that behaviors of students of color are often viewed as problematic when they may be an expression of racial identity and do not conform to dominant social norms (i.e., Whiteness; Anyon et al., 2017). Consequently, efforts to reduce bias and improve student-teacher relationships may be unlikely to succeed.

Chapter 5

Study 2: MSS Dataset

Data and Sample

The goal of Study 2 is to determine if the proposed model (see Figure 3) applies to a sample of adolescents using the Minnesota Student Survey (MSS). MSS was a large-scale, statewide school-based youth survey that was launched every three years since 1989. In 2016, 282 of 330 school districts (85.5%) in the state of Minnesota participated in the survey, which covered more than 169,000 students in grades 5, 8, 9, and 11 from regular public schools. The survey asked students about their activities, behaviors, social-emotional skills, and challenges in different social contexts, including family, school, and community. It provided general information on students' developmental assets, both internal (e.g., personal skills and capacities) and external (e.g., social supports), that potentially prevented high-risk behaviors and reached optimal development (Rodriguez, 2017). Overall, this dataset provided valid measures to operationalize the constructs of the theoretical model and to address the main research questions. Unlike ECLS-K dataset in Study 1 from multiple sources, MSS was mainly based on self-report of adolescents.

Because this study focused on adolescence, students from grades 8, 9, and 11 were selected ($N = 126,868$), with 51% male students and an average age of 14.83 years ($SD = 1.32$, $min = 12$, $max = 19$). About 69% of the sample were Caucasian/non-Hispanic, 10% Hispanic, 6% African American/non-Hispanic, 6% Asia/non-Hispanic, and 9% other races (including American Indian and multiple races). After excluding students who did not identify themselves as non-Hispanic Caucasian, non-Hispanic

African American, Hispanic/Latino, or Asian American, the final sample reduced to 114,644. About 50% of the sample was male students. The average age of the subjects was 14.85 years ($SD = 1.32$, $min = 12$, $max = 18$). The final sample consisted of 76% Caucasian/non-Hispanic, 11% Hispanic, 7% African American/Non-Hispanic, and 7% Asian. Racial category statistics were not strictly parallel to those in the ECLS-K, with a higher proportion of Caucasian youth (76% vs. 52%). Approximately 27% of the students reported that they were receiving free/reduced-price lunch. About 71% of the adolescents were living with two biological/adoptive parents, with the additional 22% from single-parent families and 7% with other guardians.

Measures

Brief descriptions and reliability statistics for all first-order latent variables and control variables are described below. Internal consistency coefficients are first presented for the full sample (α_F), and then for Caucasians (α_W), African Americans (α_B), Hispanics (α_H), and Asian Americans (α_A), when applied. Details regarding the wording of items are provided in Table 1. Results of EFA are presented under each measure. The same methods as Study 1 – PAF with oblique rotation, were employed here.

Outcome variables.

Self-control. This scale consisted of two subscales – the attitudinal and behavioral scales. The attitudinal scale assessed adolescents’ abilities to constrain one’s emotions, avoid undesired behaviors, and use coping strategies. Participants responded to seven items (e.g., “I say no to things that are dangerous or unhealthy”; “I express my feelings in proper ways”) based on a 4-point scale (1 = Not at all or rarely, 2= Somewhat or sometimes, 3 = Very often, and 4 = Extremely or almost always), yielding good internal

consistency coefficients of $\alpha_F = .86$, $\alpha_W = .86$, $\alpha_B = .86$, $\alpha_H = .85$, and $\alpha_A = .84$. PAF analysis yielded a single factor explaining a total of 44% of the variance in items, with factor loadings ranging from .41 to .74. The behavioral scale consisted of seven behavioral items that assessed the frequency of delinquent behaviors in a certain period of time that reflected low abilities to exercise self-control. Four items asked students to report how frequently they have displayed a set of behaviors (e.g., run away from home; damaged or destroyed property) during the last 12 months on a five-point scale (1 = Never, 2 = Once or twice, 3 = 3 to 5 times, 4 = 6 to 9 times, and 5 = 10 or more times). Responses turned out to be extremely positively skewed since the majority of the participants answered never or once or twice. Then responses of these delinquency items were dichotomized into 0 = Never or 1 = Once or more. Another three items asked adolescents to report their frequencies of smoking, drinking, and drug use during the last 30 days (1 = 0 days, 2 = 1 to 2 days, 3 = 3 to 5 days, 4 = 6 to 9 days, 5 = 10 to 19 days, 6 = 20 to 29 days, 7 = All 30 days). Responses to this scale was also recoded into 0 = 0 days, and 1 = 1 or more days. The behavioral scale yielded acceptable internal consistency coefficients of $\alpha_F = .75$, $\alpha_W = .75$, $\alpha_B = .76$, $\alpha_H = .79$, and $\alpha_A = .68$. PAF results showed that these ten behavioral items altogether explained 26% of variance with factor loadings ranging from .36 to .64.

Academic performance. Adolescents self-reported their grades during the 2015-2016 school year: 1 = Mostly Fs or incompletes, 2 = Mostly Ds, 3 = Mostly Cs, 4 = Mostly Bs, and 5 = Mostly As. This is a single-indicator variable. Previous cross-cultural research has found that adolescents' self-reported grades correlate highly with their actual

grades taken from official school records (e.g., Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987).

Family social capital variables.

Three core measures were used to tap family social capital, including family support, parent attitude toward substance use, and autonomy support. Family support captured interactions and interconnection between parents and their adolescents. Although parental attitudes toward substance use did not signify the quality of the parent-adolescent ties, the unfavorable attitudes may serve as social control that constrain adolescent's substance use and act in a non-deviant way. Autonomy support is another aspect of family social capital, which develops the adolescents' skills and abilities to adjust to the complexity and diversity of their social environments in and out of families. These variables were hypothesized to load onto a single family social capital second-order latent construct.

Family support. This measure assessed social support received from family members, including parents and relatives. Two items asked adolescents whether they could talk to their parents about their problems based on a 4-point scale (1 = No, not at all; 2 = No, not very often; 3 = Yes, some of the time; 4 = Yes, most of the time). Another two items asked students how much they perceived care from parents and other adult relatives based on a 5-point scale (1 = Not at all, 2=A little, 3 = Some, 4 = Quite a bit, 5 = Very much). PAF analysis of the four items yielded a single factor that explained 48% variance with high factor loadings (from .58 to .80) of items on the factor. The internal consistency of the scale was as follows: $\alpha_F = .77$, $\alpha_W = .77$, $\alpha_B = .73$, $\alpha_H = .75$, and $\alpha_A = .78$.

Parent attitudes toward substance use. This measure assessed adolescents' perceptions of their parent's disapproval of smoking cigarettes, having alcohol, marijuana, and using drugs based on a 4-point scale (1 = Not at all wrong, 2 = A little bit wrong, 3 = Wrong, 4 = Very wrong). The internal consistency coefficients were $\alpha_F = .80$, $\alpha_W = .80$, $\alpha_B = .79$, $\alpha_H = .78$, and $\alpha_A = .78$. PAF analysis yielded a factor explaining 74% of variance of the four items with high loadings (from .82 to .90).

Autonomy support. This measure assessed adolescents' perception of autonomy support from the family and the community. Four items asked about students' perception of being valued and appreciated, being included in family roles, and having responsibilities based on a 5-point scale (1 = Not at all, 2 = A little, 3 = Some, 4 = Quite a bit, 5 = Very much). Another two items asked their sense of safety at home and in the neighborhood based on a 4-point scale, from "Strongly disagree" to "Strongly agree". The measure reached good internal consistency ($\alpha_F = .83$, $\alpha_W = .83$, $\alpha_B = .82$, $\alpha_H = .82$, and $\alpha_A = .81$). PAF analysis revealed that the one-factor solution explained 42% variance in the six items with moderate to high factor loadings (from .49 to .81).

School social capital variables.

School social capital was modeled by three variables - school climate, friends' attitudes toward substance use, and out-of-school experiences. To indicate close social relations in schools, school climate was included to measure students' perceptions of the school environments and bonding to their schools. Friends' attitudes toward substance use, as another school-based indicator, reflect peer influences on the learning of substance use attitudes and behaviors. Adolescents who interact with friends who are tolerant of substance use may be inclined to experiment with substance use and

delinquent behaviors. Adolescent participation in out-of-school activities and their positive experiences capture the quality and content of connections between students and teachers.

School climate. This measure assessed adolescents' perceptions toward school norms and social support from teachers (e.g., "Overall, adults at my school treat students fairly"; "Adults at my school listen to the students"). Responses were based on a 4-point scale (1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree). A total of five items yielded a good internal consistency ($\alpha_F = .86$, $\alpha_W = .87$, $\alpha_B = .85$, $\alpha_H = .85$, and $\alpha_A = .85$). Results of PAF analysis showed that items highly loaded (factor loadings ranging from .66 to .82) on a single factor, which explained 57% of variance.

Friends' attitudes toward substance use. Four items asked about adolescents' perceptions of their friends' disapproval of smoking cigarettes, drinking alcohol, using marijuana, and using drugs, based on a 4-point scale (1 = Not at all wrong; 2 = A little bit wrong; 3 = Wrong; 4 = Very wrong). The internal consistency coefficients were $\alpha_F = .94$, $\alpha_W = .92$, $\alpha_B = .94$, $\alpha_H = .93$, and $\alpha_A = .94$. The PAF analysis yielded a factor explaining 75% of variance for the four items with high loadings (from .83 to .90).

Out-of-school experience. This measure assessed adolescents' direct experiences when they participated in out-of-school activities. Participants responded how often they felt safe, learned skills, and developed relationships using a 4-point scale (1 = Rarely or never, 2 = Sometimes, 3 = Often, 4 = Very often). This scale consisted of seven items and had good internal consistency coefficients ($\alpha_F = .86$, $\alpha_W = .86$, $\alpha_B = .87$, $\alpha_H = .86$, and $\alpha_A = .86$). The PAF analysis yielded a factor that explained 48% of variance. The factor loadings of the items ranged from .54 to .80.

Control variables. Adolescents reported their demographic characteristics, including (1) their gender (1 = Male, 0 = Female); (2) whether receiving a free or reduced-price lunch (1 = Yes, 0 = No), as a proxy of family SES; (3) living with two parents, either biological or adoptive (1 = Yes, 0 = No); (4) school-level racial/ethnic diversity, measured by the proportion of students of color enrolled in schools during the 2015-2016 school year.

Analytic Strategies

The analysis procedure was the same as Study 1. Multigroup CFAs were applied to establish a best-fitting measurement model for each key latent variable – second-order family social capital, second-order school social capital, and self-order self-control (see Figure 3 for the analytic model). It started with testing the baseline model using the full sample and then individual racial/ethnic groups separately. The estimation method of WLSMV was used for the measurement model testing of self-control because the behavioral items involved categorical variables. MLR was used for the models of family social capital and school social capital because their indicators were continuous variables. Then standard procedures were followed to establish measurement invariance. In brief, a configural invariance model (Model 1) was tested first by only constraining the *pattern* of fixed or freed parameter to be equal across groups. This model was compared to the factor-loading invariance model (Model 2) that placed constrains on both first-order and second-order (if applicable) factor loadings to be equal across groups. If the two nested models was not substantially different from each other based on a chi-square difference test ($\Delta\chi^2$) and changes in fit index statistics (ΔCFI), Model 2 was compared to the

intercept invariance model (Model 3) that constrained intercepts of measured indicator and first-order factor means using the same evidence (i.e., $\Delta\chi^2$ and ΔCFI). After establishing measurement model invariance, multigroup SEM with WLSMV as the estimation method was conducted to estimate the structural model. Then an unconstrained structural model in which all the structural path were estimated differently across groups was compared to a constrained structural model in which all the structural path were constrained to be equal across groups. Any differences between these two models was attributed to the moderation effect of the race/ethnicity.

Chapter 6

Study 2: Results and Discussion

The Multidimensionality of Family Social Capital

It was hypothesized that the correlations among three first-order factors – family support, autonomy support, and parent attitudes toward substance use, were explained by a second-order factor of family social capital. Prior to identifying a baseline model of family social capital, a first-order CFA model was first tested with the three factors to ensure that the underlying constructs were mutually exclusive (i.e., discriminant validity). However, the model did not fit the data well ($\chi^2 = 22775.60$, $df = 74$, $p < .001$, RMSEA = .095, CFI = .896). In the measure of autonomy support, two items (i.e., “feeling safe at home” and “feeling safe in neighborhood”) were worded similarly, indicating some shared residual covariance. Likewise, the residual covariance of two items from the measure of family support (i.e., “talk to your father about problems you are having” and “talk to your mother about problems you are having”) was also considered. Thus, correlations of these two pairs of measurement errors were estimated in the modified model. The resulting refined model demonstrated a good fit to the data ($\chi^2 = 5776.25$, $df = 60$, $p < .001$, RMSEA = .053, CFI = .973).

Test of baseline model. A second-order CFA model using the full sample displayed a good model fit to the data ($\chi^2 = 5776.25$, $df = 60$, $p < .001$, RMSEA = .053, CFI = .973). A second-order factor with three first-order factors was equivalent to a first order model with factors that covary, which was why the model fit statistics are identical to the first-order CFA model. The second-order loadings were significant and acceptable (.91 for family support, .81 for autonomy support, and .30 for parent attitude). Then the

same model was estimated within racial/ethnic groups. Table 10 presents a summary of fit index statistics of the second-order CFA models by groups, indicating that baseline measurement model of family social capital fit the data for individual subgroups well.

Test of invariance. The fit index statistics for model testing are presented in Table 11. The chi-square difference test showed that the configural model (Model 1) was significantly different from the factor-loading invariance model (Model 2; $\Delta\chi^2 = 246.24$, $\Delta df=39$, $p < .001$). However, since the chi-square difference was sensitive to the sample size, changes in the CF score were considered in testing factorial invariance across groups (Cheung & Rensvold, 2002). The small difference in the CFA (.001) showed that the Model 2 was slightly worse than Model 1, indicating an invariance of both first-order and second-order factor loadings. The comparison of the Model 2 and Model 3 (intercept invariance) indicated a lack of invariance of intercepts of observed indicator and first-order variables ($\Delta\chi^2 = 1626.17$, $\Delta df=39$, $p < .001$, $\Delta CFI = .010$). To determine the degree of partial measurement invariance in this case, Model 3 must be modified by setting some intercepts free (non-invariance) across groups. According to the modification index, the intercepts of one items (i.e., “feeling safe in neighborhood”) were estimated independently across groups. With this, Model 2 and Model 3P were no longer substantially different from each other ($\Delta CFI = .008$). Thus, it can be concluded that there was partial measurement invariance, with invariance of all factor loadings, and invariance of all but one intercept.

The Multidimensionality of School Social Capital

A first-order CFA model was estimated for the three school social capital subconstructs – school climate, friends’ attitudes toward substance use, and out-of-school

experiences. Results showed that the three-factor model fit the data well ($\chi^2 = 13169.31$, $df = 101$, $p < .001$, RMSEA = .062, CFA = .953), with significant and acceptable factor loadings (above .50).

Test of baseline model. A second-order CFA model was tested with the three first-order factors and a second-order construct in one measurement model. The results showed that second-order factor loadings were significant (.68 for school climate, .44 for friend attitude, and .61 for out-of-school experiences). Then the model was estimated within each racial/ethnic group. Results showed that the model fit the data well for individual groups (see Table 10). This second-order CFA model with all three first-order factors was the baseline measurement model applied in the following invariance test.

Test of invariance. A summary of fit index statistics of a series of multigroup second-order CFA models are presented in Table 12. As can be seen in Table 12, the chi-square value difference between Model 1 and Model 2 was statistically significant, but the CFI score barely changed ($< .001$), indicating invariance of both first-order and second-order factor loadings across the four racial/ethnic groups. The comparison between Model 2 and Model 3 also indicated invariance of intercepts across groups ($\Delta CFI = .006$). Taken together, scalar invariance across groups was established.

Measure of Self-Control

The two dimensions of self-control (i.e., self-control skills and delinquent behaviors) were treated as separate but related latent factors. Due to the similar wording of the items, the residual covariance between the observed items that asked about smoking and alcohol use were included in the initial model. Results showed that the model did not fit the data well ($\chi^2 = 9825.03$, $df = 63$, $p < .001$, RMSEA = .069, CFA =

.868). Based on the values of the modification indices, two items (i.e., “say no to things that are dangerous or unhealthy” and “stay away from bad influences”) were removed due to high positive covariance between them and latent factors. Then the modified model added a residual covariance between two observed items that measured self-control skills (i.e., “dealing with disappointment without getting too upset” and “finding good ways to deal with things that are hard in my life”), yielding an acceptable model fit ($\chi^2 = 1730.96$, $df = 41$, $p < .001$, RMSEA = .035, CFA = .971). Because there were only two subconstructs in the measure of self-control, the second-order construct of self-control could not be estimated independently. In the following test of the full measurement model, self-control was included as a second-order construct.

Full Measurement Model

A measurement model including all the constructs was tested here due to two reasons. First, the second-order construct of self-control couldn't be tested because a model with two first-order indicators wouldn't be identified unless one loading was fixed to some value (e.g., 1.0). Second, some items in the models of family and school social capital shared the same wording and content (e.g., parent attitude and friend attitude toward substance use). This might produce a multicollinearity problem. A test for a full measurement model was conducted to establish discriminant validity. The residual covariance between parent attitude and friend attitude was added due to the high similarity of the two scales (e.g., wording and response options).

Test of baseline model. Without considering the group differences, the full model with second-order family social capital, school social capital, and self-control yielded a good fit to the data ($\chi^2 = 47135.61$, $df = 721$, $p < .001$, RMSEA = .043, CFA = .930).

Then the same baseline model was estimated within each racial/ethnic group, which also yielded good model fit (see Table 10). However, in the within-group models, the family social capital and school social capital were highly correlated (.89 for the Caucasian group, .87 for the African American group, .88 for the Hispanic group, and .92 for the Asian American group), indicating excessive shared variance between two constructs and a lack of discriminant validity. Even though the current study had adequate sample size, it might lead to high Type II errors (i.e., failures to detect a significant effect) and wrong conclusions (Garson, 2015).

Test of invariance. A summary of fit statistics of each model are presented in Table 13. The chi-square difference between the configural invariance model and factor-loading invariance model was significant ($\Delta\chi^2 = 699.38$, $\Delta df = 120$, $p < .001$). However, the changes in the value of CFI was only .001, indicating an invariance of both first-order and second-order factor loadings. The comparison between Model 2 and Model 3 showed that the intercepts were invariant across groups ($\Delta\chi^2 = 3149.93$, $\Delta df = 120$, $p < .001$, $\Delta CFI = .005$). Thus, it could be concluded that there was no appreciable difference in the factor loadings or intercepts across groups of interest.

Descriptive Statistics

All the descriptive statistics of first-order latent variables are presented in the Table 14. Preliminary analyses determined that missing data were of trivial proportions (<10%) for the full sample (see Table 14). However, the racial/ethnic minority groups of adolescents, especially African American adolescents, had lower response rates on the items than the Caucasian groups in general. Regarding family background, fewer

Caucasian adolescents reported as recipients of free/reduce-price lunch than racial/ethnic minority adolescents did. More Caucasian and Asian American adolescents lived in a two-parent household than African American and Hispanic adolescents. Also, the school racial/ethnic diversity was lower for Caucasian adolescents than for minority adolescents.

Group differences in latent variables. Alignment optimization (Asparouhova & Muthén, 2014) was applied to study group differences in latent factor means (see Table 15 for results). The significant level of .003 was applied here. Results revealed that the Caucasian adolescents reported having better abilities of exercising self-control in the face of conflicts than racial/ethnic minority adolescents. As for the delinquent behaviors, Asian American adolescents reported having engaged in less delinquent activities compared to their peers from other racial/ethnic groups. However, Hispanic adolescents reported the lowest levels of self-control by demonstrating poorer abilities of exercising self-control and higher engagement in delinquent behaviors compared to other groups. Regarding academic performance, Caucasian and Asian American adolescents reported higher GPAs than African American (-.54) and Hispanic adolescents (-.62) did; Hispanic students reported lowest GPAs among the four groups. African American students reported significantly underachieving compared to Caucasian students.

For the family social capital variables, Asian American adolescents perceived the lowest levels of family support (-.48), followed by Hispanic (-.33) and African American (-.18), while Caucasian perceived the most support from their family members. Caucasian adolescents also perceived higher levels of autonomy support than racial/ethnic minority adolescents did; Hispanic adolescents perceived lowest levels of

autonomy support (-.43) among the four groups, followed by Asian American (-.30) and African American adolescents (-.29). African American (-.47) and Hispanic adolescents (-.27) reported that their parents' attitudes toward substance use were more permissive compared to the attitudes of parents of Caucasian and Asian American adolescents were.

For the school social capital variables, both African American (-.28) and Hispanic students (-.17) perceived less positive levels of school climate than Caucasian and Asian American students did; African American students perceived a more negative school climate than Hispanic student did. As for the friend's attitude toward substance use, African American (-.37) and Hispanic adolescents (-.35) reported that their friends were more permissive toward substance use than the friends of Caucasians and Asian American adolescents were. Also, Caucasian adolescents reported the more positive experiences of out-of-school activities than African American (-.26), Hispanic (-.34), and Asian American adolescents (-.26) did.

Multigroup SEM

After establishing the construct validity and measurement invariance, a multigroup SEM was applied to examine the associations among family social capital, school social capital, self-control, and academic performance. The structural model was tested with direct paths from family social capital and school social capital to self-control and academic performance and a direct path from self-control to academic performance (see Figure 4). A set of control variables (i.e., age, gender, living with two parents, free-reduced price lunch, and school racial/ethnic diversity) had direct paths to all four key

constructs. These structural paths were estimated independently for each racial/ethnic groups.

A high correlation between family and school social capital occurred when testing the discriminant validity of the measurement model above, which might signal a problem of multicollinearity and further lead to erroneous conclusions (e.g., about the importance of various independent variables). An initial evaluation of the path coefficients by ignoring the high correlations showed that school social capital was highly predictive of self-control ($B = 2.29$, $SE = .32$, $p < .001$), whereas family social capital was also a significant predictor of self-control but to a less extent ($B = 1.77$, $SE = .21$, $p < .001$). In predicting academic achievement, family social capital was negatively associated with students' self-report grades ($B = -.51$, $SE = .07$, $p < .001$); school social capital was non-significant ($B = .14$, $SE = .09$, $p = .123$); and self-control was a positive predictor ($B = .16$, $SE = .03$, $p < .001$). Although at the first glance these largely different paths may suggest that they would be significantly different, a critical evaluation revealed some concerns. First, the standard errors for the family-social-capital-to-achievement and school-social-capital-to-achievement path coefficients were relatively large. Similarly, the standard errors for the family-social-capital-to-self-control and school-social-capital-to-self-control coefficients were extremely large. The 95% confidence interval for these coefficients became very wide. Second, after taking family social capital or school social capital out of the model, r-square for self-control only changed by 1% (from .94 to .93), and decreased 2% for academic achievement (.29 vs. .27). By taking school social capital out, the coefficient of family social capital became 3.61 ($SE = .34$, $p < .001$) in predicting self-control and $-.79$ ($SE = .19$, $p < .001$) in predicting academic achievement. By taking

family social capital out of the model, the coefficient of school social capital became 3.53 ($SE = .15, p < .001$) in predicting self-control and $-.22$ ($SE = .09, p < .001$) in predicting academic achievement. Given these signs of collinearity, there was no sound basis for claiming that either family social capital or school social capital was a better predictor of self-control or academic achievement.

As recommended by Marsh and his colleagues (2004), an alternative model was then posited in which the path coefficient from family social capital to self-control was constrained to be equal to the path coefficient from school social capital to self-control. Similarly, the path coefficients from family social capital to academic performance and path from the family social capital to academic performance were constrained to be equal. In addition, a second goal of the model was to examine the degree to which family social capital, school social capital, and self-control were predictive of adolescents' academic achievement. Here social capital constructs were considered independent variables and self-control was the mediator. Because social capital constructs were highly correlated with self-control, their path coefficients to academic achievement were set to be equal to the path coefficient from self-control to academic achievement.

To determine whether the paths were actually equal, the model with equal path coefficients was compared to a model that did not constrain the path coefficients to be equal. A test of model comparison showed that the difference in chi-square values between the two models ($\Delta\chi^2 = 281.82$) was significant ($p < .001$) in relation to the difference in degrees of freedom ($\Delta df = 3$). However, the fit statistics that took into account model parsimony (RMSEA = .033 vs. .033) and the trivial differences in CFI score (dropped by .001) indicate that the fit of the constrained model was comparable to

the unconstrained model. In addition, the standard errors for the path coefficients leading to self-control and academic achievement in the constrained model decreased substantially in comparison to the unconstrained model. Consequently, the final model estimation constrained the paths from family and school social capital to self-control, as well as the paths from family social capital, school social capital, and self-control to academic achievement to be equal. Standard procedures were followed for conducting multigroup analyses in SEM (Byrne, 2001). It started with the baseline model that was tested within racial/ethnic group. Table 16 presents the summary of model fit indices, indicating a good model fit for each group. With applying the measurement invariance, the final multigroup SEM yielded an acceptable model fit ($\chi^2 = 57108.94$, $df = 4028$, $p < .001$, RMSEA = .045, CFI = .902). Table 17 presents the standardized unconstrained model for the Caucasian, African American, Hispanic, and Asian American group respectively.

Predicting self-control. Family social capital and school social capital emerged as significant predictors of self-control for all racial/ethnic groups (see Table 17). To address the problem of multicollinearity, the path coefficient from family social capital to self-control was set equal to the path coefficient from school social capital to self-control. Among control variables, receiving free/reduced-price lunch, as a proxy measure of family SES, was negatively related with self-control abilities for the Caucasian group ($B = -.18$, $SE = .06$, $p = .002$). Gender was also significant for the Caucasian group ($B = .09$, $SE = .04$, $p = .013$), indicating that male adolescents had higher levels of self-control than female adolescents. Living in a two-parent household was positively related to self-control abilities for the African American group ($B = .35$, $SE = .16$, $p = .033$).

Interestingly, school racial/ethnic diversity emerged as a positive factor related to higher self-control for Caucasian ($B = .37, SE = .11, p = .001$), African American ($B = 1.13, SE = .36, p = .002$), and Hispanic adolescents ($B = .81, SE = .25, p = .001$). Even though it was not significant for the Asian American adolescents, the strength and direction of the association was consistent with other groups ($B = .44, SE = .24, p = .062$). This showed that adolescents who went to schools that enrolled a higher percentage of minority students reported higher levels of self-control. Even though it was unable to assess the relative importance of family and school social capital, for each group, substantial variation (88%) was explained by self-control was explained –for the Caucasian group, 88% for the African American group, 89% for the Hispanic group, and 86% for the Asian American group.

Predicting academic achievement. The second component of the model examined the degree to which self-control was predictive of children’s academic achievement after adjusting for control variables. To address the high correlations between social capital constructs and self-control, the estimation of their path coefficients to academic achievement were set to be equal, resulting in the same magnitude of their associations with academic achievement. Specifically, they all were equally predictive of academic performance for all racial/ethnic groups ($B_{S_W} = .06, B_{S_B}=.06, B_{S_H}=.06, B_{S_A}=.04, ps <.001$). Notably, there was substantial consistency across groups in these associations. In addition to self-control and social capital, gender was a relatively strong predictor consistently across groups, with girls having better academic achievement ($B_W = -.31, B_B=-.36, B_H=-.40, B_A=-.30, ps < .001$). Adolescents who received free/reduced-price lunch tended to have poorer achievement ($B_W = -.28, B_B=-.28, B_H=-.31, B_A=-.23,$

$ps < .001$). Adolescents who were living with two parents, either biological or adoptive, had better academic achievement than those who lived with single parents or other guardians ($B_W = .24, B_B = .25, B_H = .25, B_A = .28, ps < .001$). School diversity had a positive relationship with Caucasian students' academic achievement ($B = .17, SE = .04, p < .001$).

Indirect effects. The third part of the model examined the mediating mechanism of self-control for the relationships between social capital factors and academic achievement. Table 17 presents the total of family and school social capital and indirect effects via self-control. Results revealed significant indirect relations from family social capital ($B_W = .08, B_B = .09, B_H = .09, B_A = .05, ps < .001$) as well as a from school social capital to academic achievement for all the groups (indirect: $B_W = .08, B_B = .09, B_H = .09, B_A = .05, ps < .001$) through self-control. Since the direct association of family social capital and school social capital with academic achievement was still significant, this model identified multiple pathways through which social capital might influence academic achievement for all groups. Moreover, both school and family social capital were positively related to achievement partially through their positive relationship with self-control. Overall, the model explained 22% of the variance in adolescents' academic achievement for the Caucasian group, 17% for the African American group, 17% for the Hispanic group, and 17% for the Asian American group.

Model equivalence. As a final step, a multiple group invariance test was conducted to examine whether the structural model was consistent across groups. Because the main interest here was potential differences in the structural paths, first-order and second-order factor loadings and intercepts of observed indicators and first-order factors were constrained to be equal across groups. Constraining structural paths to be

equal across racial/ethnic groups resulted in negligible change in overall model fit ($\Delta\chi^2 = 418.36$, $\Delta df = 66$, $p < .001$; $\Delta CFI = .001$). This result supported the acceptance of the constrained multi-group model in which all structural paths were fixed across groups. It suggests that the overall model was representative of the whole sample, regardless of race/ethnicity membership. The unstandardized coefficients from the constrained model are displayed in the Figure 4.

Discussion

Study 2 examined relationships between family and school social capital, self-control, and academic achievement for adolescents from a statewide sample. Self-control is initially established in childhood, but the ability to consider future consequence of actions continues to grow during adolescence. Adolescents are more likely to make risky decisions than children and adults, which is greatly driven by social acceptance. Self-control abilities may play a significant and protective role in adolescent outcomes that should be better understood. It was hypothesized that self-control might indirectly link family and school social capital with adolescents' academic achievement after adjusting for control variables. The indirect process of how social capital influenced academic achievement through self-control did not differ for the four racial/ethnic groups examined in this study (i.e., Caucasian, African American, Hispanic, and Asian American).

Regarding group differences in self-control abilities, Caucasian adolescents reported better skills for controlling emotions and problem solving in the face of conflict than did racial/ethnic minority groups, while Asian American adolescents reported the least involvement in delinquent behaviors. Hispanic adolescents demonstrated the lowest

self-control by demonstrating the poorest social skills and highest levels of deviance engagement among the four groups. Previous work on race/ethnicity and delinquency showed that Asian American adolescents commit less deviance in the form of school misbehavior than other non-Asian American adolescents (Jang, 2002). Some scholars have argued that some aspects of Asian American culture, such as family traditional values and collectivistic worldviews, decrease risk behaviors and encourage social competence for Asian American youth (Portes & Rumbaut, 2001; Hahm Lahiff, & Guterman, 2004; Iwamoto, Takamatsu, & Castellanos, 2012). As for the Hispanic youth, previous findings on deviance have also found that Hispanic adolescents were overrepresented among delinquent youth when it comes substance use (Telzer, Conzales, & Fuligni, 2014) and risk behaviors (e.g., physical fights and disobedience; Centers for Disease Control and Prevention, 2016). The protective power of family traditional values may decrease with time the youth spent in the U.S, which may be reflective of individual levels of acculturation and ethnic identity (Iwamoto et al., 2012), which in turn may predict more risk behaviors (Castro, Stein, & Bentler, 2009).

In examination of the etiology of self-control, this study suggests that the attainment of family social capital (including family support, autonomy support, and parent's attitude toward substance use) is important to promote adolescents' self-control. It has been suggested that a positive parent-child relationship continued to be a protective factor across adolescence, although older adolescents might experience decreased levels of positive relationship quality with parents as compared to younger, pre-adolescent youth (Hazel et al., 2014). Warm interactions between parents and adolescents and the support of autonomy from parents are the foundation for adolescents to exercise self-

control and take responsibilities. In addition, parents as well as peers can play a key role in instilling young people with anti-risk information so that they can make right decisions and engage in desired behaviors. Previous studies have shown that adolescents are more likely to drink alcohol or use drugs when their parents hold attitudes favorable to the use of alcohol and drugs (Cleveland, Feinberg, Bontempo, & Greenberg, 2008).

Examination of racial/ethnic differences in different forms of family social capital in this study suggests that ethnic minority youth have less access to positive social capital within their families than their Caucasian peers. Specifically, Asian Americans and Hispanic perceived less family support than the Caucasian and African American groups did; African American, Hispanic, and Asian American adolescents perceived lower levels of autonomy support than the Caucasian group did; African American and Hispanic adolescents perceived that their parents' attitude about substance use was more permissive than parents of Caucasian and Asian American adolescents. These results suggest that minority youth may face more challenges in developing self-control abilities than their Caucasian peers due to a lack of family social capital, especially given that family social capital is a promotive factor regardless of racial/ethnic membership.

This study also consistently found a positive association between school social capital (including school climate, out-of-school experiences, and friend's attitude toward substance use) and self-control for adolescents across the four racial/ethnic groups. It has been suggested that the school and classroom is an important sociocultural context where self-control can be learned and exercised (Grusec & Goodnow, 1994). High levels of positive school climate can facilitate students' connectedness and attachment to their school, which in turn decrease the prevalence of problematic behaviors (Reaves et al,

2018; Roffey, 2013; Wilson, 2004). Even though school social capital showed similar relations with self-control across racial/ethnic groups compared to their Caucasian counterparts, African American and Hispanic adolescents perceived more negative school climate, more permissive friends' attitude toward substance use, and fewer positive experiences of out-of-school activities. Asian American adolescents may experience same level of school social capital as their Caucasian peers in the forms of school climate and friends' anti-substance attitudes. However, they experienced less positive out-of-school activities than Caucasian adolescents. These racial/ethnic discrepancies in school social capital may place the minority youth at a greater risk of under developing self-control and engaging in delinquent behaviors compared to the Caucasian youth. Since school is the primary social context outside of home, for most youth, these findings provide important policy and educational implications for school health and students' outcomes.

An interesting finding from this study was the positive relationship between school racial/ethnic diversity and self-control abilities. Empirical evidence has demonstrated that greater student racial/ethnic diversity relates to higher levels of aggression and delinquency (Payne, Gottfredson, & Gottfredson, 2003; Le & Stockdale, 2011). It is possibly because more heterogeneous schools are more likely to locate in disorganized neighborhoods with lower levels of collective efficacy (i.e., sense of social cohesion among neighbors), resulting in a lack of sense of community at school. Additionally, adolescents may adopt cultural norms and values that support violence and delinquency, which lead to personal involvement in delinquent behaviors (Felson, Liska, South, & McNulty, 1994). However, other studies suggest that ethnical minority youth

benefit socially and emotionally from a more diverse school context. For instance, Juvonen, Nishina, & Graham (2006) found that African American and Latino youth reported fewer experiences of victimization and perceived a higher classroom/school safety with greater student ethnic diversity in middle schools. African American and Latino adolescents were challenged in the transition from middle to high school when the ethnic composition of their respective groups declined in high schools (Benner & Graham, 2009). With more racial/ethnic minority student enrolled in school, minority students may perceive increased peer inclusion and experience cultural pluralism, which may foster self-control ability. The present study only used the proportion of Caucasian students enrolled in schools, which was an insufficient measure of school diversity. Future research may examine the association between school diversity and self-control by applying a more detailed racial/ethnic composition (e.g., Juvonen et al., 2006; Le & Stockdale, 2011).

Regarding the role of self-control, Study 2 suggests that self-control is a reliable predictor of academic achievement for all racial/ethnic groups, which is consistent with previous studies on early adolescence (Ng-Night et al., 2016; Xia, Fosco, & Feinberg, 2015) as well as middle and late adolescence (Duckworth & Seligman, 2005; Hofer, Kuhnle, Kilian, & Fries, 2012; Muenks, Wigfield, Yang, & O'Neal, 2016). More importantly, to a large extent the effects of social capital on academic achievement can be explained by self-control. Regardless of race/ethnicity membership, adolescents with more family and school social capital tend to have higher self-control, which further promotes their academic achievement. The relation of social capital and self-control with academic achievement overlaps to some extent. Regarding racial/ethnic differences in

self-reported academic achievement, Caucasian and Asian American adolescents outperformed their African American and Hispanic peers. These group gaps in achievement may be partly attributed to the lesser family and school social capital attained by African American and Hispanic adolescents compared to Caucasian youth.

Chapter 7

General Discussion

The present pair of studies began by exploring whether the utility of social capital from multiple contexts provided young people with social sources and opportunities to exercise and improve self-control; and whether considering the context in which social capital was attained might lead to a greater promotion of young people's self-control and academic achievement. Furthermore, the two studies asked whether race/ethnicity membership affected the accumulation of social capital and the strength of association between social capital and young people's positive outcomes. The current thesis situated social capital from both families and schools within one conceptual framework so that a specified model would more precisely define the pathways leading to self-control and academic achievement. The analysis approach applied here considers the multidimensionality of social capital by forming second-order constructs so that it could appropriately represent children and adolescents of diverse origins. Results of multigroup analyses revealed that race/ethnicity membership differentially affected relationships between social capital, self-control, and academic achievement. In addition, since race/ethnicity status often covaries with more disadvantaged situations, the thesis has carefully controlled for individual backgrounds in the analyses, including age, gender, family SES, living arrangement, and school diversity, in both studies. Overall findings attest to the importance of examining cross-ethnic differences and supports the notion that returns to social capital are dependent on social contexts, which provide practical implications in focusing policies and interventions toward the contexts that are more influential.

Consistent with the existing literature, self-control was found to be an essential component in predicting academic achievement throughout childhood (based on teachers' evaluations) and adolescence (based on self-report grades). More importantly, the predictive power of self-control is similar across racial/ethnic groups. Self-control, as a stronger determinant of academic outcomes than other aspect of personality or temperament (Duckworth & Allred, 2012; Duckworth & Carlson, 2013), enables children and adolescents to employ a myriad of strategies across academic or social situations. However, as the two studies showed, racial/ethnic minority children and adolescents, especially those who are identified as African Americans and Hispanics, tend to have lower academic achievement as well as poorer self-control abilities than do their Caucasian peers. This suggests that the achievement gap between advantaged and disadvantaged children may be partially accounted for the racial/ethnic inequalities of self-control abilities that begin early in the school years.

Another role of self-control is to explain how social capital affects academic achievement of children and adolescents. High self-control has been identified as a positive mediator (though partially) of the effects of family and school social capital on academic achievement for the Caucasian and Hispanic children and adolescents of all racial/ethnic groups. These findings are noteworthy for ethnic minority children and adolescents because they are more likely to experience early academic failure than Caucasian children (U.S. Department of Education, 2017). Given the findings that the access to social capital in families and schools is disproportionately limited for racial/ethnic minority children and adolescents, improving self-control abilities of minority children and adolescents could provide an effective approach for reducing

ethnic disparities in academic achievement. Previous research has identified self-control as a preschool skill that can be targeted to reduce educational disparities between advantaged and disadvantaged children in early elementary school (Fitzpatrick et al., 2014).

The level of self-control depends on knowledge and skills that can be learned, practiced, and reinforced (Duckworth, Gendler, & Gross, 2014). The thesis provides some answers to what effective ways are to instruct children in self-control strategies and what role parents and teachers play in the cultivation of self-control. Informed by social capital theory and socio-ecological framework, the thesis identified a variety of beneficial social relationship-based resources and influences in families and schools that potentially foster self-control and academic achievement. Both studies demonstrate that it is feasible to model social capital as a second-order construct. The cross-ethnic equivalence of measures of family and school social capital indicates that the assessments are operating equivalently across samples of Caucasian, African American, Hispanic, and Asian American children and adolescents. The considerable cross-ethnic factorial invariance of the measures of family social capital and school social capital enables the interpretation of between-group differences to be attributed to the true group differences rather than to psychometric differences (i.e., measures perform differently with different groups and have differing underlying structures) related to the item responses. This suggests that through the testing for the multigroup measurement invariance, families and educational personnel may concentrate on a concrete and similar set of actions to build social capital in families and schools for all young people, regardless of race or ethnicity.

Despite measurement invariance in the factor structures of social capital across groups, the differing path coefficients in the structural equation models show that the same amount of social resources in families and schools may not result in the same levels of self-control across racial/ethnic groups for school-age children. In Study 1, family social capital is a stronger predictor of self-control than school social capital is; school social capital does not have a significant influence on self-control at all. In addition, the significant effect of family social capital did not occur for all racial/ethnic groups in Study 1. Specifically, Caucasian and Hispanic children receive higher returns to family social capital than African American and Asian American do. Although racial/ethnic minority families commonly emphasize the importance of family relations, respect for authority, and group harmony, the extent to which ethnic families succeed in socializing children and controlling their behaviors according to their beliefs tends to vary across racial/ethnic groups.

Study 2 demonstrates a different picture for a sample of adolescents. Family social capital and school social capital exert the same influence on self-control among adolescents of racial/ethnic groups. The children in Study 1 are aged approximately 6 years in kindergarten, while the adolescents in Study 2 are aged 13 years on average. This stark contrast may reflect issues of population characteristics and different socialization experiences specific to different age groups. Child socialization starts at a very early age, and initially, parents act as the primary socializing agents. As children approach adolescence, children spend more time away from their parents' influence and are increasingly exposed to other competing socializing agents, including peers and teachers. It is possible that as children age they will be more affected by their schools and peers

relative to when they are younger (Dufur, Parcel, & Mckune, 2008; Dufur, Parcel, & Troutman, 2013), while families still play a key role as their children develop socially (Dufur, Parcel, & Mckune, 2012). The confirmation of this speculation needs further investigation using longitudinal data across different age groups.

The beneficial role of social capital found in both studies in general is in accordance of the hypotheses brought up by social capital theory (Coleman, 1988) and social control theory (Hirchi, 1964), suggesting that the positive interpersonal relationships and effective socializations from multiple agencies serve as social controls; those social controls in turn increase the children's and adolescents' abilities to self-control and desire for prosocial behaviors to meet social norms and expectations instilled by parents and schools. Both theories emphasize a socio-ecological perspective as the basis to understand variations in the amount of social resources that increase individual adaptability and resilience to environmental changes. Consistent with this idea, both studies in this thesis adopt a pluralistic approach that attempts to unify key elements that emerge in social relationships at the micro (individual and family) and macro (school and community) systems. Parental attachment, control, and involvement in the forms of social capital build the bonds that enable parents to instill self-control strategies and reduce risk behaviors in their children. In the context of educational institutes, teachers and other school personnel can create extra social control through positive school climate, teacher-student relationship, and availability of out-of-school activities to ensure more returns from students. Ecological studies explicitly focusing on self-control are still limited. The fact that social control factors exist at community, school, family, individual levels

underscores the value of studying multilevel perspective of self-control development. Future research that continues to theorize along these lines is expected.

The thesis has methodological strengths by adopting a multigroup approach. Mediation processes could be explored in different racial/ethnic groups simultaneously and assessed for cultural equivalence in the associations. Previous studies could not demonstrate whether young people who vary by race/ethnicity build and benefit from social capital differently in that they tended to treat demographic characteristics as control variables rather than reflecting important social inequality. A review of the literature on executive functions during early childhood found that either researchers did not report the race/ethnicity of their samples or reported samples composed of 80 to 95% White non-Hispanic children (Garon, Bryson, & Smith, 2008). Adopting a step-by-step procedure, data and assessments were addressed to identify the most invariant model across the racial/ethnic groups. Both cultural similarities and differences in the concomitants of self-control, which underscores the need to separate the examination of different racial/ethnic groups to more effectively target facilitating self-control development using culturally appropriate approaches.

Overall, this thesis brings self-control into the spotlight with regard to a particular focus on how different socialization processes and interpersonal relationships foster the development of self-control. It supports a multifaceted approach to studying the development of self-control when it is still subject to changes. The findings indicate the importance of incorporating family and school social capital into self-control determinants models and in the application of these findings for encouraging development of self-control abilities. In addition, this thesis advances the understanding

of self-control development within racial/ethnic minority groups. Given the shift in the population distribution by race/ethnicity within the United States and varying values and norms across racial/ethnic groups, it is essential for psychologists and education researchers to understand the social context of those children and adolescents and determine which setting (family, schools, community, etc.) hold the most importance for them.

Policy and Educational Implications

The capability of self-control is not fixed and can be strengthened through practice and suitable behaviors (Oaten & Cheng, 2006). Both childhood and adolescence are major opportunities and sensitive periods for teaching since the adolescent brain is malleable and adaptable (Blakemore & Mills, 2014). Given the relatively malleable nature of self-control, any effort targeting self-control during adolescence is encouraged and supported. Meta analyses have concluded that self-control modification sessions that focus on improving personal social skills, coping strategies, and prosocial behaviors have significant and positive effects on improving self-control and decreasing delinquency (Piquero, Jennings, & Farrington, 2010; Piquero et al., 2016;). To maximize the effects of self-control on promoting young people's social adjustment and academic outcomes, policy initiatives and intervention programs aiming at fostering self-control and self-regulation should think beyond individual-level characteristics. A more comprehensive policy will be implemented at individual, family, and community levels if policy makers can realize that individual-level development of self-control is also partially influenced by their family, school, and neighborhood contexts (Teasdale & Silver, 2009). An

experimental study by Na and Paternoster (2012) using a sample predominantly consisting of African Americans revealed that a training program (training on childrearing behaviors) led to meaningful shifts in self-control abilities for the children from age 12 to 17 when their parents also participated in the program, at the beginning when the children were 6 years old. The joint efforts of multiple socializing agents may be more effective than either party working alone. Thus, policy decision-making should adopt a multilevel perspective when addressing social problems and reducing crime rate. A complete understanding of social problems based on an ecological perspective will assist to form a more refined policy.

Given the results here concerning relationships between social capital and self-control, it is necessary to take some caution in advocating self-control inventions through improving the availability of social capital in families and schools. Although social capital is an attractive way of increasing self-control abilities and academic achievement, it is unlikely that increases of social capital in either setting under study can overcome the adverse effects of a lack of financial human capital in homes or schools. Previous work has demonstrated that a set of home adversity, including parent SES, maternal depression, poor food security, poor parenting skills, and parent overall involvement in children's lives, has shown to have a continual and unique influence on the development of self-control throughout childhood (Gajo & Beaver, 2016). Study 1 found that African American children did not benefit from family social capital. One possible explanation is that African American or mixed-race membership is often associated with a diminished availability of parent social capital in a direct fashion as well as indirectly via lower SES of these racial/ethnic minorities (Caldas & Cornigans, 2015).

In accordance with the literature on the effects of low SES for children (Bloome, 2014), both scholars and practitioners should be concerned that the potential buffering effects of social capital may not be as accessible for youth who are already in disadvantaged situations. If resources from different contexts boost each other, then inequality likely increases. Some scholars have been worried that as family income disparities increase, variations in family ability to invest in children increase, inducing more sharply differentiated fates of youths and resulting in more divergent groups of the advantaged and disadvantaged (Bianchi, Cohen, Raley, & Nomaguchi, 2004; Haveman, Sandfur, Wolf, & Woyer, 2004). In the U.S. context with a wide divide between race and social status, we need to be concerned with the investment of social capital available to these traditionally disadvantaged groups, such as the case of racial/ethnic minorities. A key challenge is to further reduce the link between race/ethnicity and social capital while simultaneously strengthening social relations for the benefit of all children and adolescents.

Another concern regarding the application of social capital in improving self-control is that the definition of social capital appears to be highly sensitive to construct bias. Different ways of defining social relationships and good behaviors are established across cultural contexts. Cultural factors such as traditional values and the adaptation to historical changes have greatly contributed to prescribing the forms of social capital and their roles accordingly. The availability of social capital benefits some children less than others, as the Asian American children in Study 1 who did not receive returns from family social capital in terms of their self-control, unlike their Hispanic peers who attained the similar amount of family social capital. Thus, specific mechanisms of social

capital and whether it is beneficial in a cultural context should be explored and better understood before making them accessible to children and adolescents with different racial/ethnic background. Different socioeconomic conditions, cultural beliefs, and historical experiences may simultaneously play important roles in this process. More research is expected to provide guidance for intervention programs and policies that prioritize the specific needs and multicultural characteristics of a given targeted underserved and multethnic population.

School environment experiences can profoundly shape the development of self-control in adolescents regardless of race/ethnicity. Then the challenge for researchers and school practitioners is to understand better how social capital might be developed and more importantly, how it can be promoted in schools serving large proportions of students from racial/ethnic minorities. Up to date, existing programs and interventions that connect parents and community members with schools mainly focus on students' achievement as opposed to the impact on social capital. Interventions designed to increase social capital in schools should be guided by deliberate efforts to strengthen the access to school-based social resources as well as in a culturally-appropriate manner, especially for students of color. According to Small (2009) and Stanton-Salazar (1997), school can generate a form of social capital that provides students and their families with access to the advantages that schools present by connecting students, families, and school agents. Intentional efforts inside schools to connect institutional agents, such as teachers, to families and students may also have the power to enhance students' access to social capital. In addition, promoting education and awareness of the diversity of issues for families and schools with varying backgrounds can assist in the creation of culturally-

sensitive early prevention and intervention programs for fostering the development of self-control and social capital among children and youth. Research studying populations cross-culturally like the present thesis is able to provide mental health professionals, counselors, and education practitioners with the tools necessary to recognize behaviors indicative of future failure among specific ethnic groups.

Limitations

Several limitations characterize this thesis. More salience of school social capital in Study 2 than in Study 1 cannot be fully attributed to the differences between children and adolescents. It could be accounted for the different sampling strategies (nationwide vs. statewide), different data collection methods (longitudinal vs. cross-sectional), and different response sources (multisource vs. self-report) applied by the two studies. This research relied on datasets with different measures of social capital, self-control, and academic achievement. Even though the concepts of family and school social capital were formed into a second-order factor to capture a more general concept, they may not be comparable either at conceptual level or at measurement level. Differential operationalization of social capital may induce specification errors that contribute to the different relations of social capital with children's and adolescents' development of self-control across the two studies. Due to these differences, it is misleading to make direct comparisons of the results of the two studies.

The measures of social capital, self-control, and academic achievement were based on secondary analyses of already existing data. This may make the measures less favorable than assessments administered in primary data analysis from studies that are

specifically designed to address a particular research questions (Archambault, Pagani, & Fitzpatrick, 2013). Irrespective of such a potential risk, existing datasets that allow the investigation of social capital and self-control in comparative studies are sparse. The richness of the variables available in to tap both family and school social capital makes the ECLS-K and MSS datasets appropriate data source. Best attempts were made to match the measures across the two datasets based on their availability. For instance, among the family social capital variables, parent attachment in Study 1 serves as a parallel construct for family support in Study 2; parent control over TV watching in Study 1 for autonomy support in Study 2; parent involvement in Study 1 for parent's attitude toward substance use for in Study 2.

Regarding the measure of self-control, Study 2 used dichotomous measures for the involvement in a set of deviant behaviors to indicate low self-control. In many cases, it is preferable to have an ordinal scale to capture frequency (e.g., from “never engaged in the behavior” to “frequently engaged in the behaviors), or a true count of the behavior's occurrence in a certain period of time to more accurately determine the prevalence of deviance. However, under this case, the majority of the sample responded that they had not recently engaged in deviate behaviors (i.e., 0 times in the last 30 days). The lack of variability in the responses made it meaningless to attempt to distinguish between responses of 1 or more times. The measure of self-control utilized here captured a more comprehensive account of the construct, yet it has not been fully validate. Given the generality of self-control, assessing the construct across various populations is imperative to validate its effect.

The generalizability of Study 2's findings might be limited because of the sample

from one state. The population distribution by race/ethnicity in its sample is different from the nationally representative sample in Study 1. Therefore, it would be useful to replicate this study using adolescents residing in other states of the United States to compare the effects of social capital and self-control across varying cultural contexts. It is possible that adolescents in the state of Minnesota experience socialization processes distinct from those of adolescents in other states. In addition, the sample of adolescents in Study 2 was drawn from public schools, also limiting the generalizability of findings. Given the prevalence of private schools in the nation, future research should investigate whether these findings are generalizable to adolescents who attend private schools.

Another concern about Study 2 lies in its sole source of responses – adolescents' self-report. The single respondent may in part explain the high correlations between family social capital, school social capital, and self-control, and limit the basis for claiming which is a better predictor of academic achievement than the other one. It is important to obtaining reports from youths' parents and teachers that shed light on their social capital and self-control abilities. Future studies could incorporate such measures to assess self-control from other sources, such as parents and teachers, and supplement these with observer ratings to reduce measurement error. At the same time, the high correlation between social capital and self-control may also indicate a need for modification of the self-control measure (see also Hirschi, 2004). Unlike the work emphasizing the personality-based notion of self-control (e.g., Crasnick et al., 1993; Tangney, Baumeister, & Boone, 2004), Hirschi (2004) used social bonds (with an emphasis on familial and school attachment and commitment) to operationalize self-control. He argues that social and self-control are the same, which could be supported by the high correlations between

family and school social capital and self-control found in Study 2. At least it may suggest that social bonds/control and self-control may be able to substitute for each other. This raises the question of whether social bonds and personal traits should be incorporated within the conceptualization of self-control and if so, how. Subsequent research should continue to pay attention to the specific methodological issue – measuring self-control.

Future Directions

It has been acknowledged that social capital is a multifaceted construct. However, it is extremely difficult for one study to operationalize the full range of social capital in different contexts. The conceptualization and measurement of social capital under various contexts are still under development. There is no consensus on how to operationalize broader contexts, and weaknesses of the existing datasets limit the opportunity to examine social effects across different levels. Although the analysis examines the various forms of family and school social capital, the inclusion of other forms and covariates in the models may have improved predictions of self-control in childhood and adolescence. Including a broader range of social capital across different social contexts could have increased the ability to predict individual differences in self-control. More attempts should be made to measure additional socialization processes.

An intriguing question for future research that requires longitudinal data is whether family and school social capital continue to operate in the same fashion over time. Youth are exposed to a number of family transitions over time. For example, a parent-child relationship changes as children advance to adolescence partly because they start to require more autonomy and identity experimentation (Steinberg, 2001), and partly

because of brain growth and transformation (Fishbane, 2012). In addition, it remains possible that the influence of school social capital on self-control only emerge late in the self-control development process. Although this thesis adds further support to previous research by including both early school-age children and adolescents, it would be beneficial for future efforts to examine these influences in a lengthy period of time when self-control might be in a highly dynamic state. Such research helps us understand whether different sources of socialization rise to greater or lesser levels of importance at different period of life. The extant research has provided reason to believe that different rates of change in self-control between individuals are accounted for by the changing levels of social control within individuals. New and longitudinal data are needed that include a broad spectrum of variables to test the availability and effect of social capital in family and extra-familial settings including schools and neighborhood.

Most of the research dismisses the relevancy of race, ethnicity, and cultural context for understanding child and adolescent outcomes, even though there is enough reason to believe self-control may vary by ethnicity. An extension of the present studies is considering the ethnical disparities within the group. The examination of Asian American and Hispanic children and adolescents' multiple racial and ethnic heritages awaits future research using data with finer-grained measures of race and ethnicity. In addition, race and ethnic membership alone cannot sufficiently capture the factors that matter for minority children and adolescents' positive outcomes (Garcia Coll et al., 1996). Race and ethnic labels cannot reflect the rich heterogeneity in minority children and adolescents' experiences, such as generational status. For instance, immigrant parents are cultural minorities and experience linguistic obstacles and acculturative stress

(Iwamoto & Liu, 2010), which in turn affect their psychological well-being, stresses experienced, the amount and types of support attained, and parenting styles and practices (Birman, 2006; Bornstein & Cote, 2004; Phinney et al., 2001). Parents who were less well-integrated into the larger mainstream culture tended to exert psychological control (i.e., intrusive control of children's behaviors and emotions; Cheah et al., 2016). More research on minority children and adolescents should investigate heterogeneity within groups, such as the role of immigrant characteristics, language, and the degree to which families adhere to cultural values (e.g., levels of acculturation).

The findings of the two studies confirm the notion that parental attachment and socialization are a primary determinant of self-control development for both children and adolescents. However, the experiences with other family members, such as grandparents and other relatives as caregivers may have an immediate impact on children's development as parents, especially when they live in the same household (Bronfenbrenner & Morris, 1998). Extended family members may be especially important for ethnically diverse families, because their definition of family goes beyond the nuclear family unit, and extended family involvement is expected (Kamo, 2000). For instance, closeness with grandparents has been shown to be associated with better adjustment of children (lower levels of internalizing and externalizing problems) after controlling for other family risk factors (Lussier et al., 2002). Grandparents are critically important in situations where marital transitions occur (e.g., divorce and remarriage), for they can either be providing support or producing conflicts among family members (Lussier, Deater-Deckard, Dunn, & Davies, 2002). Overall, grandparent-grandchild relationships are likely to be prominently influential in children's development in direct

ways (e.g., providing warm and supportive caregiving in the absence of effective parenting) or indirect ways (e.g., promoting or causing conflicts in relationships between parents and children). Thus, it is believed that social capital from extended family members, such as grandparents, may account for some variance in child' self-control development above and beyond parental investment.

This thesis exclusively focuses on two contexts important for school-age children and adolescent development – families and schools, which could be arguably nested with each other. There is a possibility that the resources interact in their effects on self-control and academic outcomes. A study conducted by Turner, Piquero, and Pratt (2005) using NLSY data on 10-year-old children demonstrated that that schools socialization efforts only increased self-control when parental socialization failed to do so (i.e., poor parenting). This indicates that schools may play a particularly important role for the self-control development in families that fail to socialize their children effectively. Likewise, family investment may be more important for children who experience unfavorable conditions at school. Such compensating effects need support from thorough examinations of the interaction of family and school social capital (Dufur et al., 2016; Parcel, Dufur, Zito, 2010). School social capital may be especially important when students are not able to attain high family social capital (Hoffman & Dufur, 2008).

The theoretical and empirical approach applied in this thesis can be useful in examining how children in other contexts build social capital and what benefits they receive from that capital. Future research needs to continue to investigate socialization processes beyond the sources that have been considered so far. This thesis neglects other contexts, such as neighborhoods and peer groups. Activities of children and adolescents

that occur within families and schools are embedded in the neighborhood where they reside. Social capital in neighborhoods includes available network support and parents' access to other family members, friends, and residents within the neighborhood. Parents in a network that closely links adults and children can trust other adults in the community to intervene and redress non-conforming behaviors of their children (Coleman, 1990). Frequent contacts between adults in a community provide a flow of information about children's activities and whereabouts so that they can efficiently monitor their children's behaviors (i.e., reciprocated exchange; Sampson, Morenoff, & Earls, 1999). Peer relationships can also provide important social capital, especially for adolescents. Characteristics of peer relationships play an important role in the functioning of the socialization mechanisms. For instance, using teacher- and mother-reported self-control, high self-control of peers and peer's prosocial behavior were positively related to adolescent self-control, and delinquent peer associations were negatively related to subsequent self-control over a year, after taking initial levels of self-control and parental socialization into account (Meldrum & Hay, 2012). Ultimately, with whom and how children spend their time is more important than solely the neighborhood context in which they reside to the development of self-control.

Lastly, this thesis discusses the unidirectional relationship from social capital to self-control. Individual levels of self-control can also facilitate or undermine one's interpersonal relationships with parents, teachers, and peers, which decreases the amount of social capital they can access. A great amount of attention has focused on how individual self-control and delinquency level impacts relationship quality outcomes in a dyadic relationship, both positively and negatively (Kreager, 2004; Selfhout, Branje, &

Meeus, 2008; Vohs, Finkenauer, & Baumeister, 2011). Existing evidence shows adolescents who are poor in emotional and behavioral regulation tend to have poor relationship quality with peers and friends (Farley & Kim-Spoon, 2014; Houtzager & Baerveldt, 1999). In addition, low self-control also predicts peer rejection (Chapple, 2005; Olson & Hoza, 1993), and children who experience social rejection are more likely to engage in delinquent behaviors (Fergusson & Horwood, 1999; Giordano, 1995) and violence in childhood (Miller-Johnson, Coie, Maumary-Gremaud, & Bierman, 2002), which could also extend to early adulthood (Nelson & Dishion, 2004). Thus, given the evidence on the relations of social capital with self-control in this thesis, it may be possible that the relationship between social capital and self-control is bidirectional with each characteristic mutually influencing the other. An understanding of the directionality of the relationship between self-control and social capital has important practical implications for intervention efforts.

Conclusion

Taken together, social capital in multiple contexts is positively associated with self-control and academic achievement for both school-age children and adolescents: people with higher levels of family and school social capital generally report better self-control abilities and academic achievement. Two studies also demonstrate evidence for the mediating role of self-control in the association between social capital and academic achievement. Regarding family and school social capital across multiple domains, there is a high level of equivalence across Caucasian, African American, Hispanic, and Asian American groups in ways that parents and school invest in their children and youth. The

ability to trust in a common metric when measuring family and school social capital indicates that the estimates of coefficients for predictor variables are likely to be unbiased. Additionally, social research and policy suggest the possibility of overcoming racial and ethnic bias through the development of models and measures to tap social capital in multiple contexts. Regarding whether structural model function equivalently across racial/ethnic groups, findings in this thesis highlight both similarities and differences when comparing models of the associations among family and school social capital, self-control, and academic achievement. Omnibus tests of model equivalence provide support for the view that race/ethnicity membership is a moderator in models of social capital, self-control, and academic achievement. When allowing structural paths to vary freely, some paths are found to vary considerably, while other paths are found to be similar across groups. Given the similarities and differences in the fit of complex models across four groups of children and adolescents, interpreting these findings can be a challenge. It is critical to test the universality of a complex model, particularly given the implications for intervention and public policy. By testing for invariance at the measurement and structural levels, the findings in this thesis provide empirical evidence about the experiences of ethnic minority populations as well as majority populations.

Table 1. *Measures of social capital variables, self-control, and academic performance for Study 1 and Study 2*

Study 1: ECLS-K:2011	Study 2: MSS
<i>Outcome variables: Self-Control</i>	
<ol style="list-style-type: none"> 1. Social skill: a composite score was computed on at least 3 out of the 4 items <ol style="list-style-type: none"> a. Respecting the property rights of others; b. Controlling temper; c. Accepting peer ideas for group activities; d. Responding appropriately to pressure from peers. 2. Externalizing problem behaviors: a composite score was computed on at least 4 out of 6 items <ol style="list-style-type: none"> a. Child argues; b. Child fights; c. Child gets angry; d. Child acts impulsively; e. Child disturbs ongoing activities; f. Child talks during quiet study time. 3. Inhibitory control: a composite score was computed on at least 4 of the 6 items <ol style="list-style-type: none"> a. The child can stop him/herself when s/he is told to stop; b. The child can stop him/herself from doing things too quickly; c. The child has an easy time waiting; d. The child is good at following directions; e. The child likes to plan carefully before doing something; f. The child has a hard time slowing down when rules say to walk. 4. Attentional focus: a composite score was computed on at least 4 of the 7 items <ol style="list-style-type: none"> a. The child is easily distracted when listening to a story; b. The child looks around the room when doing school work; 	<ol style="list-style-type: none"> 1. Attitudinal scale: <ol style="list-style-type: none"> a. I say no to things that are dangerous or unhealthy; b. I express my feelings in proper ways; c. I deal with disappointment without getting too upset; d. I plan ahead and make good choices; e. I stay away from bad influences; f. I resolve conflicts without anyone getting hurt; g. I accept people who are different from me; h. I find good ways to deal with things that are hard in my life. 2. Delinquent behaviors: <ol style="list-style-type: none"> a. Run away from home; b. Damaged or destroyed property; c. Hit or beat up another person; d. Taken something from a store without paying for it; e. During the last 30 days, on how many days did you smoke a cigarette? f. During the last 30 days, on how many days did you drink one or more drinks of an alcoholic beverage? g. During the last 30 days, on how many days did you use prescription drugs not prescribed for you?

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- c. When working on an activity, the child has a hard time keeping her/his mind on it;
 - d. The child has a hard time paying attention.
 - e. The child has a hard time waiting his/her turn to talk when excited;
 - f. The child needs to be told to pay attention;
 - g. The child gets distracted when trying to pay attention in class;

Outcome variable: Academic achievement

How would you rate this child's academic skills in each of the following areas, based on curriculum standards for his/her current grade levels?

- a. Reading
- b. Writing
- c. Oral language
- d. Mathematics
- e. Science
- f. Social studies

How would you describe your grades this school year?

- 0 = Mostly Fs or Mostly incompletes;
- 1 = Mostly Ds;
- 2 = Mostly Cs;
- 3 = Mostly Ds;
- 4 = Mostly As

Family social capital variables

1. Parent warmth:

- a. Child and I often have warm, close times together;
- b. Most of the time I feel that child likes me and wants to be near me;
- c. Even when I'm in a bad mood, I show child a lot of love;
- d. I express affection by hugging, kissing, and holding.

1. Family support:

- a. How much do you feel your parents care about you?
- b. How much do you feel other adult relatives care about you?
- c. Can you talk to your father about problems you are having?
- d. Can you talk to your mother about problems you are having?

2. Parent discipline:

- a. You threaten to punish the child and then do not actually punish him/her;
- b. The child talks to you out of being punished after he/she has done something wrong;
- c. You let the child out of a punishment early, like lift restrictions earlier than you originally said.

2. Parent attitude toward substance use: How wrong do your parents feel it would be for you to ...?

- a. Smoke cigarettes;
- b. Have one or more drinks of alcoholic beverage nearly every day;
- c. Smoke marijuana;
- d. Use prescription drugs not prescribed for you.

3. Parent control: Are there family rules about any of the following...

3. Autonomy support

-
- a. Which television programs the child can watch;
 - b. How many hours the child may watch television;
 - c. How early or late the child may watch television.
- a. I feel safe at home.
 - b. I feel safe in my neighborhood.
 - c. I am included in family tasks and decisions.
 - d. I am given useful roles and responsibilities.
 - e. I am sensitive to the needs and feelings of others.
 - f. I feel valued and appreciated by others.
4. Parent-home involvement: In a typical week, how often do you or any other family member do the following things with the child?
- a. Read books to the child;
 - b. Tell stories to the child;
 - c. Sing songs with the child;
 - d. Help the child to do arts and crafts;
 - e. Involve the child in household chores, like cooking, cleaning, setting the table, or caring for pets;
 - f. Play games or do puzzles with the child;
 - g. Talk about nature or do science projects with the child;
 - h. Build something or play with construction toys with the child;
 - i. Play a sport or exercise together.
5. Parent-school involvement: Since of the beginning of the school year, have your or other adults in your household
- a. Attended an open house or a back-to-school night;
 - b. Attended a meeting of a PTA, PTO, or Parent-Teacher Student Organization;
 - c. Gone to a meeting of a parent advisory group or policy council;
 - d. Gone to a regularly-scheduled parent-teacher conference with the child's teacher or meeting with the teacher;
 - e. Attended a school or class event;
 - f. Acted as a volunteer at the school or served on a committee;
 - g. Participated in fundraising for the child's school.
-

School Social Capital

1. School climate:
 - a. The level of child misbehavior in this school interferes with my teaching (R);
 - b. Many of the children I teach are not capable of learning the material I am supposed to teach them;
 - c. I feel accepted and respected as a colleague by most staff members;
 - d. Teachers in this school are continually learning and seeking new ideas;
 - e. Routine administrative duties and paperwork interfere with my job of teaching (R);
 - f. Parents are supportive of school staff;
 - g. There is a great deal of cooperative effort among the staff members;
 - h. In this school, staff members are recognized for a job well done;
 - i. The academic standards at this school are too low (R);
 - j. There is broad agreement among the entire school faculty about the central mission of the school;
 - k. The school administrator sets priorities, makes plans, and sees that they are carried out;
 - l. The school administration's behavior toward the staff is supportive and encouraging.
 2. Student-teacher relationship
 - a. Closeness: a composite score was computed based on at least 5 of the 7 items (e.g., I share an affectionate, warm relationship with this child)
 - b. Conflict: a composite score was computed based on at least 5 of the 8 items (e.g., This child and I always seem to be struggling with each other)
 3. Out-of-school activities: Out of the school hours, has the child ever participated in...
1. School climate:
 - a. Overall, adults at my school treat students fairly;
 - b. Adults at my school listen to the students;
 - c. The school rules are fair;
 - d. At my school, teachers care about students;
 - e. Most teachers at my school are interested in me as a person.
 2. Friends' attitudes toward substance use: How wrong do your friends feel it would be for you to ...
 - a. smoke cigarettes?
 - b. have one or more drinks of alcoholic beverage nearly every day?
 - c. smoke marijuana?
 - d. use prescription drugs not prescribed for you?
 3. Out-of-school experiences: When you spend time doing activities outside of the regular school day, how often do
-

-
- a. Academic activities?
 - b. Dance lessons?
 - c. Organized athletic activities?
 - d. Organized clubs or recreational programs?
 - e. Music lessons?
 - f. Drama classes?
 - g. Art classes or lessons?
 - h. Organized performing arts programs?
 - i. Crafts classes or lessons?
 - j. Non-English language instruction?
 - k. Religious activities or instruction?
 - l. Volunteer work or community service?

4. School-parent contact:

- a. The school lets you know between report cards how the child is doing in school;
- b. The school helps you understand what children at the child's age are like;
- c. The school makes you aware of chance to volunteer at the school;
- d. The school provides workshops, materials, or advice about how to help child learn at home;
- e. The school provides information on community services to help the child or your family.

5. Teacher efficacy

- a. If I try really hard, I can get through even to the most difficult or unmotivated students;
 - b. If some students in my class are not doing well, I feel that I should change my approach to the subjects;
 - c. By trying a different teaching method, I can significantly affect a students' achievement;
 - d. I work to create lessons so my students will enjoy learning and
-

you...

- a. Feel safe?
- b. Learn skills like teamwork or leadership?
- c. Develop trusting relationships with peers your age?
- d. Develop trusting relationships with adults?
- e. Help make decisions?
- f. Do something that gives you joy and energy?
- g. Learn skills that you can use in a future job?

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- become independent thinkers;
 - e. If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson;
 - f. If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him/her quickly.
6. Job satisfaction
- a. I really enjoy my present teaching job
 - b. I am certain I am making a difference in the lives of the children I teach
 - c. If I could start over, I would choose teaching again as my career
-

Note. Individual items for student-teacher relationship scales in ECLS-K dataset cannot be provided due to copyright restrictions; R = reverse coded

Table 2. *Baseline measurement models for latent variables for separate racial/ethnic groups*

	χ^2 values	<i>df</i>	<i>p</i>	RMSEA [90% C.I.]	CFI
<i>Family Social Capital</i>					
Caucasian	700.45	205	<.001	.020 [.019, .022]	.962
African American	322.62	205	<.001	.021 [.017, .026]	.959
Hispanic	449.91	205	<.001	.020 [.018, .023]	.963
Asian American	284.55	205	<.001	.021 [.015, .027]	.954
<i>School Social Capital</i>					
Caucasian	1406.56	125	<.001	.041 [.039, .043]	.956
African American	632.03	125	<.001	.054 [.050, .058]	.937
Hispanic	877.97	125	<.001	.044 [.041, .046]	.956
Asian American	510.85	125	<.001	.059 [.053, .064]	.924
<i>Self-Control and Academic Performance</i>					
Caucasian	1853.01	25	<.001	.109 [.104, .113]	.949
African American	351.51	25	<.001	.095 [.086, .104]	.961
Hispanic	955.40	25	<.001	.105 [.100, .111]	.952
Asian American	229.73	25	<.001	.092 [.081, .103]	.959

Notes. Family social capital included measures of parental warmth, control, home involvement, and school involvement; School social capital included measures of school climate, student-teacher relationship, teacher efficacy, teachers' job satisfaction, and out-of-school activities

Table 3. A summary of fit indices for testing measurement invariance of second-order factor model of family social capital

	χ^2	df	p	RMSEA [90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
Model 1	1936.60	823	<.001	.022[.021, .024]	.952			
Model 2	2115.61	877	<.001	.022[.021, .023]	.950	M1 vs. M2	183.30***	.002
Model 3	4236.75	949	<.001	.036[.035, .037]	.858	M2 vs. M3	2414.05***	.094
Model 3P	2326.66	936	<.001	.023[.022, .025]	.940	M2 vs. M3P	333.75***	.010

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings invariant; Model 3 = Model 2 + intercepts of measured variables and first-order factors invariant; Model 3P = Model 2 + Partial invariance

Table 4. A summary of fit indices for testing measurement invariance of second-order factor model of school social capital

	χ^2	df	p	RMSEA [90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
Model 1	2283.61	500	<.001	.036[.035, .038]	.948			
Model 2	2398.19	542	<.001	.036[.034, .037]	.946	M1 vs. M2	201.44***	.002
Model 3	2844.16	605	<.001	.037[.036, .039]	.934	M2 vs. M3	648.57***	.012
Model 3P	2682.93	603	<.001	.036[.034, .037]	.939	M2 vs. M3.5	400.25***	.007

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings invariant; Model 3 = Model 2 + intercepts of measured variables and first-order factors invariant; Model 3P = Model 2 + Partial invariance

Table 5. Summary of Fit Statistics for Testing Measurement Invariance of outcome measures

	χ^2	df	p	RMSEA[90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
Model 1	3185.70	115	<.001	.096[.094, .099]	.948			
Model 2	3297.33	136	<.001	.090[.087, .093]	.946	M1 vs. M2	143.40***	.002
Model 3	3333.90	142	<.001	.088[.086, .091]	.946	M2 vs. M3	35.96***	<.001

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings invariant; Model 3 = Model 2 + intercepts of measured variables and first-order factors invariant; Model 3P = Model 2 + Partial invariance

Table 6. Descriptive statistics for all the variables for the full sample and each subgroups in Study 1

Variables	Full sample (N = 11,986)					Caucasian (n = 6,205)					African American (n = 1,459)					Hispanic (n = 3,354)					Asian American (n = 968)				
	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing
<i>Measures of Self-control (W6)</i>																									
Skills	3.23	.63	1.00	4.00	1.9%	3.25	.62	1.25	4.00	1.6%	2.98	.69	1.00	4.00	1.4%	3.23	.61	1.00	4.00	2.6%	3.37	.57	1.00	4.00	1.9%
Externalizing	1.71	.61	1.00	4.00	0.4%	1.70	.61	1.00	4.00	0.5%	1.96	.70	1.00	4.00	0.2%	1.65	.58	1.00	4.00	0.4%	1.54	.52	1.00	4.00	0.1%
Attention	3.49	1.12	1.00	5.00	0.4%	3.51	1.12	1.00	5.00	0.3%	3.21	1.11	1.00	5.00	0.4%	3.46	1.13	1.00	5.00	0.5%	3.85	1.02	1.00	5.00	0.2%
Inhibition	3.68	.84	1.00	5.00	0.4%	3.71	.85	1.00	5.00	0.3%	3.42	.86	1.00	5.00	0.5%	3.69	.81	1.00	5.00	0.6%	3.91	.80	1.14	5.00	0.2%
<i>Academic performance (W6)</i>																									
Reading	2.08	.76	1.00	3.00	0.6%	2.17	.75	1.00	3.00	0.5%	1.90	.73	1.00	3.00	0.5%	1.92	.76	1.00	3.00	1.0%	2.28	.71	1.00	3.00	0.6%
Writing	1.90	.67	1.00	3.00	0.7%	1.98	.66	1.00	3.00	0.4%	1.74	.64	1.00	3.00	1.0%	1.77	.65	1.00	3.00	1.0%	2.06	.66	1.00	3.00	0.9%
Oral language	2.09	.59	1.00	3.00	0.8%	2.17	.58	1.00	3.00	0.5%	1.97	.56	1.00	3.00	1.2%	1.97	.61	1.00	3.00	1.3%	2.10	.61	1.00	3.00	0.7%
Math	2.09	.66	1.00	3.00	0.8%	2.17	.64	1.00	3.00	0.7%	1.88	.64	1.00	3.00	0.9%	1.96	.65	1.00	3.00	1.0%	2.35	.61	1.00	3.00	1.0%
Science	2.06	.49	1.00	3.00	0.9%	2.12	.48	1.00	3.00	0.6%	1.95	.47	1.00	3.00	1.2%	1.97	.50	1.00	3.00	1.2%	2.17	.52	1.00	3.00	0.7%
<i>Measures of Family Social Capital</i>																									
Warmth (W2)	1.24	.36	1.00	4.00	25.2%	1.23	.33	1.00	4.00	19.5%	1.18	.35	1.00	4.00	34.3%	1.28	.42	1.00	4.00	30.5%	1.30	.40	1.00	3.25	29.4%
Control (W2)	.81	.27	0.00	1.00	23.6%	.80	.26	0.00	1.00	18.1%	0.83	.26	.00	1.00	32.9%	.82	.28	.00	1.00	28.9%	0.84	.28	.00	1.00	26.8%
HoInvo (W1)	2.90	.47	1.11	4.00	24.6%	2.96	.44	1.22	4.00	17.5%	2.92	.48	1.44	4.00	25.4%	2.80	.52	1.11	4.00	32.8%	2.75	.49	1.22	4.00	40.0%
SchInvo (W2)	0.57	.25	0.00	1.00	21.0%	.62	.23	0.00	1.00	16.2%	0.51	.26	0.00	1.00	29.1%	.49	.25	.00	1.00	26.1%	0.53	.26	.00	1.00	22.2%
<i>Measures of School Social Capital (W2)</i>																									
ST relation	3.88	.58	0.72	4.50	6.5%	3.93	.58	1.19	4.50	4.6%	3.74	.66	1.36	4.50	7.3%	3.85	.57	.72	4.50	8.6%	3.89	.54	1.48	4.50	9.9%
Climate	4.06	.61	1.00	5.00	6.2%	4.10	.59	1.43	5.00	4.4%	4.03	.63	1.43	5.00	6.8%	3.99	.62	1.00	5.00	8.6%	4.08	.62	1.00	5.00	8.9%
Efficacy	4.15	.41	2.17	5.00	6.2%	4.13	.39	2.17	5.00	4.5%	4.17	.44	2.67	5.00	6.3%	4.17	.42	2.33	5.00	8.6%	4.15	.41	3.00	5.00	9.2%
JobSatisf	4.42	.61	1.00	5.00	6.2%	4.44	.59	1.00	5.00	4.4%	4.38	.63	1.00	5.00	6.2%	4.41	.63	1.33	5.00	8.7%	4.43	.61	1.00	5.00	9.1%
SP contact	2.52	.45	1.00	3.00	21.1%	2.50	.44	1.00	3.00	16.3%	2.53	.47	1.00	3.00	29.1%	2.56	.47	1.00	3.00	26.2%	2.54	.42	1.20	3.00	22.3%
OSA	.34	.26	.00	1.00	22.1%	.41	.26	.00	1.00	17.0%	0.31	.24	.00	1.00	30.6%	.23	.24	.00	1.00	27.3%	0.22	.23	0.00	1.00	24.1%
<i>Covariates</i>																									
Gender (M)	.51	.50	.00	1.00	0.1%	.52	.50	.00	1.00	0.1%	.51	.50	.00	1.00	0.2%	.51	.50	.00	1.00	0.2%	0.47	.50	.00	1.00	0.1%
Two-parents	.72	.45	.00	1.00	9.8%	.79	.41	.00	1.00	7.0%	.36	.48	.00	1.00	13.3%	.69	.46	.00	1.00	12.6%	0.92	.28	.00	1.00	13.4%
SES	-.04	.82	-2.33	2.60	10.0%	.23	.73	-2.07	2.44	7.1%	-.38	.70	-2.07	2.44	13.4%	-.54	.71	-2.33	2.44	13.0%	0.34	.89	-2.33	2.60	13.4%
Diversity	.47	.35	.00	1.00	0.1%	.24	.22	.00	1.00	0.1%	.74	.27	.02	1.00	0.2%	.72	.29	.00	1.00	0.1%	.63	.30	.02	1.00	0.3%
Public School	.89	.31	.00	1.00	0.1%	.86	.35	.00	1.00	0.1%	.91	.29	.00	1.00	0.1%	.94	.24	.00	1.00	0.1%	.89	.32	.00	1.00	0.1%

Note. W1 = Wave 1 (Fall 2010); W2 = Wave 2 (Spring 2011); W6 = Wave 6 (Spring 2013); SchInvo = Parents' home-based involvement; SI = Parents' school-based involvement; ST relation = Student-teacher relationship; JobSatisf = Job Satisfaction; SP Contact = School-parent contact; OSA = Out-of-school activities;

Table 7. Alignment results of factor mean comparisons for the four racial/ethnic groups in first-order latent variables

Group	Factor Mean	Groups with significantly smaller factor mean
<i>Self-control</i>		
Caucasian	.00	African American
African American	-.48	
Hispanic	-.02	African American
Asian American	.29	African American, Caucasian, Hispanic
<i>Academic performance</i>		
Caucasian	.00	African American, Hispanic
African American	-.48	
Hispanic	-.41	
Asian American	.14	Caucasian, African American, Hispanic
<i>First-order factors of family social capital</i>		
<i>Parent warmth</i>		
Caucasian	.00	Hispanic, Asian American
African American	.06	Hispanic, Asian American
Hispanic	-.24	
Asian American	-.28	
<i>Parent control</i>		
Caucasian	.00	
African American	.64	Caucasian
Hispanic	.69	Caucasian
Asian	.94	Caucasian
<i>Home involvement</i>		
Caucasian	.00	African American, Hispanic, Asian American
African American	-.13	Hispanic, Asian American
Hispanic	-.37	
Asian American	-.34	
<i>School involvement</i>		
Caucasian	.00	African American, Hispanic, Asian American

African American	-.63
Hispanic	-.67
Asian American	-.53

First –order factors of school social capital

Teacher relationship

Caucasian	.00	African American, Hispanic, Asian American
African American	-.85	
Hispanic	-.18	African American
Asian American	-.17	African American

School climate

Caucasian	.00	African American, Hispanic
African American	-.15	
Hispanic	-.23	
Asian American	-.04	Hispanic

Teacher efficacy

Caucasian	.00	
African American	.14	Caucasian, Asian American
Hispanic	.10	Caucasian, Asian American
Asian American	.03	

Teacher job satisfaction

Caucasian	.00	African American
African American	-.12	
Hispanic	-.04	African American
Asian American	-.02	African American

Note. Significance at .003 level

Table 8. *A summary of fit statistics for each group and a test for model invariance across groups*

Groups	χ^2	<i>df</i>	<i>p</i>	RMSEA [90%	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
Caucasian	5373.26	1284	<.001	.024[.023, .024]	.932			
African American	1999.83	1284	<.001	.021[.019, .023]	.946			
Hispanic	2695.60	1284	<.001	.019[.018, .020]	.951			
Asian American	1580.69	1284	<.001	.023[.021, .025]	.917			
<i>Structural invariance</i>								
Unconstrained Model	12218.06	5403	<.001	.022[.021, .022]	.933			
Constrained Model	12216.59	5472	<.001	.023[.022, .023]	.933	Unconstrained vs. Constrained	246.58***	<.001

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings invariant; Model 3 = Model 2 + intercepts of measured variables and first-order factors invariant

Table 9. Unstandardized estimates of direct, indirect, and total effect in the final (unconstrained) model for Study 1

	Caucasian				African American				Hispanic				Asian American			
	<i>B</i>	<i>SE</i>	CI 95%	<i>p</i>	<i>B</i>	<i>SE</i>	CI 95%	<i>p</i>	<i>B</i>	<i>SE</i>	CI 95%	<i>p</i>	<i>B</i>	<i>SE</i>	CI 95%	<i>p</i>
On academic performance																
SC direct effect	.68	.03	[.63, .73]	<.001	.74	.05	[.65, .83]	<.001	.75	.04	[.67, .82]	<.001	.72	.08	[.57, .88]	<.001
FSC total effect	.97	.29	[.53, 1.54]	<.001	1.24	.42	[.46, 2.15]	.003	1.26	.26	[.80, 1.81]	<.001	.79	.52	[-.05, 1.91]	.132
FSC indirect via SC	.41	.12	[.21, .67]	<.001	.20	.19	[-.18, .58]	.291	.23	.11	[.02, .47]	.047	-.29	.23	[-.83, .09]	.205
FSC direct effect	.57	.24	[.16, 1.08]	.017	1.04	.40	[.33, 1.86]	.008	1.03	.24	[.60, 1.53]	<.001	1.08	.56	[.24, 2.39]	.053
SSC total effect	.04	.04	[-.04, .12]	.334	.09	.06	[-.03, .21]	.147	.00	.05	[-.09, .09]	.929	.11	.09	[-.08, .30]	.247
SSC indirect via SC	.05	.02	[.02, .09]	.006	.04	.03	[-.02, .11]	.209	-.02	.02	[-.06, .02]	.377	-.06	.04	[-.15, .01]	.162
SSC direct effect	-.01	.04	[-.08, .06]	.787	.05	.06	[-.06, .16]	.376	.02	.04	[-.07, .11]	.593	.17	.09	[.01, .36]	.066
Gender	.06	.02	[.03, .09]	<.001	.01	.03	[-.05, .07]	.814	.04	.02	[.00, .09]	.052	.05	.04	[-.04, .13]	.258
Two parents	-.02	.02	[-.06, .02]	.295	-.04	.04	[-.10, .04]	.299	-.02	.02	[-.06, .03]	.530	-.03	.07	[-.17, .12]	.692
SES	.16	.01	[.13, .29]	<.001	.12	.03	[.06, .17]	<.001	.18	.02	[.15, .22]	<.001	.11	.04	[.03, .16]	.002
School diversity	.00	.00	[.00, .00]	.001	.00	.00	[.00, .00]	.066	.00	.00	[.00, .00]	<.001	.00	.00	[-.00, .00]	.418
On SC																
FSC	.60	.17	[.30, .97]	<.001	.27	.26	[-.24, .81]	.294	.30	.15	[.03, .63]	.046	-.41	.32	[-1.12, .13]	.176
SSC	.07	.03	[.02, .13]	.006	.06	.05	[-.03, .15]	.203	-.03	.03	[-.08, .03]	.375	-.08	.05	[-.19, .02]	.133
Gender	-.24	.01	[-.26, -.22]	<.001	-.22	.02	[-.27, -.17]	<.001	-.22	.01	[-.25, .19]	<.001	-.23	.03	[-.28, -.18]	<.001
Two parents	.13	.02	[.10, .16]	<.001	.13	.03	[.08, .18]	<.001	.11	.02	[.08, .15]	<.001	-.03	.05	[-.12, .07]	.592
SES	.07	.01	[.06, .09]	<.001	.06	.02	[.02, .11]	.006	-.01	.01	[-.03, .02]	.658	.07	.02	[.03, .11]	<.001
School diversity	-.00	.00	[-.00, .00]	.005	.00	.00	[.00, .00]	.245	-.00	.00	[.00, .00]	.855	-.00	.00	[-.00, .00]	.035
On FSC																
Gender	-.00	.00	[-.01, .00]	.480	-.00	.01	[-.02, .01]	.523	-.00	.00	[-.01, .00]	.371	-.01	.01	[-.02, .01]	.417
Two parents	.02	.00	[.01, .03]	<.001	.00	.01	[-.01, .02]	.661	.02	.01	[.01, .03]	.005	-.00	.01	[-.03, .02]	.855
SES	.04	.00	[.03, .05]	<.001	.04	.01	[.03, .06]	<.001	.05	.01	[.03, .06]	<.001	.04	.01	[.03, .06]	<.001
School diversity	.00	.00	[.00, .00]	.979	.00	.00	[.00, .00]	.437	.00	.00	[.00, .00]	.321	.00	.00	[.00, .00]	.923
On SSC																
Gender	-.03	.01	[-.05, -.01]	.005	-.01	.02	[-.06, .04]	.811	-.01	.02	[-.04, .02]	.676	-.00	.02	[-.06, .05]	.924
Two parents	.02	.01	[-.01, .04]	.253	.01	.03	[-.04, .07]	.608	.03	.02	[.00, .07]	.036	-.04	.05	[-.13, .05]	.352
SES	.03	.01	[.02, .05]	<.001	.05	.02	[.01, .08]	.015	.04	.01	[.02, .06]	<.001	.06	.02	[.03, .09]	<.001
School diversity	.00	.00	[.00, .00]	.282	.00	.00	[-.00, .00]	.608	.00	.00	[.00, .00]	.087	-.00	.01	[-.00, .00]	.005

Note. FSC = Family social capital; SC = Self-control; SSC = School social capital; $\chi^2 = 12216.03$, $df = 5405$, CFI = .933, RMSEA = .022

Table 10. *Baseline second-order CFA models for latent variables by racial/ethnic groups in Study 2*

	χ^2 values	<i>df</i>	<i>p</i>	RMSEA [90% C.I.]	CFI
<i>Family Social Capital</i>					
Caucasian American	5656.51	72	<.001	.055 [.054, .056]	.965
African American	484.66	72	<.001	.049 [.044, .053]	.976
Hispanic	686.29	72	<.001	.049 [.046, .052]	.972
Asian American	567.88	72	<.001	.056 [.052, .060]	.968
<i>School Social Capital</i>					
Caucasian	9784.83	101	<.001	.061[.060, .062]	.954
African American	1356.25	101	<.001	.072[.069, .076]	.935
Hispanic	1449.86	101	<.001	.061[.059, .064]	.948
Asian American	930.46	101	<.001	.061[.058, .065]	.953
<i>Full measurement model</i>					
Caucasian	37025.68	721	<.001	.044[.044, .044]	.928
African American	3942.90	721	<.001	.043[.042, .044]	.930
Hispanic	5388.63	721	<.001	.043[.041, .044]	.928
Asian American	3728.39	721	<.001	.043[.042, .045]	.930

Notes. The full measurement model included second-order constructs of family social capital, school social capital, and self-control

Table 11. *A summary of fit statistics for testing measurement invariance of second-order factor model of family social capital*

	χ^2	<i>df</i>	<i>p</i>	RMSEA [90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
<i>Four-group model</i>								
Model 1	3405.07	240	<.001	.044[.042, .045]	.969			
Model 2	3602.71	279	<.001	.042[.040, .043]	.968	M1 vs. M2	246.24***	.001
Model 3	4700.84	318	<.001	.045[.044, .046]	.958	M2 vs. M3	1626.17***	.010

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings invariant; Model 3 = Model 2 + intercepts of measured variables and first-order factors invariant

Table 12. A summary of fit statistics for testing measurement invariance of second-order factor model of school social capital

	χ^2	<i>df</i>	<i>p</i>	RMSEA [90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
Model 1	39447.39	584	<.001	.052[.051, .052]	.952			
Model 2	40550.91	629	<.001	.050[.050, .051]	.952	M1 vs. M2	1079.91***	<.001
Model 3	45685.04	605	<.001	.050[.050, .051]	.946	M2 vs. M3	5989.54***	.006
Model 3P	4486.53	315	<.001	.044[.043, .045]	.960	M2 vs. M3P	1303.62***	.008

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings; Model 3P = Model 2 + Partial invariance

Table 13. A summary of fit statistics for testing measurement invariance of the full measurement model

	χ^2	<i>df</i>	<i>p</i>	RMSEA[90% C.I.]	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
<i>Four-group model</i>								
Model 1	23380.66	2888	<.001	.033[.032, .033]	.924			
Model 2	23621.59	3008	<.001	.032[.032, .033]	.923	M1 vs. M2	699.38***	.001
Model 3	25300.97	3128	<.001	.033[.032, .033]	.918	M2 vs. M3	3149.93***	.005

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings

Table 14. Descriptive statistics for all the variables for the full sample and each subgroups in Study 2

Variables	Full sample (N = 114,644)					Caucasian (n = 87,075)					African American (n = 8,013)					Hispanic (n = 12,027)					Asian American (n = 7529)				
	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing	M	SD	Min	Max	Missing
<i>Measure of Self-control</i>																									
Attitudinal	2.99	.62	1.00	4.00	4.9%	3.02	.61	1.00	4.00	3.3%	2.95	.67	1.00	4.00	16.5%	2.83	.64	1.00	4.00	7.7%	2.96	.57	1.00	4.00	6.8%
Behavioral	.18	.17	.00	1.00	7.1%	.17	.16	.00	1.00	4.9%	.18	.17	.00	1.00	22.4%	.21	.19	.00	1.00	11.0%	.15	.14	.00	1.00	10.0%
Academic	3.18	.93	.00	4.00	1.4%	3.27	.88	.00	4.00	1.1%	2.79	1.03	.00	4.00	3.5%	2.72	1.05	.00	4.00	2.2%	3.33	.87	.00	4.00	2.2%
<i>Family Social Capital</i>																									
Support	3.91	.68	1.00	4.67	4.3%	3.96	.64	1.00	4.67	2.8%	3.83	.74	1.00	4.67	14.4%	3.76	.75	1.00	4.67	7.0%	3.63	.75	1.00	4.67	6.4%
Autonomy	3.29	.51	1.00	4.00	4.9%	3.32	.50	1.00	4.00	3.3%	3.23	.54	1.00	4.00	16.8%	3.16	.53	1.00	4.00	7.7%	3.18	.49	1.38	4.00	7.0%
ParAtti	3.69	.67	1.00	4.00	8.6%	3.72	.61	1.00	4.00	6.2%	3.46	1.00	1.00	4.00	24.1%	3.56	.81	1.00	4.00	13.1%	3.68	.71	1.00	4.00	12.6%
<i>School Social Capital</i>																									
Climate	2.97	.58	1.00	4.00	1.2%	2.99	.58	1.00	4.00	0.9%	2.84	.65	1.00	4.00	3.8%	2.90	.59	1.00	4.00	1.7%	3.02	.52	1.00	4.00	1.8%
FriAtti	3.31	.89	1.00	4.00	8.9%	3.35	.86	1.00	4.00	6.5%	3.07	1.07	1.00	4.00	24.7%	3.08	.98	1.00	4.00	13.5%	3.39	.85	1.00	4.00	13.2%
OSE	2.96	.68	1.00	4.00	3.5%	3.01	.66	1.00	4.00	2.5%	2.83	.75	1.00	4.00	10.4%	2.78	.70	1.00	4.00	5.5%	2.82	.65	1.00	4.00	5.0%
<i>Control Variables</i>																									
Age (Years)	14.85	1.32	12.00	18.00	0.1%	14.88	1.32	12.00	18.00	0.1%	14.71	1.32	12.00	18.00	0.2%	14.71	1.31	12.00	18.00	0.2%	14.80	1.35	12.00	18.00	.2%
Male	.50	.50	.00	1.00	0.0%	.50	.50	.00	1.00	0.0%	.47	.51	.00	1.00	0.0%	.50	.50	.00	1.00	0.0%	.51	.51	.00	1.00	.0%
FRL	.27	.44	.00	1.00	1.1%	.16	.37	.00	1.00	0.9%	.72	.45	.00	1.00	1.5%	.59	.49	.00	1.00	1.7%	.50	.50	.00	1.00	1.5%
Two parents	.71	.45	.00	1.00	0.4%	.76	.43	.00	1.00	0.3%	.43	.49	.00	1.00	1.0%	.55	.50	.00	1.00	0.7%	.75	.43	.00	1.00	1.0%
Diversity	.25	.20	.00	1.00	0.0%	.19	.15	.00	1.00	0.0%	.46	.25	.01	1.00	0.0%	.36	.24	.00	1.00	0.0%	.47	.27	.02	.98	.0%

Note. Support = Family support; Autonomy = Autonomy support; ParAtti = Parent's attitude toward substance use; Climate = school climate; FriAtti = Friend's attitude toward substance use; OSE = Out-of-school experiences; FRL = Free/reduced-price lunch;

Table 15. Alignment results of factor mean comparisons for the four racial/ethnic groups in first-order latent variables

Group	Factor Mean	Groups with significantly smaller factor mean
<i>Self-Control</i>		
Attitudinal scale		
Caucasian	.00	African American, Hispanic, Asian American
African American	-.14	Hispanic
Hispanic	-.36	
Asian American	-.14	Hispanic
Delinquent behaviors		
Caucasian	.00	Hispanic
African American	-.11	Hispanic
Hispanic	-.32	
Asian American	.35	Caucasian, African American, Hispanic
<i>Academic performance</i>		
Caucasian	.00	African American, Hispanic
African American	-.54	
Hispanic	-.62	
Asian American	.07	African American, Hispanic
<i>Family Social Capital</i>		
<i>Family support</i>		
Caucasian	.00	African American, Hispanic, Asian American
African American	-.18	Hispanic, Asian American
Hispanic	-.33	Asian American
Asian American	-.48	
<i>Autonomy support</i>		
Caucasian	.00	African American, Hispanic, Asian American
African American	-.29	Hispanic
Hispanic	-.43	
Asian American	-.30	Hispanic

<i>Parent attitude</i>		
Caucasian	.00	African American, Hispanic
African American	-.47	
Hispanic	-.27	African American
Asian American	-.03	African American, Hispanic
<i>School Social Capital</i>		
<i>School climate</i>		
Caucasian	.00	African American, Hispanic
African American	-.28	
Hispanic	-.17	African American
Asian American	.03	African American, Hispanic
<i>Friend attitude</i>		
Caucasian	.00	African American, Hispanic
African American	-.37	
Hispanic	-.35	
Asian American	.01	African American, Hispanic
<i>Out-of-school experiences</i>		
Caucasian	.00	African American, Hispanic, Asian American
African American	-.26	
Hispanic	-.34	
Asian American	-.26	

Note. Significance at .003 level

Table 16. A summary of fit statistics for each group and a test for model

	χ^2	<i>df</i>	<i>p</i>	RMSEA [90%	CFI	Model Comparison	$\Delta\chi^2$	Δ CFI
<i>By groups</i>								
Caucasian	5373.26	1284	<.001	.024[.023, .024]	.932			
African American	1999.83	1284	<.001	.021[.019, .023]	.946			
Hispanic	2695.60	1284	<.001	.019[.018, .020]	.951			
Asian American	1580.69	1284	<.001	.023[.021, .025]	.917			
<i>Four-group model</i>								
Unconstrained	12559.41	5452	<.001	.022[.021, .023]	.930			
Constrained	13184.24	5475	<.001	.023[.022, .023]	.924	Unconstrained vs. Constrained	253,40***	.006

Note. *** $p < .001$; ** $p < .01$; * $p < .05$; Model 1 = Configural invariance; Model 2 = Model 1 + First- and second-order factor loadings

Table 17 Study 2 unstandardized estimates of direct, indirect, and total effect in the final (unconstrained) model

	Caucasian				African American				Hispanic				Asian American			
	B	SE	C.I. 95%	p	B	SE	C.I. 95%	p	B	SE	C.I. 95%	p	B	SE	C.I. 95%	p
<i>On Academic Performance</i>																
SC direct effect	.06	<.01	[.06, .06]	<.001	.06	.01	[.05, .08]	<.001	.06	.01	[.05, .07]	<.001	.04	.01	[.03, .05]	<.001
FSC total effect	.14	<.01	[.14, .15]	<.001	.15	.01	[.12, .18]	<.001	.15	.01	[.12, .17]	<.001	.10	.01	[.08, .12]	<.001
FSC indirect via SC	.08	.01	[.08, .09]	<.001	.09	.01	[.07, .10]	<.001	.09	.01	[.07, .09]	<.001	.05	.01	[.04, .07]	<.001
FSC direct effect	.06	<.01	[.06, .06]	<.001	.06	.01	[.05, .08]	<.001	.06	.01	[.05, .07]	<.001	.04	.01	[.03, .05]	<.001
SSC total effect	.14	<.01	[.14, .15]	<.001	.15	.01	[.12, .18]	<.001	.15	.01	[.12, .17]	<.001	.10	.01	[.08, .12]	<.001
SSC indirect via SC	.08	<.01	[.08, .09]	<.001	.09	.01	[.07, .10]	<.001	.09	.01	[.07, .09]	<.001	.05	.01	[.04, .07]	<.001
SSC direct effect	.06	<.01	[.06, .06]	<.001	.06	.01	[.05, .08]	<.001	.06	.01	[.05, .07]	<.001	.04	.01	[.03, .05]	<.001
Age	-.01	<.01	[-.02, -.00]	<.001	-.05	.02	[-.09, -.01]	.016	-.04	.02	[-.07, -.01]	.012	-.08	.02	[-.11, -.06]	<.001
Gender	-.31	.01	[-.34, -.29]	<.001	-.36	.05	[-.46, -.26]	<.001	-.40	.04	[-.48, -.32]	<.001	-.30	.04	[-.37, -.22]	<.001
Two parents	.24	.02	[.21, .28]	<.001	.25	.06	[.14, .35]	<.001	.25	.05	[.16, .34]	<.001	.28	.07	[.15, .41]	<.001
FRL	-.28	.02	[-.31, -.24]	<.001	-.28	.06	[-.39, -.16]	<.001	-.31	.04	[-.38, -.23]	<.001	-.23	.04	[-.32, -.14]	<.001
School diversity	.17	.04	[.10, .24]	<.001	.21	.12	[-.04, .43]	.079	.10	.09	[-.07, .29]	.262	-.05	.08	[-.22, .12]	.576
<i>On SC</i>																
FSC	1.37	.08	[1.23, 1.53]	<.001	1.36	.09	[1.20, 1.55]	<.001	1.43	.09	[1.27, 1.61]	<.001	1.23	.07	[1.09, 1.38]	<.001
SSC	1.37	.08	[1.23, 1.53]	<.001	1.36	.09	[1.20, 1.55]	<.001	1.43	.09	[1.27, 1.61]	<.001	1.23	.07	[1.09, 1.38]	<.001
Age	.02	.01	[-.00, .04]	.088	-.01	.02	[-.05, .03]	.690	.02	.02	[-.01, .05]	.249	-.01	.02	[-.04, .02]	.630
Gender	.09	.04	[.02, .16]	.013	.05	.16	[-.28, .37]	.765	.07	.12	[-.16, .30]	.548	.21	.11	[-.02, .44]	.061
Two parents	.05	.05	[-.04, .14]	.288	.35	.16	[.04, .69]	.033	-.09	.12	[-.33, .14]	.459	.12	.17	[-.22, .46]	.467
FRL	-.18	.06	[-.30, -.08]	.002	.15	.18	[-.20, .48]	.404	-.01	.12	[-.24, .21]	.903	.09	.13	[-.16, .33]	.476
School diversity	.37	.11	[.16, .59]	.001	1.13	.36	[.44, 1.84]	.002	.81	.25	[.34, 1.32]	.001	.44	.24	[.02, .92]	.063
<i>On FSC</i>																
Age	-.04	.01	[-.05, -.03]	<.001	-.02	.01	[-.04, -.01]	.004	-.05	.01	[-.06, -.04]	<.001	-.03	.01	[-.05, -.02]	<.001
Gender	.05	.02	[.02, .08]	.001	-.00	.07	[-.13, .14]	.976	.17	.05	[.08, .26]	<.001	.11	.06	[.00, .20]	.040
Two parents	.42	.02	[.37, .46]	<.001	.20	.07	[.05, .33]	.005	.29	.05	[.19, .40]	.001	.04	.07	[-.10, .19]	.588
FRL	-.32	.03	[-.38, -.28]	<.001	.03	.08	[-.13, .18]	.736	-.17	.05	[-.27, -.07]	<.001	-.15	.06	[-.28, -.03]	.019
School diversity	-.11	.05	[-.21, -.01]	.030	-.44	.19	[-.77, -.12]	.009	-.21	.11	[-.43, .00]	.055	-.35	.12	[-.57, -.11]	.003
<i>On SSC</i>																
Age	-.08	.01	[-.09, -.08]	<.001	-.07	.01	[-.09, -.05]	<.001	-.09	.01	[-.11, -.08]	<.001	-.07	.01	[-.08, -.05]	<.001
Gender	-.06	.02	[-.10, -.03]	<.001	.23	.08	[.06, .38]	.004	.20	.06	[.09, .31]	.001	-.14	.06	[.02, .26]	.024
Two parents	.42	.03	[.37, .46]	<.001	.01	.08	[-.15, .17]	.907	.33	.06	[.21, .45]	<.001	.13	.09	[-.04, .30]	.148
FRL	-.35	.03	[-.40, -.29]	<.001	-.09	.09	[-.28, .08]	.313	-.26	.06	[-.38, -.15]	<.001	-.14	.07	[-.28, -.00]	.053
School diversity	-.11	.06	[-.22, .01]	.079	.65	.20	[-1.01, -.27]	.001	-.50	.13	[-.75, -.26]	<.001	-.55	.13	[-.81, -.30]	<.001

Note. FSC = Family social capital; SC = Self-control; SSC = School social capital; FRL = Free/reduced-price lunch;

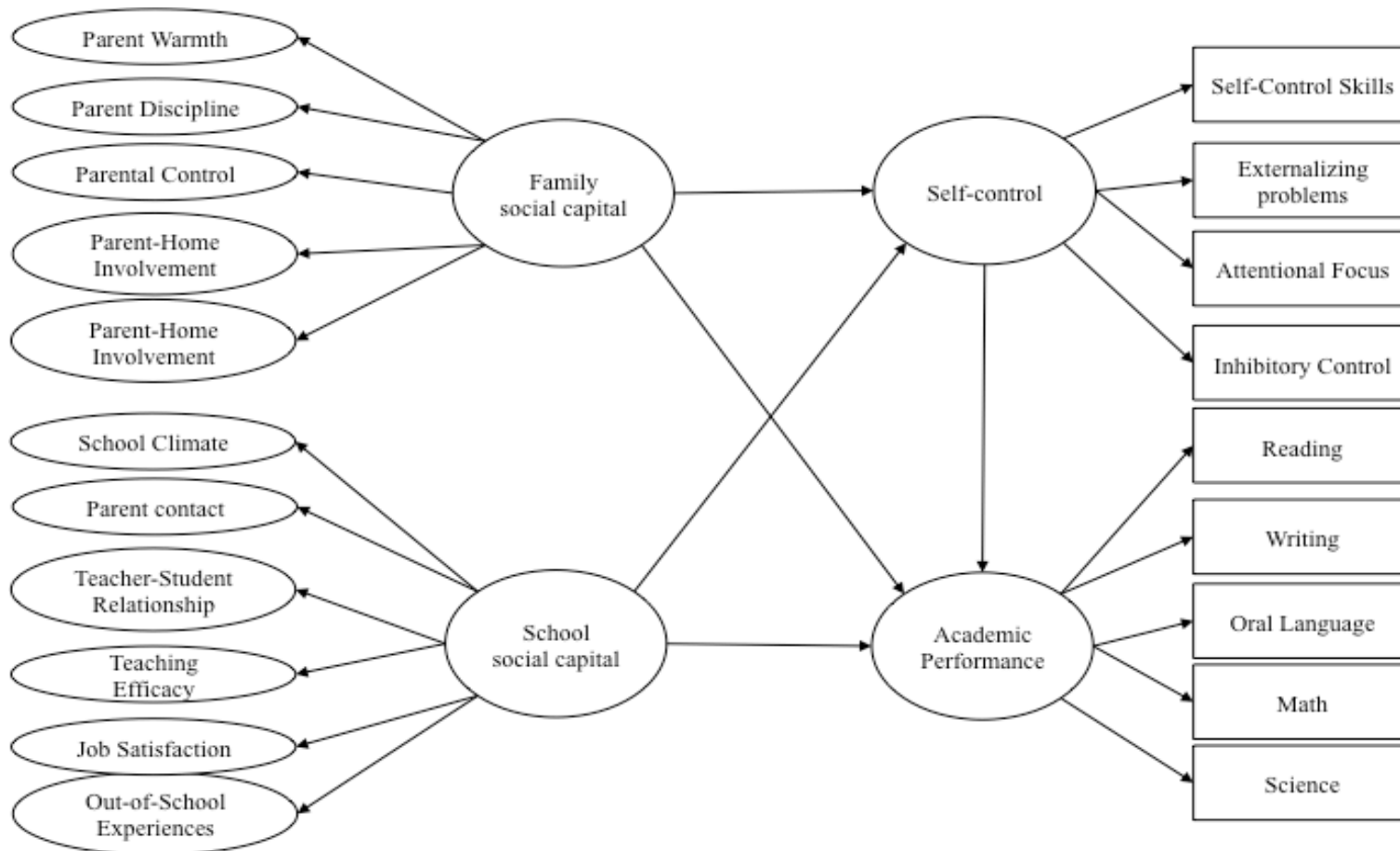


Figure 1. Proposed model for Study 1 using ECLS-K dataset. Control variables (i.e., children's gender, family SES, living with two parents, and school diversity) had direct paths to the constructs of family and school social capital, self-control, and academic performance.

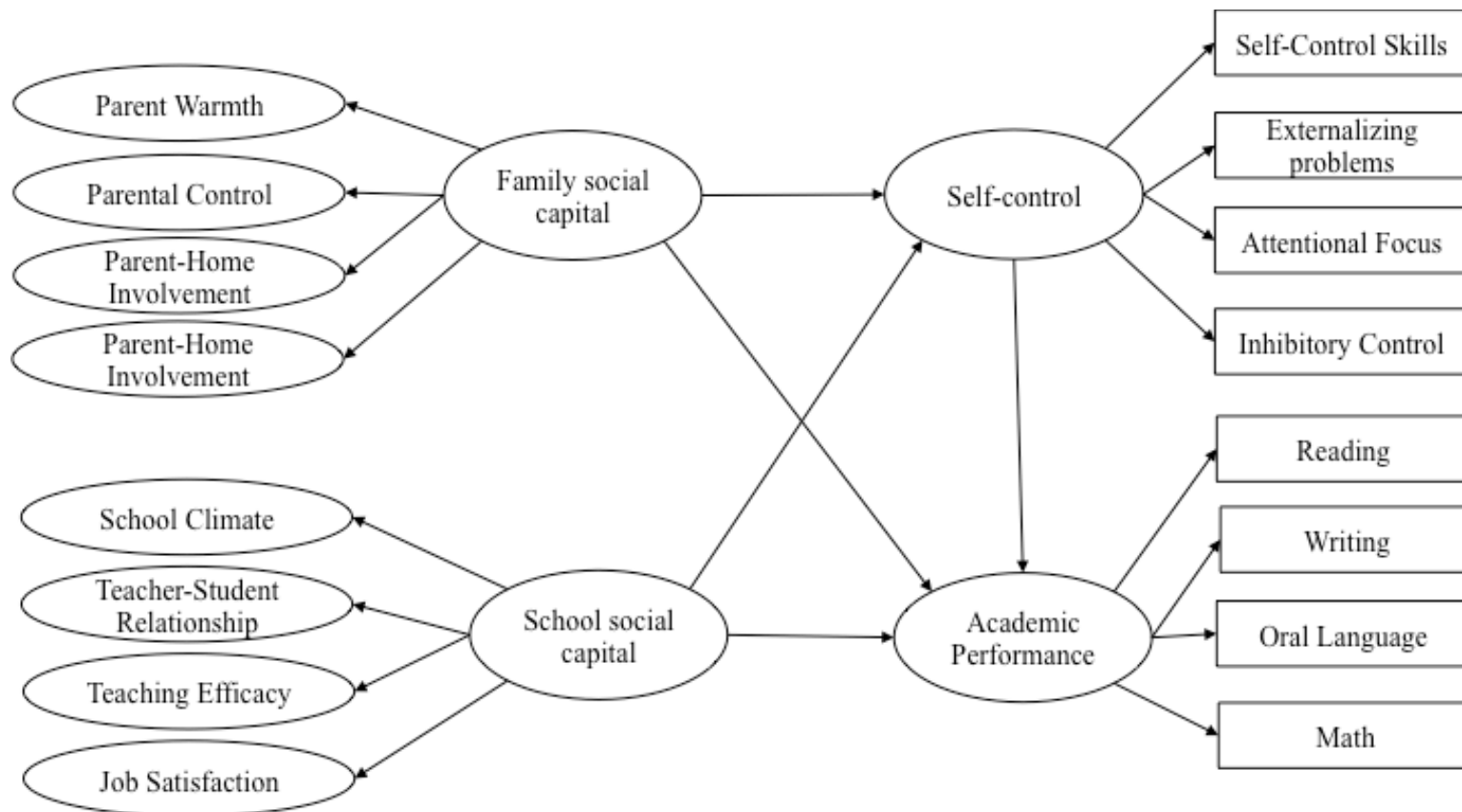


Figure 2. Analytic model for Study 1 using ECLS-K dataset. Control variables (i.e., children’s gender, family SES, living with two parents, and school diversity) had direct paths to the constructs of family and school social capital, self-control, and academic performance.

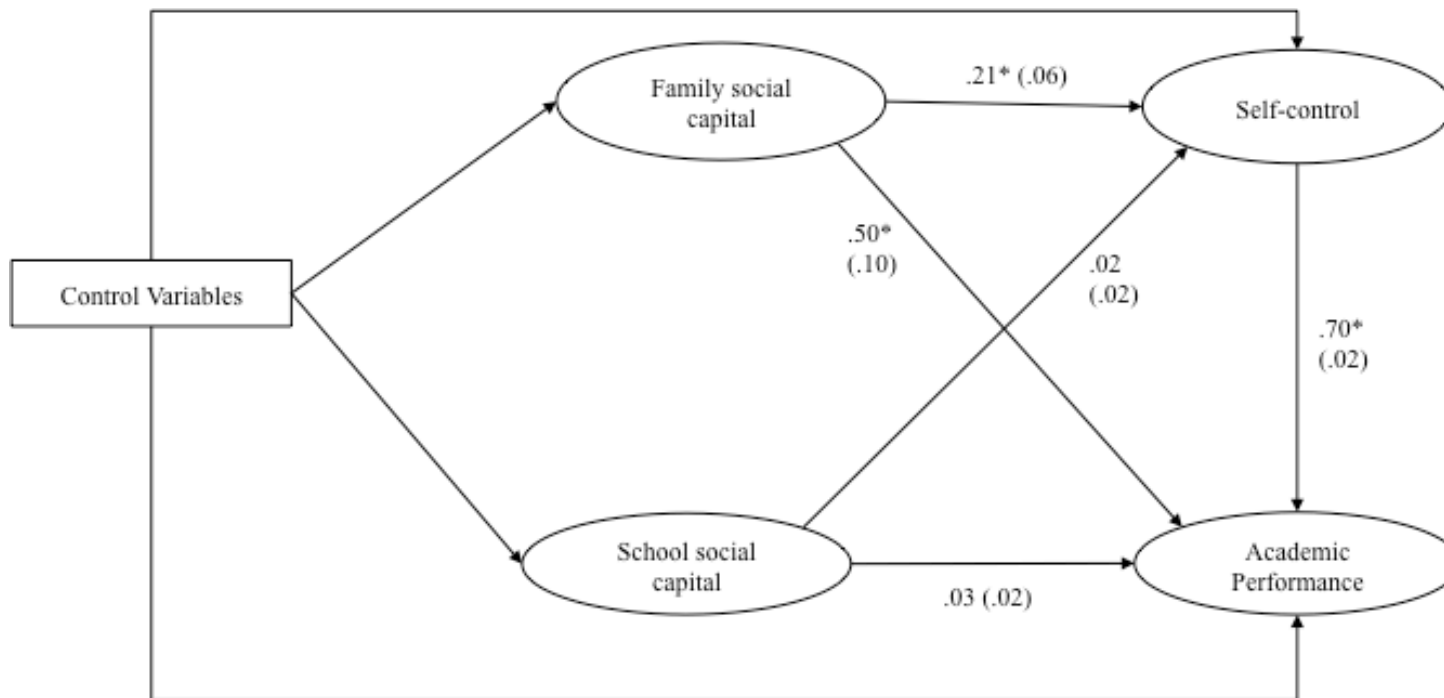


Figure 3. Unstandardized coefficients (standard errors) of the constrained structural model.

Note. Control variables (i.e., gender, living with two parents, family SES, and school diversity) had direct paths to the family social capital, school social capital, self-control, and academic performance. Their coefficients were omitted here; * $p < .05$

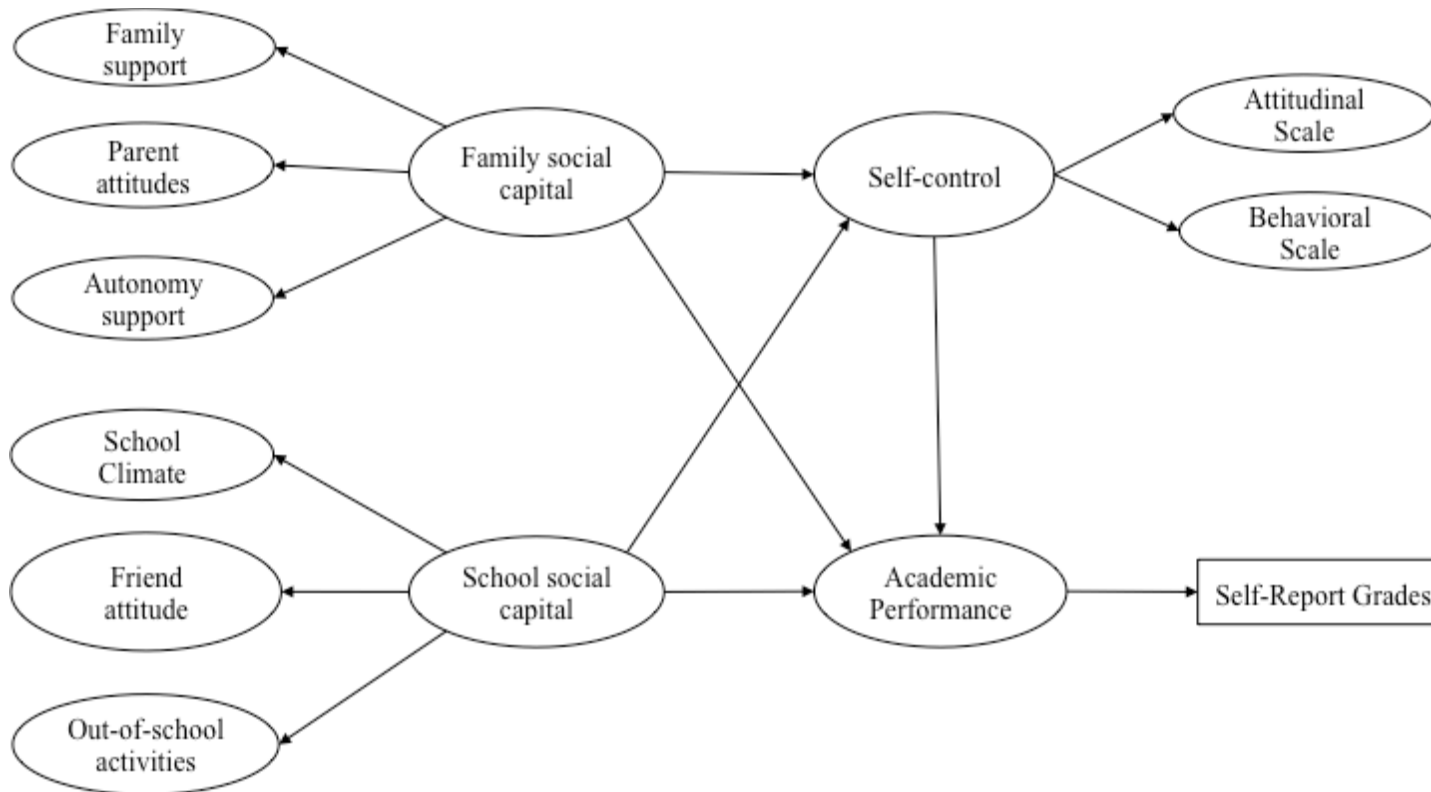


Figure 4. Analytic model for Study 2 using MSS dataset. Control variables (i.e., adolescent's age, gender, free/reduced-price lunch, living with two parents, and school racial/ethnic diversity) had direct paths to the constructs of family and school social capital, self-control, and academic performance.

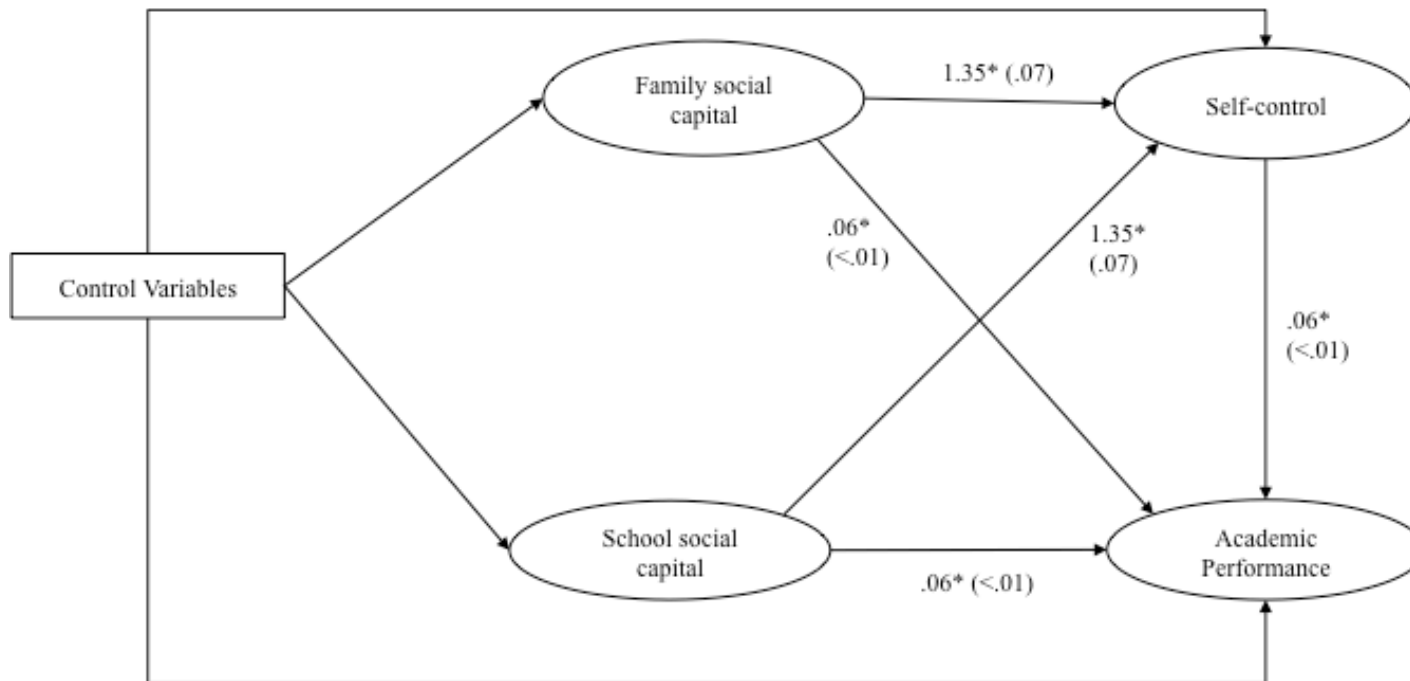


Figure 5. Unstandardized coefficients (standard errors) of the constrained structural model. Control variables (i.e., age, gender, living with two parents, family SES, and school diversity) had direct paths to the family and school social capital, self-control, and academic performance.

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