

SCHOOL SOCIALIZATION STYLE, STUDENT ENGAGEMENT,  
AND ACADEMIC PERFORMANCE

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## ABSTRACT

Jung-Sook Lee: School Socialization Style, Student Engagement,  
and Academic Performance  
(Under the direction of Natasha K. Bowen, Ph.D.)

Lack of student engagement has been a major concern for educators and practitioners working in schools because it has been a robust predictor of low achievement, behavioral problems, maladjustment, and school dropout. School, a key part of students' social environment, exerts great influence on student engagement and academic performance. This study examined the influence of school socialization style on three components of student engagement at school (i.e., behavioral, emotional, and cognitive) and reading performance.

This study utilized U.S. data from the Program for International Student Assessment (PISA) 2000 conducted by the Organisation for Economic Co-operation and Development (OECD). The sample comprised 2,849 15-year-old ninth and tenth graders from 141 schools. Based on their levels of demandingness (i.e., academic press and disciplinary climate) and responsiveness (i.e., teacher support and teacher-student relationship), schools were categorized into four school socialization styles: authoritative, authoritarian, permissive, and indifferent. Two-level multilevel analyses were used to test three hypotheses: (1) authoritative school socialization style is significantly associated with enhanced student engagement and academic performance; (2) the effects of school socialization style on student engagement and academic performance vary by student and school characteristics;

(3) student engagement mediates the effect of school socialization style on academic performance.

An authoritative school socialization style was positively associated with behavioral and emotional engagement but not with cognitive engagement or reading performance. Seven significant interactions involving school socialization styles were found: interactions with race were found for behavioral and cognitive engagement; interactions with grade were found for emotional and cognitive engagement; and an interaction with school-mean SES was found for reading performance. The effect of school socialization style was mediated through behavioral engagement.

By examining three components of student engagement and academic performance, this study provided a better understanding of the complex realities experienced by students and schools. Despite some limitations, this study provides useful implications for future research, practice, and policy in enhancing student engagement and academic performance. Furthermore, results of this study may lay the foundation for future international comparisons of school socialization style.

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## INTRODUCTION

A large proportion of students are disengaged from school, and children living in poverty and minority children are more likely to be disengaged. Disengaged students are more likely to struggle academically, drop out of school, and engage in problem behaviors (Fredricks, Blumenfeld, & Paris, 2004). Researchers and educators have emphasized the significant influence of school environment on student engagement and academic performance (e.g., V. E. Lee & Smith, 1993). This study uses the framework of school socialization style to examine the relationships among school environment, student engagement, and academic performance.

Research indicates that 25 to 60 percent of U.S. students are disengaged from school (Klem & Connell, 2004; Willms, 2003). This phenomenon is not unique to the U.S. In a study using data from the Program for International Student Assessment (PISA) conducted by the Organisation for Economic Co-operation and Development (OECD), Willms found that on average, 25% of students in the 43 countries studied reported a low sense of belonging and an average of 20% of students reported low participation. Although there is some discrepancy in numbers due to differences in sampling and measurement, these studies show that overall, more than one in five students is disengaged from school.

Student engagement is a multifaceted concept that includes behavioral, emotional, and cognitive components (Fredricks et al., 2004). *Behavioral engagement* refers to students' participation in academic and non-academic activities at school. *Emotional engagement* refers to students' sense of belonging at school and identification with school. *Cognitive*

*engagement* includes mental involvement with learning through the exercise of thinking. Research has shown that each component of engagement is significantly related to student outcomes; however, previous studies have for the most part examined only one or two components of student engagement (e.g., Alexander, Entwisle, & Horsey, 1997; Woolley & Bowen, 2007). Therefore, studies that examine all three components of student engagement are needed.

Student engagement is more malleable than other status indicators or student traits that have been shown to be related to student outcomes (Finn, 1993; Fredricks et al., 2004) because it is responsive to change in the social environment. Although individual intelligence and family background are significant predictors of student achievement and other student outcomes, they are less receptive to change in the environment than student engagement. Given the strong relationship between student engagement and other student outcomes and the relative ease with which student engagement can be enhanced through environmental change, it would follow that the research community needs to pay more attention to student engagement and ways to increase it.

Student engagement is a robust predictor of student success at school. Studies have reported a positive association between student engagement and academic achievement regardless of race, gender, and socio-economic status (SES) (e.g., Klem & Connell, 2004). Highly engaged students are also less likely to drop out of school (Finn & Rock, 1997). From a developmental perspective, academic failure and dropping out are not isolated events but instead are results of a long-term process of disengagement from school (Alexander et al., 1997; Randolph, Fraser, & Orthner, 2004). Enhancing student engagement may help prevent these poor student outcomes.

For this reason, it is critical to identify the types of social environment that promote student engagement. Schools, a key part of students' social environment, can provide conditions to facilitate student engagement. Although student engagement has been a significant concern for educators and researchers, there is a relative paucity of theories about student engagement. The framework of school socialization style (Pellerin, 2005) is presented here in an attempt to establish a theoretical framework to explain the role of schools in enhancing student engagement. The framework of school socialization style is a relatively new approach; however, given the strong evidence from studies of parenting style (on which much school socialization style theory is based), this framework shows great promise in explaining the influence of other socialization agents on student engagement and academic performance.

## STUDENT ENGAGEMENT AND SCHOOL

Student engagement is a “meta-construct” that incorporates many separate lines of educational research into one conceptual model (Appleton, Christenson, Kim, & Reschly, 2006). Researchers have conducted studies about participation, truancy, learning behavior, and sense of belonging, but for the most part their focus has been confined to only one of these variables at a time. But student engagement at school is a combination of all these variables and more. To some degree, the concept of student engagement overlaps with other constructs (Fredricks et al., 2004). Nonetheless, student engagement is “a construct worthy of study in its own right” (Appleton et al., 2006, p. 428) because studies using the meta-construct of student engagement can provide a broader picture of a student’s life at school than studies using only single components.

The term *student engagement* has been used in two different ways in the literature: (1) student engagement with learning in the classroom, and (2) student engagement with school in general. Studies of student engagement with learning often focus on narrower aspects of behavioral and cognitive engagement such as on-task behavior and use of learning strategies, while studies of student engagement with school often focus on broader aspects of behavioral and emotional engagement, such as participation at school and having a sense of belonging at school. In this study, the term *student engagement at school* includes both student engagement with learning and student engagement with school.

### *Definition of Student Engagement*

Student engagement includes three interdependent components—behavioral, emotional, and cognitive engagement (Fredricks et al., 2004)—and students need to be engaged in all three areas in order to be fully engaged. Although student engagement is somewhat difficult to measure, research has indicated that the construct itself is useful and significant (e.g., Finn & Rock, 1997; Marks, 2000; Willms, 2003).

#### *Behavioral engagement*

The term *behavioral engagement* usually encompasses a broad range of behaviors at school, from merely showing up to actively participating in academic or non-academic activities. Fredricks et al. (2004) have identified three forms of behavioral engagement: positive conduct, involvement in learning, and participation in school-related activities. Positive conduct includes attending class, avoiding disruptive behaviors, responding to directions, and following classroom rules. Involvement in learning includes concentrating, making an effort, being persistent, contributing to class discussion, asking questions, finishing homework, and spending extra time on class-related learning. Participation in school-related activities includes taking part in extracurricular activities such as sports teams or student organizations.

While all the above activities can be categorized as behavioral engagement, they differ greatly in degree. For example, merely sitting in a classroom is not the same as actively asking questions in the classroom; these activities require different amounts of individual effort and thus represent varying degrees of engagement. Additionally, schools differ in the number and type of opportunities provided for extracurricular activity. These variations cause

some difficulties in constructing a measure of behavioral engagement that evaluates an individual's participation in such activities.

### *Emotional engagement*

*Emotional engagement*, also called affective engagement or psychological engagement, includes affective reactions and having a sense of belonging at school (Finn, 1993; Willms, 2003). Affective reactions toward tasks, school, and people at school (e.g., teachers or peers) may include liking, disliking, being interested, being bored, being happy, being sad, or being anxious. These emotional reactions can be task- or person-specific but may also be more general—for example, a student may be simply happy to be at school. Positive emotional reactions to tasks or people can lead to students having a sense of belonging at school. Having a sense of belonging refers to feeling accepted, included, respected, and/or valued by people at school (Goodenow & Grady, 1993; Willms, 2003). Studies have also referred to this sense of belonging as identification with school (Finn, 1993), school connectedness (Shochet, Dadds, Ham, & Montague, 2006), and attachment to school (Johnson, Crosnoe, & Elder, 2001).

As Fredricks and her colleagues (2004) have noted, measures of emotional engagement often do not specify the source of the feeling or emotion. A student may be happy to be at school because s/he likes to learn or to take part in extracurricular activities, or because s/he likes peers or teachers at school. Even when the source or cause of engagement is unknown, however, the construct of emotional engagement is useful in capturing how students generally feel about their school.



### *Cognitive engagement*

*Cognitive engagement* is an “exercise of thinking” (Lao & Kuhn, 2002) which is evidenced by the amount of mental involvement and types of cognitive strategies that students use in learning (Ravindran, Greene, & DeBacker, 2005). Cognitive engagement involves seeking, interpreting, analyzing, summarizing, critiquing, reasoning, and making decisions (Zhu, 2006). Due to the difficulties inherent in operationalizing and measuring the amount and depth of mental involvement, cognitive deep processing strategies and cognitive self-regulation often have been used to indicate cognitive engagement (e.g., R. B. Miller, Greene, Montalvo, Ravindran, & Nichols, 1996). Higher levels of cognitive engagement require higher-order thinking that can be found in deep processing strategies and self-regulated learning. Deep processing involves connecting new information with existing knowledge, creating meaning, and creating knowledge structure, while shallow processing involves only rote memorization ( Craik & Lockhart, 1972). Self-regulated learning involves the use of meta-cognitive functions such as goal-setting, planning, self-monitoring, and self-evaluation during the process of learning (Zimmerman, 1990).

Cognitive engagement has not been clearly defined in the literature. In fact, most of the information cited by researchers on the subject has come from studies of cognitive processing or self-regulated learning, which do not use the term cognitive engagement per se. This ambiguity may be due to the difficulty of measuring cognitive activities. In an attempt to clarify the definition of cognitive engagement, Fredricks and her colleagues (2004) have described it as psychological investment. However, psychological investment, too, is a rather vague definition because such investment involves both emotion and cognition. Clearly, a better definition of cognitive engagement is needed. Focusing on activities that are

exclusively cognitive in nature may be a better way to precisely and decisively define this phenomenon.

Although the definitions of student engagement found in the literature have at times been unclear, the multidimensional construct of student engagement effectively captures how students feel, think, and behave at school. Students are fully engaged when they are engaged behaviorally, emotionally, and cognitively, because these three components of engagement are interdependent and therefore influence each other. Students are more likely to show behavioral and cognitive engagement, for example, when they like the tasks and people at school, feel close to people at school, and feel they belong at school. Students also develop emotional engagement through meaningful behavioral and cognitive engagement.

#### *Student Engagement and Academic Performance*

Studies generally have reported a positive relationship between student engagement and academic performance (e.g., Furrer & Skinner, 2003; Wentzel, 1998; Willms, 2003) although the reported magnitude of the relationship varies depending on the components of engagement examined. For example, the PISA study cited earlier showed that at the school level, behavioral engagement, defined as attendance and punctuality, has a moderate correlation (.48 - .51) with students' literacy skills (Willms, 2003). The positive effect of behavioral engagement on academic performance is more evident among academically resilient students (Borman & Overman, 2004; Finn & Rock, 1997). For example, in a study of 925 low-SES minority students, Borman and Overman found that greater engagement in academic activities was a characteristic shared by all students who were deemed to be academically resilient, defined by having higher-than-predicted math scores (predictions were based on previous math scores and individual SES). Studies that separately examined

attendance (Lamdin, 1996) and extracurricular activities (Jordan, 1999) also found a positive relationship between behavioral engagement and academic performance.

Evidence regarding the effect of emotional engagement on academic performance is mixed. Studies using measures of emotional engagement combined with behavioral engagement (Borman & Overman, 2004; Connell, Spencer, & Aber, 1994; Sirin & Rogers-Sirin, 2004) have generally found a positive relationship between engagement and academic performance. However, emotional engagement focusing on a sense of belonging or identification with school was not a strong predictor of academic performance in the PISA study (Willms, 2003) or in Finn's study (1993). On the other hand, a study of 214 Mexican American high school students (Gonzalez & Padilla, 1997) found that the level of sense of belonging at school was significantly associated with students' grade point average (GPA).

Studies of school instruction have shown a significant association between cognitive engagement and academic performance. Strategic learning, which is also known as self-regulated learning, is widely considered to represent a high level of cognitive engagement. Several studies (e.g., Zimmerman, 1990) have found that students who use higher-level meta-cognitive strategies perform better on various measures of academic performance than do those who do not use such strategies.

Student engagement, in general, is positively related to academic performance. However, research findings regarding the relationship of students' emotional engagement with academic performance are mixed, in part because researchers have used different measures of emotional engagement. Overall, it seems apparent that more studies are needed to understand the relationship between student engagement and academic performance, and these studies need to incorporate separate measures of each of the three components of

student engagement (i.e., behavioral, emotional, and cognitive) so as to clearly identify the relationships between each component of student engagement and academic performance.

### *Factors Relevant to Student Engagement*

Student engagement at school is influenced by various individual and social factors. Individual factors (e.g., age, grade, gender, race, educational aspirations, self-efficacy, previous academic performance), family factors (e.g., SES, parental attitudes toward school, parental involvement), peer factors (e.g., friends' behaviors and attitudes toward school, victimization at school), and school factors (e.g., school size, school climate, student composition) may all influence student engagement as well as academic performance.

In studies of student engagement at school and academic performance, it is important to consider individual demographics such as gender, grade level, and race/ethnicity because they are associated with the level of student engagement at school as well as academic performance. According to the literature, levels of behavioral, emotional and cognitive engagement differ significantly by gender. For example, Finn (1989 cited in Marks, 2000) found that girls were consistently more engaged than boys at all grade levels. Grade level is also related to student engagement and academic performance. According to Klem and Connell (2004), students become less engaged with school as they progress from elementary to middle school and from middle to high school. Grade level can also be an indicator of opportunity-to-learn (Cooley & Leinhart, 1975 cited in Williams, Williams, Kastberg, & Jocelyn, 2005) because students are exposed to different levels of subject matter according to grade level. For example, tenth graders are exposed to and expected to master different levels of mathematics than ninth graders. Thus, studies of student engagement and academic performance need to control for grade level.

Researchers also should be aware of the importance of race/ethnicity in student outcomes, as there exists a consistent and significant achievement gap among racial/ethnic groups. Minority students' emotional disengagement has been offered as one explanation for this phenomenon. Steele (1997), for example, argues that African American students disidentify with school due to frustration caused by "stereotype threat"—the fear that their actions will confirm the existing negative stereotype about African Americans. The effect of minority status on student engagement may differ, however, depending on the grade level of the students in question. For example, minority students in elementary school were less engaged than their European American counterparts (Finn & Cox, 1992 cited in Marks, 2000) while, in contrast, minority high school students were *more* likely to be engaged than their European American counterparts (Lee & Smith, 1993 cited in Marks).

Further, it is well-known that family characteristics and home environments are critical in relation to student academic performance and school success (Henderson & Berla, 1994; Henderson & Mapp, 2002; Randolph, Fraser, & Orthner, 2006). For example, it has been widely reported that family SES is significantly related to student outcomes. Henderson and Berla take issue with this blanket statement and argue that it is the educational involvement of the family—not their level of SES—that is the most important predictor of a student's academic achievement. Nonetheless, access to or preference for certain types of parental involvement seem to be related to the SES of the family (J. Lee & Bowen, 2006).

For non-native speakers, the language spoken at home can be related to student engagement and reading performance because it may reflect acculturation and the English proficiency of their parents as well as themselves. Fuligni (1997) found that adolescents who spoke a language other than English at home tended to score lower in English. McLaughlin,

Liljestrom, Lim, and Meyers (2002) also found that parents' limited English proficiency can influence their children's academic success.

While individual and family characteristics are important factors in student engagement and educational outcomes, this study focuses on another central factor—the school. Student engagement is a result of dynamic interplay between individual students and the social and educational context of their schools (Kenny, Blustein, Chaves, Grossman, & Gallagher, 2003) and as such is responsive to changes in school environment. And compared to individual and family characteristics, school environment is much more malleable in response to change efforts.

### *School as a Context of Student Engagement*

School exerts great influence on student engagement because school is the setting in which student engagement occurs. Schools are not neutral settings but instead active settings that promote or constrain individual students' opportunities for school success (Baker et al., 2001). Schools differ in the motivation levels and abilities of their administrators, teachers, and staff to provide students opportunities to develop interpersonal relationships, be exposed to challenging courses, receive remedial support, or participate in extracurricular activities. It is difficult for students to be successful at school when opportunities for success are not provided. Clearly, the school itself is an important factor related to student engagement.

Empirical evidence demonstrates that the school environment has a strong effect on student engagement (Finn & Voelkl, 1993; Marks, 2000; Pellerin, 2005; Willms, 2003). Levels of student engagement have been found to vary from school to school even after controlling for students' individual characteristics. These differences have been attributed to

a variety of school-related factors such as school size, teacher-student relationships, academic and disciplinary climate, student composition, and instructional activities.

*School process*—that is, practices at classroom or school level—has been perceived as a good target of change at schools to enhance student engagement. Research on effective schools has identified four components of school effectiveness: school input (e.g., material and human resources), school context (e.g., school-mean SES or racial composition), school process (e.g., classroom- or school-level practices), and school outcome (e.g., student performance) (Scheerens 1997 as cited in Luyten, Visscher, & Witziers, 2005). Although school effectiveness research has mostly focused on academic performance, this model can be expanded to improve understanding of relationships among factors at school. Among the components of school effectiveness, school process has received attention from the research community and practitioners because it can be altered relatively easily at the school level.

*School climate* has often been used as a proxy for school process because school process creates indicators of school climate, such as teacher-student relationships, academic press (i.e., commitment to high standards of student academic performance), and disciplinary climate (i.e., orderliness of the school). Studies have reported that academic press, positive disciplinary climate, and supportive teacher-student relationships each significantly predict student engagement and academic performance (e.g. Finn, 1993). Academic press has been positively associated with students' sense of belonging, attendance and academic performance (Ma, 2003; Phillips, 1997). Disciplinary climate has been shown to be predictive of students' sense of belonging to school and school dropout (Finn & Voelkl, 1993; Ma, 2003; McNeely, Nonnemaker, & Blum, 2002; Willms, 2003). Supportive teacher-student relationships have been positively associated with student engagement, especially

emotional engagement (Furrer & Skinner, 2003; Gill, Ashton, & Algina, 2004) and negatively associated with school dropout (S. Miller, 2000).

Since the 1970s, researchers have investigated whether schools can make a difference in the outcomes of children (Luyten et al., 2005). However, there has been a controversy over which type of school process is best, both for schools and for students (Gill et al., 2004). In the 1980s, researchers advocated academic press, as they believed that valuing academic success and holding high academic expectations for students was the best way to promote student achievement. In the 1990s, however, this view was challenged by researchers who advocated a communal perspective which emphasizes shared values, supportive student-teacher relationships, and a caring atmosphere at school. Further complicating matters, other school researchers assert that a positive disciplinary climate at school, characterized by orderliness, fairness, and flexibility, is also associated with increased levels of student engagement (Finn & Voelkl, 1993; Willms, 2003).

In the meantime, several studies have examined multiple school factors simultaneously and have indicated the possibility that there exist optimal combinations of school process factors (Gill et al., 2004; Pellerin, 2005; Shouse, 1996). For example, Shouse, in a study of mathematics achievement of 398 high-school students, found that high levels of communality (i.e., sense of community) in schools had a positive effect on academic performance in low-SES schools only when accompanied by high academic press and disciplinary climate. Based on these findings, scholars recently suggested that examining meaningful combinations of school factors may be more important than studying a single factor and may, in fact, better reflect complex realities experienced by schools (Luyten et al., 2005). In an effort to identify the optimal combination of school factors, a few researchers



(e.g., Gill et al; Pellerin) have suggested using the concept of school socialization style, which is an application of the more familiar parenting-style framework to schools.

## THE THEORETICAL FRAMEWORK OF SCHOOL SOCIALIZATION STYLE

School socialization style is a framework that bridges two different areas of research: parenting styles and school process. The typology of socialization style was originally developed to categorize and illustrate parenting styles. Since then, it has been applied to different socialization agents such as teachers (teaching style) or schools (school socialization style).

### *Typology of Parenting Style*

The best-known theoretical framework in the field of parenting studies is Baumrind's (1967) typology of parenting style. Baumrind gauged levels of parental control to identify three categories of parenting style: authoritative, authoritarian, and permissive. Maccoby and Martin (1983) enhanced the generalizability of Baumrind's typology by creating a two-dimensional framework based on levels of demandingness and responsiveness (Darling & Steinberg, 1993) of the socialization agent—that is, the parent, or in our research, the school. Demandingness is the socialization agent's willingness to socialize children to integrate them into society, and responsiveness is the socialization agent's recognition of children's individuality. This expanded framework included the three categories of parenting style identified by Baumrind plus a fourth category: indifferent (also known as neglectful). Socialization style is “a constellation of attitudes toward the child” (Darling & Steinberg) that creates the climate in which socialization agents' behaviors are expressed. Figure 1 shows Maccoby and Martin's two-dimensional framework of socialization style.

		<u>Responsiveness</u>	
		High	Low
<u>Demandingness</u>	High	Authoritative	Authoritarian
	Low	Permissive	Indifferent

Figure 1. Socialization style by level of responsiveness and demandingness

The biggest strength of the typology of parenting style is that it embraces both demandingness and responsiveness. Demandingness has been operationalized as having high standards for behavior and maturity, firm rule enforcement, and academic press, while responsiveness has been operationalized as including warmth, open communication, respect for the child’s developmental needs, trust toward the child, and encouragement of psychological autonomy (Aunola, Stattin, & Nurmi, 2000; Pellerin, 2005). Some have perceived demandingness and responsiveness as somewhat conflicting qualities; the debate between advocates of academic press and advocates of communal models represents this ideological conflict. Other theorists have emphasized one of the two qualities while assuming the existence of the other. For example, social control theory (Hirschi, 1969), also known as social bonding theory, highlights the connection between individuals and social institutions through commitment, involvement, and beliefs. These elements represent responsiveness. At the same time, social control theory assumes that these social institutions require individuals’ maturity and responsibility, which represent demandingness. The parenting-style framework, however, explicitly models the two-dimensional approach and suggests the existence of an optimal combination of the two.

Among these four parenting styles, authoritative parenting, characterized by high demandingness and high responsiveness, has been reported to be the most effective (e.g.,

Aunola et al., 2000; Darling & Steinberg, 1993). Authoritative parents show high levels of interest and involvement in their children's lives, behavioral control, and monitoring, while also providing emotional support, open communication, trust toward the child, parental acceptance, and encouragement of psychological autonomy. Authoritative parents help children and adolescents develop an instrumental competence and balance individual needs and responsibilities. As a result, children with authoritative parents have higher educational aspirations, more adaptive achievement strategies, higher levels of performance, better school adjustment, higher levels of school engagement, and more positive attitudes toward school.

Compared to authoritative parenting, the other parenting styles have been reported to be less effective (Aunola et al., 2000; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Slicker, 1998; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). Authoritarian parenting, which features high demandingness but low responsiveness, is more adult-centered. Authoritarian parents display low trust toward their children, express little encouragement, and discourage open communication. Children of authoritarian parents generally have high performance levels and few behavioral problems, but they have low levels of social competence and self-esteem. Permissive parenting is characterized by low demandingness but high responsiveness. Permissive parents are warm, accepting, child-centered, and autonomy-granting, but they do not require mature behaviors from their children and often do not exert control over their children. The uncontrolled environment provided by permissive parents may not foster their children's self-regulation. Thus, while children of permissive parents have relatively high levels of social competence and self-esteem, they show relatively low levels of achievement and school engagement. Indifferent

parenting is characterized by low demandingness and low responsiveness. Indifferent parents do not support or encourage their child's self-regulation and fail to monitor or supervise their child's behavior. Perhaps as a result of this lack of attention, children with indifferent parents generally fare the worst on most student outcomes.

### *School Socialization Style*

Although socialization style was originally developed to explain interpersonal phenomena between children and parents, the two-dimensional approach (demandingness and responsiveness) of socialization style also can be applied to teachers and schools, which, like parents, are active agents of socialization. This study included teaching style as a component of the more general school socialization style because some measures of teaching style and school socialization style overlap. For example, teacher support and teacher-student relationship can be measures of teaching style if students are asked to reflect upon the practices of individual teachers, but they also can be measures of school socialization style if students are asked to consider the general practices of all teachers at the school. Teaching style and school socialization style may exert shared influence on students, particularly in middle and high schools where students interact with multiple teachers and school staff beyond the classroom. For these reasons, this study did not differentiate between teaching style and school socialization style.

Studies of school socialization style, like those of parenting style, use the categorical descriptors authoritative, authoritarian, permissive, and indifferent based on levels of demandingness and responsiveness, to describe schools. School demandingness includes academic press, high expectations from school, and an orderly disciplinary climate, while

school responsiveness includes supportive teacher-student relationships, a supportive school climate, and shared values.

Like most studies of parenting style, studies of teaching and school process suggest that the authoritative socialization style is the most effective for schools. In research by Pellerin (2005), students in authoritative schools showed the lowest levels of behavioral disengagement, defined as absenteeism, tardiness, and turning in unfinished homework, while students in indifferent schools presented the highest disengagement levels. The appropriate combination of responsiveness and demandingness seems to be more critical for disadvantaged students than for others. In the study by Shouse (1996) cited above, high levels of communality in schools (which represents responsiveness) had a positive effect on achievement in low-SES schools only when this high communality was accompanied by high academic press and disciplinary climate (which represent demandingness).

Although school socialization style is an excellent tool in illustrating the complex realities of schools, it is more like a conceptual framework than a theory because it does not explain how these various socialization styles influence children's and adolescents' attitudes and behaviors. The self-system processes model (Connell, 1990) and self-determination theory (SDT) (R. M. Ryan & Deci, 2000) may help explain the underlying mechanisms. Figure 2 shows the proposed model of school socialization style combined with the self-system processes model and self-determination theory.

Connell's self-system processes model (1990) explains the mechanism by which social context influences students' engagement at school and achievement. Self-system processes are appraisals of self in relation to activities in the social surroundings. Self-system processes are the result of a dialectic relationship between the individual's psychological

needs (i.e., competence, relatedness, and autonomy) and social context. Several self-system processes were identified: ones associated with competence are perceived strategies and capacities; one related to autonomy is self-regulation processes; and ones linked to relatedness are the experience of oneself as worthy and the perceived security of one's relationships with significant others. The appraisal of self varies by the levels at which these needs are being fulfilled in the social surroundings.

*Social contexts* that provide individuals with structure, autonomy support, and involvement promote the development of *self-system processes* of the individual because they satisfy individuals' three psychological needs. As a result, individuals show a desired *action*, which in turn produces a desired *outcome*. When applied to the school setting, the social context of a school that satisfies an individual's psychological needs encourages the desired action of student engagement, which in turn produces the desired outcome of improved academic performance and student achievement. In this process, student engagement is pivotal because it is the link through which social context and student self-system influence achievement (Tucker et al., 2002).

R.M. Ryan and Deci's (2000) self-determination theory (SDT) addresses another piece of the puzzle of school socialization style—motivation, which is having the need or desire to do something. There is an important distinction between motivation and engagement. If “to be motivated” is “to be moved to do something” (R. M. Ryan & Deci, 2000, p54), then “to be engaged” is “to do something” in a broader sense. This “doing” includes behavioral, emotional, and cognitive action stages. Even when someone is motivated to do something, he or she may not actually do it because engagement requires more than simply being motivated. However, individuals may be unable to become fully

engaged (i.e., behaviorally, emotionally, and cognitively) without motivation. As such, motivation can be considered a prerequisite for student engagement at school. Thus, SDT—a theory of motivation—is quite useful for understanding the relationship between school socialization style and student engagement.

According to the tenets of SDT, social contexts that support individuals' psychological needs (i.e., competence, relatedness, and autonomy) promote motivated actions by facilitating the internalization of extrinsic motivation (R. M. Ryan & Deci, 2000). SDT identifies four types of extrinsic motivation based on the level of internalization: external regulation, introjected regulation, identified regulation, and integrated regulation. Support for the psychological needs of human beings (i.e., competence, relatedness, and autonomy) is critical in internalizing extrinsic motivation as well as maintaining intrinsic motivation (Deci, Vallerand, Pelletier, & Ryan, 1991). When individuals understand goals and have the skills needed to successfully complete them—that is, when they have a sense of competence—they are more likely to adopt and internalize the goals. The primary reason that people are willing to do uninteresting activities is that these activities are valued by significant others with whom they feel connected or have a sense of relatedness. However, competence and relatedness are believed to facilitate intrinsic motivation and integrated regulation only when they are provided in autonomy-supportive ways (Deci et al., 1991).



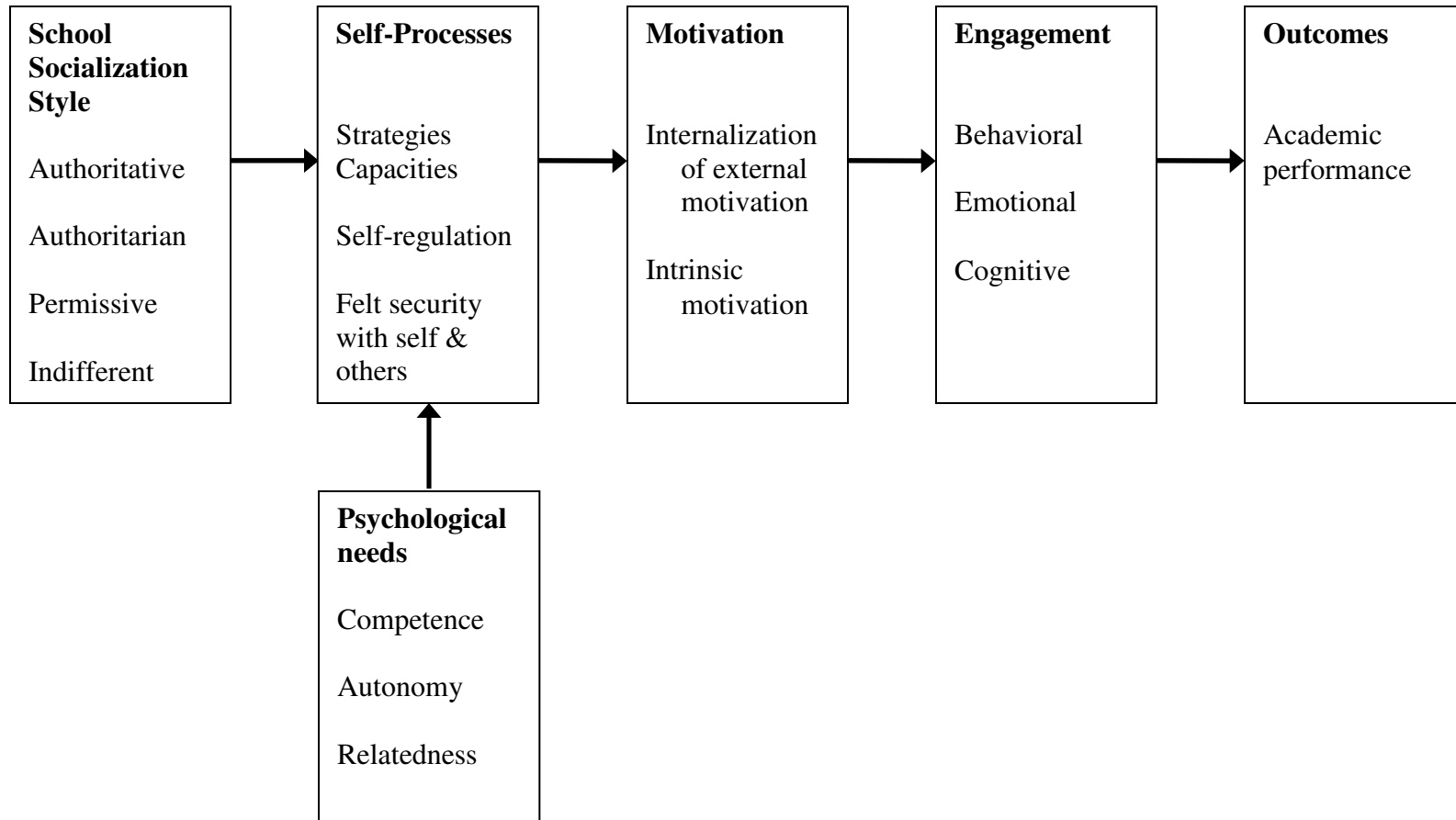


Figure 2. A model of school socialization style combined with the self-system processes model and self-determination theory.

Schools with different socialization styles may provide different levels of support for psychological needs. Thus, schools may promote the development of self-system processes or internalization of extrinsic motivation differently. Two main dimensions of school socialization style are demandingness (i.e., the socialization agent's willingness to socialize children to integrate them into society) and responsiveness (i.e., the socialization agent's recognition of children's individuality). An appropriate balance of demandingness and responsiveness may facilitate an individual's sense of competence, autonomy, and relatedness.

From the self-system processes perspective, authoritative schools with high levels of both demandingness and responsiveness may promote the development of capacities and strategies, self-regulation, and felt security with self and others. On the contrary, permissive or indifferent schools, because of their lack of demandingness, may be unable to facilitate students' development of self-regulation and capacities. Authoritarian or indifferent schools, due to their lack of responsiveness, may fail to promote the development of students' felt security with self and others. From the view of SDT, the authoritative school with high levels of both demandingness and responsiveness may facilitate students' internalization of extrinsic motivation because external demands are provided in the context of responsiveness. In contrast, permissive or indifferent schools may not provide sufficient external demands for students to internalize, while authoritarian or indifferent schools may not invite students' willingness to internalize the external demands provided.

Authoritative schools with high levels of both demandingness and responsiveness can enhance student engagement and performance by providing optimal school conditions to facilitate students' self-system processes and their internalization of extrinsic motivation. An

authoritative school holds high academic expectations and firmly enforces rules, which allows students to develop the self-regulation and skills necessary to function adequately in society. However, an authoritative school also provides support for positive interpersonal relationships and accommodates students' needs, thereby promoting students' sense of relatedness and sense of autonomy. This balance between demandingness and responsiveness is central in the development of students' competence. In order for students to develop academic and social competence, adequate levels of academic and behavioral demands need to be provided. To determine what are adequate levels of demands, schools take into account the developmental needs of their students. For example, a middle school teacher in an authoritative school may require more responsible behavior and intensive and thoughtful work while s/he provides adequate supports to handle students' issues emerging in the process of identity formulation.

It is important to note, however, that the effect of school socialization style may vary depending on the individual characteristics of students. Studies of parenting style (Park & Bauer, 2002; Vinden, 2001) have reported variations across groups. For example, Steinberg, Mounts, Lamborn, and Dornbusch (1991 as cited in Darling & Steinberg, 1993) found that the predicted outcome of higher academic achievement for children of authoritative parents was significant only for European American students – not for African American or Asian students. Other studies, however, have also found an invariant effect of parenting style across racial/ethnic groups; see Querido, Warner, and Eyberg (2002) and Radziszewska, Richardson, Dent, and Flay (1996). Although schools are different than parents, similar variations regarding the effects of school socialization style on students may be present. For example, in a longitudinal study using the National Education Longitudinal Study of 1988, Gregory and

Weinstein (2004) found that authoritative teaching predicted greater academic growth in math, especially for low-SES students.

The prevalence and the influence of school socialization style also may vary depending on the social milieu in which the school is embedded. Social contexts such as school resources, the physical environment of the school, school-mean SES, the cultural norms of the society, and broader educational policy may influence schools' socialization styles and the effect of that socialization style on student outcomes. Because the application of socialization style to schools is a relatively new approach, there is a scarcity of studies examining these relationships. Studies of school socialization style are needed so that researchers can determine whether the variations that have been observed in the parenting literature also apply to school socialization style.

This study utilized the framework of school socialization style (see Figure 3). According to this framework, student engagement (i.e., the *action*) is a mediator that connects school socialization style (the *context*) and academic performance (the *outcome*). Studies of parenting style have reported the effectiveness of authoritative parenting. As such, authoritative schools with both demandingness and responsiveness may be the most effective. Studies of student engagement often suggest that student engagement is a significant predictor of academic performance. If so, student engagement may mediate the effect of school socialization style on academic performance. The effect of parenting style on children has been found to vary depending on individual and social characteristics. Likewise, the effect of school socialization style may vary. The research questions of this study are drawn from this foundation:

- Is school socialization style significantly associated with student engagement and academic performance?
- Do the effects of school socialization style on student engagement and academic performance vary by student and school characteristics?
- Does student engagement mediate the effect of school socialization style on academic performance?

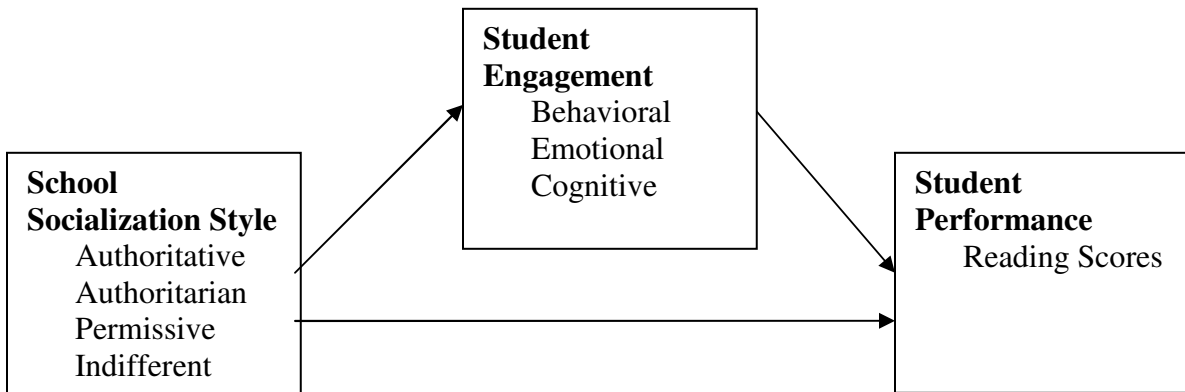


Figure 3. The framework of school socialization style

## METHODS

### *Study Design*

This study used a cross-sectional dataset, the Program for International Student Assessment 2000 (PISA 2000), collected by the Organisation for Economic Co-operation and Development (OECD). PISA is an internationally standardized assessment of 15-year-olds in schools. Unlike many standardized tests, PISA assesses the extent to which students have acquired the knowledge and skills required to meet real-life challenges rather than their mastery of a particular school curriculum. The first PISA survey was conducted in 2000; subsequent surveys have been conducted every three years since. All PISA surveys assess skills in reading literacy, mathematics, and science, but emphasis is placed on a different dominant domain each year: reading in 2000, mathematics in 2003, and science in 2006. This study uses PISA results from 2000, when reading literacy was the main domain. Forty-three countries, including both OECD members and non-members, took part in the development and administration of the 2000 PISA surveys. The United States, an OECD member, was one of the participating countries.

One of the distinguishing characteristics of PISA is that it collects detailed and comprehensive information about the psychological, social, economic, cultural, and educational factors related to student performance. Data are gathered from two sources: students and school principals. The PISA Student Questionnaire asks students to report on individual characteristics and family background, individual learning strategies, individual motivation to learn, and their individual perception of school climate. The School

Questionnaire asks school principals to report on school characteristics, policies, climate, and resources.

### *Sample*

The target population of PISA is 15-year-old students attending educational institutions (i.e., public and private schools, vocational training programs, or foreign schools; home-schooled children are excluded) located within participating countries. A small proportion of students (fewer than 5%) were generally excluded from the PISA for mental, functional, or linguistic reasons.

When the initial school response rate was between 65% and 85%, replacement schools were used to achieve an acceptable school response rate of 85%. Schools with more than 50% student participation were categorized as responding schools. Weighted school response rates in PISA ranged from 56% to 100% after replacement, and weighted student response rates ranged from 81% to 99%. The student sample size per country ranged from 314 in Liechtenstein to 29,461 in Canada; most countries had between 4,000 and 5,000 students in their sample. The U.S. sample included 3,700 students from 145 schools. This study used only the U.S. sample.

In the United States, a three-stage stratified sampling procedure was used. The first-stage or primary sampling units (PSUs) were geographical areas, schools were the second-stage sampling units, and students were the third-stage sampling units. In the first stage, 52 PSUs were selected. The public release data did not provide further information about the geographical regions. Then, a total of 220 schools were selected from within the sampled

PSUs. Ninety-two schools were excluded due to ineligibility<sup>1</sup> or refusal, leaving 128 schools before replacement. Thirty-two schools with characteristics similar to those of the 128 remaining schools were added as replacement schools, increasing the number of schools that agreed to participate to 160. In each of these participating schools, up to 35 eligible students were randomly selected. Only 145 schools with more than 50% student participation were categorized as responding schools. For the U.S. sample, weighted school response rates were 70% after replacement and weighted student response rates were 85%.

The sample of this study was further limited to ninth- and tenth graders, who comprised the vast majority (98%) of the U.S. sample. (PISA collected an age-based sample, meaning that all 15-year-olds were included regardless of their current grade level. Approximately 2% of the students in the U.S. sample were in seventh, eighth, or eleventh grade; these outliers were excluded from the study sample in an effort to limit grade effects.) For convenience of analysis, only cases with full data on all the requisite variables were retained. Twenty-four percent of ninth- and tenth graders in the U.S. did not provide complete responses to the survey questions; thus, these students were dropped from the study sample. As a result, the final study sample included 2,849 students from 141 schools. A series of bivariate tests (chi-squared tests and ANOVA) was conducted to determine whether the study sample (n=2,849) was representative of the original U.S. sample (n=3,700). The percentage of exclusion due to missing data ranged from 0% to 15%; the variable with the largest proportion of exclusion (15%) was individual SES. Unfortunately, excluded students were generally different from included students on all variables. Male students were more likely to be excluded from this study than female students (25% vs. 19%):  $\chi^2(1, N =$

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<sup>1</sup> These schools did not have any students born in 1984.



3,753) = 19.69,  $p < 0.01$ . Tenth graders were more likely to be excluded from this study than 9th graders (25% vs. 20%):  $\chi^2(1, N = 3,754) = 11.65, p < 0.01$ . About 9% of European American students were excluded while the exclusion rates for students from all other racial backgrounds were between 24% and 31%:  $\chi^2(3, N = 3,508) = 227.98, p < 0.01$ . Students who speak English at home were less likely to be dropped from the study than students who speak another language at home (15% vs. 39%):  $\chi^2(1, N = 3,533) = 122.98, p < 0.01$ . Students dropped from the study due to missing data had generally lower individual SES ( $F = 9.53, p < 0.01$ ), lower behavioral engagement ( $F = 7.93, p < 0.05$ ), lower emotional engagement ( $F = 30.84, p < 0.01$ ), lower cognitive engagement ( $F = 5.64, p < 0.05$ ), and lower reading scores ( $F = 265.02, p < 0.01$ ). Due to the significant differences between those who were included and those who were excluded, results from the study should be interpreted with caution. For example, because included students have higher levels of student engagement and higher reading scores than excluded students, the applicability of the study's findings for less engaged students with lower reading scores may be limited. Additionally, when interpreting findings, the study sample's lower proportion of male, tenth-grade, racial/ethnic minority, and language minority students needs to be considered.

### *Data Collection*

PISA 2000 was a two-hour pencil-and-paper test that included multiple-choice, short-answer, and essay questions. Students answered questions from one of nine test booklets that were selected from a larger item pool. Testing was conducted between March 1 and October 31, 2000. Testing was conducted only after the first three months of the school year due to concerns about lower student performance at the beginning of a school year. In each country, National Project Managers administered the test, assisted by School Coordinators and Test

Administrators in each school. The quality of the implementation was monitored by National Centre Quality Monitors and School Quality Monitors.

### *Measures*

A variety of school-based datasets other than PISA exist, including the National Education Longitudinal Study of 1988 and the Education Longitudinal Study of 2002. After careful review, the PISA was deemed the best fit for this study because it is a large-scale dataset with all the necessary variables to create the constructs of interest: the three components of student engagement (i.e., behavioral, emotional, and cognitive) and the two dimensions of school socialization style (responsiveness and demandingness).

This study used indices of student and school characteristics that were provided by PISA. Scale scores of the indices were created using Rasch item response model techniques, and all scale scores were weighted likelihood estimates (WLEs) (Warm, 1989). In the Rasch model, the probability of a specific response is modeled as a function of item and person parameters. For example, in educational tests, as a person possesses higher ability relative to the difficulty of an item, the probability of getting a correct answer increases. And so, the person's ability, a latent trait, is estimated by the difficulty of items and the number of correct answers. PISA used WLEs instead of maximum likelihood estimates (MLEs) because WLEs are less biased because the contribution of each item is weighted by the information the item provides (Warm, 1989).

PISA adopted a rotated-booklet design to maintain broad coverage of the assessment domain while limiting student testing time. In order to compare test results among different populations using a subset of tests, PISA reported scores obtained using the WLEs of the Rasch model instead of raw scores. Although a student's raw score does not take into account

the difficulty of test items, the Rasch model incorporates the difficulty of items as well as the number of correct answers in order to estimate a student's ability. Thus, students' ability estimates can be comparable even when they were assessed using a different subset of items. Detailed information regarding PISA measurements and analysis may be found in the PISA 2003 data analysis manual (OECD, 2005).

Behavioral engagement<sup>2</sup> in this study is defined as effort and perseverance in learning activities because effort and perseverance require a high degree of the behavioral engagement that might be most relevant to academic success at school. Behavioral engagement scores were derived from four items: working hard, working despite difficulty, trying one's best to acquire knowledge and skills, and putting forth one's best effort. The internal consistency reliability<sup>3</sup>—the Cronbach's alpha ( $\alpha$ )—of behavioral engagement was .83. Emotional engagement in this study refers to a sense of belonging at school ( $\alpha = .86$ ). This measure was derived from students' responses to questions about the degree to which they agree that the school is a place where they feel like they belong, where they make friends easily, and where other students seem to like them, or conversely, where they feel awkward and out of place, feel like an outsider, and feel lonely. Cognitive engagement is represented by elaboration strategy, a learning strategy that relates new information to prior knowledge (Artelt, Baumert, Julius-McElvany, & Peschar, 2003). The measure of elaboration strategy ( $\alpha = .80$ ) was

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<sup>2</sup> In a report using PISA 2000 (Willms, 2003), behavioral engagement was measured by the levels of tardiness: missing school, skipping classes, and being late for school. However, the reliability of this tardiness measure was unacceptably low ( $\alpha = 0.46$ ). Therefore, this study incorporated a different measure of behavioral engagement that focuses on effort and perseverance.

<sup>3</sup> The reliabilities using the U.S. data were taken from the PISA 2000 technical report (Adams & Wu, 2002).

derived from students' responses to four items about the frequency with which they try to relate new material to things that they already know or have learned, and the frequency with which they figure out the usage of new material in the real world. Elaboration strategy was chosen to represent cognitive engagement because higher levels of cognitive engagement require this kind of deep processing. All questions used to construct the measures of the three components of student engagement had four response categories (e.g., *Strongly Disagree*, *Disagree*, *Agree*, and *Strongly Agree*.) Appendix A presents the actual test items.

Reading literacy was used in the current study as an academic performance measure because reading is the basis for further learning in other subjects. PISA defines reading literacy as "capacity to understand, use and reflect on written texts, in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society" (Kirsch et al., 2002). Reading literacy includes three domains: processing skills, knowledge and understanding, and the context of application.

In order to categorize schools into four socialization styles, school levels of demandingness and responsiveness were constructed from student-reported measures of academic press, disciplinary climate, teacher support, and teacher-student relationship. The indicators of academic press include how often the respondent's English teacher wants students to work hard, encourages students to do better, disapproves of careless work, and makes students learn a lot. Unfortunately, the reliability of the measure of academic press is undesirably low ( $\alpha = .54$ ) and this could have led to the inaccurate categorization of schools. For example, schools that actually had high expectations for students could have been included in the low-demandingness group because of unreliable measures of academic press;

conversely, schools that actually had low expectations for students could have been included in the high-demandingness group.

The measure of disciplinary climate ( $\alpha = .83$ ) assesses the frequency with which , students do not listen to the teacher during English lessons, waste instructional time before English lessons begin, make noise and are disorderly, and cannot work well. The measure of teacher support ( $\alpha = .91$ ) is based on six items assessing the frequency with which students believe their English teacher shows an interest in every student's learning, gives students an opportunity to express opinions, continues teaching until the students understand, and helps students with their work and learning. The measure of teacher-student relationship ( $\alpha = .83$ ) assesses the degree to which students agree that most of the teachers at their school get along with students, are interested in students' well-being, listen to what students have to say, provide extra help, and treat students fairly. Appendix A presents the survey questions used to construct the above measures.

Academic press and disciplinary climate were chosen to represent demandingness because those measures show whether a teacher or a school holds high standards for learning and behavior. Teacher support and teacher-student relationship were chosen to represent responsiveness because those measures indicate whether a teacher or a school provides a warm, open, and caring climate. In each school, composite scores of academic press, disciplinary climate, teacher support, and teacher-student relationship were calculated. The means of the former two were summed to become the scores of demandingness and the means of latter two were summed to become the scores of responsiveness. Then, demandingness and responsiveness scores of individual schools were averaged to calculate the means of demandingness and responsiveness scores among schools. Schools with

demandingness scores above the mean and responsiveness scores above the mean were categorized as authoritative; schools with demandingness scores above the mean and responsiveness scores below the mean were categorized as authoritarian; schools with demandingness scores below the mean and responsiveness scores above the mean were categorized as permissive; and schools with demandingness scores below the mean and responsiveness scores below the mean were categorized as indifferent.

Grade, gender, race/ethnicity, language spoken at home, and individual SES were covariates in the analysis. These covariates were chosen because the literature suggests the influence of these variables on student engagement at school and on academic performance (see details in the literature review above). Tenth grade was coded as 1 while ninth grade was the reference group. Female was coded as 1 and male was coded as 0. The U.S. PISA data includes seven racial groups: White, Black/African American, Hispanic, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and Multiracial. Because of the small number of students included in some of these racial groups, this study categorized students into four racial groups: *European American*, *African American*, *Latino/Hispanic*, and *Other Minority*. Three dummy variables of race were created with *European American* as the reference group. Language spoken at home was categorized into *English* (coded as 1) and *Other Languages* (coded as 0). To measure students' individual SES, PISA used the International Socio-Economic Index of Occupational Status (ISEI). Students' ISEI scores were derived from information they provided about parental occupation and were designed to capture the attributes of occupation that convert parents' education to income (Kirsch et al., 2002). This study used the highest occupational status of parents (HISEI) which indicates the highest ISEI values of the student's father or mother (or guardians). School-mean SES was

added to separate the contextual effect from the effect of individual SES. School-mean SES represents the average HISEI in each school. Further, school type—*private*, *public*, or *unknown*<sup>4</sup>—was included as a covariate because a relatively high proportion of permissive schools were private schools. Controlling for school type allowed us to separate the effect of school socialization style from the effect of school type. Two dummy variables of school type (*public* and *unknown*) were created with *private* serving as the reference group.

The constructs used in this study have been used in many PISA reports. Among measures used in this study, all but academic press ( $\alpha = .54$ ) have moderate to high reliabilities, with Cronbach's alphas above .80. It is possible that low internal consistency of academic press reduces the effect of school socialization style on student outcomes by introducing error into the categorization of schools. Factor analyses have shown that the above measures have adequate construct validity. The PISA 2000 technical report (Adams & Wu, 2002) provides detailed information about reliability tests and factor analyses for each of the 43 countries in the PISA sample.

### *Data Analysis*

Multilevel analysis using the generalized linear latent and mixed models, or “gllamm” (Rabe-Hesketh & Skrondal, 2006) program of Stata was used in order to adequately incorporate the nested structure and sampling weights of the data. Multilevel analysis was chosen because of the hierarchical sampling methods used in the study. Ignoring the clustered nature of the data and using single-level analytical methods, such as ordinary least squares regression, increases the risk of committing type I errors (Snijders & Bosker, 1999).

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<sup>4</sup> Schools with a missing value on school type were categorized as *unknown*.

In contrast, multilevel analysis incorporates the nested nature of the data and produces more accurate results. Moreover, multilevel analysis was necessary because the study explicitly tested multilevel propositions: the influence of school level variables on individual-level outcomes and the influence of cross-level interactions on individual-level outcomes.

PISA 2000 used a multistage sampling design. Because units were selected with unequal probabilities at each stage, in order to obtain unbiased parameter estimators, it is necessary to use weights at each level. When sampling weights are incorporated in the likelihood, it produces pseudo-likelihood, and pseudo-likelihood estimation requires weights corresponding to the levels of the hierarchical sampling design (Rabe-Hesketh & Skrondal, 2006). Without such weights at each level, random-intercept variance and regression coefficients can be biased.

The Stata program `gllamm` allows specification of probability weights at each level while most other software packages (such as HLM, SAS) allow users to use only one-staged weights. `Gllamm` uses a pseudo-likelihood approach via adaptive quadrature, and standard errors are obtained by using the sandwich estimator (Rabe-Hesketh & Skrondal, 2006). `Gllamm` can handle multilevel models with any number of levels. It also allows stratification and PSUs that are not included as a top level in the model.

In multilevel models with pseudo-maximum-likelihood, scaling of weights can affect the parameter estimates if the scaling is applied at level-one (Rabe-Hesketh & Skrondal, 2006). When raw weights are applied, the between-cluster variance is overestimated because the scaling of weights makes the cluster appear larger without reducing between-cluster variability due to error. Rabe-Hesketh & Skrondal introduced various scaling methods to reduce the bias in the variance components for small cluster sizes. Among them, this study



used a method presented by Longford (Cited in Rabe-Hesketh & Skrondal). Under the weighting scheme, the final individual weights provided by PISA data were multiplied by the following scale factor ( $a$ ).

$$a = \frac{w_{1j}}{\sum_{i=1}^{n_j} (w_{ij})^2}$$

Here,  $i$  indicates an individual student (unit) and  $j$  represents an individual school (cluster). Thus,  $w_{ij}$  denotes the weight of the individual student  $i$ , given school  $j$ , and  $w_{1j}$  denotes the sum of individual weights in each school. The level-two weights were the school weights provided by PISA data. Detailed information about the weighting schemes for the multilevel modeling can be found in Rabe-Hesketh and Skrondal.

The centering of variables in multilevel modeling has been recommended because it makes zero meaningful and reduces the potential for problems with convergence (Raudenbush, 1989). However, the choice of centering method is a critical issue. Different centering techniques can lead to different conclusions. Variables can be centered around the grand mean (CGM) or around the group mean (also known as centering within context, or CWC). CGM is equivalent to using raw scores, but is easier to interpret and has computational advantages (Kreft, de Leeuw, & Aiken, 1995). However, CGM may have problems with high correlations between the random intercepts and the random slopes and multicollinearity between individual variables ( $X_{ij}$ ) and the means of the individual variables ( $X_{.j}$ ) (Raudenbush, 1989). CWC separates within and between group variations on the outcome and is useful when a researcher wants to investigate the frog-pond effect<sup>5</sup> (Hofmann

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<sup>5</sup> Frog-pond effect means that one's relative standing within a subgroup means more than one's absolute score.

& Gavin, 1998; Kreft et al., 1995). However, CWC changes the meaning of individual- and group-level effects, requires certainty about the representativeness of the study sample, and is less effective because it needs additional group-level variables ( $X_j$ ) to restore information about group differences (Hox, 2002; Paccagnella, 2006).

CGM with the means of level-one variables (CGM-M) was chosen for this study: Variables were grand-mean centered and school-mean SES as well as individual SES was included. The main focus of this study is an examination of the effects of level-two predictors (i.e., school socialization style) after controlling for covariates. Because CGM would control for the level-one covariates, using CGM is appropriate. Another reason for choosing CGM over CWC is that CWC requires certainty about the representativeness of the study sample. Due to the difference between the excluded students and included students, the study sample may be limited in ability to represent school population. Furthermore, CGM-M that includes school-mean SES as well as individual SES can successfully separate the effects of cross-level interaction and between-group interaction as CWC does. More importantly, as suggested by Kreft et al. (1995), the choice of centering method was based on a theoretical basis. Theories behind this study do not suggest the frog-pond effect. Thus, CGM-M is a reasonable and efficient approach for this study.

Although the U.S. utilized a three-stage sampling procedure as described above, the primary sampling units (PSUs)—geographical regions—were not included as a level in the models for this study because the effect of geographical regions was not a substantive interest of this study and estimation would require knowledge about the selection probability of PSUs (Rabe-Hesketh & Skrondal, 2006). Thus, two-level models (with students at level one and schools at level two) were utilized in the study. Intra-class correlations for each of the three

components of student engagement (i.e., behavioral, cognitive, and emotional) and for academic performance (as measured by reading scores) were calculated to examine how much variation resided between schools. Model specification in the study was based on both substantive and statistical considerations. None of the random slopes tested were significant at the .05 level. Most variations related to the effects of level-one covariates on outcomes seem to be captured by cross-level interactions between school socialization style and the covariates. Moreover, we do not have theoretical reasons to assume differing effects of level-one covariates in each school. In order to describe the data to a satisfactory extent without unnecessary complications, random intercept models were adopted for this study.

*Hypotheses*

Statistical analysis models to answer three research hypotheses are shown in the chart below.

Hypotheses	Analytic model
1. Authoritative school socialization style is significantly associated with enhanced student engagement and reading performance	Main effect
2. The effects of school socialization style on student engagement and reading performance vary by:	Moderation (Interaction)
(1) gender	
(2) grade	
(3) race/ethnicity	
(4) language spoken at home	
(5) individual SES	
(6) school-mean SES	
(7) school type	
3. Student engagement mediates the effect of school socialization style on reading performance.	Mediation

### *Main models*

To examine the first research hypothesis, the effects of school socialization style on each of the three components of student engagement and reading performance were examined. Each of these four variables was separately modeled as a dependent variable, and in each model, dummy variables of school socialization style were included as predictors. Within each school, students' outcomes ( $Y_{ij}$ ) such as reading scores were regressed on students' gender (FEMALE), grade (10TH), race/ethnicity— African American (AFR), Latino/Hispanic (LATINO), and other (OTHER) —, language spoken at home (ENGLISH), and individual socioeconomic status (SES). The level-one model is:

$$Y_{ij} = \pi_{0j} + \pi_{1j}(\text{FEMALE})_{ij} + \pi_{2j}(\text{10TH})_{ij} + \pi_{3j}(\text{AFR})_{ij} + \pi_{4j}(\text{LATINO})_{ij} + \pi_{5j}(\text{OTHER})_{ij} + \pi_{6j}(\text{ENGLISH})_{ij} + \pi_{7j}(\text{SES})_{ij} + r_{ij}$$

The parameters were interpreted as follows:  $\pi_{0j}$  = mean outcomes for students in school  $j$ ;  $\pi_{1j}$  = the mean differences between outcomes of male and female students in school  $j$ ;  $\pi_{2j}$  = the mean differences between the outcomes of ninth-grade students and tenth-grade students in school  $j$ ;  $\pi_{3j}$  = the mean differences between the outcomes of African American and European American students in school  $j$ ;  $\pi_{4j}$  = the mean differences between the outcomes of Latino/Hispanic and European American students in school  $j$ ;  $\pi_{5j}$  = the mean differences between the outcomes of Other Minority students and European American students in school  $j$ ;  $\pi_{6j}$  = the mean differences between the outcomes of students who speak English at home and those who speak another language at home in school  $j$ ;  $\pi_{7j}$  = the degree to which differences in students' individual SES is related to outcomes in school  $j$ ;  $r_{ij}$  = residual variance across individuals within schools.

The means of outcomes in school  $j$  ( $\pi_{0j}$ ) were regressed on dummy variables of school socialization style—Authoritarian (AUTH), Permissive (PERM), and Indifferent (INDI)—, school-mean SES (SSES), and dummy variables of school type—PUBLIC and UNKNOWN.

The level-two model is:

$$\pi_{0j} = \beta_{00} + \beta_{01}(\text{AUTH})_j + \beta_{02}(\text{PERM})_j + \beta_{03}(\text{INDI})_j + \beta_{04}(\text{SSES})_j + \beta_{05}(\text{PUBLIC})_j + \beta_{06}(\text{UNKNOWN})_j + u_{0j}$$

$$\pi_{pj} = \beta_{p0}, p > 0$$

The parameters were interpreted as follows:  $\beta_{00}$  = the grand mean of outcomes;  $\beta_{01}$  = the mean differences between outcomes of authoritarian schools and authoritative schools;  $\beta_{02}$  = the mean differences between outcomes of permissive schools and authoritative schools;  $\beta_{03}$  = the mean differences between outcomes of indifferent schools and authoritative schools;  $\beta_{04}$  = the degree to which differences in outcomes between schools is related to school-mean SES;  $\beta_{05}$  = the mean differences between outcomes of public schools and private schools;  $\beta_{06}$  = the mean differences between outcomes of unknown type schools and private schools;  $u_{0j}$  = residual variance between schools.

### *Interaction models*

To address the second research hypothesis, cross-level interactions between school socialization style and the covariates (gender, grade, race/ethnicity, language spoken at home, individual SES, school-mean SES, and school type) were examined. The level-one models were the same as the level-one models in the Main Models section above. In the level-two models, the means of outcomes in school  $j$  ( $\pi_{0j}$ ) are regressed on dummy variables of school socialization style, school-mean SES, and dummy variables of school type. However, the slopes of the level-one covariates are also regressed on dummy variables of school

socialization style. For example, the cross-level interaction between school socialization style and gender is shown in the following level-two model:

$$\begin{aligned}\pi_{0j} &= \beta_{00} + \beta_{01}(\text{AUTH})_j + \beta_{02}(\text{PERM})_j + \beta_{03}(\text{INDI})_j + \beta_{04}(\text{SSES})_j + \beta_{05}(\text{PUBLIC})_j + \\ &\quad \beta_{06}(\text{UNKNOWN})_j + u_{0j} \\ \pi_{1j} &= \beta_{10} + \beta_{11}(\text{AUTH})_j + \beta_{12}(\text{PERM})_j + \beta_{13}(\text{INDI})_j \\ \pi_{pj} &= \beta_{p0}, p > 1\end{aligned}$$

The final models included only significant interactions<sup>6</sup>. When significant interactions were found, graphical representations were provided to show the interaction effects visually.

### *Mediation models*

To examine whether student engagement mediates the effect of school socialization style on academic performance, mediation analyses were performed. Mediators were included both separately and simultaneously. For the sake of simplicity, reading scores are indicated as READ, school socialization style is indicated as SSS, and student engagement is indicated as SE in the following description; covariates were omitted. The coefficients to calculate mediation effects were obtained from the following models:

$$\text{READ} = i_1 + c(\text{SSS}) + e_1$$

$$\text{READ} = i_2 + c'(\text{SSS}) + b(\text{SE}) + e_2$$

$$\text{SE} = i_3 + a(\text{SSS}) + e_3$$

In the above equations,  $i_1$ ,  $i_2$ , and  $i_3$  are the intercepts,  $c$  is the effect of school socialization style (SSS) on reading scores (READ),  $c'$  is the effect of school socialization

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<sup>6</sup> For a group of hypotheses, False Discovery Rate (Benjamini, Drai, Elmer, Kafkafi, & Golani, 2001) was used to determine significant interactions:  $0.05 \times m/(m + 1 - i)^2$ , where  $m$  = total number of hypotheses and  $i$  = rank.

style (SSS) on reading scores (READ) adjusted for student engagement (SE),  $b$  is the effect of student engagement (SE) on reading scores (READ),  $a$  is the effect of school socialization style (SSS) on student engagement (SE), and  $e_1$ ,  $e_2$ , and  $e_3$  are residuals. Figure 4 is a graphical representation of the mediation model.

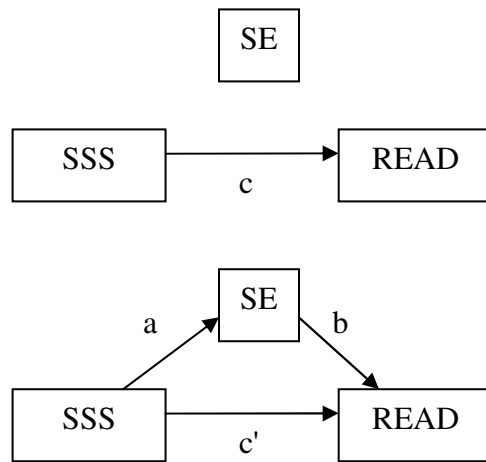


Figure 4. Mediation model

The mediation effect can be calculated either as  $\hat{c} - \hat{c}'$  or  $\hat{a} \times \hat{b}$  (Krull & MacKinnon, 2001). The most commonly used formula to obtain standard error of the mediation effect is the following (MacKinnon, Fairchild, & Fritz, 2007):  $\hat{\sigma}_{ab} = \sqrt{\hat{a}^2 \hat{\sigma}_b^2 + \hat{b}^2 \hat{\sigma}_a^2}$ . Here,  $\hat{\sigma}_a^2$  is the variance of  $\hat{a}$  and  $\hat{\sigma}_b^2$  is the variance of  $\hat{b}$ . The p-value of the mediation effect can be obtained from the critical ratio:  $\hat{a}\hat{b} / \hat{\sigma}_{ab}$ . Mediation effects of school socialization style were examined for each component of student engagement.

#### *Explained variance*

Researchers have suggested various ways to calculate explained variance in multilevel linear models. In multiple regression analysis, explained variance is often calculated using the squared multiple correlation coefficient, or  $R^2$ . However, it is

problematic to define the concept of explained variance in a multilevel linear model because it involves several variance components (Snijders & Bosker, 1999). A well-known procedure is to calculate the proportional reductions in estimated variance components,  $\hat{\sigma}^2$  and  $\hat{\tau}_0^2$  from the unconditional model to the conditional model. Here,  $\hat{\sigma}^2$  is residual variance at level one and  $\hat{\tau}_0^2$  is residual variance at level two. However, this approach sometimes leads to increased variance by adding explanatory variables or even a negative  $R^2$ . Snijders and Bosker argue that “defining  $R^2$  as the proportional reduction in residual variance parameters  $\hat{\sigma}^2$  and  $\hat{\tau}_0^2$ , respectively, is not the best way to define a measure analogous to  $R^2$  in the linear regression model” (p. 100). Instead, they suggest using *proportional reduction of prediction error*. According to their reasoning, explained variance at level one is the proportional reduction of error for predicting an individual outcome ( $Y_{ij}$ ), and explained variance at level two is the proportional reduction of error for predicting a group mean ( $\bar{Y}_{ij}$ )<sup>7</sup>. Explained variance at level one is calculated as follows:

$$1 - (\text{Total unexplained variance in fitted model} / \text{Total variance in null model})$$

To calculate explained variance at level two, the associated mean squared prediction error (MSPE) must be calculated. The MSPE can be obtained from the following formula:

$$\frac{\sigma^2}{n} + \tau_0^2.$$

Here,  $n$  is a representative value of the group size. When the group sizes vary, a

harmonic mean can be used:  $m / \{\sum_j (1/n_j)\}$ . Here,  $m$  is number of schools and  $n$  is the

number of students in each school. Although it is generally advised to allow  $n$  to reflect the

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<sup>7</sup> This calculation is for random intercept models. Please refer to Snijders and Bosker (1999) for the calculation of explained variance in models with random slopes.



group sizes in the population rather than the sample group sizes (Snijders & Bosker, 1999), the harmonic mean of the sample was used in this study because the number of 15-year-olds in each school was unknown. Then, explained variance at level two can be obtained using the following:

$$1 - (MSPE \text{ of fitted model} / MSPE \text{ of null model})$$

### *Diagnostics*

Multilevel analysis assumes a normal or multivariate normal distribution of residuals at each level with mean of zero and constant variance (Snijders & Bosker, 1999). After fitting models, the “gllapred” (Rabe-Hesketh & Skrondal, 2006) program of Stata was used to obtain predicted outcomes ( $\hat{Y}_{ij}$ ), the distribution of residuals ( $r_{ij}$ ), and random intercepts ( $u_{0j}$ ). Scatter plots of residuals against predicted outcomes were examined to identify violations of homoscedasticity. A swarm of points without discernable patterns around zero indicates no violation of the assumption. The normal Q-Q plots of residuals and random intercepts were examined to evaluate the normality of residuals and random intercepts. When resulting plots roughly lie on the straight diagonal lines, the assumption of normal distribution is not violated.

## RESULTS

### *Sample Description*

Descriptive statistics of individual-level variables were examined using final weights, and descriptive statistics of school-level variables were examined using school weights. Table 1 presents descriptive statistics for the dependent variables, independent variables, and covariates with weights. The dependent variables were the three components of student engagement at school (i.e., behavioral, cognitive, and emotional) and reading performance. The means of behavioral, emotional, and cognitive engagement were around zero and the SDs were close to 1. Histograms of student engagement showed a ceiling effect and a floor effect. Scores of behavioral, emotional, and cognitive engagement piled up at the upper end (i.e., ceiling effect) and scores of behavioral and cognitive engagement piled up at the bottom (i.e., floor effect). Ceiling and floor effects occur when the measurement strategy used is not effective at detecting the variability of data. Potential problems with ceiling and floor effects are (1) the inability to detect a phenomenon above the ceiling or below the floor, and (2) a limited possibility of finding effects due to violation of the normal distribution assumption. Appendix B shows histograms of the outcome variables. The mean reading score was 522.22 (SD = 93.28). Descriptive statistics by socialization style showed that students in authoritative schools generally have higher levels of behavioral, emotional, and cognitive engagement—but not reading performance—than students in other schools.

Table 1

## Descriptive Statistics

	N	<u>Total</u> Percent /Mean (SD)	<u>Authoritative</u> Percent /Mean (SD)	<u>Authoritarian</u> Percent /Mean (SD)	<u>Permissive</u> Percent /Mean (SD)	<u>Indifferent</u> Percent /Mean (SD)
Student-level variables						
Behavioral engagement	2849	-0.05 (1.08)	0.12 (1.11)	-0.04 (1.06)	-0.11 (1.06)	-0.13 (1.12)
Emotional engagement	2849	0.00 (1.12)	0.13 (1.17)	-0.13 (1.03)	0.08 (1.15)	-0.08 (1.09)
Cognitive engagement	2849	0.04 (1.06)	0.18 (1.06)	0.03 (1.08)	0.00 (1.01)	-0.01 (1.09)
Reading performance	2849	522.52 (93.28)	519.48 (93.80)	514.31 (87.22)	538.52 (92.23)	508.00 (99.13)
Gender						
Male	1303	45.7	46.4	45.1	46.3	45.1
Female	1546	54.3	53.6	54.9	53.8	54.9
Grade						
9th grade	1133	39.8	35.8	43.3	43.7	31.0
10th grade	1716	60.2	64.2	56.7	56.3	69.0
Race						
European American	1867	65.6	59.1	63.9	74.0	58.7
African American	340	11.9	22.4	14.2	5.9	9.7
Hispanic/Latino	407	14.3	10.2	16.3	13.1	17.5
Other Minority	235	8.2	8.3	5.7	7.0	14.2
Language spoken at home						
English	2641	92.7	95.0	91.0	94.0	90.7
Other Language	208	7.3	5.0	9.0	6.0	9.3
Individual SES	2849	53.0 (16.2)	53.0 (15.8)	52.4 (16.0)	54.4 (16.6)	51.4 (16.1)
School-level variables						
School-mean SES	141	49.3 (9.7)	52.0 (5.3)	41.1 (11.2)	53.6 (7.2)	52.2 (5.8)
School type						
Public school	101	71.9	91.3	79.5	42.0	94.4
Private school	27	19.0	0.0	5.5	51.8	0.0
Unknown type	13	9.1	8.7	15.0	6.2	5.6

Note. Other Minority includes Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, or Multiracial students. SES = socio-economic status. SD = standard deviation. Descriptive statistics using weights were reported. Sample sizes without weights were reported. Number of students = 2,849 and number of schools = 141.

The independent variables were indicators of school socialization style (the reference category was authoritative school). When weights were incorporated, 21 of the 141 schools in the sample (15.2%) were authoritative, 42 schools (29.9%) were authoritarian, 47 schools (33.6%) were permissive, and 30 schools (21.4%) were deemed indifferent. Covariates at the individual level were students' gender, grade, race/ethnicity, language spoken at home, and individual SES. About 54% of students were female and about 60% were in tenth grade. Most of students were European American (65.6%) and spoke English at home (92.7%). Individual SES ranged from 16 to 90 and the mean was 53.0 (SD = 16.2). School-level covariates were school-mean SES and school type. The school-mean SES ranged from 28 to 71.5 and the average was 49.3 (SD = 9.7). About 72% of the schools were public and 19% were private; approximately 9% of the schools did not report school type.

Descriptive statistics by school socialization style showed differences regarding race/ethnicity and school type. Compared to schools with other socialization styles, a higher proportion of permissive schools were private. Permissive schools also had a relatively higher proportion of European American students. However, permissive schools did not differ from schools with other socialization styles on gender, grade, language spoken at home, individual SES, or school-mean SES. Intraclass correlations (ICCs) of outcomes (i.e., the three components of student engagement and reading performance) ranged from 0.03 to 0.18, with the largest ICC being for reading performance. In other words, 18% of the variation in the students' reading scores resided between schools. ICCs of student engagement were around 0.05 (0.03 for behavioral engagement, 0.07 for emotional engagement, and 0.06 for cognitive engagement). Although some of the ICCs were relatively small, it is still appropriate to use multilevel analysis because using multilevel analysis has been

recommended with ICC's as low as .02 (Kreft & de Leeuw, 1998). Moreover, in studies using data with the multilevel structure, multilevel analysis is a more rigorous approach than single-level analysis. Due to the multi-stage sampling design of PISA, individual students in each school share information. This multilevel data structure necessitates multilevel analysis. Further, the multilevel inquiries of this study required multilevel analysis. This study examined the effects of level-two variables (i.e., school socialization style) on level-one outcomes (i.e., the three components of student engagement and reading performance) and the effects of cross-level interactions (e.g., interaction between gender and school socialization style) on level-one outcomes. Thus, conducting multilevel analysis was necessary regardless of the size of ICCs.

#### *Main Effects of School Socialization Style*

Models without any interaction terms revealed that the effects of school socialization style varied by the outcomes examined. As shown in Table 2, authoritative schools had a significantly positive effect on behavioral and emotional engagement. Holding all covariates at their means, students in authoritative schools showed significantly higher levels of behavioral engagement than did students in permissive schools ( $\beta = -0.24, p < .01$ ). When all covariates were at their mean values, students in authoritative schools also had significantly higher scores on emotional engagement than did students in authoritarian schools ( $\beta = -0.48, p < .05$ ). However, holding all covariates at their means, students' cognitive engagement and reading scores did not differ by the socialization style of the schools they attended.

Female students had significantly higher levels of behavioral engagement ( $\beta = 0.40, p < .001$ ) and emotional engagement ( $\beta = 0.19, p < .05$ ), and higher reading scores ( $\beta = 25.98, p < .001$ ) than did male students. The effect of grade level was found only for reading scores:

tenth graders had higher reading scores than ninth graders ( $\beta = 30.06, p < .001$ ).

Race/ethnicity was a significant predictor of behavioral engagement and reading scores.

Compared to European American students, African American students had higher levels of behavioral engagement ( $\beta = 0.24, p < .05$ ); however, they had lower reading scores ( $\beta = -42.76, p < .001$ ). Although Latino/Hispanic students did not differ from European American students on any of the three components of student engagement, they had significantly lower reading scores ( $\beta = -29.88, p < .001$ ).

Speaking English at home was a significant predictor for all outcomes except emotional engagement. Compared to students who spoke another language at home, English-speaking students showed lower levels of behavioral engagement ( $\beta = -0.31, p < .05$ ) and cognitive engagement ( $\beta = -0.41, p < .001$ ), and they had higher reading scores ( $\beta = 16.44, p < .05$ ). Individual SES was a statistically significant predictor for all outcomes. An increase of one unit in individual SES was associated with a 0.0068 unit increase in behavioral engagement ( $p < .01$ ), a 0.0050 unit increase in emotional engagement ( $p < .05$ ), a 0.0044 unit increase in cognitive engagement ( $p < .01$ ), and a 1.24 unit increase in reading score ( $p < .001$ ). Relative to the range of outcome values, individual SES had small but statistically significant effects for all outcomes. Score ranges of the variables were 16 to 90 for individual SES, 3.12 to 2.20 for behavioral engagement, -3.40 to 2.33 for emotional engagement, -2.80 to 2.49 for cognitive engagement, and 193.34 to 887.31 for reading performance. Thus, a 0.0068 unit increase in behavioral engagement related to one unit increase of individual SES, for example, may not be clinically significant, in spite of its statistical significance. School-mean SES was positively associated with students' emotional engagement ( $\beta = 0.013, p < .05$ ) and reading scores ( $\beta = 2.34, p < .001$ ).

Table 2

Main Effects of School Socialization Style on Student Engagement and Reading Performance

	<u>Behavioral engagement</u>		<u>Emotional engagement</u>		<u>Cognitive engagement</u>		<u>Reading</u>	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	0.01	0.03	0.03	0.06	0.08	0.06	508.57 <sup>***</sup>	3.02
Individual-level predictors								
Female	0.40 <sup>***</sup>	0.06	0.19 <sup>*</sup>	0.08	0.11	0.08	25.98 <sup>***</sup>	5.81
10th Grade	0.04	0.07	0.01	0.09	0.14	0.09	30.06 <sup>***</sup>	4.13
African American	0.24 <sup>*</sup>	0.10	0.04	0.08	0.13	0.11	-42.76 <sup>***</sup>	8.12
Latino/Hispanic	0.02	0.10	0.17	0.16	-0.12	0.13	-29.88 <sup>***</sup>	7.22
Other Minority	0.04	0.18	-0.19	0.11	0.10	0.11	-14.12	14.48
English spoken at home	-0.31 <sup>*</sup>	0.15	0.04	0.18	-0.41 <sup>***</sup>	0.11	16.44 <sup>*</sup>	7.14
Individual SES	6.8E-03 <sup>**</sup>	2.1E-03 <sup>a</sup>	5.0E-03 <sup>*</sup>	2.5E-03	4.4E-03 <sup>**</sup>	1.7E-03	1.24 <sup>***</sup>	0.20
School level predictors								
School-mean SES	-7.8E-03	8.7E-03	1.3E-02 <sup>*</sup>	6.5E-03	-2.0E-02	1.3E-02	2.34 <sup>***</sup>	0.51
Public school	-0.31	0.16	-0.15	0.20	-0.34	0.29	-3.27	11.71
Unknown school type	-0.31	0.17	-0.18	0.21	-0.36	0.30	-2.41	11.72
Authoritarian style	-0.12	0.09	-0.48 <sup>*</sup>	0.23	-0.15	0.11	13.67	8.13
Permissive style	-0.24 <sup>**</sup>	0.08	-0.23	0.23	-0.26	0.23	8.30	10.67
Indifferent style	-0.15	0.09	-0.29	0.26	-0.26	0.23	-10.32	10.21
Variance components								
Within schools	1.14	0.07	1.21	0.06	1.07	0.06	5865.69	322.37
Between schools	0.02	0.02	0.04	0.04	0.07	0.06	333.99	102.27
Percent of variance explained								
Within schools	6.1		5.2		2.5		24.6	
Between schools	18.8		20.1		3.8		61.0	
-2 Loglikelihood	1372664		1403963		1354869		5312950	

Note. SE = Standard error. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

<sup>a</sup> Scientific notation is used to express small numbers. "E" indicates "times ten raised to the power" which replaces the "x10<sup>n</sup>." A negative exponent shows that the decimal point is shifted that number of places to the left. Thus, 2.1E-03 indicates 0.0021.

Relatively large proportions of level-one and level-two variance on reading performance were explained by predictors included in the model. The main model explained 24.6% of the variation in individual reading scores and 62.7% of the variation in the school-mean reading scores. Explained variance in the model of reading performance was obtained as follows. In the null model, total variance was  $6613.60 + 1471.98 = 8085.58$ . In the main model, total variance was  $5774.12 + 314.85 = 6088.98$ . Hence the percentage of explained variance at level one was  $\{1 - (6088.98 / 8085.58)\} \times 100 = 24.6$ . To calculate the explained variance at level two, the mean squared prediction error (MSPE) was calculated. The average group size using the harmonic mean was 13.667. In the null model, the MSPE was  $6613.60 / 13.667 + 1471.98 = 1955.89$ . In the main model, the MSPE was  $5774.12 / 13.667 + 314.85 = 737.35$ . Hence, the percentage of explained variance at level two was  $\{1 - (730.35 / 1955.89)\} \times 100 = 62.7$ . The variances explained in the models of school engagement were calculated using the same procedure. The percentages of explained variance at level one were 6.1% (behavioral engagement), 5.2% (emotional engagement), and 2.5% (cognitive engagement). The percentages of explained variance at level two were 19.7% (behavioral engagement), 20.8% (emotional engagement), and 2.1% (cognitive engagement).

Scatter plots of residuals against predicted outcomes did not show specific patterns, although the plots have clear boundaries in the upper-right and lower-left sides. The plots reflect a ceiling effect and a floor effect associated with student engagement scores. Aside from this limitation, the scatter plots of residuals did not present serious problems. The normal Q-Q plots of outcomes also did not indicate serious violations of the normal distribution assumption. Although plots around the tails were slightly away from the diagonal lines, most plots lay on the diagonal lines. The distribution of residuals for emotional



engagement, however, seemed to be somewhat different from normal. Appendix C presents the scatter plots and Q-Q plots of residuals and random intercepts for each model.

### *Interaction Effects of School Socialization Style*

Interactions between school socialization style and covariates were tested for each outcome. As hypothesized, several significant interactions were found: interactions with grade were found for emotional and cognitive engagement; interactions with race/ethnicity were found for behavioral and cognitive engagement; and an interaction with school-mean SES was found for reading performance. Table 3 shows these significant interaction effects and the associated changes in coefficients of other covariates. Graphical illustrations of the interaction effects are also provided in Figure 5 below.

With all covariates at their mean values, tenth graders in indifferent schools were less emotionally and cognitively engaged than tenth graders in other schools. The emotional and cognitive engagement of ninth graders did not vary by school socialization style. Interactions related to Other Minority and African American students were found. When all covariates were at their means, Other Minority students in permissive or indifferent schools showed lower levels of behavioral engagement than Other Minority students in schools with other socialization styles. In contrast, when all the covariates were at their means, European American, African American, and Latino/Hispanic students in permissive and indifferent schools had higher levels of behavioral engagement than did those students in other schools. Controlling all covariates at their means, African American students in authoritarian schools showed higher levels of behavioral engagement than African American students in other schools. However, the opposite phenomenon was found for all other racial groups. African American students in permissive schools showed lower levels of cognitive engagement than

did African American students in other schools. However, European American, Latino/Hispanic, and Other Minority students did not show this pattern. Related to reading performance, an interaction between school-mean SES and school socialization style was found. Among schools with a low school-mean SES<sup>8</sup>, students in authoritarian schools showed higher reading scores than did students in other schools. In contrast, among schools with high school-mean SES, students in authoritarian schools showed lower reading scores than students in other schools.

In general, the inclusion of significant interaction effects did not substantially change the direction or magnitude of the effects of other covariates. However, slight differences in the magnitude of coefficients made two notable changes related to school type and school-mean SES. With significant interaction effects in the model, public and unknown type schools were associated with lower levels of behavioral engagement than private schools. Also, school-mean SES was no longer a significant predictor of emotional engagement of students when significant interaction effects were included. The inclusion of interaction terms, however, increased the percentages of explained variance, especially in the area of cognitive engagement. The percentage of explained variance at level one increased from 2.5% to 4.6%, and the percentage of explained variance at level two increased from 3.8% to 13.2%. Deviance differences also suggested that the inclusion of interaction terms improved the models.

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<sup>8</sup> Schools with a school-mean SES that is one standard deviation lower than the average school-mean SES were categorized into low-SES schools while schools with a school-mean SES that is one standard deviation higher than the average were categorized into high-SES schools.

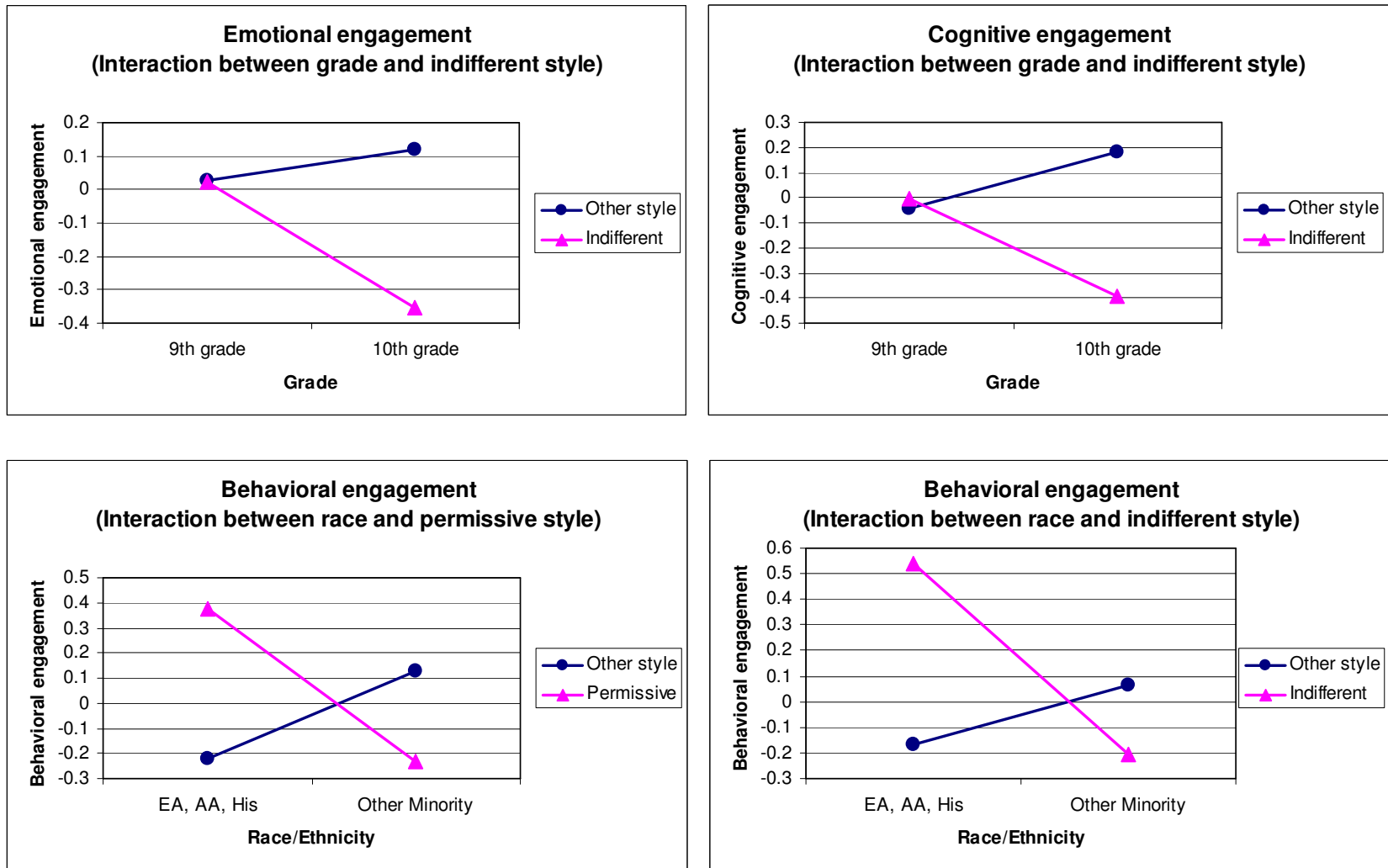
The assumptions of multilevel models were also examined in the models with interaction terms. Scatter plots of residuals against predicted outcomes did not show specific patterns despite clear boundaries in the upper-right and lower-left sides. Again, this reflects ceiling and floor effects associated with student engagement scores. Given this limitation, the scatter plots of residuals did not indicate serious violation of the homoscedasticity assumption. The normal Q-Q plots of outcomes also did not present serious violation of the normal distribution assumption because most of plots lay on the diagonal lines. Appendix C presents the scatter plots and Q-Q plots of residuals and random intercepts for each model.

Table 3  
Interaction Effects of School Socialization Style

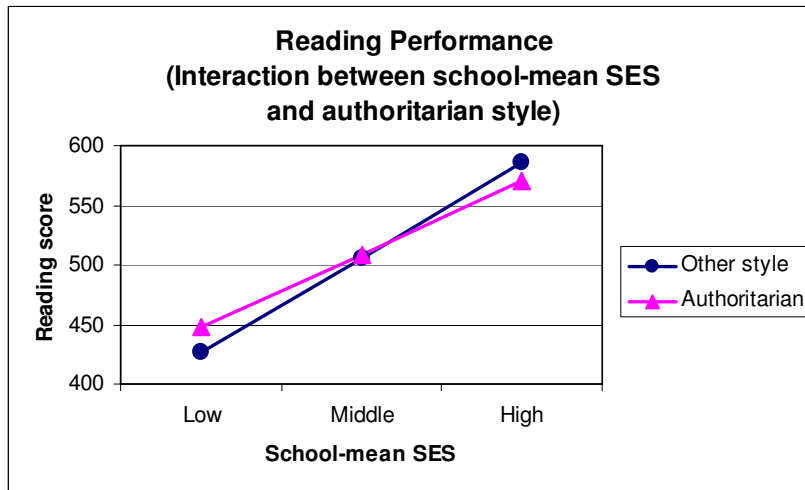
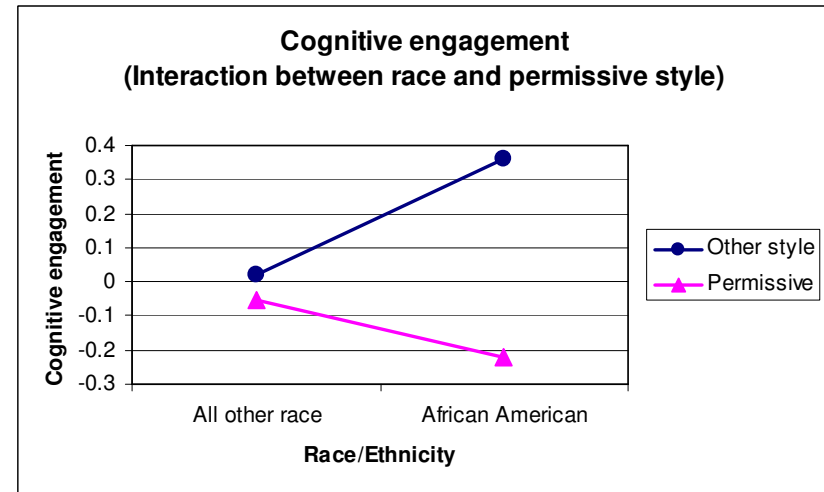
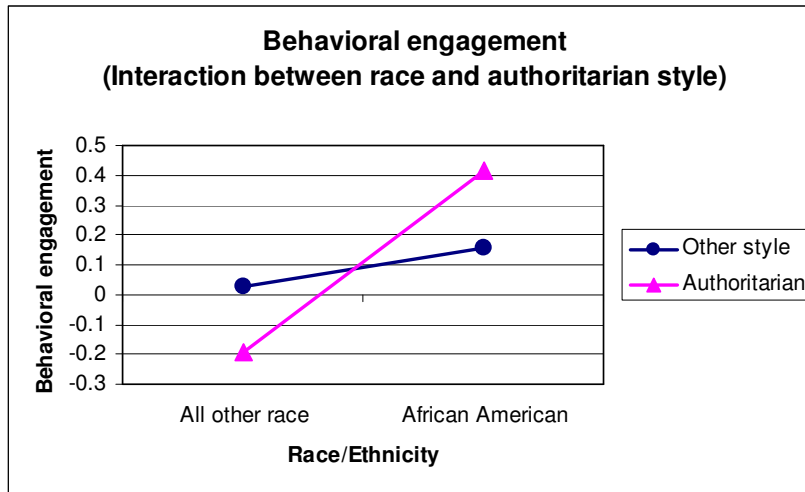
	Behavioral engagement		Emotional engagement		Cognitive engagement		Reading	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	0.00	0.03	0.03	0.06	0.07	0.05	506.77***	2.99
Individual-level predictors								
Female	0.40***	0.06	0.19*	0.08	0.12	0.08	25.88***	5.76
10th Grade	0.03	0.07	0.01	0.08	0.14	0.07	30.93***	4.10
African American	0.24**	0.09	0.01	0.08	0.09	0.10	-40.86***	8.06
Latino/Hispanic	0.02	0.10	0.17	0.16	-0.13	0.12	-27.90***	7.21
Other Minority	-0.05	0.13	-0.18	0.12	0.11	0.12	-13.41	14.02
English spoken at home	-0.30*	0.14	0.05	0.18	-0.42***	0.11	14.69*	7.04
Individual SES	6.8E-03**	2.1E-03	5.1E-03	2.6E-03	4.5E-03**	1.6E-03	1.24***	0.20
School-level predictors								
School-mean SES	-7.4E-04	8.6E-03	1.1E-02	6.8E-03	-2.0E-02	1.3E-02	2.71***	0.47
Public school	-0.34*	0.16	-0.14	0.18	-0.34	0.25	2.25	10.42
Unknown school type	-0.33*	0.16	-0.15	0.19	-0.33	0.27	2.44	10.66
Authoritarian style	-0.13	0.08	-0.47*	0.23	-0.14	0.11	10.06	7.27
Permissive style	-0.27***	0.07	-0.21	0.23	-0.19*	0.09	9.38	9.99
Indifferent style	-0.17	0.09	-0.28	0.26	-0.25	0.21	-10.30	10.05
Interactions								
Grade*Indifferent			-0.47**	0.16	-0.53**	0.19		
African American*Authoritarian	0.33*	0.16						
African American*Permissive					-0.45**	0.16		
Other*Permissive	0.80**	0.30						
Other*Indifferent	0.94***	0.26						
School-mean SES*Authoritarian							-2.46**	0.72
Variance components								
Within schools	1.13	0.07	1.21	0.06	1.06	0.06	5854.58	322.95
Between schools	0.01	0.01	0.03	0.04	0.05	0.05	285.25	95.06
Percent of variance explained								
Within schools	7.2		6.0		4.6		25.9	
Between schools	25.4		25.5		13.2		63.6	
Deviance (-2Loglikelihood)	1366950		1401181		1349913		5310259	
Deviance difference	5714***		2782***		4956***		2691***	

Note. Deviance difference was calculated against models without interaction terms. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Figure 5. Seven interaction effects involving school socialization style



Note. EA: European American, AA: African American, His: Hispanic/Latino



### *Mediated Effects of School Socialization Style on Reading Performance*

Student engagement was tested as a mediator of school socialization style's effects on reading performance. The three types of engagement were tested separately and simultaneously. Behavioral engagement significantly mediated the effect of school socialization on reading performance. Permissive school socialization style was negatively associated with the behavioral engagement of students ( $\beta = -0.24$ ,  $\sigma = 0.08$ ,  $p < .01$ ), and behavioral engagement was positively associated with reading scores ( $\beta = 7.66$ ,  $\sigma = 2.11$ ,  $p < .001$ ). The mediation effect was  $-0.24 \times 7.66 = -1.84$ ; the standard error of the mediation effect was  $\sqrt{(-0.24)^2 \times (0.08)^2 + (7.66)^2 \times (2.11)^2} = 0.80$ ; and the critical ratio was  $-1.84/0.80 = -2.30$  ( $p < .05$ ). Thus, the direct effect of permissive school on reading was 10.13, the indirect effect was -1.84, and the total effect (equivalent to the sum of direct and indirect effect) was 8.30.

No other mediation effects tested were significant at the .05 level. As shown in Table 3, among the proposed mediators, cognitive engagement was a significant predictor for reading performance. However, as shown in Table 2, there was no positive association between authoritative school style and cognitive engagement. In contrast, compared to authoritarian schools, authoritative schools had a positive association with emotional engagement in Table 2. However, Table 3 shows that emotional engagement was not a significant predictor of reading performance. This non-significant association between emotional engagement and reading performance may contribute to the non-significant mediation effect of school socialization style on reading performance via emotional engagement. When all three mediators were included at the same time, none of the three components of student engagement was a significant predictor of reading performance.

Table 4

## Effects of Student Engagement on Reading Performance

	<u>Reading</u>									
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	508.57***	3.02	508.54***	2.99	508.49***	3.08	508.11***	2.95	508.47***	2.96
Individual-level predictors										
Behavioral engagement			7.66***	2.11					7.10*	2.84
Emotional engagement					1.80	1.91			0.56	2.00
Cognitive engagement							5.84**	2.14	0.67	2.95
Female	25.98***	5.81	22.91***	6.01	25.65***	5.82	25.33***	5.69	22.95***	6.16
10th Grade	30.06***	4.13	29.68***	4.09	30.03***	4.15	29.24***	4.18	29.60***	4.02
African American	-42.76***	8.12	-44.24***	8.25	-42.85***	8.19	-43.57***	8.17	-44.26***	8.27
Latino/Hispanic	-29.88***	7.22	-29.87***	7.31	-30.19***	7.21	-29.17***	7.16	-29.89***	7.44
Other Minority	-14.12	14.48	-14.47	14.95	-13.76	14.51	-14.75	14.46	-14.40	14.79
English spoken at home	16.44*	7.14	18.80*	7.56	16.41*	7.18	18.81**	7.16	18.90*	7.58
Individual SES	1.24***	0.20	1.18***	0.21	1.23***	0.20	1.21***	0.20	1.18***	0.21
School-level predictors										
School-mean SES	2.34***	0.51	2.42***	0.46	2.32***	0.53	2.46***	0.48	2.42***	0.49
Public school	-3.27	11.71	-0.66	11.40	-2.94	11.76	-1.37	11.63	-0.52	11.42
Unknown school type	-2.41	11.72	0.16	11.44	-2.00	11.80	-0.41	11.58	0.34	11.44
Authoritarian style	13.67	8.13	14.41	7.91	14.64	8.34	14.50	8.27	14.76	7.98
Permissive style	8.30	10.67	10.13	10.68	8.72	10.94	9.29	10.90	10.24	10.78
Indifferent style	-10.32	10.21	-9.17	9.89	-9.74	10.48	-8.85	10.17	-8.91	9.98
Variance component										
Within schools	5865.69	322.37	5806.36	331.03	5858.66	323.69	5830.33	320.19	5804.28	330.16
Between schools	333.99	102.27	317.29	104.43	321.13	107.66	329.42	104.94	320.16	106.05
% variance explained										
Within schools	25.2		26.1		25.4		25.7		26.1	
Between schools	61.0		62.1		61.7		61.4		61.9	
Deviance (-2Loglikelihood)	5312950		5307779		5312649		5310075		5307727	
Deviance difference	reference		5170***		301***		2875***		5223***	

Note. Deviance difference was calculated against the model without a mediator. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



## DISCUSSION AND CONCLUSION

This study examined the effect of school socialization style (authoritative, authoritarian, permissive, or indifferent school style) on the three components of student engagement (i.e., behavioral, emotional, and cognitive engagement) and on reading performance. We also investigated whether the effects of school socialization style on student engagement and reading differed by student demographics or school-mean SES and whether the effect of school socialization style on reading performance was mediated through student engagement. This study utilized U.S. data from the Program for International Student Assessment (PISA) 2000 conducted by the Organisation for Economic Co-operation and Development (OECD). The sample comprised 2,849 15-year-old students from 141 U.S. schools.

### *Discussion*

#### *Main effects of school socialization style*

As hypothesized, the authoritative school socialization style had significant positive associations with behavioral and emotional engagement. Students in authoritative schools had higher levels of behavioral engagement than students in permissive schools. It is possible that permissive schools, which lack demandingness, are not able to promote the development of self-regulation as suggested by the self-system processes model. In this study, behavioral engagement was defined as effort and perseverance in learning. It may be natural that students with limited self-regulation show lower levels of effort and perseverance in learning. Further, it is likely that

permissive schools are not able to provide sufficient external demands for students to internalize as suggested by self-determination theory. The prerequisite of internalization is the existence of sufficient demands from the socialization agents. Without high levels of demandingness from schools to do well academically and behaviorally, students may not show effort and perseverance in learning.

Compared to students in authoritarian schools, students in authoritative schools reported higher levels of emotional engagement. In this study, emotional engagement was represented by sense of belonging at school. Students in authoritarian schools may be unable to achieve a sense of belonging when their school has high academic press and firm rule enforcement but provides little or no support for students' individual needs or positive interpersonal relationships with teachers. This finding is also congruent with the tenets of the self-system processes model and self-determination theory regarding the need for satisfying students' three psychological needs (i.e., competence, autonomy, and relatedness). The lack of responsiveness that characterizes authoritarian schools may not promote the development of students' felt security with self and others. This may result in less of a sense of belonging at school. Further, students in authoritarian schools may not perform the desired action of engaging in school because their individual needs are not met.

Interestingly, students in indifferent schools (i.e., schools with low demandingness and low responsiveness) did not display significantly lower levels of behavioral or emotional engagement compared to students in authoritative schools. This implies that demandingness or responsiveness is not the sole determining factors in student engagement but that it is instead the combination of demandingness and responsiveness that determines levels of student engagement. This finding supports the usefulness of the two-dimensional approach of school socialization

style; studies examining only one of these dimensions may fail to detect the interdependence of the two variables.

The positive effect of authoritative school style was not observed on cognitive engagement or reading performance. While the differences were not statistically significant, students in other types of schools (authoritarian, permissive, and indifferent) generally had lower levels of cognitive engagement than students in authoritative schools. School socialization style is a context that alters the effectiveness of school practices by changing the nature of interactions at school and by changing students' willingness to accept the values and rules of the school. Thus, it is understandable that socialization style has immediate effects on individual students' behaviors and their emotions. However, cognitive engagement, defined as elaboration strategy, may require more from students than simply willingness to perform a desired action: it also involves having the skills necessary to perform that action. And so, even when students are willing to use elaboration strategy, they may still need opportunities to learn and practice it. Thus, other factors such as quality of instruction, rigor of curriculum, or students' cognitive abilities, may also be relevant to students' levels of cognitive engagement. This also may be true for reading performance. However, this does not mean that cognitive engagement or reading performance cannot be influenced by school socialization style; instead, it may simply take longer for cognitive engagement or reading performance to be influenced because students must master skills in order to increase their cognitive engagement and reading scores. Furthermore, the levels of students' behavioral engagement and emotional engagement may influence their levels of cognitive engagement and reading performance in the long run. Nonetheless, it is not clear why there was an unexpected trend: students in authoritarian and permissive schools had slightly higher reading scores (but not significantly so) than those in authoritative schools.

Unfortunately, the explained variances of student engagement were not large. Most of the variations in student engagement resided between students not among schools, and the variables included in our models did not explain the variances to a large extent. In other words, important variables at the individual level were not included in the models. Studies have reported that individual characteristics (e.g., self-efficacy, educational aspiration) and family-related factors (e.g., parental expectation, education involvement) other than students' demographics (e.g., gender, race) influence student engagement. For example, Henderson and colleagues argued that the most important predictor of a student's academic achievement is the educational involvement of his or her family. After reviewing over fifty studies each, Henderson and Mapp (2002) and Henderson and Berla (1994) found that students earned higher grades and test scores, had better attendance, completed more assigned homework, and showed more positive attitudes and behaviors when their families provided a positive learning environment at home, expressed high expectations, and maintained educational involvement at school and in the community. In a study of high-achieving African American male students, Maton, Hrabowski, and Greif (1998) also found that the parents of these students displayed active and persistent engagement in all aspects of their sons' educational endeavors: they maintained high expectations, helped with homework, advocated for higher academic placement, and took part in school activities. This study focused on the influence of school environment, and our failure to include individual- and family-level variables other than students' demographics may have led to the small amount of explained variance. Another variable that was not included in this study was information about past levels of student engagement and academic performance. Obviously, current student engagement and academic performance levels are influenced by past levels (A. M. Ryan &

Patrick, 2001). Unfortunately, PISA data is not based on longitudinal research but instead is cross-sectional.

### *Interaction effects of school socialization style*

We found several interaction effects related to grade level, race/ethnicity, and school-mean SES. The self-system processes model and self-determination theory were used to explain the underlying mechanism of school socialization style; however, those were not fully developed to explain differing effects by groups or settings. Thus, we attempted to interpret interaction effects using various approaches.

The negative influence of indifferent schools seems to appear only after students have spent a significant amount of time in those schools. Tenth graders in indifferent schools presented lower levels of emotional and cognitive engagement than did tenth graders in other schools, but this difference was not observed among ninth graders. The reason for this difference may be that it takes time for students to be influenced by the school environment. Indifferent schools provide lower levels of both demandingness and responsiveness to students. It may be natural that students in indifferent schools generally fare the worst in schooling outcomes. It is important to note, though, that students in the study had been under the influence of various educational institutions long before they entered their current schools, and they might have experienced different school socialization styles at their previous schools. Hence, the effect of the current school may appear only after students spend a considerable amount of time at that school. In most U.S. school systems, students begin high school in ninth grade. Most ninth graders in the PISA study sample were still in a period of transition to their new schools and may not have been influenced enough by the socialization style of those schools. In contrast, tenth

graders, most of whom were likely in their second year at their current school, were more likely to show the negative effects of the general lack of attention provided in indifferent schools.

Low levels of school demandingness seemed to be especially detrimental to the behavioral engagement of students in the Other Minority category of race/ethnicity. (As stated earlier in this paper, this Other Minority group includes Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and Multiracial students.) Other Minority students in permissive and indifferent schools showed lower levels of behavioral engagement than did their counterparts in authoritarian or authoritative schools; however, the opposite pattern was observed among other racial/ethnic groups. (Remember that both permissive and indifferent schools are characterized by lack of demandingness.) Demandingness also seemed to be very important for the behavioral engagement of African American students. African American students in authoritarian schools with high levels of demandingness showed higher levels of behavioral engagement than African American students in other schools, but other racial/ethnic groups did not show this difference.

This finding may indicate the existence of cultural variation regarding normative beliefs about what constitutes an adequate level of demandingness. Some studies of parenting style have reported such variation among cultural groups. Rudy, Grusec, and Wolfe (1999), for example, found that parenting styles that support a child's autonomy were more highly valued in individualistic cultural groups than in collectivistic cultural groups. Julian, McKenry, and McKelvey (1994) also found that African-American, Hispanic, and Asian-American parents placed a greater emphasis on their children's self-control and success in school than did European American parents. The cultures of Other Minority or African American groups may share collectivistic views and value conformity toward authority figures. The home environments

of children in these cultures are often authoritarian (and thus have high levels of demandingness). It is possible, therefore, that the children would be most comfortable in a school environment that is also high in demandingness, and would display high levels of behavioral engagement in such a school environment. Congruency between the socialization style of the home and school environments seems to be related to students' academic outcomes (Paulson, Marchant, & Rothlisberg, 1998)—at least for some students.

Another possible explanation is that Other Minority or African American students may need higher levels of school demandingness due to social disadvantages that they encounter. Authoritarian schools hold high levels of demandingness but low levels of responsiveness. In this study, demandingness of schools was measured by academic press and ordinary disciplinary climate of schools. Demandingness is indeed a form of support from schools, especially for students who are in disadvantaged environment. According to a report by the U.S. Department of Education's National Center for Education Statistics, a relatively high proportion of low-income minority students attend overcrowded and under-funded schools with higher proportions of inexperienced teachers (Lewis, et al., 2000). Disadvantages in school conditions experienced by these students may require higher levels of demandingness. As do all students, Other Minority and African American students work hard and persevere in learning when they are expected to perform well in schools and when they are provided with an orderly school climate. However, this does not mean that school responsiveness is not necessary for them. Rather, demandingness may be more important to help these students overcome their social disadvantages. For example, in a study with high-achieving African American male students, Maton et al. (1998) found that students and their parents believed that strict limit setting and discipline were necessary for African American males in a sometimes racist and dangerous world where juvenile mischief can

be misattributed as criminal behavior. However, they also believed that love, support and encouragement fostered children's belief in self and their power to achieve. It seems that socialization agents may need to provide more demandingness for some Other Minority or African American students due to their social disadvantages.

African American students in permissive schools presented lower levels of cognitive engagement than African American students in other schools; however, other racial/ethnic groups did not show this difference. One possible explanation for this finding is related to stereotype threat—the fear that one's behavior will confirm an existing negative stereotype of a group with which one identifies (Steele & Aronson, 1995). Studies have reported that African American students suffer from the stereotype of inferior intellectual ability (K. E. Ryan & Ryan, 2005). Compared to their European American counterparts, African American students perform poorly, and their perceived stereotype threat is believed to depress their performance. Various explanations regarding the mechanism of stereotype threat exist. One is that stereotype threat interferes with the cognitive process. The performance-avoid goal—a concern with appearing unable or less able—has been linked to decreased use of cognitive deep-processing strategies and increased use of shallow processing strategies. Thus, it may be that African American students present lower levels of cognitive engagement because they have established performance-avoid goals under the threat of negative stereotype regarding academic ability. However, high demands—including high expectations by evaluators—seem to reduce the stereotype threat. In a study by Cohen, Steele, and Ross (1999), African American students showed more motivation and identification with tasks when evaluators explicitly provided feedback that invoked both high standards and assurance of students' capacity to reach those standards. Permissive schools with lower levels of demandingness (which in turn implies low expectations regarding academic



and behavioral outcomes) may be unable to quell African American students' fears that they may be judged under the negative stereotype of intellectual inferiority. It is possible that African American students in permissive schools presented lower levels of cognitive engagement than African American students in other schools for this reason. However, it is not clear why students in permissive schools had even lower cognitive engagement than students in indifferent schools.

Demandingness of schools seemed to be more important for African American and Other Minority students. It is possible that different racial/ethnic groups require different levels or types of demandingness and responsiveness due to their different culture or social conditions. Mandara (2006), for example, argued that African American students have a better possibility of being successful in school when their parents use an African American version of authoritative parenting—teaching them cultural heritage and personal power to achieve, and being actively involved. However, Hispanic/Latino students did not show the same pattern as the African American or Other Minority students discussed above. Additional cross-cultural research in the area of school socialization style is needed to explain these differences.

In the main effects models without interaction terms, school-mean SES and individual student SES were significant predictors for all components of student engagement and reading performance. Also, a model with interaction terms showed that the effect of school socialization style differs by school-mean SES. Students in low-SES schools showed better reading performance when they were in authoritarian schools. This result is somewhat similar to the finding from Shouse's (1996) study in terms of the significance of demandingness in low-SES schools. Shouse found that high levels of communality in schools (which indicates responsiveness) had a positive effect on achievement in low-SES schools only when this high communality was accompanied by high academic press and disciplinary climate (which indicate

demandingness). This finding may indicate that authoritarian socialization style can be beneficial when other environmental risks are present.

Most of the relevant evidence of socialization style on children's behavior and outcomes come from studies of parenting style. Ceballo and McLoyd (2002) found that stressful environmental conditions seemed to invoke parental control and restrictiveness. Other studies have reported that in stressful environments, such as impoverished and dangerous neighborhoods, caretakers' control and restrictiveness actually protected children from the negative effects of the environment (Bhandari & Barnett, 2007; Simons et al., 2002). Therefore, it seems that authoritarian parenting can function as a protective factor for low-SES families. By the same token, low-SES schools may function best to protect students from the disadvantages that they experience in their lives when they employ an authoritarian style. In contrast, the opposite phenomenon was observed for students in high-SES schools. It seems that authoritarian style can negatively influence academic performance when other environmental risks are not present. This may happen because demandingness without responsiveness cannot satisfy student's psychological needs and may, in turn, erode their motivation.

#### *Mediated effects of school socialization style on reading performance*

This study tested whether student engagement mediated the effect of school socialization style on reading performance even though school socialization style was not significantly associated with reading performance. In fact, the effect of school socialization style on reading performance was mediated through behavioral engagement. Compared to students in permissive schools, students in authoritative schools showed higher levels of behavioral engagement, which was transferred to higher reading scores. From the perspective of the self-system processes

model, the school's authoritative style satisfied students' psychological needs and encouraged the desired action of behavioral engagement, which in turn produced the desired outcome of higher reading scores. However, the positive mediation effect of the authoritative school style was cancelled out because the positive direct effect of permissive school style on reading scores was a lot higher (although it was not significant at .05 level). Relatively higher reading scores in permissive schools may indicate that the permissive school style is more effective than an authoritative style in enhancing students' reading performance. However, it is also possible that schools adopted a permissive style because of the characteristics of the student population, their family backgrounds, or their home environment. More than half of permissive schools were private, and permissive schools had a relatively higher proportion of European American students. In order to understand the effect of school socialization style, in future studies, it may be necessary to separate the effect of school process from the effect of student composition.

Cognitive engagement was a significant predictor of reading performance, but it was not significantly predicted by school socialization style. This result is somewhat congruent with the previous literature. Although measures of student engagement differ, the literature has generally supported the positive effect of cognitive engagement on academic performance (e.g., Zimmerman, 1990). The problem is that school socialization style was not significantly associated with cognitive engagement. This likely contributed to the non-significant mediation effect.

In contrast, school socialization style significantly predicted emotional engagement. However, emotional engagement was a non-significant predictor of reading performance. The non-significant effect of emotional engagement on academic performance may require further examination. In a study of Mexican and Puerto Rican high school students, Sanchez, Colon, and

Esparza (2005) found that having a sense of belonging significantly predicted academic motivation, effort, and lower absenteeism, but not grade point average. This may indicate that emotional engagement influences academic achievement through other components of student engagement (i.e., behavioral or cognitive). Further studies that show the mediational paths would provide better understanding about the effect of emotional engagement on academic performance.

### *Limitations*

PISA 2000 includes measures covering various aspects of students' life and school conditions as well as academic performance. Most of these measures have good reliability and validity. However, the measure of academic press had an undesirably low reliability and this could have had a damaging effect on the independent variables of the study (i.e., indicators of school socialization style). Indicators of school socialization style were constructed based on the scores of academic press, disciplinary climate, teacher support, and teacher-student relationship. The unreliable measure of academic press may have influenced the categorization of schools. Another limitation was the use of demandingness and responsiveness scores to construct categories of schools. Considering variations among cultural groups regarding the prevalence and the effect of socialization style, the amount of demandingness and responsiveness that are considered adequate or appropriate can differ by race/ethnicity, SES, and other factors. This study did not take these variations into account due to lack of guidance from the literature, and instead used average scores of demandingness and responsiveness from all students. Future studies may need to focus more attention on the appropriate cut points and on group differences.

The operationalization of student engagement in this study may be another concern. In this study, behavioral engagement was defined as effort and perseverance in learning, emotional

engagement was defined as having a sense of belonging, and cognitive engagement was defined as elaboration strategy. Operationalization of each component of engagement corresponded to these definitions. Different definitions and/or operationalizations may provide different results from those found in this study. For example, a study of behavioral engagement focusing on attendance or extracurricular activities might have obtained different results. However, the operationalization of student engagement used in this study was supported by the existing literature.

Although the framework of school socialization style seems promising, there are some limitations that need to be overcome in the future. For example, the framework does not provide any interpretation about the mechanism(s) through which socialization style, an environmental factor, transfers to the individual's attitudes and behaviors. This study attempted to combine the framework of school socialization style with the self-system processes model and self-determination theory in explaining results, but empirical studies explicitly testing the mechanisms and further development of theory are required. Moreover, some critics have questioned whether socialization style is an action or a reaction. Students may present the negative behaviors or attitudes influenced by restrictive and indifferent socialization of schools; on the other hand, schools may become restrictive or helpless because of behavioral, emotional, and academic problems of students. Those influences also can be bidirectional. Because most studies of school socialization style are descriptive and correlational, it is hard to identify the directionality of these associations. Longitudinal studies may help resolve the dispute.

Despite the rigorous methods used, this study has some limitations regarding the data and analysis methods. Student engagement data showed ceiling and floor effects. This means that the current measures of student engagement in the PISA data were not able to capture all the

variability of student engagement among students. It is possible that the limited variability of the data reduced our ability to determine the effect of school socialization style. For example, compared to authoritative style, all other school styles (i.e., authoritarian, permissive, and indifferent) had negative associations with behavioral, emotional, and cognitive engagement, although only two out of nine coefficients were significant at the .05 level. Studies using better measures of student engagement without ceiling and floor effects may produce results that indicate a stronger effect of school socialization style.

About 24% of students were dropped from this study due to missing data, and there were some differences (e.g., related to gender and race) between the included and excluded individuals. The differences represent a limitation to the generalizability of the study results. Centering is another issue to consider in interpreting the findings. Possible concerns of grand mean centering include high correlations between random intercepts and random slopes and multicollinearity between individual variables and the means of the individual variables (Raudenbush, 1989). However, these were not problems in the current study because random slopes were not included in models, and the multicollinearity between individual SES and school-mean SES was not high. With grand mean centering, confounding between cross-level interaction effect and group level effect can be another concern (Hofmann & Gavin, 1998). For cross-level interactions with gender, grade, language spoken at home, or race/ethnicity, this can be a potential problem. However, in the current study, interactions with individual SES and school-mean SES were examined separately.

This study focused on the effect of school environment while controlling for student demographics. What happens at school indeed distinguishes high-performing schools from low-performing schools (Craig et al., 2005). Nonetheless, the influence of students' families should

not be ignored. Studies have reported the significance of home environment and parental involvement on student engagement and academic performance (Henderson & Berla, 1994; Henderson & Mapp, 2002; J. Lee & Bowen, 2006). Omitting variables related to family might have led to the small amount of explained variance in this study. Considering the paucity of literature regarding the framework of school socialization style, however, this study provides unique information contributing to research and practice. In the future, it will also be worthwhile to examine family and school effects together.

The inability to control for previous engagement and performance was another limitation of this study. It is known that prior student engagement and academic performance are strong predictors of current engagement and performance. When the effect of the current school environment is examined, it may be desirable to control for previous student engagement and academic performance. High school students have been under the influence of various educational institutions before they enter their high school. Depending on their backgrounds, students may experience vastly different conditions in their elementary and middle schools. For example, low-SES students in a poor neighborhood may attend schools with a deteriorated and overcrowded physical plant and a general lack of resources, parental participation, and qualified teachers. It is also possible for students to experience a different school socialization style in each school they attend. Without controlling for previous student engagement and performance, it may be hard to isolate the effect of the current school. Another issue is that the effect of the current school environment can materialize or increase as students spend more time in their current school. Because this study used the cross-sectional dataset of PISA 2000, it was not possible to control for previous engagement and performance or to show any change of engagement and performance over time. Still, despite the limitations of cross-sectional data, the

PISA data were a good fit for this study because they included variables to create the constructs of interest: the three components of student engagement (i.e., behavioral, emotional, and cognitive) and the two dimensions of school socialization style (responsiveness and demandingness). Nonetheless, future studies using longitudinal data are needed.

### *Implications*

#### *Research implications*

Better measures of student engagement and school socialization style need to be developed. Student engagement is a multidimensional construct that consists of behavioral, emotional, and cognitive engagement. In the literature, definitions of these three components of student engagement and the distinctions among them are often unclear. In fact, sometimes the same items are used by different authors to measure different components of engagement. The resulting confusion regarding the measures of student engagement makes it hard to compare results from different studies. In this study, as was mentioned earlier, the reliability of the measure of academic press was undesirably low. Academic press was a key factor in determining classification of schools' socialization style. (Disciplinary climate was also a factor.) As a result, low reliability of the measures of academic press can largely influence an entire study. Thus, developing measures of student engagement and school socialization style with clearer definitions and higher reliabilities should be the basis for future studies.

It is also imperative that researchers study all components of student engagement separately and not just use a combined measure of student engagement or limit their focus to only one or two components. Studies often report significant relationships between student engagement and various student outcomes; however, the magnitude and significance of



relationships can differ depending upon the components of engagement and outcomes examined, as shown in this study. Further, the influence of social environment, including school, on student engagement also can differ by components of student engagement examined. Without examining all three components student engagement separately, it is impossible to understand the complexity of this phenomenon. Thus, in order to understand the whole picture of students' lives at school, it is necessary to examine all three components of student engagement separately.

Studies have often reported that various individual and social factors influence student engagement (e.g., Klem & Connell, 2004; Marks, 2000) and that student engagement is a robust predictor of various student outcomes (e.g., Furrer & Skinner, 2003; Gonzalez & Padilla, 1997). Based on this logic, studies often assume that student engagement mediates the effects of those influencing factors on various student outcomes. However, as has been shown in this study, this may not be true. Various individual or social factors may significantly influence a component of student engagement even when the component was a non-significant predictor of a schooling outcome (e.g., emotional engagement in this study). On the contrary, the individual or social factors may not be significantly associated with another component of student engagement when the component is a significant predictor (e.g., cognitive engagement in this study). Thus, researchers need to explicitly test whether each component of student engagement mediates the effect of individual or social factors on various student outcomes.

The application of school socialization style is a promising approach to understanding academic success, but more studies using the framework are needed. While the existing literature on parenting style and school process provides plenty of evidence to support the veracity of the framework itself, there is not enough research that incorporates the framework to allow results from such studies to be generalized at this time. Another issue that needs to be considered is the

broader social context. As studies of parenting style have found, the prevalence and the influence of school socialization style may vary by culture. Other social milieus such as neighborhood SES and broader educational policies may also exert influences. This study also found that the associations between school socialization style and student outcomes differed by student backgrounds or school characteristics. Thus, it is necessary to pay more attention to the broader social context in studies of school socialization style.

In general, there is a paucity of theories that explicitly explain student engagement, and more such theories need to be developed. Given that the importance of student engagement is well-accepted in the education field and that interventions to enhance student engagement have been employed, it seems obvious that more theories regarding the mechanism of student engagement need to be developed. Additional theories of student engagement could help educators, practitioners, and policymakers understand and create social conditions that would enhance student engagement at school. The current lack of theories about student engagement may hinder such efforts.

### *Practice implications*

Interventions in the education field need to pay more attention to student engagement. Plenty of studies have reported significant relationships between student engagement and various student outcomes. This study, too, found that behavioral and cognitive engagements were significant predictors of reading performance. Despite these promising findings, current educational interventions often do not target or examine changes in student engagement. This may be due to the lack of interest in student engagement as well as difficulties in measuring student engagement. Although gains in standardized tests (often a proxy for academic

achievement) may be more visible and easier to change, enhancing student engagement may generate longer-term effects for various student outcomes including achievement. School officials and others who design and employ various interventions at school need to pay more attention to student engagement both as an outcome in and of itself and as a process that can lead to change in other target areas.

Both demandingness and responsiveness are critical aspects of school process. Enhancing student engagement has been a theme for decades (Marks, 2000), and debates over whether it is academic press or a communal perspective that is the best way to increase student engagement have persisted (Gill et al., 2004). Some have emphasized the importance of high scores on standardized tests and strict discipline while others have stressed supportive and caring relationships at school. However, it may be that the combination of demandingness and responsiveness is most important for certain types of schooling outcomes, as was shown in this study. The findings from this study may provide useful information to resolve the debate and help educators and practitioners develop and implement effective interventions to promote student engagement and academic performance. Effective interventions at a few schools have achieved or are moving toward this balance. For example, an early version of the School Development Program—a comprehensive school reform developed by James Comer—focused on creating positive school climate (an indicator of responsiveness) as a priority; however recent versions of the program emphasize a more balanced focus on both demandingness and responsiveness by placing more emphasis on pedagogy (Cook, Murphy, & Hunt, 2000). Other fields also can be informed by the non-contradictory view of school socialization style, including leadership training and professional development.

It may be also true that when it comes to interventions at school, one size may not fit all. The findings of this study suggest that the characteristics of students and schools may need to be considered when designing and implementing interventions to increase student engagement and improve academic performance. While both demandingness and responsiveness are necessary, the amount of each that is adequate may differ depending on characteristics of students and schools.

In impoverished neighborhoods, for example, some schools may suffer from disorder in classrooms, drug activity, and violence among students. Without a safe and orderly environment, students cannot focus on learning. Thus, an intervention to increase academic performance at such a disadvantaged school may need to first focus on creating an orderly disciplinary climate at school. Level of expectation is another issue. It is imperative that teachers and school staff strive to hold high expectations for minority students and students from low-income families. Schools often provide remedial instructions for struggling students. It is critical, however, to avoid underestimating students' abilities when providing extra supports. Adequate training for teachers and school staff may help them maintain high expectations and provide adequate supports for all students regardless of their backgrounds. Not only teachers and school staff but also students may have lower expectations about themselves due to a stereotype threat or a fixed mindset of ability—a mindset that sees one's ability as a given that is immutable. Thus, some students may benefit from interventions that help them overcome these psychological barriers.

However, holding high expectations for all students does not imply that every student should get the same instruction. A school's responsiveness is as important as its demandingness, as we discussed above. For example, differentiated instruction which reflects students' individual needs (e.g., readiness, interest, and learning style) may provide all students the opportunity to be

challenged and to succeed (Lawrence-Brown, 2004). Another way of increasing responsiveness of schools is adopting culturally relevant instruction. Instructions and practices at schools may reflect the culture of dominant groups which is middle class European American culture in the U.S. (J. Lee & Bowen, 2006). Thus, culturally relevant instruction that explicitly incorporates everyday lives of minority students may enhance their understanding of the subjects and increase chances of being successful at school (Brenner, 1998). As such, social workers and other practitioners as well as educators may need to take into account different individual and social conditions in their practices to increase student engagement and academic achievement.

### *Policy implications*

Recent policy changes, such as the increased accountability of schools required by the No Child Left Behind (NCLB) acts, have led to educational reforms that focus narrowly on test scores and academic achievement, and this trend raises serious concerns for educators. Schools cannot offer a balance of demandingness and responsiveness when they are under the pressure of an accountability system that focuses solely on scores of standardized tests. Focusing narrowly on test scores may indeed raise these scores for some children, but relying on this or any single indicator to determine school success may generate unintended longer-term negative consequences. Such a policy could, for example, decrease motivation or emotional engagement of students. More importantly, such a policy could sabotage a key goal of education, that is, raising life-long learners who can adjust to the changing needs of society and workplace (Sheldon & Biddle, 1998). Thus, future educational policy needs to be developed in a way that will enhance other aspects of student learning (e.g., motivation and student engagement) as well as academic achievement.

Improving test scores, as is so heavily emphasized in NCLB, is important; however, test scores may not be sufficient to accurately measure how schools perform in a broader sense. The social, emotional, and ethical development of children is as important as their intellectual development and can, in fact, influence their learning. Therefore, it is necessary to develop better ways of establishing school accountability that use multiple measures to capture all the relevant areas of student development. The measures may include a broad range of student engagement indicators as well as academic performance: attendance, frequency of suspension, sense of belonging at school, usage of higher order thinking strategies, academic performance, grade retention, course completion, graduation, or enrollment in advanced education. With this more comprehensive and inclusive accountability system, schools may be able to strike a balance between demandingness and responsiveness and, as a result, provide better social contexts to promote the healthy and balanced development of children.

An alternative accountability system that measures a broad range of child development indicators may enable schools to meet the needs of diverse student population. However, accommodating diversity does not mean tolerating inequality. It is important to ensure that all schools are equally well-funded and well-supported. The uneven distribution of resources among schools is widespread, a trend that results in opportunity gaps among schools are often unrecognized (Jerald, 2005). Addressing these opportunity gaps along with student performance gaps should be a main concern of policies (e.g., NCLB) to increase student engagement as well as academic achievement.

### *Conclusion*

The framework of school socialization style allows researchers to study meaningful combinations of variables in classrooms and schools. The results of this study partially supported hypotheses based on that framework. By examining the three components of student engagement and academic performance, this study provides a better understanding of the complex realities experienced by students and schools. Findings from this study can inform educators, practitioners, and policymakers who are interested in enhancing student engagement and academic performance. Furthermore, results of this study may lay the foundation for future international comparisons of school socialization style.

APPENDIX A. DESCRIPTION OF MEASURES

Constructs		Items
Student engagement	Behavioral engagement ( $\alpha = 0.83$ )	<i>When I study, ...</i> ( <i>Strongly Disagree, Disagree, Agree, Strongly Agree</i> )
		.....I work as hard as possible.
		.....I keep working even if the material is difficult.
		.....I try to do my best to acquire the knowledge and skills taught.
	Emotional engagement ( $\alpha = 0.86$ )	.....I put forth my best effort.
		<i>School is a place where ...</i> ( <i>Strongly Disagree, Disagree, Agree, Strongly Agree</i> )
		.....I feel like an outsider.
		.....I make friends easily.
		.....I feel like I belong.
		.....I feel awkward and out of place.
	Cognitive engagement ( $\alpha = 0.80$ )	.....other students seem to like me.
		.....I feel lonely.
		<i>When I study, ...</i> ( <i>Almost Never, Sometimes, Often, Almost Always</i> )
.....I try to relate new material to things I have learned in other subjects.		
.....I figure out how the information might be useful in the real world.		
.....I try to understand the material better by relating it things I already know.		
.....I figure out how the material fits in with what I have learned.		

(appendix continues)

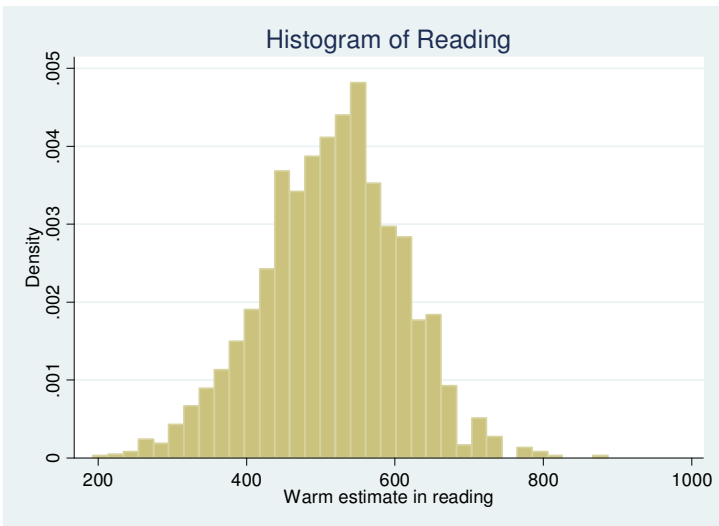
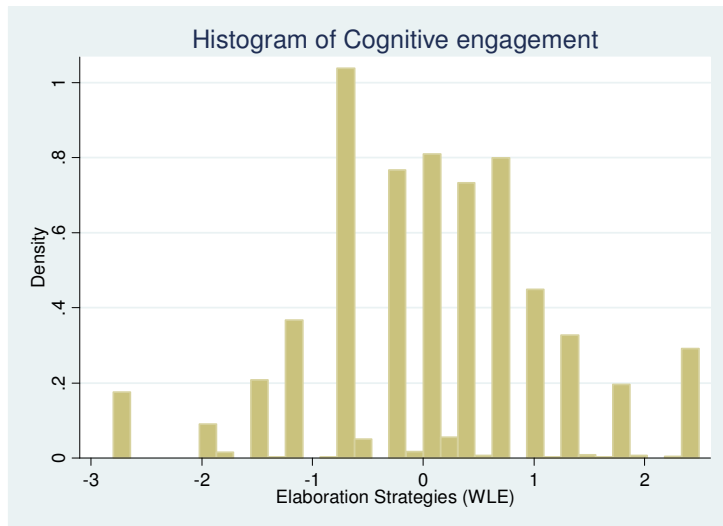
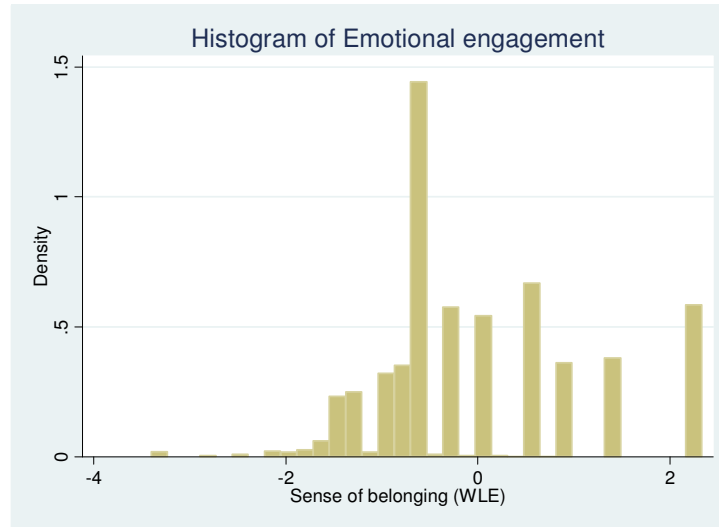
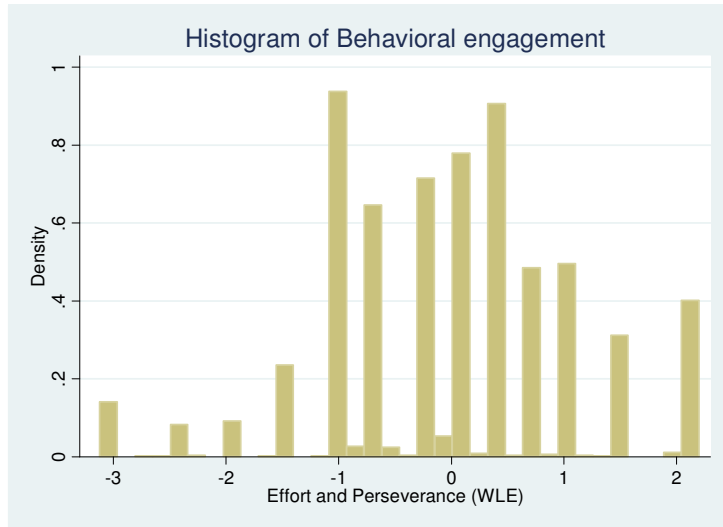
Note.  $\alpha$  = Reliability of measures in the U.S. sample.



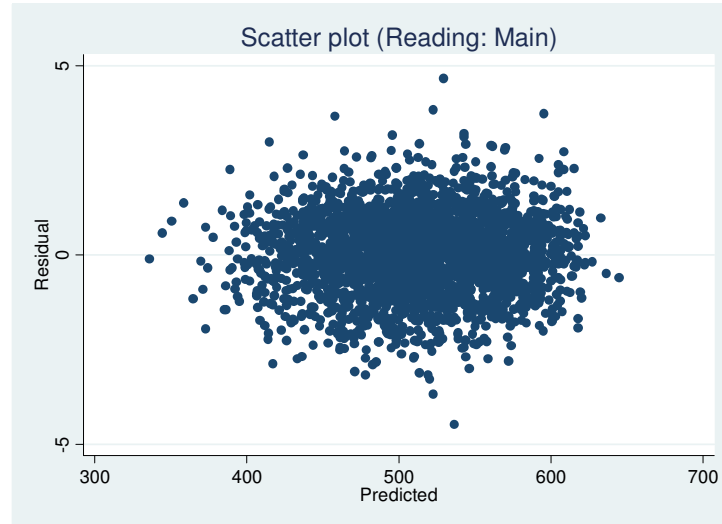
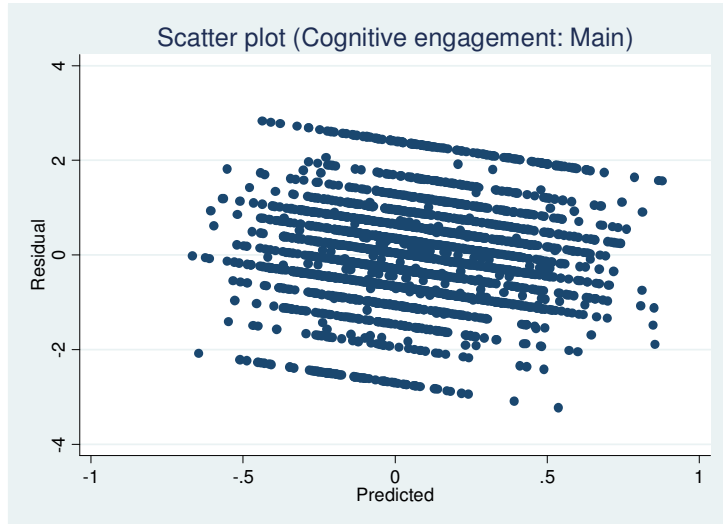
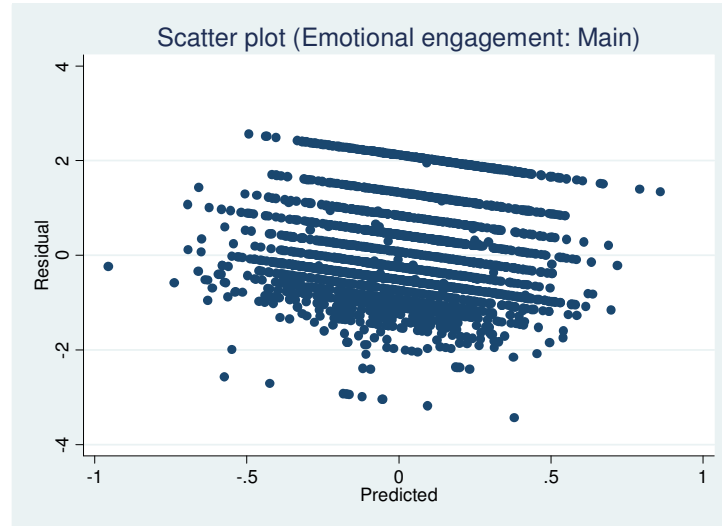
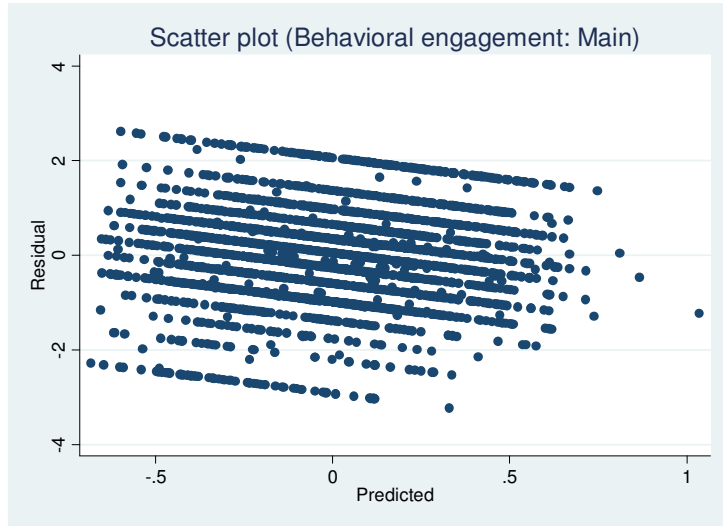
Description of Measures (continued)

Constructs		Items	
School socialization style	Demandingness	Academic press ( $\alpha = 0.54$ )	<i>How often do these things happen in your English lessons: (Never, Some Lessons, Most Lessons, Every Lesson)</i> The teacher wants students to work hard.
			The teacher tells students that they can do better.
			The teacher does not like it when students deliver careless work.
			Students have to learn a lot.
		Disciplinary climate ( $\alpha = 0.83$ )	<i>How often do these things happen in your English lessons: (Never, Some Lessons, Most Lessons, Every Lesson)</i> The teacher has to wait a long time for students to quiet down.
			Students cannot work well.
			Students don't listen to what the teacher says.
			Students don't start working for a long time after the lesson begins.
		There is noise and disorder.	
		At the start of class, more than five minutes are spent doing nothing.	
	Responsiveness	Teacher support ( $\alpha = 0.91$ )	<i>How often do these things happen in your English lessons: (Never, Some Lessons, Most Lessons, Every Lesson)</i> The teacher shows an interest in every student's learning.
			The teacher gives students an opportunity to express opinions.
			The teacher helps students with their work.
			The teacher continues teaching until the students understand.
		The teacher does a lot to help students.	
		The teacher helps students with their learning.	
Teacher-student relationship ( $\alpha = 0.83$ )		<i>How much do you disagree or agree with each of the following statements about teachers at your school: (Strongly Disagree, Disagree, Agree, or Strongly Agree)</i> Students get along well with most teachers.	
		Most teachers are interested in students' well-being.	
	Most of my teachers really listen to what I have to say.		
	If I need extra help, I will receive it from my teachers.		
	Most of my teachers treat me fairly.		

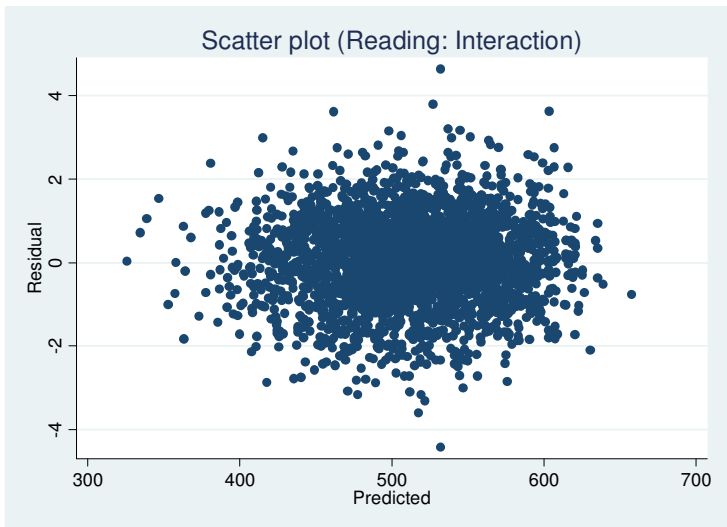
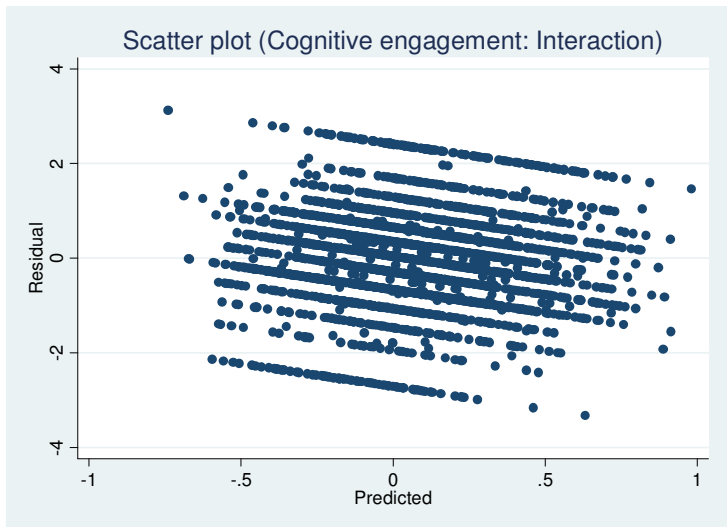
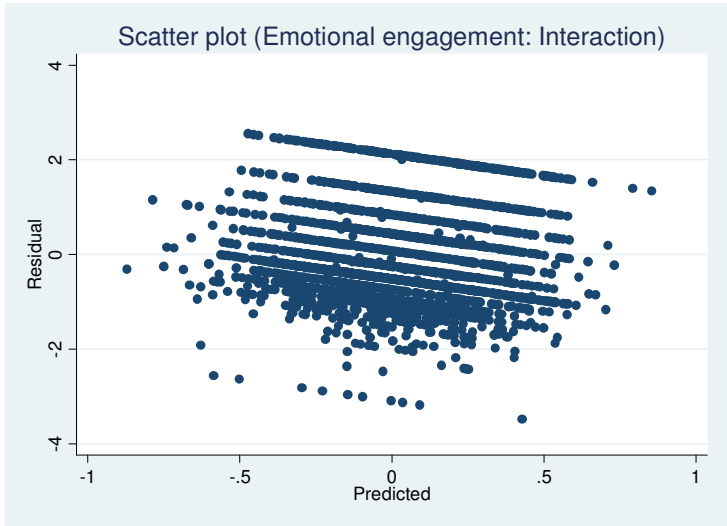
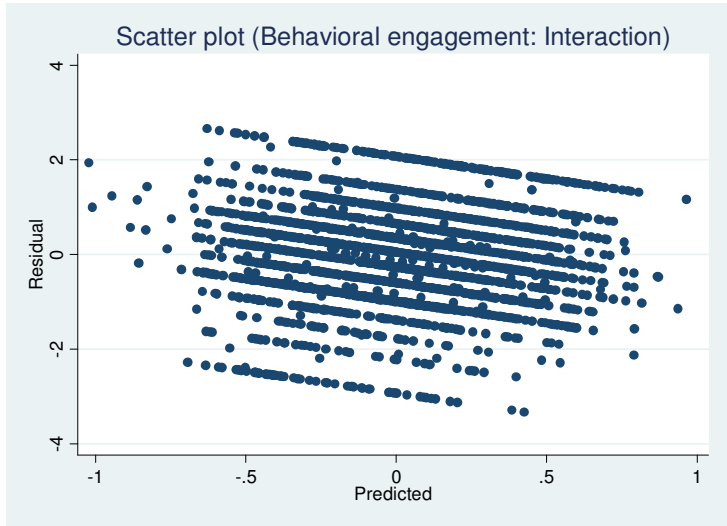
## APPENDIX B. HISTOGRAMS OF OUTCOMES



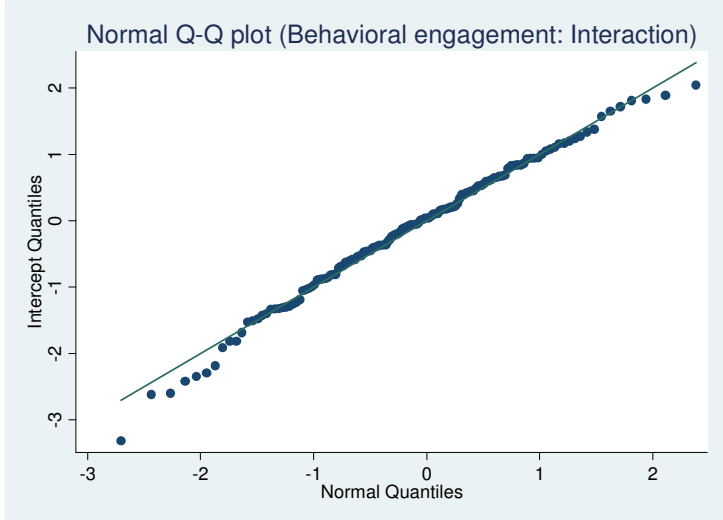
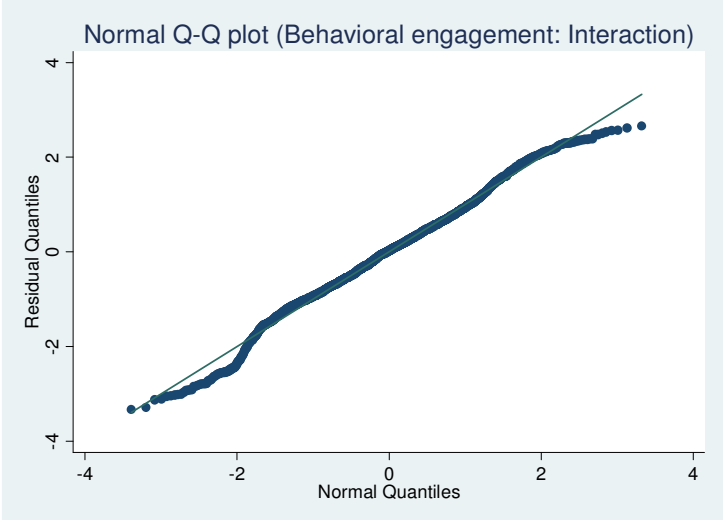
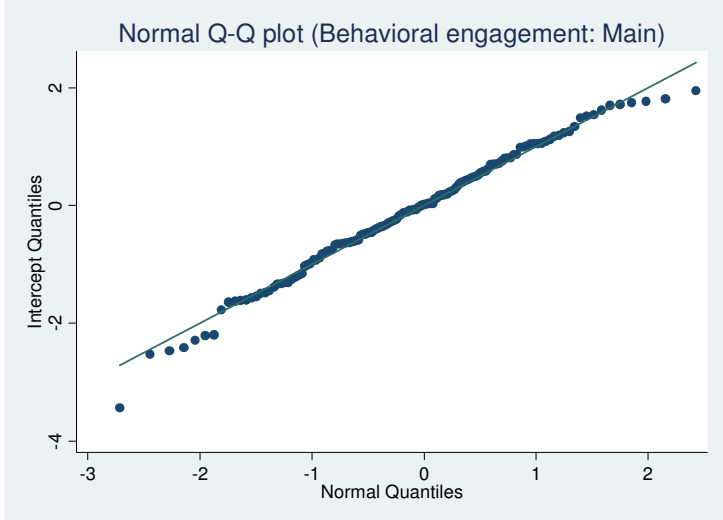
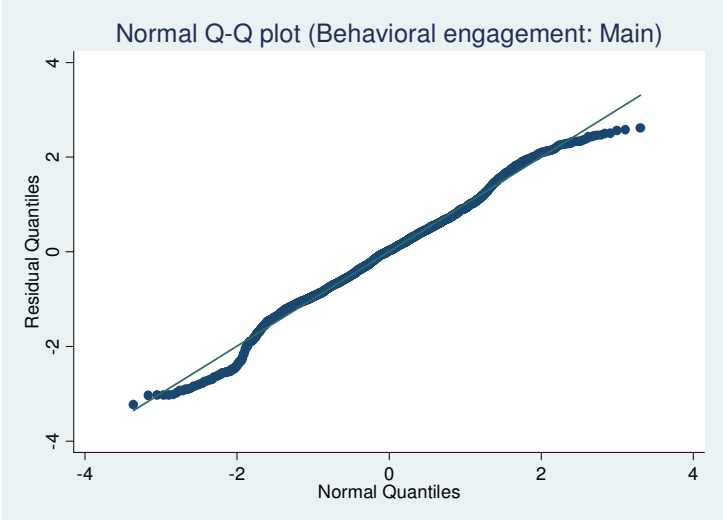
APPENDIX C. RESIDUALS OF MAIN MODELS AND INTERACTION MODELS



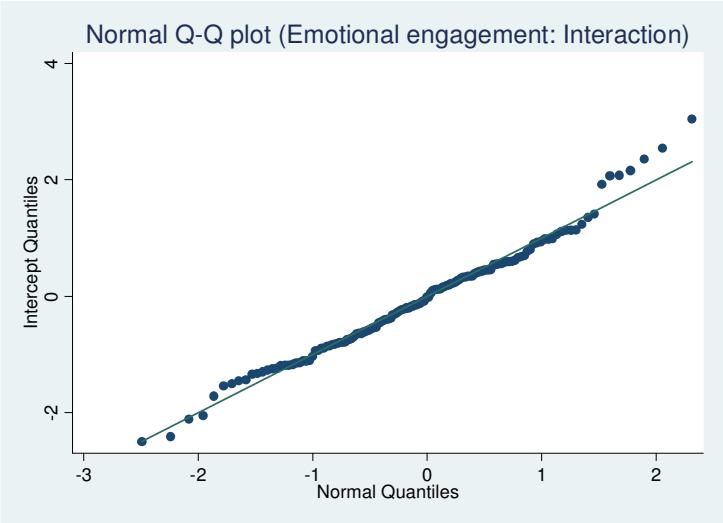
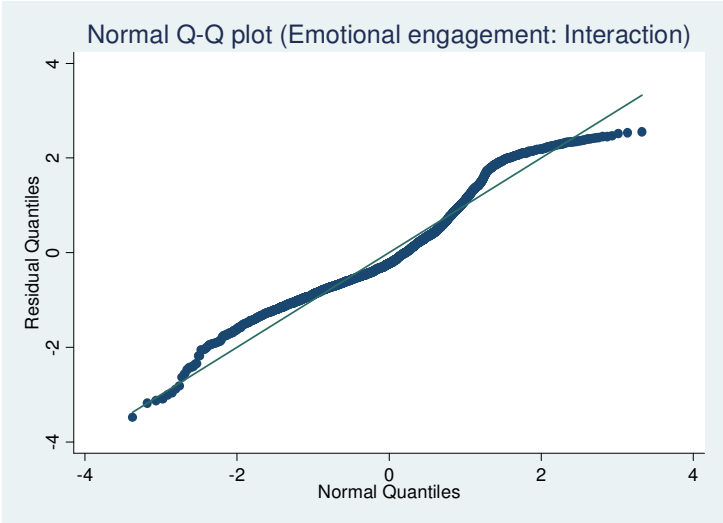
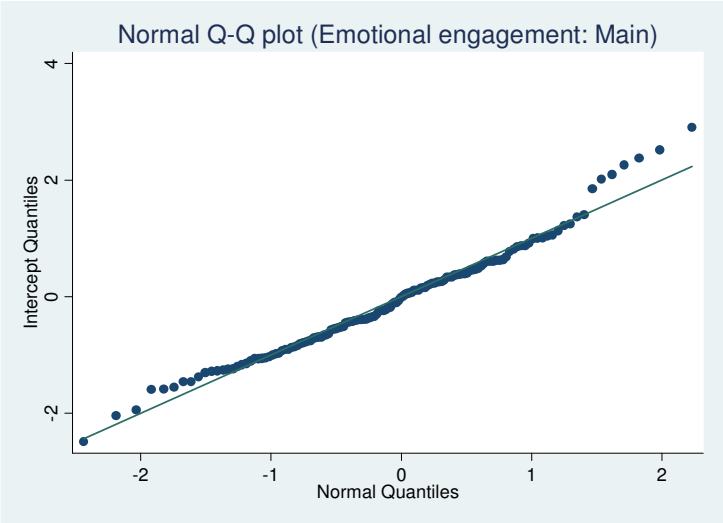
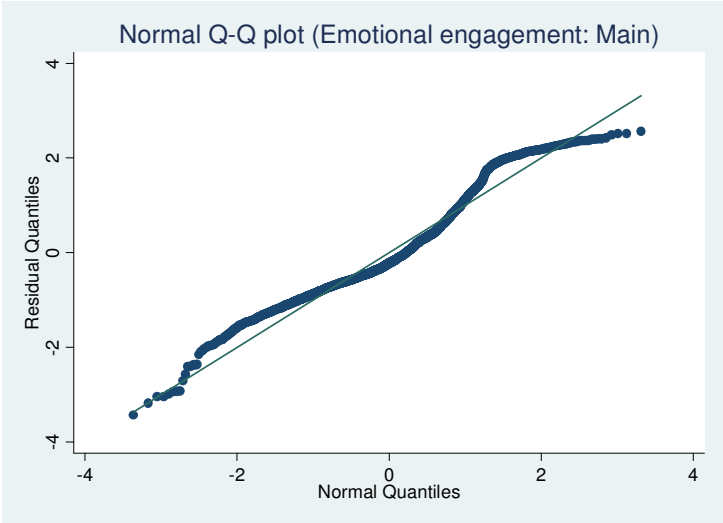
Residuals of main models and interaction models (*continued*)



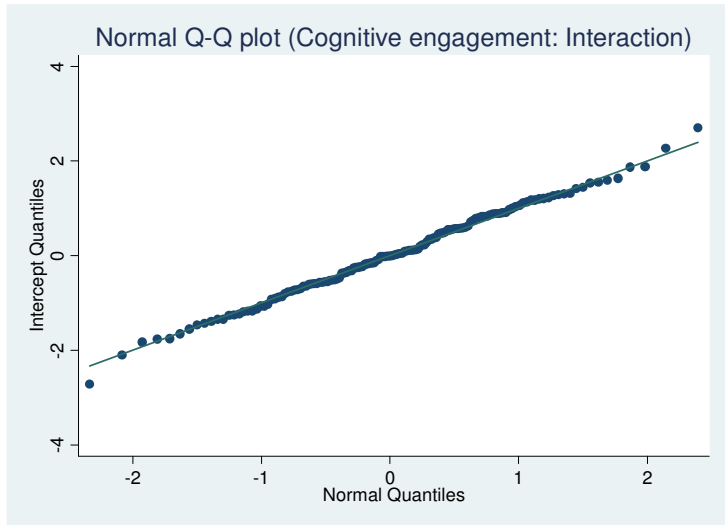
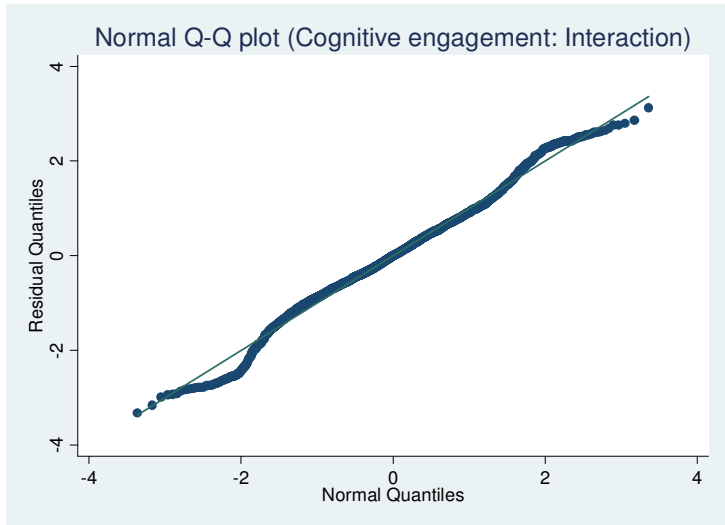
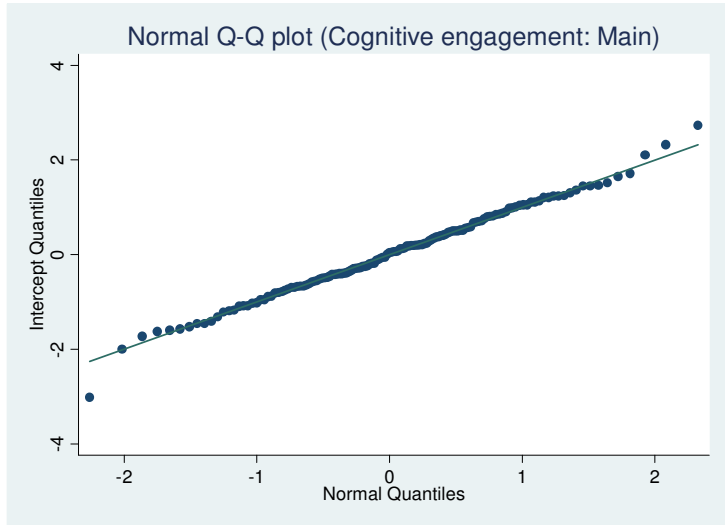
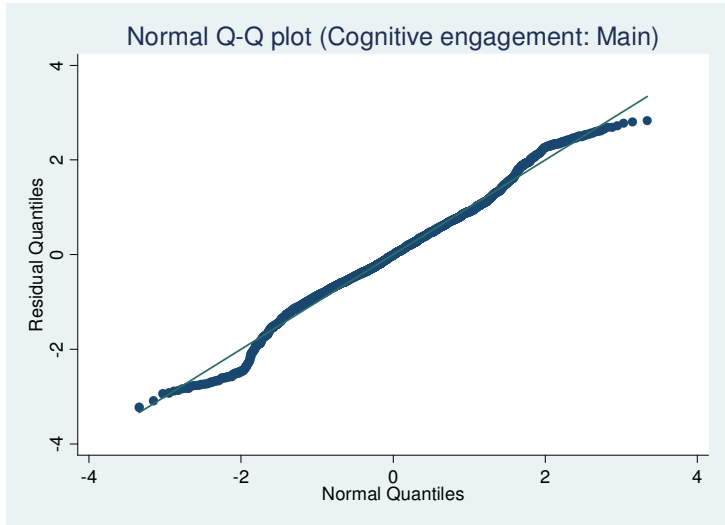
Residuals of main models and interaction models (continued)



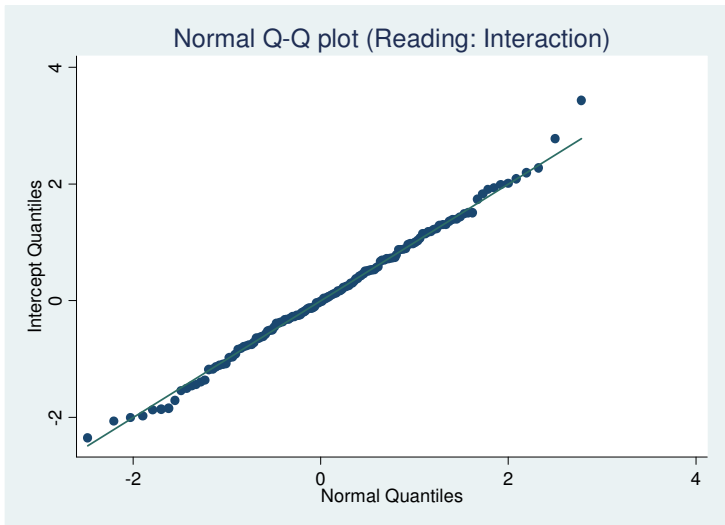
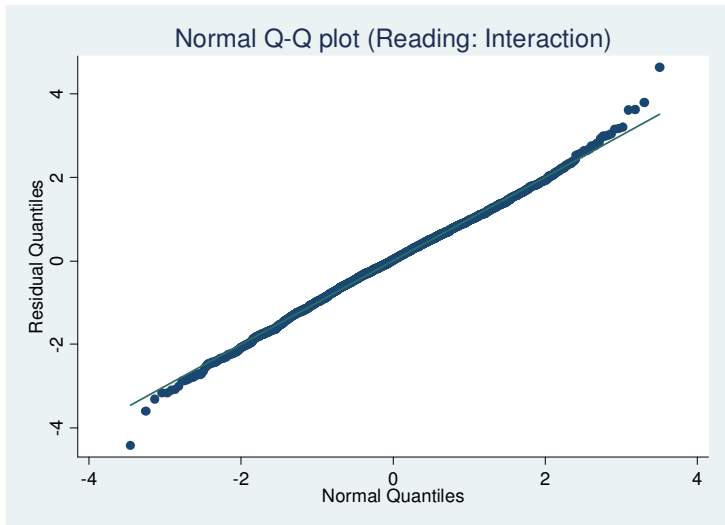
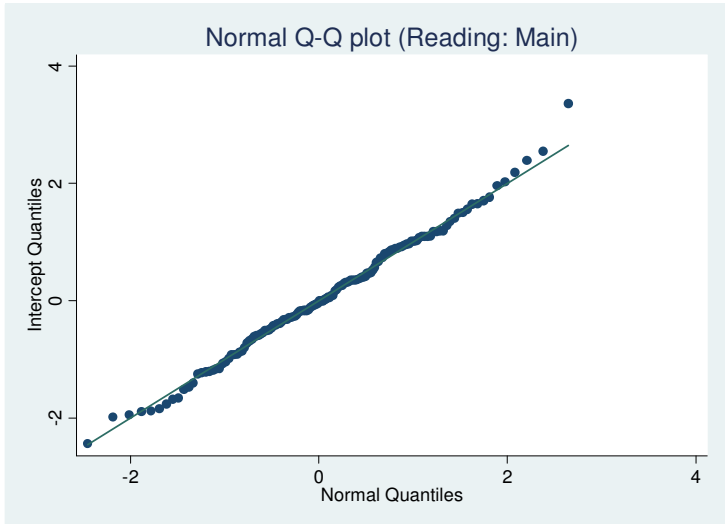
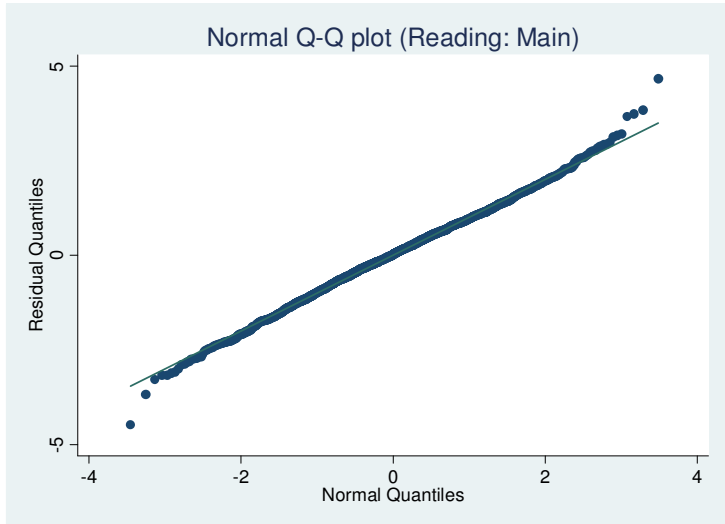
Residuals of main models and interaction models (continued)



Residuals of main models and interaction models (*continued*)



Residuals of main models and interaction models (*continued*)





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