INVESTIGATING THE INTERSECTION OF SCHOOL ACADEMIC POSITION AND STUDENT BACKGROUND ON JAPANESE TENTH GRADERS' EDUCATIONAL CHOICES AND STUDY HABITS

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By

Ryoji Matsuoka

Dissertation Committee:

Ronald H. Heck, Chairperson
David Ericson
Gay Garland Reed
Seio Nakajima
Patricia Steinhoff

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ABSTRACT

This study investigates tracking effects on students' educational choices and behavior that shape their educational trajectories. It represents an initial attempt to document how high school students' tracking location and other features of their schools influence their choice of obtaining additional learning opportunities inside or outside of their formal high school settings and how these choices may explain how much effort students exert in learning math. More specifically, the study investigates whether three tracking locations (i.e., school rank, school socioeconomic status, and curriculum tracking) and student background (i.e., student socioeconomic status and academic attitude) influence students' likelihood of obtaining instructional lessons additional to their regular lessons (i.e., shadow education and supplemental free lessons) and the length of self-studying hours they report spend learning math during the first semester of their three-year high school education.

This study utilizes data from the Programme for International Student Assessment (PISA) 2006 conducted by the Organisation for Economic Co-operation and Development (OECD). This is a nationally representative data set consisting of 5,952 tenth grade students in 185 high schools in Japan, which has a well-defined high school hierarchical academic structure, and a substantial number of students who obtain supplemental instruction. Based on theory of practice by Bourdieu (1984), multilevel logistic and ordinal regression analyses were conducted. Results of the study suggested that (1) the three tracking factors along with students' socioeconomic status affect students' pursuit of family-paid shadow education lessons; (2) students' academic attitude influences their attendance at free-of-charge additional lessons provided by school teachers; (3) a significant interaction term between student SES and school SES was identified suggesting, more specifically, that higher SES students who attend high-SES schools are more likely to

obtain both types of extra lessons; and (4) gaining additional lessons influenced students' reported self-study-hours net of other contextual and school factors. In the final chapter, these results are discussed in terms of their theoretical and practical implications.

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CONCEPTUALIZATION OF THE RESEARCH PROBLEM

Introduction

Increased student competition for limited places in postsecondary selective educational institutions has raised the stakes for students to obtain strong educational preparation during high school. Tracking is still a common structural mechanism of separating high school students by ability or interest in the United States (Heck, Price, & Thomas, 2004; Lucas, 1999; Oakes, 1985, 2005). While one's track location within the school is known to affect preparation for postsecondary education, most previous studies on tracking focus on mechanisms within schools that enhance or limit students' access to quality curriculum and teaching (Carbonaro, 2005). This tracking study of Japanese high schools will unpack tracking effects on specific student behaviors (i.e., educational choices and study habits) in the constantly changing educational environments where students can choose to participate in, or purchase, additional learning opportunities inside/outside their high schools. The assumption underlying the study is that obtaining these types of extra learning experiences enhances students' likelihood of obtaining more favorable opportunities for postsecondary study.

To assess possible tracking effects on the students' educational choices and study habits, this study utilizes a data set consisting of tenth graders in Japan, where one can find three types of learning opportunities: (1) *regular lessons* of different duration at public/private schools that are hierarchically ranked and recognized as school-based academic tracking (i.e., school-based tracking with possible ability grouping within each school), (2) *supplemental free lessons* taught by school teachers, and (3) *supplemental purchased lessons*, called shadow education, taught by non-school teachers outside of public/private schools. It is strategically ideal to use Japanese data

to study the potential tracking effects on students' choices and study habits, since Japan has a well-defined high school academic ranking structure, and a substantial number of students either pay for, or obtain, supplemental instruction. Using this dataset, the current study will explore whether the academic tracking, or ranking, process within the formal educational system serves to moderate (i.e., increase or decrease) students' likelihood to seek extra learning opportunities to increase their academic performance and, in turn, whether this contributes to differences in their reported study habits. Studying these processes in further detail may reveal whether this system of extra educational experiences serves to maintain unequal access to formal educational opportunities, such as higher education, through social class differences.

High School Tracking in Japan

Japan has a different type of secondary schooling system from the typical comprehensive high school model in the United States. Secondary schools in Japan are differentiated according to their academic press (i.e., educational expectations for students, curricular experiences, student outcomes viewed as the number of graduates who proceed to universities). This differentiation has been noted to represent a type of academic ranking system similar to a tracking system (Kariya & Rosenbaum, 1999; LeTendre, Hofer, & Shimizu, 2003; Rohlen, 1983). As Kariya and Rosenbaum (1999, p. 11) describe this type of tracking system:

> While Japanese schools rarely had ability grouping within schools, their school hierarchy is regarded as tracking in Japan as it would be in the United States (Iwaki & Mimizuka, 1983). Sociologists note that both forms of tracking have similar social properties (Rosenbaum, 1976; Sorensen, 1970).

Although there is no specific word for "tracking" in Japanese, high schools are ranked on a single continuum (LeTendre et al., 2003). At ninth grade, which is the last year of compulsory

education, Japanese middle school students must take an entrance examination and then attend high schools that match their demonstrated level of academic performance (Rohlen, 1983). Even in small school districts and regions that attempt to diminish academic ranking, public high schools are often included somewhere in the academic ranking system of private schools (Takeuchi, 1995).

In the hierarchical high school ranking system, which high school one attends essentially limits opportunities and choices of academic and career path (Iwaki & Mimizuka, 1983). Kariya and Rosenbaum (1987) note that students who attend low-ranked general high schools and vocational high schools "are virtually eliminated from further competition for higher education" (p. 178). Moreover, other researchers also conclude there is limited access to higher education available for students who attend low ranked high schools (Nakanishi, 2000; Ono, 2001), while "[a]ttending higher ranking high schools significantly improves the probability of advancing to higher ranking colleges" (Ono, 2001, p. 182). By using the national survey of social stratification and social mobility (SSM) gathered in 1985 and in 1995, Nakanishi (2000) points out that attendance rates for four-year universities greatly differ due to high school rank and suggests that lower high school ranking limits students' possibility of attending top universities. A more recent study by Brinton (2009), using data from 1997 to 2003, indicates a positive relationship between school rank and the proportion of graduates attending the university over a several-year period. Her data indicates that the lower the school's academic rank, the higher the percentage of students that enter the job market directly. In short, based on his findings that high SES students enter the academically competitive high school, Onai (1998) contends that the high school tracking system therefore functions to reproduce the existing social stratification, helping social reproduction occur.

Shadow Education

Under this hierarchal academic ranking system in Japan, tracking effects may also emerge outside of high schools. One primary means is through students' choices to obtain additional instructional lessons which are provided through a private educational market referred to as *shadow* education (Baker, Akiba, Le Tendre, & Wiseman, 2001; Stevenson & Baker, 1992). These additional organized learning activities are similar to those instructional activities found within formal high schools; that is, their lessons are intended to enhance students' academic performance within formal school settings (Baker et al., 2001). Shadow education has grown greatly in both developed and developing countries over recent decades (Bray, 1999, 2003, 2007; Stevenson & Baker, 1992). These services can be provided even across national borders through the Internet (Bray, 2009).

Because pressure to attend a prestigious university represents a primary reason for attending a better academically-ranked high school, it is not surprising that shadow education has become a major phenomenon in East Asian countries such as Japan, Republic of Korea, and Taiwan (Bray, 2003). Taking these additional instructional lessons can be essential in order for students to gain acceptance into more prestigious universities. In one often-cited longitudinal shadow education study in the Japanese context during the early 1980s, Stevenson and Baker (1992) found that 88% of students who intended to go on to higher education participated in at least one shadow education activity, and 60% participated in two or more activities. Although shadow education may enhance opportunities for select students, they noted that Japanese high school seniors from wealthier families, and families with highly educated parents were more likely to participate in shadow education. Echoing this line of argument, Bray (2006) proposes that shadow education is a mechanism that can maintain and increase social inequalities, since

rich families can invest in it. Shadow education also increases the gaps between urban and rural areas and between boys and girls (Bray, 2006). Baker and LeTendre (2005) similarly argue that "[a]s with private schooling, which is often assumed to provide better education, in many nations shadow education becomes another avenue for families to invest in their children's schooling" (p. 67). Kynch and Moran (2006) conclude shadow education represents "growing proof of how economically generated inequalities outside of education systematically undermine equality of access, participation and outcome within" (p. 223). Bray (2009) also suggests that the formal education system be underpinned by a shadow education system that helps maintain inequalities.

Supplemental School-Provided Lessons

In contrast to supplemental paid lessons in the shadow education industry, supplemental free lessons are also available in some public/private schools. The premise underlying these types of programs is that greater student exposure to key topics (i.e., time, opportunities to study more in depth) will result in increased academic performance. In theory, this provides a free opportunity for students to gain extra learning opportunities regardless of their socioeconomic background. While obtaining extra shadow education lessons requires relatively high family economic capital, supplemental free lessons by definition require no additional family economic costs—only the willingness to study more, which seems to represent an academically-oriented *habitus*/learning capital (discussed in further detail later in the chapter). There are only few studies on this topic by Japanese researchers even though a number of high schools are known to offer such supplemental lessons.

Study Habits

In addition to students' educational choices, it is important to assess how the tracking system may affect students' study habits outside of school. More specifically, one of the ways in

which the purchase of, or free participation in, extra academic lessons may widen gaps in student learning due to social class would be if the hierarchal academic ranking of the formal school system influenced individual students' likelihood to study longer periods of time in preparation for school periodic examinations and postsecondary entrance examinations. Assessing who exerts more individual study effort within the formal high school academic system may help reveal another possible hidden effect of tracking on student academic preparation. For example, Carbonaro (2005) argues that there are a number of studies about the relationship between student effort and academic achievement, but little attention has been paid to the possible connection between tracking and student effort. His study appears to be one of the only ones in the United States to find that students' effort due to track placement accounts for some variation in student learning.

As for studies conducted in Japan, Kariya (2000b) argues that although the individual's self-learning time can be used as a sociological index to show individual effort, there have been no previous studies that assessed the relationship between students' family background and their learning effort. Kariya's study on students' self-learning hours outside of their formal schooling revealed considerable differences in the length of self-learning hours (i.e., the index of effort) among students, depending on high school ranking. Moreover, these differences among schools became greater between 1979 and 1997 (Kariya, 2000a, 2000b; Kariya & Rosenbaum, 2003). The model, however, is best considered as preliminary, since the only variables included were father's job, mother's educational background, gender, and four broad categories defining high school academic rank. This study preliminarily supports the proposition that the high school academic tracking exerts independent effects on student studying efforts net of social class background; however, more research supporting this preliminary finding is needed with a

nationally representative sample, detailed school ranks, and including the possible additional influence of extra lessons.

Purposes of the Study

The focus of this study is to examine how the Japanese academically-ranked secondary educational system may influence individual students' likelihood of seeking additional learning opportunities (e.g., pay for private lessons, attend supplemental free lessons provided by public or private schools) and their study habits. Previous research suggests that the likelihood of choosing to participate in the two types of lessons specified may be influenced by a number of school and individual variables including, most prominently, the academic ranking of their schools, the relative availability of such opportunities, and family socioeconomic status. Considering these influential factors, more specifically, the purposes of this study are (1) to investigate how school academic differentiation may influence students' likelihood of obtaining extra instruction to boost their likelihood of gaining entrance to a quality postsecondary institution; and (2) to determine whether tracking and additional instructional lessons influence students' study habits in learning mathematics. Because previous research has identified the importance of students' successful transition from intermediate or middle school to high school (Akos & Galassi, 2004; Alspaugh, 1998), the focus of the study is on students' early experience in transitioning to high school (i.e., their first semester) in order to identify which students initially begin preparing for higher education by taking/purchasing additional instructional lessons immediately after entering into high school, and how the tracking structure and these extra instructions affect the amount of effort students exert.

Conceptual Framework

The conceptual framework draws from four theories in specifying how school academic ranking affects student learning choices and study habits. These include academic tracking (Oakes, 2005), theory of practice (Bourdieu, 1984), capital conversion (Bourdieu, 1984, 1986; Lynch & Moran, 2006), and learning capital (Kariya, 2009a). The first framework, the structure of academic tracking, underpins the entire study, while the latter three are used to investigate each research question more specifically.

Tracking Effects

Tracking, or ability grouping, based on academic performance is one of the core structural mechanisms which reinforces and intensifies existing inequality in schooling (Oakes, 2005). As Oakes argues, because of negative effects of tracking, students in lower track classes

> have less access to high-status knowledge, fewer opportunities to engage in stimulating learning activities, and classroom relationships less likely to foster engagement with teachers, peers, and learning. The sorting and differentiated opportunities promote gaps in outcomes of every sort: achievement, graduation rates, college going, and so on. (p. xi)

The literature on the Japanese tracking system also suggests that the existing system reinforces and intensifies the inequality based on one's socioeconomic position (Onai, 1998), discussed in further detail in Chapter 2.

Habitus, Capital, and Field: How Practice is Generated

To understand who chooses to take free/paid lessons and spends longer time in self-study and how such practices are generated as reproduction strategies under the influence of the tracking system (tracking effects), this study includes variables to apply Bourdieu's (1977)

practice equation for theory testing: Who takes certain actions shaped by tracking? Bourdieu elaborates his theory of practice in his *Outline of a Theory of Practice* and later, in his prominent work, *Distinction*, he refers to it as follows (Bourdieu, 1984, p. 101):

(*Habitus* x Capital) + Field = Practice

As the equation suggests, Bourdieu views *habitus*, capital, and field as interrelated concepts.

Habitus. Maton (2008) summarizes this complex concept based on Bourdieu's numerous writings. He explains that *habitus* is a system of dispositions, which is a structure that structures itself (a structuring and structured structure); it is shaped by the individual's past experience and present circumstances, and it also shapes one's current and future perceptions/practices.

Capital. Bourdieu (1986) defines three forms of capital. These include economic capital (e.g., money and property rights), cultural capital (i.e., *embodied cultural capital*: one's awareness towards cultural matters/goods; *objectified cultural capital*: cultural goods like books and pictures; and *institutionalized cultural capital*: educational qualifications), and social capital (i.e., resources gained in social networks with group membership and titles). He argues further that economic capital is at the root of every form of capital. There is a difference noted between the embodied form of cultural capital and *habitu*s. The embodied form of cultural capital includes a taste for "high art," general cultural awareness, and verbal skills (Swartz, 1997), while *habitu*s is ''a set of deeply internalized master dispositions that generate action (Swartz, 1997, p. 101)."

Field. A field can be defined "as a network, or a configuration, of objective relations between positions" (Bourdieu & Wacquant, 1992, p. 97). It consists "…of positions occupied by social agents (people or institutions) and what happens on/in the field is consequently boundaried" (Thomson, 2008, p. 69). Drawing on Bourdieu's writings, Thomson argues that

games played in social spaces or fields are competitive, and social agents with certain capitals use various strategies to improve or maintain their social position; an example of such strategies is financial investment, which is an economic strategy. In social fields, some players possessing certain volumes of capital are advantaged, and these players can use their advantages to improve their position, while fields are differently shaped based on the game which is played on those fields.

Interrelated concepts. It is necessary to use these three concepts together in order to understand how individuals (families) strategically use education to maintain and improve their social position. As Maton (2008) argues, Bourdieu's (1984) practice equation, which demonstrates the relationship among the three concepts, can be understood as follows: [P]ractice results from relations between one's dispositions (*habitus*) and one's position in a field (capital), within the current state of play of that social arena (field) (p. 51). Moreover, as he suggests, "practices are not simply the result of one's habitus but rather of *relations between* one's habitus and one's current circumstances" (p. 52).

Reay (2004) also articulates Bourdieu's argument, suggesting "habitus becomes active in relation to a field, and the same habitus can lead to very different practices and stances depending on the state of the field" (p. 432). As Reay continues, "For Bourdieu it is the interaction of habitus, cultural capital and field that generates the logic of practice" (p. 435).

Capital Conversion

Another theoretical framework underlying the study is *capital conversion*, a term coined by Bourdieu (1986). He emphasizes the convertibility of the three forms of capital (economic, cultural and social); one form of capital can be converted into another. Converting economic capital to another form of capital tends to require less effort, and this means that it is less costly

compared to converting from cultural or social capital to another form of capital. This convertibility of capital is a foundation of strategies to ensure reproduction of capital for intergenerational transmission of capital, which reproduces individuals' social positions (Bourdieu, 1984, 1986).

Bourdieu (1984) suggests that one example of capital conversion as a social class reproduction strategy is the conversion from economical capital to academic credentials (e.g., types of diplomas, diplomas for more desirable institutions). These types of secondary school academic credentials represent an institutionalized form of cultural capital (Bourdieu, 1986). Based on these understandings of the theory and example given by Bourdieu (1984), in this study, taking paid (shadow education) lessons is understood as an example of capital conversion from economic capital to cultural capital with the influence of one's *habitus* and field (tracking location).

Learning Competencies in a Learning-Capital Society

Kariya (2009a) proposes to apply the concept of learning capital for understanding how social reproduction occurs in the context of the Japanese society. According to Kariya (2009a), Japan used to be viewed as a middle class society, with an emphasis on the importance of having "academic credentials" based on a meritocratic ideology. More recently, however, there has been a shift from this type of credentials-oriented society to a type of class society that differentiates people based on their level of learning competencies that are "a combination of eagerness to learn, good learning habit, initiating active learning, and learning how to learn" (p. 94). In this new "learning capital society"(p. 88), Kariya argues that "learning competencies are the core of the new types of human capital formation" (p. 92), which are referred to as a form of learning capital.

After emphasizing that social inequality and its reproduction over time are led by the unequal distribution of this form of capital and how crucial it is to develop learning capital at younger ages for one's life chances, Kariya (2009a) questions whether learning competencies are equally distributed based on individuals' socioeconomic backgrounds, since students with disadvantages in terms of family supports and environments tend to "fall behind in developing learning competence as well as basic skills" (p. 101). As a consequence, they "never develop the mechanism of lifelong human capital formation" (p. 101).

Kariya (2009) argues that it is possible to assess learning capital indirectly by observing students' learning attitude, and he uses data which includes variables that reflect "students' degree of active participation and their perception of themselves as taking responsibility for their own learning" (p. 102) that are the main component of learning competencies: that is, being able to *learn* how to learn. Kariya (2009) finds that fifth and eighth graders with higher cultural background are more likely to have higher learning competencies; these competencies are unequally distributed and significantly influenced by students' family background. These gaps in learning competencies are observed as early as the fifth grade level. He contends that disadvantaged students will "eventually face the most severe challenges in developing those competencies later in life" (p. 106) because of their family environments that "limit their exposure to learning opportunities, and thus their development of adaptive, efficient and successful learning competencies" (p. 110).

Need and Significance of the Study

Tracking Effects on Students' Behaviors

This study's primary purpose is to unpack tracking effects on students' educational choices and effort; more specifically, the accumulation of learning capital as a mechanism to

widen achievement gaps. As Carbonaro (2005) argues, previous tracking studies mainly investigate mechanisms within schools that enhance or limit students' access to quality curriculum and teaching. He suggests that sociologists in education heavily focus on "the importance of social *structure*" (p. 27), such as curriculum tracking that provides learning opportunities differently across tracks, but generally do not pay sufficient attention to "the importance of human *agency* in shaping students' outcomes" (p. 27). Thus, Carbonaro contends that "few studies have successfully accounted for the role that both structure and agency play in determining students' outcomes" (p. 28). Carbonaro's study using the NELS:88 data set revealed that higher track students exerted more effort than their lower track counterparts, and these track-related differences in effort partially explained between-track differences in students' learning outcomes. Building on this line of inquiry, this proposed study investigates whether school tracking location influences students' behaviors with respect to obtaining additional academic lessons and their study habits—both thought to be primary indicators of students' means of enhancing their skills needed to increase their performance on post high school examinations within the Japanese educational context.

From a broader standpoint, it is important to assess tracking effects on students themselves (i.e., educational choices of obtaining additional lessons and changes in study habits) in a time that neo-liberal policies are influential. Such policies emphasize student/parental choices and self-responsibility for consequences of their educational choices, even though student/parental choice and study habits (e.g. how much effort one exerts) seem to be shaped by not only students' family background, but also academic structures such as tracking, which appears to be an essential feature of the formal educational system in Japan. The same argument could be applied to other countries as well. Considering that higher SES students are more likely

to attend competitive high schools within the academic ranking system, it is imperative to clarify such tracking effects on students' choice and study habits that may be exacerbating existing social inequities in educational opportunities.

Tracking and Shadow Education

This study will assess relationship between academic tracking, one feature of the formal educational system, and shadow education. Examining this relationship is necessary, since previous scholars have not rigorously examined the potential effects of academic ranking of high schools on whether individual students choose to obtain additional academic training inside/outside the regular school hours or whether such academic tracking and receiving extra lessons influence their reported study habits. With the nationally representative data on tenth graders in Japan, where school-based tracking and the three types of instructional learning opportunities exist, it is possible to examine the following theoretical questions:

- Which students choose additional opportunities to improve their academic performance when those opportunities can be gained for free and purchased?
- How does tracking, one of the fundamental features of the formal educational system, influence students' decisions?

Since data were collected in the third or fourth month of students' three-year high school education, the number of students who began conducting capital conversion (purchasing lessons outside of regular lessons) is relatively limited. This will help identify who starts preparing for higher education immediately after entering into high schools, likely reflecting well-planned educational strategies by both students and their parents.

In one set of "tentative results" (see pp. 11-12), Smyth (2009) discusses how school demographic seems to affect attendance of shadow education in Ireland.

> Participation in private tuition is found to be higher in schools with a strong orientation to higher education, that is, where teachers expect their students to go on to college and these expectations are also held by students. These are disproportionately schools with a high concentration of middle-class students so the interaction between social class mix and expectational climate may result in a 'hot house' effect with students feeling under pressure to excel academically. In this way, shadow education and formal schooling may be interlinked, with academic pressure within the school context fuelling the demand for private tuition. (p. 19)

This "hot house" (i.e., tracking) effect that Smyth (2009) refers to is similar to tracking effects in the Japanese context (i.e., with the metaphor referring to "heating" educational aspirations and, hence, competition). Because the entrance examination to attend high schools assesses individuals' academic performance and because there is a relationship between family background and academic performance, secondary education schools in Japan tend to have students from a narrowly-defined level of family socioeconomic status. More specifically, competitive (or highly ranked) academic high schools are more likely to have a larger percentage of students from families of middle or high socioeconomic status. This could be partly because higher SES students tend to take shadow education lessons to prepare for high-school entrance examinations when middle school students. As Yamamoto and Brinton (2010) report, students who obtain shadow education are more likely to attend higher-ranked high schools, while people from highly-educated and wealthier parents tend to obtain shadow education. Since academic high schools expect their students to go on to postsecondary education, this tracking effect is assumed to result in students at competitive schools taking advantage of further learning

opportunities. This proposition, however, requires further empirical testing with a data set that brings together information about the formal education system and shadow education.

Converting Economic Capital into Cultural Capital through Shadow Education

To illustrate capital conversion in relation to shadow education, Kynch and Moran (2006) argue in the Irish case that "middle-class parents use their highly convertible economic capital to open up markets in education outside of the school system itself" (p. 232). Because of the availability of shadow education, individuals "who have superior economic resources can exercise choice not just between schools, but between schools and the private market" (p. 232). Drawing on interviews and Bourdieu's argument, Ball (2003) contends that middle class parents use private tutoring "as an alternative to intervention" (p. 94) from school, and "economic capital is converted into cultural capital" (p. 95) when "bought-in supplements work to fill in for the shortcomings of school provisions and ensure a surplus of performance which distinguishes this child from others" (p. 95). This study empirically tests the influence of tracking with shadow education on students' educational choices as capital conversion which, as noted previously, has not been documented.

The Significance of *Habitus* on Capital Conversion

Another important theoretical proposition examined in this study is whether one's *habitus* is significant in choosing to take additional learning opportunities. Specifically, this study tests who would choose to gain more extra learning opportunities without consideration of students' economic capital by investigating which students are more likely to take free supplemental lessons taught by teachers in their high schools. Since attending these lessons does not require extra economic capital, investigating this could help clarify how individuals' (family) *habitus* generates the practice of obtaining learning opportunities. If higher SES (socioeconomic status)

students are more likely to take these supplemental free lessons, even after controlling for other factors, it would suggest that these students are choosing to have more learning opportunities due to their *habitus*, a system of dispositions toward academic subjects, in order to have higher academic performance valued by the educational system, expecting that resultant gains in academic performance will enable them to enter competitive universities in order to eventually receive a more highly-valued diploma, an institutionalized form of cultural capital. When testing this, the study includes "field," one's location in the academic ranking system, as a control, since "habitus becomes active in relation to a field, and the same habitus can lead to very different practices and stances depending on the state of the field (Reay, 2004, p. 432)." This proposition has not been documented and, therefore, it should be tested empirically with a nationally representative data.

Accumulation of Learning Capital

Learning competencies are defined as "a combination of eagerness to learn, good learning habit, initiating active learning, and learning how to learn" (Kariya, 2009, p. 94). This concept seems to overlap with Bourdieu's (1986) concept of *habitus*; having a high volume of learning capital benefits individuals to keep/advance their social position as having certain types of *habitus* which are legitimated and highly regarded in a field, advantages social agents to maintain/improve their position along with capital. Learning capital could be categorized under *habitus*; learning competencies are substantial aspects of *habitus* in the area of learning: the system of dispositions focusing on abilities and attitudes to learn.

As argued, *habitus* is a structuring and structured structure; educational opportunities that one is exposed to further shape his/her *habitus*, which will affect the structure (*habitus*), and this cycle continues. As Kariya (2009) states, some students who know how to learn, keep learning

and even know how to enjoy learning, while others do not enjoy the same advantages when learning because of the *habitus* formed during early childhood socialization, which their family background impacts strongly.

It is important for students to develop their learning capital, since gaining a high volume of learning capital advantages students for both the short term and also for long term. For example, Kariya (2009) emphasizes the importance of developing learning capital, since "[s]ome high schools and universities now place more emphasis on student achievement reported in school transcripts and accept students on the basis of recommendation by their high schools instead of only through the regular examination procedure" (p. 97). Teachers may evaluate students who possess a high volume of learning capital favorably by giving them higher grades and writing convincing letters of recommendation, while not considering that these students successfully develop their learning capital due to their high socioeconomic backgrounds. As for long term benefits, developing learning capital becomes crucial, since the ways in which schooling is linked to success in life is becoming less clear in the Japanese society (Kariya, 2009). Kariya (2009) argues that "success in school is no longer a guarantee of success in career or life" (p.109); one has to keep learning to maintain/advance their social position in the rapidly changing society. Empirical testing may reveal which students possess high volume of learning capital which shapes their future volume of it, how the tracking system plays a role in determining who develops his/her learning capital, and how students' educational choices may also influence its accumulation.

Convertibility of Learning Capital

Although the concept of learning capital is included in Bourdieu's *habitus*, it is theoretically important to address it because of its high convertibility that Kariya (2009) points

out. Learning competencies began to be important due to societal changes like becoming a knowledge economy, and the competencies started to function as capital which could be transformed into other forms of capital (Kariya, 2009). This could be understood as another type of capital conversion. It can be argued, based on Kariya (2009), that *habitus* "in learning" is aimed at increasing its value and convertibility into other forms of capital. As Kariya contends:

> High learning competencies, as in other forms of capital, continually increase in value, and can be transformed into other forms of capital, such as human capital, cultural capital (through a richer learning environment in the family, for example), social capital (through the development of a wider and more effective social network) and financial capital (through expanded occupational opportunities). (p. 100)

In this sense, his argument is different from Bourdieu's argument. Bourdieu (1986) argues that capital conversion from economic capital to another form of capital requires less effort and less cost compared to capital conversion from cultural capital to another form of capital. Kariya (2009) suggests that in this era, especially in the Japanese context, convertibility of learning capital, *habitus* in learning, became prominent; converting learning capital into another form of capital requires less effort and less cost. *Habitus* in learning becomes capital which has high convertibility, helping social agents who hold it to advance their social position, while *habitus* in learning keeps shaping itself. In this aspect, Kariya's (2009) argument on learning capital represents a revision of Bourdieu's (1986) concepts of "*habitus*," "forms of capital," and "capital conversion." As Bourdieu (1984, 1986) contends that convertibility of capital is a foundation of strategies to ensure reproduction of capital for intergenerational transmission of capital, which reproduces individuals' social positions, it is sociologically

imperative to understand learning capital; how it is accumulated, and who benefits from it in a social field (i.e., in this case, an educational system).

Kariya (2009) shows that one's volume of learning capital is shaped by one's socioeconomic background; if not only economic capital but also *habitus* in the form of learning capital has high convertibility into other forms of capital, higher SES students tend to benefit from this increasing high convertibility of *habitus* (learning capital) along with economic capital. Highly evaluated *habitus* (i.e., a high volume of learning capital) enables higher SES students to employ a wider range of strategies based on not only their high volume of economic capital, but also highly recognized and convertible *habitus* in learning (learning capital) so as to ensure and advance their position in social fields that include education and business.

This study uses the length of self-learning hours as an outcome variable to represent indirectly how much effort students exert in mathematics. Students' length of self-learning hours indirectly represents who currently possess a higher volume of learning capital; that is, it indicates how much effort one exerts, and it covers most of Kariya's (2009) definition of learning competencies as "a combination of eagerness to learn, good learning habit, initiating active learning, and learning how to learn" (p. 94). By analyzing students' length of self-learning hours, it may also be possible to identify who would develop the current positive/negative learning habits more and more, since *habitus* is shaped by the individual's past experience and present circumstances, and it simultaneously shapes his/her current and future perceptions/practices. One's system of dispositions, *habitus*, is a structure that structures itself (a structuring and structured structure). In academic learning, if students exert effort in self-studying, this practice is likely to lead to next practice (self-learning) with a higher volume of

knowledge in academic subjects (cultural capital) and confidence gained in the current and previous learning experiences (*habitus*: "feel" for the game).

To accumulate a high volume of learning capital, students have to be exposed to learning opportunities and such opportunities are not equally distributed due to individuals' family background (Kariya, 2009). This study includes other factors such as tracking location and choices regarding gaining additional academic lessons (i.e., shadow education lessons and supplemental free lessons) in order to clarify how social factors shape students' learning capital development/formation.

Specifying the Multilevel Model

In formulating multilevel conceptual models, researchers often draw a distinction between *exogenous* variables (i.e., variables whose variability is accounted for by factors outside of the model) and *endogenous* variables (i.e., variables whose behavior is dependent upon other variables within the model). The goal of the analysis is to solve the equations for the endogenous variables taking into account the exogenous variables and random errors between constructs. Figure 1.1 illustrates how main constructs are related. Students' exogenous background factors (SES, gender and math performance) are proposed to affect their individual choices of pursuing shadow education and supplemental lesson opportunities. How long individuals engage in self-study of mathematics is proposed to be influenced by their backgrounds and combinations of three types of instructional lessons (regular, shadow education, and supplemental). At the school level, school context (e.g., tracking location) and student composition factors (school SES) are proposed to affect aggregate (school wide) supplemental lesson choices, and in turn, both are proposed to affect reported student self-study hours.

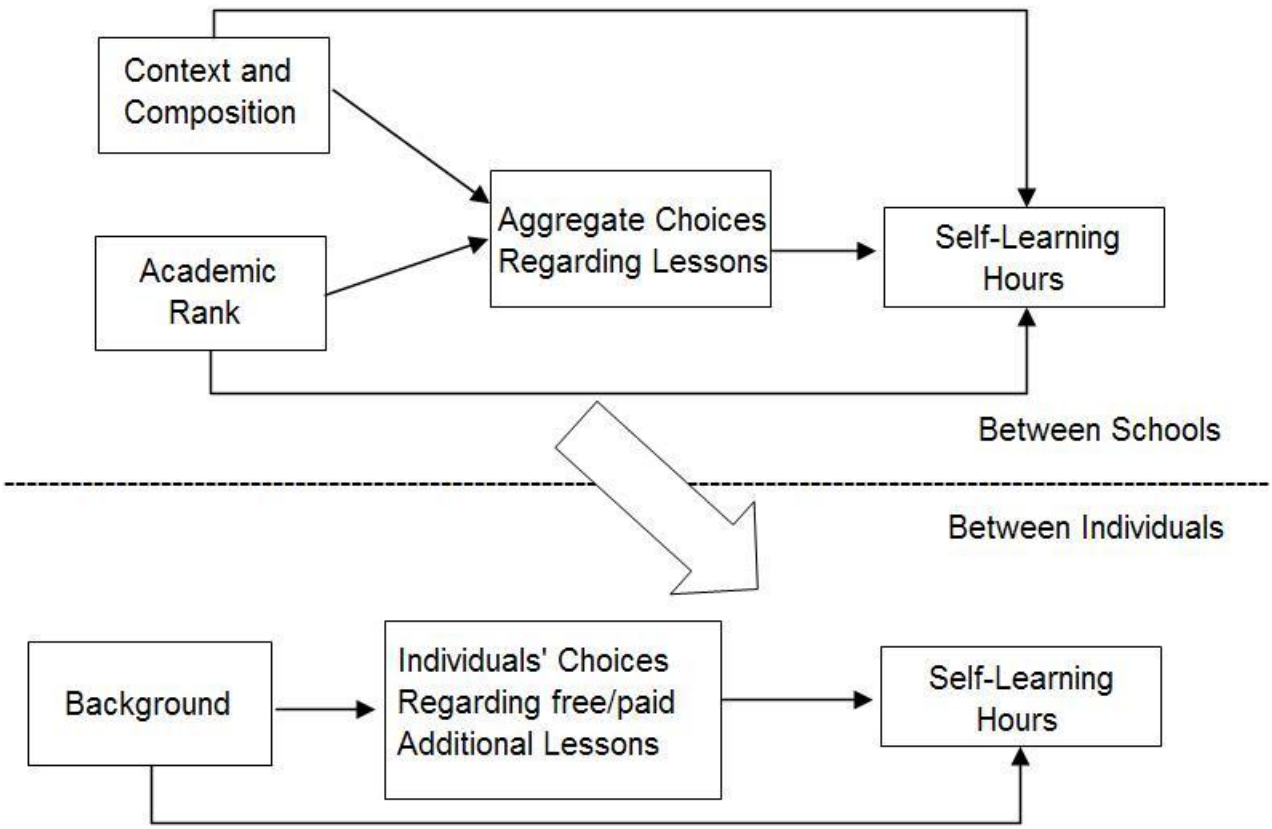


Figure 1.1. Conceptual model for understanding the relationships between student- and school-level exogenous variables and endogenous variables.

Research Focus and Questions

This study empirically tests who conducts the capital conversion and exerts efforts under the influence of the tracking system in order to help explain how the tracking system (which is the "field" designed and maintained by educational policies) may facilitate individuals' likelihoods of utilizing certain educational strategies (e.g. taking free lessons taught by school teachers at their schools and shadow education lessons which require tuition) and further enhance their study habits. To do so, the previously mentioned Bourdieu's (1986) theoretical model should be modified with multilevel nature of its reality (nested field) as follows.

((Habitus x Capital) + Sub-Field) + Field) = Practice

Bourdieu's approach can be used to better understand the topic of tracking effects on the students' educational choices and their accumulation of learning capital. To conduct a study of a field, Bourdieu (Bourdieu & Wacquant, 1992) suggests three necessary steps:

> First, one must analyze the position of the field vis-à-vis the field of power (p. 104). Second, one must map out the objective structure of the relations between the positions occupied by the agents or institutions who compete for the legitimate form of specific authority of which this field in the site. And, third, one must analyze the habitus of agents, the different systems of dispositions they have acquired by internalizing a determinate type of social and economic condition, and which find in a definite trajectory within the field under consideration a more or less favorable opportunity to become actualized. (p. 105)

The field in this case is the Japanese high school academic ranking system (school-based tracking) in which students (agents) are embedded, while each school is a sub-field. More broadly, in this case the field could also be argued to be secondary education (10th grade-level), or it could be viewed as an academic competition for higher positioning (e.g., entering competitive universities in the future) in which 98% of the age cohort are participating, and they are supposed to narrow down their after-graduation choices (e.g. entering which level of universities, attending specialized schools, finding jobs, and so on). As for the first and second steps, since high schools in Japan are hierarchically ranked according to academic level, it is clear that students who attend academically competitive (and selective) schools occupy relationally dominant positions within the entire high school system, compared with students in low-ranked general education and vocational schools. This dominant position is because the students who attend competitive schools are more likely to gain admissions to competitive

universities and receive academic credentials from such higher education institutions. These credentials in the form of undergraduate diplomas (institutionalized form of cultural capital) can be considered as legitimate forms of specific authority within the field of education. Moreover, receiving such credentials will also advance these students' position subsequently, since it functions as symbolic capital which helps them gain highly-recognized occupations.

As for the third step, using the data set from PISA study, it should be noted that it is difficult to quantify agents' *habitus* in the detailed, complex manner that Bourdieu discussed. However, it can be assumed that students' socioeconomic status represents, to some degree, their family's *habitus* and "academic attitude" variable (discussed in Chapter 3 in detail) represents students' *habitus.* Both factors are assumed to lead students to different types of educational trajectories within the field (the academic ranking system) and each sub-field (the particular high school an individual attends). Students who attend competitive high schools, because of *habitus* in the past that helped them enter such schools, have more "favorable opportunity to become actualized" (Bourdieu & Wacquant, 1992, p. 105) by receiving academically demanding and rigorous lessons in high schools (sub-fields) within the overall tracking system. Also, if higher SES students obtain free supplemental lessons, the main drive to make this decision would be their *habitus*, the system of dispositions, as opposed to their economic capital.

Research Question 1

Having the field defined, the study poses two research questions. The first question examines whether the school's academic rank (or perceived position with respect to academic quality relative to other schools) affects students' likelihood of seeking additional instructional lessons, more specifically:

1. Does formal high school tracking structure in Japan affect students' choice to seek additional instructional learning opportunities?

The first research question examines whether there is any relationship between individual schools' overall academic rank within the high school system and students' collective (and individual) likelihood to pursue additional instructional opportunities outside of their regular-school day.

Applying Bourdieu's equation to the first research question. Bourdieu suggests that "in a situation of equilibrium, the space of positions tends to command the space of position-takings" (Bourdieu & Wacquant, 1992, p. 105). Moreover, "field mediates what social agents do in specific social, economic and cultural contexts. In other words, *field* and *habitus* constitute a dialectic through which specific practices produce and reproduce the social world that at the same time is making them" (Thomson, 2008, p. 75). This argument and the previously-mentioned modified equation based on Bourdieu's theory can be applied to this study.

There are two different types of "additional instructional learning opportunities"; one is free lessons taught by school teachers in high schools, and the other is charged lessons taught by non-school teachers, presumably in the shadow education industry. For this first research question, "practice" is whether one chooses to gain additional instructional lessons inside (i.e., free supplemental) or outside (i.e., private paid) of the formal high school system. To apply Bourdieu's equation to this study, *habitus*, capital, and field need to be defined in the Japanese context. As noted, the "field" is the entire high school ranking system, and the sub-field is the specific high school that an individual attends. Students' SES could represent family's "*habitus*" and "capital," while its complex relationships between the two concepts cannot be separately identified, even with "academic attitude" variable which represents students' disposition toward

academic subjects. Despite this limitation of the data, it is meaningful to assess the effect of each individual's SES in relation to which school (sub-field) she or he attends within the hierarchal academic ranking/tracking system (field), since, as quoted before, "the same habitus can lead to very different practices and stances depending on the state of the field" (Reay, 2004b, p. 432). The "state of the field" could be understood as each school's academic level and expectation for students' academic future within each school (or sub-field). It is expected that higher SES students who presumably have academically-oriented dispositions (*habitus*) tend to choose to obtain additional instructional lessons outside of their regular high school lessons, and this tendency could be intensified according to the particular school's academic level (i.e., the specific sub-field to which the students belong).

In other words, practice (i.e., whether one chooses to gain more instructional lessons) can be estimated by considering both one's SES (i.e., which could represent, to some degree, his/her *habitus* and capital combined) along with "academic attitude" (i.e., students' *habitus*) and the specific sub-field in which she or he is a member. On the theoretical level, tracking effects are assumed to appear, since the sub-field to which one belongs in relation to the overall "field," or school-based tracking system, should generate "practice" along with one's SES (*habitus* x capital) and "academic attitude" (students' *habitus*). These relationships can be summarized as follows.

One's socioeconomic status and academic attitude (*Habitus* x Capital) + High School one attends (Sub-*field*) which is relationally located somewhere in the *field* (the hierarchical tracking system) = Choices to obtain additional instructional lessons (Practice)

Additionally, if higher-SES students tend to take free lessons while other factors are controlled, this advantaged "SES" level and more academic oriented "academic attitude" would suggest that

one's *habitus* is significant in this behavior, while its effect should be weaker than that with respect to obtaining shadow education lessons since, in this case, one's SES includes his/her economic capital.

Hypothesis 1. The research hypothesis is that there is a relationship between school academic rank and students' collective likelihood of taking additional learning opportunities. More specifically, students in highly-ranked academic schools will be more likely to seek extra instructional lessons outside of their public/private high schools than students in schools of lower academic rank. In addition, it is assumed that students' individual SES interacts with high school academic rank along with the direct effect of their SES level on increasing their likelihood of obtaining more learning opportunities. Schools at higher academic ranks will be more likely to offer additional learning opportunities for free (or as part of their broader academic program) as opposed to schools at lower academic ranks. At the individual student level, it is likely that higher-SES students are more likely take the opportunity of obtaining the free lessons provided than lower-SES students.

These two types of additional instructional lessons outside of regular instructional lesson hours create greater opportunity gaps based on tracking (school/structure) effects and students' socioeconomic level (family) effects. Although the study will examine students' enrollment in extra paid or free instruction, it should be noted the data do not allow the investigation of the actual reasons why students obtain the lessons (e.g., remediation or enrichment), although obtaining additional instruction in major academic subjects during the first semester of the high school education in Japan implies their intention to go on to postsecondary education. This should be noted as a limitation of the study, because the individual reasons students have for obtaining extra lessons may affect their choices in unknown ways. Although

SES may affect the type of lessons students obtain (shadow versus free supplemental), it may also affect the particular reasons why students seek out these different types of lessons.

Research Question 2

The second research question assesses school tracking effects (i.e., the overall academic ranking of the school) on students' study habits (defined as their self-learning hours in mathematics), or learning capital; that is, it investigates whether there is a relationship between the three types of structured instructional lessons (e.g., regular lessons, supplemental free lessons in schools and lessons in shadow education) and duration of self-learning hours. More specifically:

2. Do schools' academic position and students' pursuit of extra instruction affect their study habits (i.e., self-study time)?

Applying Bourdieu's equation to the second research question. For the second research question, there are three sub-fields. The main field is, again, the school-based tracking system, and the three sub-fields are (1) formal instructional lessons in high schools which are shown as school rank, (2) supplemental lessons taught by school teachers for free, and (3) paid additional lessons within the shadow education industry. "Practice" here means how many hours students report they engage in studying mathematics by themselves outside of any instructional lessons.

In addition to "academic attitude" which should represent students' *habitus*, one's SES should represent his/her *habitus* and capital combined. With these variables and the relationships among them, it is expected that one' SES (*habitus* x capital) and the sub-field one is in (i.e., different level of regular lessons and two additional types of lessons) generate the number of hours one studies mathematics (practice). The formula with this understanding is the following:

One's socioeconomic status and academic attitude (*Habitus* x Capital) + Regular lessons (school rank)/additional lessons in schools/shadow education lessons (Three sub-fields) = How long one studies mathematics, presumably, to do well in schools and to prepare for postsecondary education (Practice).

Hypothesis 2. The research hypothesis is that the three types of instructional lessons (sub-fields) shape the amount of effort individual students exert (practice) regarding: 1) regular instructional lessons, shown as school rank in the academic tracking system (field); and 2) whether they take/purchase additional instructional lessons under the influence of the tracking (one's position in the field), both of which contribute to shaping their self-learning time (practice). As shown in Figure 1, this can be tested by examining whether or not individuals obtain the two types of supplemental lessons, and whether this behavior is related to differences in reported self-study hours. Moreover, as suggested by the vertical (block) arrow in Figure 1, it is proposed that the school-level variables, in particular, the academic rank of the school (sub-field), will *moderate* (enhance or diminish) the strength of the student-level relationship between likelihood of taking extra lessons and reported self-study hours; that is, *habitus*, capital, and field work together. More specifically, students in higher-ranked schools (sub-field) have a stronger relationship between obtained supplemental lessons and reported hours of self-study in math than their peers in lower-ranked schools. This type of relationship is known in the multilevel literature as a "cross-level interaction," or the effect of activity at a macro level of the organization on a relationship at the micro (individual) level (Hox, 2010).

Assuming that students in highly-ranked schools tend to receive regular instructional hours of longer duration and to purchase/take additional lessons, the school-based tracking system (field) facilitates students being in positions to study longer by themselves, while

controlling for other factors like their SES level and the school's SES composition. Thus, different levels of effort (practice) shaped by one's tracking location and obtained extra instruction (practice) may widen achievement gaps that already exist. It should also be noted that "practice" in the equation for the second research question can be understood as one's volume of learning capital proposed by Kariya (2009a). Since students' volume of learning capital, *habitus* in learning, should shape next practice, this learning capital gap, structured by one's family background and track location, could be considered as one of the sources of widening achievement gaps.

Organization of the Dissertation

The remainder of the dissertation is organized as follows. Chapter 2 presents the relative theoretical propositions and empirical findings that form the conceptual framework of the study. Chapter 3 details the design, subjects, instrumentation, and analyses of the study. Chapter 4 presents the results of the analyses to answer the research questions. Finally, Chapter 5 presents a discussion of the findings, several conclusions, and implications that can be drawn from the study for further research.

Chapter 2

REVIEW OF THE LITERATURE

This chapter outlines the previous research relevant to this study. The first part of the chapter examines the integration of research on academic tracking over the past several decades, which creates a comprehensive view of how school tracking processes influence student academic performance in the United States and Japan. The second part of the chapter examines shadow education and supplemental lessons in high school, highlighting some of the differences in various approaches and discussing how they may contribute something new to understanding school tracking processes and student learning. The third part examines self-learning as it applies to high school students' study habits.

Tracking

Definition of Tracking

Oakes (2005) defines tracking as "the process whereby students are divided into categories so that they can be assigned in groups to various kinds of classes. Sometimes students are classified as fast, average, or slow learners and placed into fast, average, or slow classes on the basis of their scores on achievement or ability test "(p. 3). Most high schools in the United States became comprehensive schools after the "detracking" movement: or strategic efforts to reduce the presence of formal tracks within high schools. However, Oakes (2005) insists that the structure of tracking remains; high schools still sort students into different classes. Hallinan (1994) explains that "track categories have been replaced by course levels, with students typically being assigned to advanced, honors, regular, or basic courses. These course levels continue to be referred to as tracks, with the regular and higher-level courses loosely equivalent to the academic track and the basic and lower courses loosely equivalent to the general and

vocational tracks" (p. 79). A recent case study by Heck, Price and Thomas (2004) also finds that even if there is no formal tracking system in a comprehensive high school, a clear stratification of course-taking patterns exists based on the difficulty of courses in a hierarchical order, which is similar to conventional tracking structure.

Tracking Effects

Critics are concerned about tracking because it widens the gap in educational opportunity. In her prominent study, *Keeping Track*, Oakes (1985) contends that students in the 25 sampled schools receive learning experiences of differing quality resulting from their track levels. For instance, students in higher English tracks are exposed to the type of knowledge and skills (e.g., literature, writing, vocabulary) which are required for going on to the university, while those in lower-track classes rarely have opportunities to acquire the same kind of knowledge and skills. She also describes that students in lower tracks are deprived of certain academic content, and over time this denies opportunities to move up into an upper track level. Similarly, Oakes with Ormseth, Bell and Camp (1990) identify great differences in opportunities to learn mathematics and science between tracks. High school seniors in higher tracks take many academic courses that prepare them for higher education, while those in lower tracks are rarely required to take the same number of mathematics and science courses that the students in high track receive. High-track classes generally offer demanding topics and skills like problem solving tasks, and teachers spend more time on instruction and interactive learning activities, while those in low-track classes consistently use longer time on discipline and activities such as seat-work and worksheet. Similarly, students in advanced courses tend to receive longer lesson hours in major subjects like mathematics and are more tightly connected in high-academic,

course-taking networks to similar peers over their entire time in high school as a result of their favored track positions in key academic subjects (Heck et al., 2004).

Based on empirical studies on tracking, Hallinan (1994) summarizes five negative effects of tracking: segregation, low social status, heterogeneous tracks, slower achievement of students in low tracks and negative social psychological consequences. First, tracking segregates students based on race, ethnicity, and socioeconomic status (SES). Because of the relationship between students' background and academic achievement, low tracks have a disproportionably larger number of minority and low SES students. Case studies of high school socio-curricular structures also suggest that high schools can be clearly divided along ethnic and socioeconomic lines with respect to patterns of student course taking (Heck et al., 2004). Second, Hallinan suggests that tracking can affect students' social positions within the school:

> A second negative feature of tracking is its effects on students' social status. Tracking typically leads to a social hierarchy based on track level and academic performance. Students who are assigned to the lower tracks are apt to receive less respect from their peers and to be assigned lower status in the academic hierarchy. Lower status can have negative consequences for learning by decreasing a student's motivation and effort. (p. 81)

Hallinan's third point is that schools cannot create strict homogeneous tracks. In most cases, the distribution of academic achievement overlaps between different tracks. Fourth, and the most serious negative effect of tracking, is that students' academic achievement in low tracks grew slower than those in high tracks. Fifth is that students in low tracks "are likely to view their assignment to low tracks as evidence that teachers have a low regard for their academic abilities

and as an indication that they cannot be successful in school and should not aspire to go to college" (p. 82).

Tracking in Japan

Although there is no specific word for "tracking" in Japanese, high schools are ranked on a single continuum (LeTendre et al., 2003). Japanese middle school students at ninth grade, which is the last year of compulsory education, take an entrance examination, and then attend high schools that match with their level of academic performance (Rohlen, 1983). Even in small school districts and regions that attempt not to create a ranking system, public high schools are often included somewhere in the academic ranking system which is consisted of private schools (Takeuchi, 1995).

According to Ministry of Education, Culture, Sports, Science and Technology (2009), 97.8 percent of the age cohort entered some types of high schools, and 72.3% of regular high school students attends general education called *futsuuka* high schools nationwide in 2008. These schools offer a general curriculum that prepare students for higher education, but differ greatly depending on how their graduates succeeded in the college entrance examination (LeTendre et al., 2003). This means that high schools are hierarchically ranked and sort students, according to their academic achievement, and high school academic ranking determine students' school lives and courses to take after graduation (Iwaki & Mimizuka, 1983). While a majority of students attend general education high schools, a considerable number of students attend vocational (*shokugyoka*) high schools. These students receive specialized lessons in technical, commercial, or industrial arts to prepare for seeking jobs after graduation (LeTendre et al., 2003); more specifically, 8.1 percent of regular high school students for industrial arts, 6.8 percent of them for commercial, 2.6 percent for agriculture and so forth (MEXT, 2009). These vocational high

schools are ranked at the bottom of the hierarchy, below general education high schools (Nakanishi, Nakamura, & Ouchi, 1997). Other types of high schools are night schools (*teijisei*), correspondence course high school (*tsushinsei*), and special-needs schools(*tokubetsu shien*), but the percentage of students who enroll these types of schools are small: 3.2, 5.4, and 3.3 percent respectively in 2008, according to MEXT (2009).

Mimizuka (1993) reviews studies on tracking, and summarizes that these studies view the Japanese high school tracking system as two levels of tracking: school-based-tracking and ability grouping within each high school. Shimizu (1987) also theoretically points out two aspects of the high school stratified system. First, high schools' curricula greatly differ between general and vocational education like agricultural and technical schools, which represents a type of curriculum tracking (Kikuchi, 1986). Second, high schools flexibly comprehend the national curriculum, according to their own students' characteristics. As a result, even if curriculum is for general education, each school offers totally different contents of lessons based on students' academic performance. Kikuchi (1986) also argues that high schools may also create ability grouping within schools as a type of internal tracking.

As for rural areas where only one high school exists per school district, Kikkawa (2001) reports that a high school in *Shimane* prefecture has curriculum tracking inside the high school. More specifically, seniors are sorted into five classes, and each class has specific academic or career goal. Two courses are for students who intend to go on higher education, but these two courses are hierarchically separated; one course is for nationally established (usually high level) and private universities, while the other general education course is to prepare students for passing entrance emanations of some private universities and two year-colleges. The former academic course for national and private universes includes forty five students and is referred to

as called the “high class.” Since no shadow education exists in such a rural area, this class needs to help the students to be academically competitive for university entrance examinations. To accomplish the purpose, the class is divided into ability-based smaller classes when primary subjects such as mathematics and English are taught. This high school exemplifies that even such a small rural high school practices two layers of tracking: curriculum-based tracking and ability grouping inside the academic tracking.

Effects of the High School Tracking System in Japan

Kikuchi (1986) theoretically assesses the Japanese high school tracking system and argues that it creates pre-tracking effects and post-tracking effects. Pre-tracking effects consist of two parts: tracking sequence and anticipatory socialization (Kikuchi, 1986). At high school level, there is a sequence structure between general/vocational education courses. As for anticipatory socialization, Kariya and Rosenbaum (1987) investigate junior high school students who already knew which high school to attend. With longitudinal surveys, they found that the specific high school students attend determines their image of future educational attainment after graduating from high school. Even before attending high schools, school rank largely affects students’ future image of educational attainment (see also Kituchi, 1986).

Post-tracking effects are related to differential instruction, peers, and expectations (Kikuchi, 1986). Kikuchi argues that there are differences in terms of academic content among different levels of high schools. In addition to this theoretical discussion, he actually finds the differences of academic content between his two sampled schools. As Rohlen (1983) finds in five high schools studied in Kobe, “[a] spectrum of school subcultures apparently exists that correlates academic achievement, orderly behaviors, high morale, and a preoccupation with

university entrance exams, on the one hand, and on the other, academic difficulties, delinquent tendencies, and low morale" (p. 43).

In relation to this negative school subculture argument, by conducting a survey at a newly established high school in *Kanagawa* prefecture, Kadowaki (1992) and his colleagues find that high school students at low ranked schools tend to label each other negatively. Students in this academically lowly-ranked school, for example, consider many of the other students are unmotivated and do not claim responsibility for their own words and acts. This mutual negative labeling may create a student culture that hinders teachers from conducting effective lessons (Kadowaki, 1992). As Kadowaki (1992a) observes, this negative labeling toward the other students is observed at the other low-ranked high school in a prefecture of the *Kanto* region. Also, the students at this studied school evaluate teachers negatively at varied aspects. For instance, 87% of the students think that teachers do not understand them. Higher expectation was also found at the higher level school.

A recently published study by Tsukada (2010) also describes the bottom ranked high schools in *Aichi* Prefecture; one teacher actually labeled the situation in such school as "combined pollution." Tsukada summarizes three characteristics of these schools: (1) students are from low economic status families; (2) have the lowest level academic record at their junior high schools; and (3) "teachers at this type of school tend to give up controlling their students and let them do whatever they want without any rigid punishment" (p. 82). In relation to school culture, Tsukada (2010) argues that teachers in *Aichi* Prefecture adjust themselves to the high school culture they work within; that is, teachers directly and indirectly contribute to maintain and reproduce the hierarchy of high schools regardless their political orientation. In summary, as

Kikuchi (1986) argues, these different tracks facilitate differentiation of students' academic achievement and aspirations.

Japanese scholars have studied effects of the school-based tracking on whether students' track placement (school rank) for postsecondary education. Hata (1977) studies who is cooled toward higher education by the high school rank system and finds that disproportionately large percentages of students from white-collar families attend high-ranked high schools during the mid-1950s. This trend persists in later years of the study (i.e., 1968 and in 1975) and is especially strong in smaller cities, even though high school education became popularized during these years. He argues that the high school rank system contributes the inequality of educational opportunity for pursuing higher education.

Takeuchi (1981) investigates how school culture based on academic rank affects students' aspiration by using data on ten general education schools sampled in 1980. This study indicates that students' parental educational backgrounds are high within high-ranked high schools, and these settings heat up students' aspirations for higher education.

Yoshimoto (1984) identifies a relationship between school rank and student aspiration for university attendance before students enter high schools. A majority of students who attend a high-level high school but did not plan on attending a university when they were middle school students became more interested in pursuing higher education. In contrast, most students at vocational high schools who previously indicated a desire to attend a university changed their minds. Thus, Yoshimoto concludes that competitive college-bound high schools heat up students' aspirations for higher education, while non-college-bound high schools cool students' aspirations.

Onai (1998) investigates three hierarchically-ranked high schools in a school district of industrial complexes of the Northern *Kanto* region and finds out that students' school rank is the fundamental factor that affects students' and parental attitude toward various issues including aspiration for higher education, while students' gender and family background are somewhat important. His findings also suggest that parental expectation also differ based on their children's high school rank. Similarly, he also concludes that school rank warms or cools parental expectations for their children's future educational attainment.

As Arakawa (2001) argues, since the late 1980s, upper secondary education policy has focused on diversification and individualization of high schools, in order to provide students with a larger number of options that match with their interests and career paths. Based on thirty high schools in two prefectures sampled in 1997 and in 1999, her findings suggests that lower and lower-middle rank high schools tend to offer diversified courses that suit students' interests, while students at higher-middle and higher rank schools receive academically rigorous courses. These academic courses at higher-level schools seem to enhance students' aspirations. On the contrary, students at lower level schools seem have had their aspirations diminished by taking courses that are interesting but not academically rigorous. Arakawa insists that these students do not feel inferior, as it was before the policy. She concludes that low ranked high schools may not "cool down" students' aspirations because of their low academic position, but since students choose academically non-rigorous courses based on their interests, the diversified curriculum in these types of schools seems to reduce these students' likelihoods to aspire for higher academic accomplishment.

More recently, Arakawa (2009) finds 34 high schools in one prefecture respond differently to curriculum diversification. More specifically, low-ranked or middle-ranked schools

drastically diversify their curriculum; that is, a larger number of non-academic courses are offered in order to meet with students' interests and preferred career options. In contrast, three elite schools do not even initiate any curriculum reform, and eight slightly-less competitive schools modify their curriculum superficially, but still focus on academic subjects. Additionally, newly established programs in low and middle ranked schools offer diversified options for students' future careers, while new programs in competitive high schools has a strong focus on preparing students for higher education. Based on this divide between academically-oriented high schools and more non-academically oriented low and middle ranked schools, Arakawa proposes that there is a change of mechanism in cooling down students' postsecondary aspirations in Japan. In the past, students at low-ranked schools attempted to compete in an academic competition, but had to cool down their aspirations for unachievable academic careers. Meanwhile, under the educational reform, students at low- and middle-ranked schools are "cooled" from the academic race. These students choose non-academic paths based on their interests and future dreams. Arakawa argues "cooling out" does not make these students feel inferiority unlike being cooled down, but they may lose the opportunity to participate in the academic race because of their schools offering non-academic options.

By surveying high school seniors about their educational aspirations at five different stages between elementary school and high school, Nakamura (2002b, 2003) argues that students at academic schools have higher aspirations than those at vocational schools, and there are aspiration gaps due to father's occupation. His multiple regression analysis shows that attending academic high schools affects students' educational aspirations, but the impact is not as great as in South Korea. He argues that the Japanese high school track system at least maintains students'

aspirations, which differ, however, based on fathers' occupation from the time of elementary education.

By analyzing responses of 1548 eleventh graders who attended Tokyo metropolitan general-education high schools, Honda (2009) argues the high school tracking system in Tokyo affects whether students wish to attend four-year-universities because of, seemingly, each school's different academic guidance and peer pressure. This tendency was observed even among students who performed well academically in middle schools but attended low-ranked academic high schools. These students do not have the same higher aspirations for four-year-universities as students who attended high-ranked schools, suggesting the tracking system largely affects students' aspirations for higher education (Honda, 2009).

While the previous studies argue that school tracking functions to cool down students' educational aspirations when they attend low ranked schools, Takeuchi (1995) contends that school tracking works to re-kindle their aspirations; even low performing middle school students exert more effort to study in order to attend a higher-ranked high school. He discusses that high school students also study more to gain admission from one higher-ranked university, since there are many universities in the academic hierarchy. His data is from one area of *Hokuriku* district. He admits that there is a relationship between school rank and rank of universities from which one gains admission, but he argues that some students from lower-ranked high schools do successfully attend high-ranked universities. Takeuchi argues, since Japanese high schools are minutely ranked, unlike a tracking system which only has general and vocational programs, students who attend non-competitive high schools maintain their aspiration to attend high-ranked universities; that is, the Japanese school-based tracking system rewarms the aspirations of students in relatively low-ranked schools. He contends that how colleges and universities select

students facilitates maintenance of student aspirations; unlike the admissions office does in the United States, since students need only to pass a one-time written entrance examination, while their GPA and school rank are not considered at all.

Takeuchi (1995) contends that the Japanese high school tracking system helps students who fail to enter desirable high schools succeed in passing the entrance examinations of universities. Except for the bottom level of high schools, there is no cooling down between high schools (between-school-tracks). However, he notes there is a type of “small frog” effect inside schools (inside-school tracks); that is, the school-based-tracking enables students who fail at high school entrance examinations to have a consolation match at university entrance examinations. As he argues, this suggests a type of frog pond effect (Drew & Astin, 1972), whereby if one's academic performance is low among peers within one school, he/she is cooled out, while when one's performance is high, there is “big frog” effect, which warms the individual’s desire to attend the university. In summary, Takeuchi argues that the Japanese tracking system functions to influence students’ educational aspirations, that is, students remain in the same academic competition as opposed to developing non-academic interests like sports.

Takeuchi’s (1995) line of reasoning is challenged by Arakawa (2009), however, who argues that students tend to be “cooled out” in low ranked schools—that is, students in these settings are more likely to leave the academic competition. Takeuchi’s other main argument that the educational system offers a return math to students who go to low ranked schools is also challenged by another empirical study. Nakanishi (2000) finds that high SES students are the ones who successfully enter competitive universities from lower-ranked high schools. By using the national survey of social stratification and social mobility (SSM) gathered in 1985 and 1995, Nakanishi identifies students who successfully entered competitive universities among those

students who failed to enter competitive high schools. She found that students who once failed to enter competitive high schools, but later on succeeded in entering competitive universities, were from higher-SES families. She then argues that while everybody in Japan appears to have a chance to enter competitive universities successfully, in reality, this chance is only afforded to students with high-SES backgrounds.

A recently-conducted study by Fujihara and his colleagues (2010) assesses how high school students choose their career paths. Fujihara et al. conduct a longitudinal quantitative and qualitative study in five high schools located in an urban area close to Osaka. The team selects these schools based on their school rank: around 0.5 to one standard deviation below the average in academic performance. Two of them are academic high schools, while the other two are in industrial and the one is commercial. Based on five surveys, they find three primary patterns of changes in aspiration; warming up, cooling down, and being consistent over the three-year high school education. These patterns are related to gender and whether one attends general/vocational school; that is, male students in the general academic schools tend to warm up their aspiration for four-year universities during the three-year high school experience, while female students in academic schools and those in the vocational schools do not change their choice much: neither warming up nor cooling down. Thirty-three percent of males in the academic schools warm up their aspiration, and 73% of them aspire to attend four-year universities. Many males do not decide their future after graduation upon entering high school, but decided to aim for attending universities.

According to Fujihara (2010), this may be due to non-traditional admission styles such as recommended by high schools and U.S-like admission office selection. As a result, it became easier to enter into four year universities. He also writes that there is no relationship between

these patterns and students' social class, while their socioeconomic position measured by parental education/occupation and so on is related to differences in educational aspiration; social class gaps exist but it does not change much during the high school years, suggesting that SES's influence maintains but does not intensify as Nakamura finds (2002b). With the same data, Nakamura (2010) finds out that 175 out of 210 students who plan to attend four year-universities received admission acceptance through non-traditional entrance exams; that is, by being recommended by high schools and accepted through the admission office. The rate of taking this path is 81.4%, and it becomes 94.4% when it is calculated with the vocational schools. He argues that this shifting phenomena to attend four-year-universities was small among students in low-ranked high schools, since those attending these high schools were supposed to go into the workforce. Because of the increasing number of universities, the low birthrate, and reduced availability of job due to the recession, however, attending four-year universities became an option for those attending low-ranked high schools. Additionally, by analyzing the phenomena that students in the low-ranked schools may wish to attend four year universities, Nakamura (2010) contends that the tracking effect resulting from academic/vocational differences can be observed at the first part of the high school education; that is, the tracking effect is strong at some points, however, not during the entire three-year period of high school.

Tracking intensifies the learning opportunity gap. By reviewing studies on the tracking system in Japan, Iida (2007) insists that most of these studies focus on the process and effects of the tracking system inside schools. These studies on schools lack adequate investigation of the relationship between disparities in schools and the social structure. While this argument seems to be valid, some studies articulate the relationship. Iwaki and Mimizuka (1983) argue that school ranking is strongly related to family background. Rohlen (1983) also contends that students have

largely different family backgrounds at hierarchically-ranked high schools in *Kobe*; higher ranked schools tend to have a larger number of students with variables indicating higher SES, which includes data on one's parental education level. Additionally, by using the national survey of social stratification and social mobility (SSM) collected in 1985, Nakanishi, Nakamura and Ouchi (1997) find relationships between students' family background, high school rank, and the social class that one eventually reaches. High school ranking became important as a medium of social mobility especially in late 1960s when baby boomers attended high schools. Vocational high schools used to have students from non-white-collar families who performed well before the late 1960s. However, these vocational schools came to be placed at the lowest level of schools under the emerging hierarchal high school ranking system. Disparities among general education high schools in terms of academic level also became clearer in the late 1960s. Nakanishi and colleagues (1997) argue that their study demonstrates the importance of high school ranking system including academic rank and vocational/general education differences as a medium of social mobility.

By using SSM data collected in 1995, Ono (2001) also finds that "[s]ocial origin plays an important role in facilitating individuals' advancement through higher education, not only in determining whether they advance to the next stage but also in advancing to institutions of higher rank" (p. 187). Yamamoto and Brinton (2007) also analyze the 1995 SSM survey and find that parental SES including parents' educational background and financial situations are significantly associated with one's academic performance before entering high school. In a more recently published article with using the same 1995 SSM survey, Yamamoto and Brinton (2010) report that students who live in a larger city and have highly educated and wealthier parents are more likely to attend competitive high schools. At the same time, "embodied cultural capital

subsequently affects final educational attainment via its effect on ninth-grade academic performance and objectified cultural capital exerts its effect via high school quality" (Yamamoto and Brinton, 2010, p. 79). They contend that families' objectified cultural capital exert "a powerful effect at the transition from middle school to high school, probably through teachers' recommendations" (p. 75) since middle school teachers evaluate students' home environment by teacher's visit to students' home and personal information like parental occupational status, and these affect guidance in students' choice of high school and processes of application.

Additionally, Aramaki (2001) analyzes two surveys for seniors conducted at thirteen high schools in 1981 and in 1997, and discusses that the relationship between academic ranking and one's aspiration for higher education is almost unchanged between 1981 and 1997, while the effect of one' social background (father's occupation and academic credential) strongly determine whether s/he wishes to go on to higher education between the two surveys. Furthermore, Kimura and Motoji (2001) argue that higher SES students attend higher ranked high schools by analyzing eleventh graders at eleven high schools sampled by a stratified three-stage method in *Sendai* area, one of the largest city areas located the Northern part of Japan in 1999. They report that one's aspiration for four-year universities vanishes after controlling for his/her fathers' job but the high school rank remains significant. This means that the high school tracking system functions to transform one's social class to educational aspiration.

By using the same dataset in addition to previous surveys conducted in the same area in 1986 and in 1994, Katase (2005) reports that the influence of students' high school ranking on their educational aspiration became gradually weaker from 1986 to 1995 and from 1995 to 1999, but argues that it remains significant and, based on other studies, one's economic factor may become stronger because of the prolonged economic stagnation. In addition to this study, by

using 1999 data, Katase (2005) investigates if high school students' frequency of reading literary works and historical books is acquired from their parents. Findings of the study suggest that mothers' frequency as habit of reading books and high school rank affect male students' habit for reading books. He argues that this habit of male students is acquired from mothers and also enhanced by higher-ranked schools. As for female students, only high school rank remains significant, suggesting that the habit is not acquired from the home but, rather, results from their high school education. Because there is the strong relationship between parental educational background and children's school rank, he contends that parental educational background affects children's school rank, and its high ranked schools helps the children to gain the habit for reading books. Katase (2005) also explains that this habit of reading books is a factor to positively determine one's educational aspiration by helping students have positive learning attitudes.

Outcomes of the Tracking Effects. Ehara (1973) argues that high school rank is the strongest factor that indicates whether one attends high education or has a job. Iwaki and Mimizuka (1983) also state that the Japanese high school ranking system is tracking, since which high school one attends essentially limits opportunities and choices of academic and career path. Kariya and Rosenbaum (1987) discuss that students who attend low ranked general high schools and vocational ones "are virtually eliminated from further competition for higher education" (p. 178). Moreover, other researchers suggest this limited possibility for students at low ranked high schools from competing for higher education (Nakanishi, 2000; Ono, 2001), while "[a]ttending higher ranking high schools significantly improves the probability of advancing to higher ranking colleges" (p. 182, Ono, 2001).

Meanwhile, Tachibanaki and Yagi (2009) propose a more optimistic view with data collected online; while arguing father's academic achievement (i.e., higher than two year-college graduate or not) has the strongest effect on high school rank that their children attended, one can enter competitive universities by exerting effort, even if they attend non-elite high schools. They argue that a majority of students at competitive high schools tend to attend top prestigious universities, but students at non-competitive high schools also go on top-tier universities.

However, a more recent study by Brinton (2009) finds a positive relationship between school rank and the proportion of graduates attending university. By using school-level data on more than 200 general education public high schools in *Kanagawa* Prefecture about post-graduation destinations of their graduates from 1997 to 2003, Brinton finds the lower the school rank, the higher percentage of students who go into a job market directly. This trend was unchanged over time. In addition, as a recent trend under the economic recession, the relationship between low-ranked school status and the percentage of idle graduates who do not work (i.e., or only work part-time), enroll in school or look for a job became stronger from 1997 to 2003. Another recently conducted qualitative study on a working-class low ranked high school in Tokyo (Slater, 2009) describes students as primarily from low SES families; and depending on cohorts, between 6 and 15 percent of students have one or two parents with college experience, and about one fourth of their parents are divorced or separated (which is quite high in Japan). From this school, only one or two out of about 150 students attend higher education institutions each year, and these are not selective universities.

Aoto (2009), a former high school teacher in *Saitama* Prefecture, reports that most high school dropouts are from low-ranked high schools. He creates five groups with 147 public high schools in *Saitama*, according to each school's average score on entrance examination. More

specifically, 13.4% of students who entered the public high schools in 2004 dropped out. The lowest rank schools have about 30% dropout rates, while about 20% students drop out from the second lowest ranked schools. Aoto (2009) concludes that the dropout rate is not equally distributed among high schools. He argues that high dropout rates are due to non-academic oriented school culture and teachers who attempt to maintain a type of social order within high schools. He also contends that the lowest ranked schools have academically low performing students who come from low income-families. In another recently conducted work, Sakai (2010) describes that students voluntarily chose not to go to university in a studied commercial high school in Tokyo; this school is ranked at the bottom even compared to other neighboring commercial high schools. More than 20 percent of students in this school dropout and many of the students are from families that have complicated backgrounds. These students "choose to take a path with a low possibility for success in society, dictated by their low achievement, family financial situations, or low expectations from their parents, and this becomes the basis for their career narratives (p. 104)."

Summary of the Literature on Tracking

The high school tracking system functions to reproduce the existing social stratification, helping social reproduction occurs as studies cited in this chapter reveal. Importantly for the proposed dissertation study, tracking effects are consistently found in Japan, and this is an issue of inequality; that is, the literature reveals that (1) students' SES level is related to their tracking location; (2) one's tracking location influences postsecondary aspirations; and (3) attendance at academically-competitive high schools helps students to enter top-ranked universities. More specifically, the studies reveal that higher SES students tend to enter competitive high schools;

attendance at academically rigor schools confers academic advantages that increase students' aspiration for higher education, and as a result, they successfully enter top-rated universities.

One limitation of these studies is that they primarily focus on effects of tracking inside high schools (e.g., competitive schools have academic oriented culture and offer demanding courses). The current dissertation study assesses if the tracking structure influences students to seek more learning opportunities inside/outside high schools in the third or fourth month of the three year high school education to prepare for higher education. Also, the study investigates who exerts more effort under the tracking influence. These two factors, learning opportunities outside of regular lessons and self-studying, should affect one's academic achievement (e.g. entering to competitive colleges), but these two issues have not been specifically documented.

Moreover, it is important to highlight that most of the tracking-studies conducted in Japan use regional survey/observation data; no nationally representative data is used to assess the high school tracking effects. This is a clear weakness of the existing literature and the strength of the current study using PISA, only one nationally representative data with high school students ever conducted in Japan. It should be noted that Nakanishi (2000) use the national survey of social stratification and social mobility (SSM) collected in 1985 and 1995 and Nakanishi et al. (1997), Ono (2001) and Yamamoto and Brinton (2007, 2010) analyze the SSM gathered in 1995. However, SSM is not intended to study high school and a specific cohort; the sample is about 10,000 Japanese electoral registers aged from 20 to 69. Also, the sampled people retrospectively respond to questions about their K-12 education experience (e.g. "when you were 15 year-old" or "when you were elementary/middle school student").

Because of these limitations, to reveal tracking effects on students' behavior and choice, the PISA 2006 is a much more ideal data set that includes a nationally-representative sample of

10th graders, who respond to the student-questionnaire when they are actually at the assessed grade. Moreover, the existing tracking studies use broad categories of the high school ranking (e.g. only five categories). In addition, the PISA data facilitate the accurate examination of both school and individual factors, since both schools and students are scientifically sampled. Hence, these data are better suited for multilevel investigations which may more accurately capture tracking effects which are embedded in school settings on student behavior. This study deals with these technical issues and then produces a more accurate picture with the nationally representative sample of the 10th graders.

Shadow Education

Definition and Trends of Shadow Education

To assess who would likely obtain additional learning opportunities when they become available, this section summarizes research on these opportunities outside of high schools. These learning opportunities practiced outside of formal schooling are called shadow education (Baker et al., 2001; Stevenson & Baker, 1992). These are defined as organized learning activities offered by private companies which are similar to the activities in formal school settings. They are intended to enhance students' academic performance within formal schooling (Baker et al., 2001). Shadow education (SE) has become a major educational phenomenon in East Asian countries such as Japan, Republic of Korea, and Taiwan (Bray, 2003). It has also grown greatly in both developed and developing countries over recent decades (Bray, 1999, 2003, 2007; Stevenson & Baker, 1992). These services can be provided even across national borders through the Internet (Bray, 2009).

In concrete terms, shadow education is reported as prevalent among seventh and eighth graders in the 1994-95 Third International Mathematics and Science Study (TIMSS) sample of

41 countries (Baker et al., 2001). North America is not an exception for this trend, for example; an educational service industry has rapidly grown in Canada. In Ontario, 24% of parents with school-age children report hiring private tutors, even though Canada does not have particular legislation like No Child Left Behind that increases demands for academic tutoring (Davies & Aurini, 2006). Based on a national survey that includes a random sample of Canadian adults in 1997, Davies (2004) reports that 514 out of 2001 respondents had children in elementary and secondary school, and 17% of these parents indicate they hired tutors for their children at some time, while 9% of the parents hired tutors at the time of the survey. Also, he indicates that parents who hire tutors have higher average education and income levels than parents without hiring tutors. However, because parents who desire to hire tutors have lower average education and income levels, he argues that SES affects whether one can hire tutors, as opposed to whether one prefers to do so. Davies finds that parents with more education tend to hire tutors, controlling for other factors in the model. The student SES effect is insignificant in the model, which Davies suggests may be due to the relative inexpensive nature of tutoring compared to other educational choices like private schooling.

These growing tutoring franchises are also found in the United States. SE that closely works with the curricula of public educational system is usually run by individual tutors, but new franchise educational providers called “learning centers” offer long-term education, not just for test preparation. In fact, they offer “courses in reading comprehension, speed reading, study skills, note taking, time management, test-taking strategies, public speaking, and goal setting” (Davies & Aurini, 2006, p. 125), while many still provide short-term services such as traditional private tutors. These franchises also offer a wider range of services than individual shadow tutors; for example, they offer test-preparation courses for the SSAT and SAT. In the United

States, using the NELS:88 longitudinal study of high school students, Briggs (2001) calculated that 14% of high school students who took the PSAT and SAT and/or PSAT and ACT used commercial course providers to prepare for these college examinations. In addition, 7% of these students received private tutoring for these examinations. With the same dataset, Claudia Buchmann, Roscigno, and Condron (2006) found that higher student SES increases the likelihood of taking all four types of SAT test preparation, and three types (i.e., preparation courses by private companies, such courses by high school and private tutoring) other than using books or software positively affect students' SAT scores. In turn, SAT scores explain likelihood of enrolling in four year-colleges, especially, selective ones (Claudia Buchmann, Condron, & Roscigno, 2010; Claudia Buchmann et al., 2006).

Shadow Education Effects on the Opportunity Gap

Shadow education is a mechanism that maintains and increases social inequalities, since rich families can invest in shadow education, according to Bray (2006). By reviewing literature on SE comparatively, he also argues that SE increases the gaps between urban and rural areas and between boys and girls. Formerly socialist countries like Poland and Ukraine also have a growing shadow education industry, and it exacerbates social inequities (Silova, Budiene, & Bray, 2006). Because of concerns regarding negative effects, South Korea, Myanmar, Mauritius and Cambodia have banned private tutoring at various times (Bray, 1999). Baker and LeTendre (2005) argue that "[a]s with private schooling, which is often assumed to provide better education, in many nations shadow education becomes another avenue for families to invest in their children's schooling" (p. 67). Kynch and Moran (2006) summarize shadow education's negative effect on equality, suggesting that SE "is growing proof of how economically generated

inequalities outside of education systematically undermine equality of access, participation and outcome within" (p. 223).

A number of empirical studies affirm that students with economic means are more likely to obtain additional learning opportunities in shadow education industry including mass-tutoring and private tutoring. Nishio's (2007) dissertation assesses how high school students in the United States use private supplemental lessons and whether these lessons produce significant academic outcomes using the NELS:88 data. Findings of the study indicate that families with higher educational aspirations tend to use supplemental instruction for enhancing students' academic ability, and there is a relationship between receiving such lessons and students' subsequent chance of receiving college admission. However, a relationship between SE and academic outcomes (e.g., standardized tests) does not appear to be supported. The study reveals that students with higher family income are more likely to take the supplemental instructions for both enrichment and remedial purposes, and students who attend enrichment lessons tend to receive admission by four-year colleges. A qualitative study by McDonough (1997) shows that some parents possess greater cultural capital than others, that is, "first-hand" knowledge about college admission processes. These parents also know the possibility of increasing their child's SAT scores by hiring formal coaching while understanding the significance of SAT scores.

In the United Kingdom, Scanlon and Buckingham (2004) discuss out-of school learning products and services such as educational books, digital media and private tutoring. Their case study describes that parents in West London where there are a range of secondary schools have great anxiety about which school their children will attend. Based on interviews, a number of children have tutors and some families employ tutors while some cannot afford. In addition to UK government's emphasis on importance of learning at home, they argue that

commercialization of out-of school learning including private tutoring "seems bound to exacerbate educational inequalities" (p. 302). Another study in England also indicates that parents who attend universities are more likely to hire tutors for their children, especially in the last academic year of compulsory education (Ireson & Rushforth, 2005). As an example of "mothers' ability to draw on a range of strategies in support their children's schooling" (p. 78), Reay (2004) notes that one mother suggests, "Well he just wasn't making enough progress in school so we decided we'd have to get him a tutor" (p. 78). A similar study by Bray and Kwok (2003) in Hong Kong suggests link between SE and parental education level. For example, 72.9% of students whose parental education level is described as "university or above" receive tutoring, while only 35.3% of students with parental education is described as "primary education or less" receive tutoring.

In South Korea, Byun and Kim (2010) use a nationally representative data of eighth graders from the Trends in International Mathematics and Science Study (TIMSS). With three cohorts data gathered in 1999, 2003 and 2007, they examine the relationship between students' academic achievement and their socioeconomic background. Their results demonstrate growing educational inequality in South Korea, and they argue that a widening income gap and educational reforms with tracking and school choice probably contribute to this growing inequality.

The trend is also found in a developing country; in Kenya, Buchmann (2002) studies 506 households in three regions in 1995 and finds out that male adolescents (ages 13 to 18) and those in urban areas tend to take shadow education lessons, and this participation is related to lower grade repetition and higher academic performance.

Shadow Education in Japan

Rohlen (1980) provides one of the early descriptions of *gakushu juku*, cram schools, that teach academic subjects to students from the first to ninth grade. He also mentions *yobiko*, which prepares high school students for university entrance examinations. More recent work on shadow education in Japan explains that *juku* can be categorized into a few different types. Some of the major ones are *juken* or *shingaku juku* for enrichment and *hoshu juku* for remedial purposes (Roesgaard, 2006; Russell, 1997).

By analyzing a large scale longitudinal study of high school seniors conducted in Japan in 1980 and 1982, Stevenson and Baker (1992) note that 88% of students who intend to go on higher education participated in at least one SE activity and 60% completed two or more activities. They indicate that Japanese high school seniors from wealthier families and families with highly-educated parents are more likely to participate in shadow education. Schumer (1999) argues that one primary reason for studying shadow education in mathematics education in Japan is that a considerable number of students take shadow education lessons for substantial hours. By using The Trends in International Mathematics and Science Study (TIMSS) conducted in 1995, she calculates the mean time spent on additional mathematics lessons by eight graders in Japan, Germany, and the United States indicates that Japanese eighth graders study 68 minutes in extra math classes per week, compared to 18 minutes by students in the U.S., and 10 minutes by German eighth graders. She contends that out-of-school learning which includes homework, self-studying at home, and shadow education contribute substantially to the high achievement of Japanese students in mathematics.

MEXT (2008) publishes a report on learning activities of children outside of public schools; 67512 parents of children whose grades are from 1st to 9th and 53458 public school

pupils who are between 3rd grade to 9th grade in a variety of city sizes reported their situation on this topic as of November, 2007. Based on the part of the survey that parents complete, 15.9% of first graders attend *juku* which teaches academic subjects, while more than 50% of eighth graders do so: 50.9%. As of the end of 2007, 65.4% of ninth graders also take *juku* lessons. In addition to *juku* attendance, 6.8% of ninth graders receive private tutoring, and 15% of the same graders take correspondence education. Among ninth graders who attend *juku*, mathematics is the most popular subject and English language is the second: 90.8% and 89.3% respectively. This trend is also observed among elementary school students who take *juku* lessons. Most of them take mathematics lessons, ranging from 66.3% for first graders to 80.4% for fifth graders.

Again, this tendency is seen among students who take private tutoring lessons. Mathematics is the most popular subject at both elementary and middle school levels. As for correspondence education, Japanese and mathematics are almost equally popular. This report describes types of *juku* that one attends; about 40% of the students who take *juku* lessons articulate that those lessons are to help them do school assignments and preparations and reviews of public school lessons. These students' *juku* can be categorized as *hoshu juku*, which provides remedial lessons. On the other hand, about 30% of fifth and sixth graders take preparatory lessons for, possibly, entering into private middle schools. 64.4% of ninth graders who receive *juku* lessons respond as those lessons are preparatory; it should be noted that a high school entrance examination would be held three months later after the survey was conducted. Private tutoring seems to be chosen by students who are left behind academically and/or those who need help to do school assignment and preparations and reviews of public school lessons, while 43.7% of ninth graders who take private tutoring take preparatory lessons. As for correspondence

education, the trend is similar to privet tutoring except the fact that only small number of students takes this type of shadow education because of being left behind academically.

Turning to what is taught at shadow education situations, by visiting and observing *juku* that serves elementary and middle school students, Dierkes (2008) finds that teaching methods and materials used at *juku* do not greatly differ from those in school. He also reports that educational materials are based on the curriculum and textbooks approved by MEXT, and companies that publish teaching materials follow contents and structure of official textbooks as well.

A new trend is also emerging in shadow education in terms of curricula. In Japan where a number of types of shadow education services exist, it is not unusual to find educational services that offer long-term academic skills rather than short-term test preparation. For example, about five hundred *juku* offer lessons that aim at enhancing students' motivation and study habits, according to the program's official page (FC Education, 2010). As of 2010, 17000 students (from 4th to 12th graders) receive their lessons at contracted shadow education institutions. Since this program is based on the "*the Seven Habits of Highly Effective People*" (Covey, 1989) to aim at enhancing students' studying habits, lessons are clearly not for short-term test preparation but for enhancing students' learning capital.

Tracking in Shadow Education

Tracking or ability grouping are observed in shadow education as well as the high school stratification system. *Yobiko* provides a comprehensive preparatory education for college entrance examinations with students who plan to attempt to enter universities next year after graduating from high school (Tsukada, 1988). Tsukada (1991) suggests that "The Yobiko is more explicitly organized to promote differentiation of academic achievement and aspirations

than high schools are. Students are assigned to classes at Hiroshima Seminar according to their placement test scores" (p. 20). He extensively studies a *yobiko* and describes that students are divided into sixteen classes, while their academic level assessed by their placement examination performance and future major at higher education are considered. For example, the *yobiko* he studies has two top classes for students who are capable of and plan to take an entrance examination of the University of Tokyo and the University of Kyoto, while there are five lower-ranked classes (Tsukada, 1991, 1999). Tsukada (1988) contends that students who graduated from high-ranked schools attend higher ranked classes in *yobiko*. This means that students who attended highly ranked schools tend to maintain or improve their academic performance. He concludes that there is a direct relationship between the high school tracking and that in *yobiko*. As a consequence of tracking in *yobiko*, students who take low testing scores in *yobiko* will lower their aspirations and plan to enter a specific university; that is, the cooling down function was observed in *yobiko*'s tracking system (Tsukada, 1988).

Tracking and its effect in shadow education is observed among middle school students as well. Hara (2007) conducts interviews with forty two eighth graders who participate in shadow education and thirty nine others who don't. He first conceptually argues that students can be divided into two groups: students with shadow education-attendance and those without it, and the former group do better in terms of academic performance. Based on his earlier study, he notes that the students with shadow education also can be grouped into two distinctively different types. He identifies students who participate in shadow education and do well as "academic elites," while others who take shadow education lessons but do poorly on academics are called "fake elites." By referring to his earlier study which identified divided awareness between students who attend shadow education lessons and who do not, he subsequently conducts new

interviews with middle school students to find out if students who take shadow education have a clear sense of belonging to either “academic elites” or “fake elites.” Results of the interviews show that eighth graders who take a higher one of the two shadow education ability-grouped classes think that students who take a lower class are not good at academics, and they cannot understand why they do poorly. Hara (2007) argues that interviewed eighth graders view students in the other class as “they,” while these students see themselves “we” like Willis (1981) reports blue-collar workers’ youth did. Despite the fact that these students attend the same *juku*, they separate themselves based on which class (track or ability grouping) to which the individual belongs.

Shadow Education Effects on Learning Opportunity Gaps in Japan

There are few studies that solely focus on the opportunity gaps and effects of shadow education on inequality. Seiyama (1981) describes a link between higher family income and whether a family invests in shadow education, however, the limited sample (one school) makes it unclear whether this is an anomaly or not. Seiyama and Noguchi (1984) conduct another study with nine public middle schools in a school district of *Sapporo*. With a response survey rate of 35.3%, the responses are likely biased. Among returned responses, however, 21.5% of respondents report experience in attending *juku* when elementary school pupils, while 57.8% of them report attending *juku* when they were middle school students. The attendance of *juku* is, to some degree, related to one's family background (e.g., income level). In addition, although no clear evidence is found about *juku*’s positive effect on academic ability is noted, there is still relationship indicated between individuals’ family backgrounds such as parental educational background, father’s occupation, income level and the number of books and high school

academic ranking; this suggests differences of education achievement among different SES levels.

As mentioned previously, Stevenson and Baker (1992) use the large scale longitudinal study to describe how richer families tend to invest in shadow education, while being male and having good grades in high school also increase a likelihood of taking shadow education; shadow education is used by parents to enhance their children's already accumulated advantages. Furthermore, they find out that outcomes of taking shadow education differ from modest to large, depending on forms of shadow education.

Yamazaki (1993) argues that many parents in poverty wish their children to succeed in schools and proactively take strategies for that purpose, based on a random sample of interviews from one city-provided housing complex in a city in Northern part of Japan. Not a few parents in poverty use shadow education to help their children. A mother states that her son, a sixth grader, learns how to study at a shadow education institution. Yamazaki (1993) contends that she expects the *Juku* to motivate son to study, illustrating an expected warming-up-function. However, Yamazaki (1993) cannot find an example that children are motivated to study by attending shadow education institution; these children are denied/rejected by teachers at *Juku*. Some reasons for denial are their poor academic performance and how they dress.

Ojima (1994) analyzes the national survey of social stratification and social mobility (SSM) gathered in 1985 to identify who invests in shadow education activities. Although it should be reminded that this is a correlation analysis, his findings show that there is significant correlation between father's educational background and income level with the amount expended in shadow education when children are in lower grades of elementary education. As for the upper grades of elementary school and middle school pupils, father's academic background and income

are still significant, but the expectation for children's future educational opportunities and preference of investing in education become more strongly correlated. Family background variables become insignificant as a determinant of educational investment when children are at high school level, while parental attitude toward education is only weakly correlated with the amount of educational investment. The results suggest that as children get older, parental attitudes become more important than direct SES indictors (Ojima, 1994).

Kataoka (1998, 2001) analyzes the 1995 SSM survey which includes variables about whether one took three types of shadow education activities for more than half a year when they were elementary and middle school pupils. The three types of shadow education activities in the survey are cram schools, private tutor and correspondence course. The data show that 50.7% of the 20-34 year-old report attending *juku* for more than half a year during their relevant school years, while the percentage was 25% for the 35-49 year old-group, and 8.2% for the 50-70 year-old cohort and. With her findings, she argues that shadow education activities have some effects on one's educational attainment among men. On the other hand, no significant effects of shadow education on educational attainment are found among 20-49 year-old females. She argues that as the number of people who take shadow education grows, effect of shadow education on educational attainment becomes weaker. She also argues shadow education is a part of mechanism that highly-educated parents use to convert their family's cultural capital into children's academic credential.

Yamamoto and Brinton (2007) also analyze the 1995 SSM survey. Their findings show that parental SES including parents' educational background and financial situations are significantly associated with one's academic performance before entering high school. Also, students who receive shadow education are more likely to attend a higher ranked high school.

Moreover, they contend that taking shadow education increases the chances of passing an entrance examination of higher-ranked high schools. In another article with using the same 1995 SSM survey, Yamamoto and Brinton (2010) report that students who obtain shadow education tend to attend higher-ranked high schools, while those who have a fewer number of siblings, live in larger cities, and have highly-educated and wealthier parents tend to obtain shadow education also.

Gordon (2005) argues that shadow education is the principal factor that helps families with economic means provide supplemental exam-oriented instruction for their children. By interviewing with Japanese middle and high school teachers in urban areas, she contends that "[t]he economic good times of the 1970s and 1980s provided an increasing number of Japanese families with the means to provide the necessary supplemental schooling and soften the competitive reality enforced by examinations for high school and university admission but economic hard times have widened the gap to an unsettling degree" (p. 56). Her study suggests that students with fewer resources have less opportunity to learn because of the continued economic difficulties.

In an ethnographic study, Bjork (2010) writes how students' learning opportunities are affected by the relaxed education policies (*yutori* education) in Japan. He contends that parents tend to use shadow education rather than to share their concerns with schools in order to help their children receive the necessary preparation in order to be accepted in desired high schools or higher education institutions. Bjork (2010) argues that "cuts to curriculum and instructional hours disproportionately affected students who already struggled academically" (p. 89), while pointing out that parents with high level of income and education are more likely to enroll their children in shadow education (cram schools and private tutoring).

Kariya (2004) creates three groups based on one's cultural level and then finds that eight graders at public schools in Osaka who belong to the highest cultural group are more likely to attend cram schools (55% of this group), compared to 38% of the lowest cultural group. This tendency is found at the fifth grade level as well; that is, 39.7% of fifth graders considered in the highest cultural group attend cram schools, while only 24% of the pupils from the lowest cultural group do so. By analyzing the data gathered in 1989 and in 2001, he argues that the impact of attending *juku* greatly increased from 1989 to 2001. More specifically, although the average rate of attending *juku* went down from 1989 to 2001 (i.e., 57% to 48%), the rate of eighth graders who do not study at home increased from 30.2% in 1989 to 44.9% in 2001. This trend may explain why students who do not study at home and do not attend *juku* increase from 15.2% in 1989 to 23.8% in 2001 (Kariya, 2004). These students named "no study kids" perform poorly on given math exams. They tend to be from low SES families (i.e., fathers without bachelor's degree and low cultural status). Considering that these "no study kids" performed more poorly between 1989 and 2001, he concludes that the disparity of academic achievement has widened between the two time points. This study suggests that the importance of attending *juku* becomes significant, while higher SES students tend to gain learning opportunities outside of public schools.

Kaneko (2004) reports that 54.2% of sixth graders with college-graduate fathers at sampled public schools in the *Kanto* region (Tokyo and surrounding prefectures) attend some types of *juku*, while only 33.9% of the pupils did so if they had fathers who did not complete college. This difference is especially large for *juken juku*, that is, cram schools for enhancing students' academic performance to get accepted by competitive private middle schools. In fact,

15.4% of the six graders with fathers having college degrees attend this type of *Juku*, while only 4% of their counterparts with lower educational levels do so.

In one large-scale study, Ueno, Mino, Ohio, and Sano (2007) obtain data on more than thirty thousand-students. They demonstrate that as household's annual income increases, an expenditure on shadow education tends to become larger. Moreover, they note a positive correlation between test scores and attending *juku* among fifth and sixth graders and middle school students, while controlling other variables.

Mimizuka and his colleagues (2007) conducted the Japan Education Longitudinal Study 2003 (JELS2003), which consists of data gathered in two cities. One city was mid-sized within the capital metropolitan area (population of about 250 thousand), where they found that 14.2% of middle school students attend private schools. The other city is small and located in the *Tohoku* area (population of 90 thousand) with no private schools. Although results are based on only the first wave of JELS2003, they find father's educational background and participating in shadow education significantly increase a likelihood of passing a certain level in mathematics among sixth graders in the mid-size city. On the other hand, while father's educational background benefits sixth graders (i.e., when their fathers graduated from universities), no effect of taking shadow education lessons is noted. This suggests that how one's academic ability is formed is dependent on factors specific to each area (Mimizuka, 2007). JELS2003 collects data from parents as well, but it should be noted that its return rate was 29.5%. Therefore, it is biased; that is, parents with high achievers, high academic background, and high income tend to complete the survey. With this limitation, Mimizuka and colleagues (2007) report that a monthly expenditure on shadow education has the largest impact on children's math ability.

Kariya and his team report on results on a 2007 national achievement examination (Kariya, 2008). In this report, Kariya argues that it is invalid to assess school effectiveness without considering shadow education, since, according to their data from *Chiba* Prefecture, next to Tokyo, 45% of sixth graders and 60% of ninth graders attend shadow education lessons. Four out of eight chapters of this report articulate *Chiba* prefecture's results of the national exam in terms of shadow education. First, a school level analysis tells that schools with a larger percentage of attending shadow education tend to have larger achievement gaps in ninth graders' mathematics (Hiraki, 2008). Hiraki argues that this result suggests a possibility of widening achievement gaps between two groups of students: students who attend shadow education and who do not /cannot afford to attend. Using the same data, Sudo (2008) also reports that while there are insufficient data to create a social class variable, municipality-level analysis suggests that municipality with high income/cultural level is more likely to result in a higher percentage of ninth graders receiving shadow education.

Origuchi (2008) conducts a survey with students and their parents at two public schools in *Yokohama* city. His regression analysis to determine whether individuals send their children to *juku* indicates that years of mother's education and the number of children are significant. He argues that mothers with higher academic credentials are more likely to send their children to *juku*, and he also points out that families with a larger number of children are less likely to use *juku* because of the cost. He also indicates that attending *juku* positively affects one's academic achievement by showing results of another regression model.

Katase and Hirasawa (2008) use SSM survey data collected in 2005 to identify if the number of siblings affects parental decisions to seek shadow education when their children are at the elementary and middle school levels. Based on results of their analyses, they argue that the

number of years of mother's education is significant for both males and females over each cohort, even when the economic level of the 15-year-old was controlled. In addition, they conduct regression analyses to see what influences one's academic performance when he/she was a ninth grader may make along with the number of years of education. They report that investing in shadow education seems to directly and indirectly affect males' final educational levels across the four cohorts studied. Furthermore, they test if parents who used to receive shadow education lessons would intend to send their children to shadow education. While controlling for parents' years of education, gender, and current household income, they find that experience of receiving shadow education lessons significantly affects their future intentions. Although experience in shadow education schooling is significant, the intention to invest in shadow education and household income are significant to predict one's actual monthly expenditure in shadow education. They argue that having experience in attending shadow education lessons seems to affect whether they as parents intend to invest further in shadow education which, in turn, affects the actual month expenditure in shadow education. Katase and Hirasawa (2008) conclude that these results may mean that parental wealth and investment in shadow education determine their children's academic achievement, which is not the meritocracy but "parent-cracy."

The survey report on shadow education by MEXT (2008) indicates that 88.2% of parents who want their children to go on four year-university or graduate school in the future provide their children some types of shadow education activities. This number is quite high compared to 56% of parents who want their children to just go on middle or high school and provide them with shadow education. Moreover, the report indicates that *juku* attendance increased from 1985 to 2007 among parents who aspire for their children to graduate from four-year university or graduate school in the future; that is, 30.9% of these parents used *juku* in 1985, while 43.2% of

parents did so in 2007. The regional disparity is also seen in the report. In fact, the rate of *juku* attendance in a large city was noted to be considerably higher than in a small city (41.3% and 32.5%, respectively). The large city in this report was one of the cabinet-order designated 12 major cities along with the Tokyo special zone, while the small city had a population of less than 10,000 people.

Supplemental Lessons in School

Definition of Supplemental Lessons in school. Supplementary lessons in this study refer to free-of-charge instructional lessons taught by teachers conducted at public/private high schools outside of regular lesson hours counted as school attendance (e.g., before school or after school). The literature is limited in this field. More specifically, recently Lauer et al. (2006) synthesize 35 studies on out-of-school-time (OST) programs (e.g. summer schools and after-school programs) that help at-risk students in the United States. Their meta-analysis shows small but significant OST effects on students' achievement in reading and mathematics.

Supplemental lessons in Japanese High School. Only few studies have reported on supplementary lessons in Japanese high schools. Kikkawa (2001) describes extra lessons taught by school teachers every school day before and after regular lessons that appear on the published official school curricula. These extra lessons are named as "time period 0 and 7," since regular lessons are held between periods 1 to 6. Most students in the higher academic track at a rural high school who wish to attend national public universities willingly receive these lessons. Kikkawa (2001) argues that the total number of hours of lessons can increase more than thirty percent if one attends these supplemental lessons. Also, most students attend such lessons day after day during summer vacation. Moreover, these students take supplementary lessons on weekends as the entrance examination approaches (approximately four months before the exam).

Tsukada (1991) describes another type of supplemental lessons for high school graduates when shadow education institutions like *Yobiko* do not exist in town:

> Historically, ever since the prewar period hoshuka, or supplementary learning programs, have been attached to high schools as fourth supplementary year programs in this prefecture. On each high school campus, high school graduates from the school study for the entrance examination for an additional year as fourth-year high school students. Three hoshuka in the prefecture were closed recently because of the establishment of the mammoth Yobiko there. (p. 13)

Summary of the Literature on Shadow Education and Supplemental Lessons

The existing literature indicates that shadow education produces a number of effects on students' educational lives. These studies suggest that a substantial number of students obtain shadow education lessons; shadow education maintains and increases social inequalities (i.e., higher SES students tend to purchase these charged lessons); and some evidence suggests that obtaining shadow education lessons can improve students' academic achievement and help students to enter competitive high schools/universities. No prior study specifically focuses specifically on possible tracking effects related to obtaining shadow education lessons. Although Stevenson and Baker (1992) do include a variable concerning high-school reputation in seeking determinants of shadow education participation, their study does not specifically focus on possible tracking effects associated with SE. Moreover, their data does not constitute a nationally representative sample, and they could not apply proper multilevel modeling techniques which would provide a more accurate assessment of possible individual-level and group-level effects associated with shadow education.

Similarly, existing studies on SE also do not identify which students participate in supplemental free lessons under possible tracking influences. It is expected that higher-SES families send their children to shadow education institutions because of their relatively-high economic capital. By identifying who obtains lessons which do not require additional economic capital, the current study may determine whether non-economic factors also may play role in shadow education. Participation in supplemental lessons of various types should be assessed with respect to students' tracking locations.

In addition, it is important to emphasize that no shadow education studies use a nationally representative data of Japan except two comparative studies using TIMSS (Baker et al., 2001; Schumer, 1999). This is a clear weakness of the existing literature about shadow education. One strength of the current study is that it uses the newer PISA 2006 data set, which is a nationally representative sample of high school students who responded to questions about regular lessons and possible additional lessons inside/outside of formal school hours. Among previous studies, Ojima (1994) uses SSM (collected in 1985), Kataoka (1998, 2001) and Yamamoto and Brinton (2007, 2010) analyze the 1995 SSM, and Katase and Hirasawa (2008) examine the SSM survey data collected in 2005. In this latter case, however, the SSM does not include specific questions about supplemental free lessons. Moreover, as argued, the existing tracking studies use broad categories of the high school ranking and no multilevel regression techniques are applied to observe tracking effects on individual students' educational choices.

Self-Learning

Self-learning is not well-studied, but there are a number of existing studies about the effectiveness of doing homework in the United States.

Homework Studies

Cooper provides two major attempts to synthesize homework studies at the time of the research (Cooper, 1989; Cooper, Robinson, & Patall, 2006). Cooper's first research on this topic (1989) defines homework as tasks assigned by school teachers and completed by students during non-school hours. These homework studies are relevant to include in this study because of both positive and negative identified effects of homework. Cooper (1989) summarizes potential positive effects of homework as follows: while there are immediate achievement and learning effects such as better retention of knowledge and increasing understanding, some are long-term benefits including better study habits. Cooper (1989) also notes that one of the potentially negative effects is to increase disparity between high-academic and low-academic performers. Who receives homework is an issue of inequality. As for effectiveness of homework, Cooper's first review (1989) generally finds correlations between completing homework and better academic performance, although its effects differ considerably across grade levels. A recent review of homework studies by Cooper, Robinson and Patall (2006) also reports positive effects of homework on students' achievement across differently-designed studies.

Self-Learning in Japan

Kariya (2000b) argues that one's self-learning time can be used as a sociological index to show one's effort. In a study on opportunity gaps in shadow education, Kaneko (2004) contends that the amount of effort differs greatly, according to one's social status, and influential factors for this difference are family' cultural status and *juku* attendance affected by SES.

Fujita (2002) conducts a comparative study in self-learning hours between Japan and South Korea consisting of 1439 high school seniors from seven high schools in Tokyo and five schools in *Tottori*. There are four types of schools for Japanese high schools in the study; three

different levels of academic schools, and one vocational school at the bottom of the four schools in terms of difficulty in gaining admission. The average of self-learning hours differs, according to the four ranks; that is, students at the highest-ranked schools report studying 146.9 minutes per weekday, while students in second-ranked schools report studying 89.8 minutes, those at third-ranked academic schools (i.e., the bottom of the academic schools) report studying only 18.2 minutes, while vocational school students report spending a similar average of 24.7 minutes. After presenting these descriptive data, Fujita tests factors that structure high school students' self-learning hours. Results of a multiple regression analysis show that school rank and father's level of educational credential are significant, while a variable that indicates if father is a white-collar worker is not significant. He also determines who does not study at all. Only 5.6% of the top-ranked and second-ranked high school students do not study by themselves, while 60.1% of students who attend the third-ranked academic high school report no self-learning hours during weekdays. Finally, 54.3% of vocational school students also report not studying at all. By comparing these students and those who study, Fujita argues that while students who report they do not study are late for and/or skip classes, they do not resist teachers and report that they enjoy school in general.

By analyzing results on a national achievement examination 2007, Otawa (2008) argues that sixth graders who do not receive shadow education lessons report studying for about 1 hour outside of public schools during weekdays, while those who receive shadow education lessons report spending 2.2 hours in self-study.

Origuchi (2008) finds that individuals' measured amount of cultural capital is the largest determining factor on their hours of self-study per week, while father's educational background also affects self-study hours. In addition, attendance of *shingaku juku* increases reported self-

study hours by almost 1.7 hours per week. It should be noted that these hours exclude time that students study at *juku* and assess the hours of studying at home.

Self-Learning and Tracking in Japan

Kanbayashi (2008) reports that eleventh graders who attend higher-track schools tend to study much longer than their counterparts at general education and vocational schools on weekends. Even after years of mother's education are controlled, an indicator of top-high schools is statistically significant to predict students' learning hours on weekdays and weekend. Another study on self-learning hours outside of high schools shows that there are great differences in the length of self-learning hours, depending on high school ranking, and the differences among schools became greater between 1979 and 1997 (Kariya, 2000a, 2000b; Kariya & Rosenbaum, 2003). Also, in 1979, high school rank largely determined one's self-learning hours, regardless of family background factors. However, in 1997, mother's academic background appears as a significant factor that affects the length of self-learning hours.

Hasegawa (1993) reports cases of school maladaptation from families in poverty, which is selected from the same sample as the study by Yamazaki (1993). Hasegawa (1993) argues that high school students in poverty tend to have no commitment to schools. His interviewees do not recognize the seriousness of dropping out from high schools, suggesting that they are not aware of academic competitiveness issues in schooling. These students who have a variety of problems with schools do not understand its importance as a means of obtaining further education and occupational advantage. Hasegawa (1993) discusses Bourdieu's (1984) distinction that it could be argued that such students attempt to devalue the meaning of the academic competition, the dominating rule, by disengaging in it.

Summary of the Literature on Self-Learning

While self-learning is not well-studied, existing findings suggest that completing homework appears to improve students' academic achievement; students in academically rigor high schools tend to study longer by themselves; students who take shadow education lessons study longer by themselves than those who do not; and students' SES (e.g., one's level of cultural capital and parental educational background) shape their studying hours.

In addition to the fact that only a few studies are conducted in this field, the existing studies do not include any variable that indicates who participates in supplemental free lessons under the tracking influence. Since talking shadow education lessons increases students' studying hours, free lesson participation should also be included as the current study does so. Also, as mentioned before, the existing studies use only regional/interview data and broad categories of the high school ranking. Moreover, no multilevel regression techniques are applied to observe tracking effects on students' study habits.

Summary of Research

The literature in this chapter provides support for the view that the existing inequality in educational opportunity and outcomes is intensified through the three studied areas: the school tracking system, the shadow education industry, and the amount of time students are engaged in self-learning. More specifically, higher-SES students tend to be in competitive high schools that offer academic rigor college preparation courses with highly motivated peers and high expectations from teachers, participate in shadow education lessons and enhance/remedy their academic performance, and study longer by themselves. Their study habits are shaped by their high tracking location and shadow education participation.

The goals of the current study is to connect these three areas by analyzing a nationally representative sample with detailed tracking locations and multilevel regression techniques in order to identify, in terms of student SES, (1) who attends competitive high schools; (2) who is more likely to take shadow education lessons and free supplemental lessons in mathematics under the tracking influence; and (3) who tends to study longer under the influence of the tracking system and shadow education/free supplemental lesson participations. These connections between the tracking structure, learning opportunities outside of regular lessons (shadow education and free supplemental lessons) and self-learning have not been simultaneously studied, and the current study should provide evidence regarding that gap in the literature. It should be emphasized that these questions are well grounded in the following conceptual frameworks: academic tracking (Oakes, 2005), theory of practice (Bourdieu, 1984), capital conversion (Bourdieu, 1984, 1986; Lynch & Moran, 2006), and learning capital (Kariya, 2009a), as argued in Chapter 1. More specifically, this study is the first of its kind to test Bourdieu's theory of practice shown as "(Habitus x Capital) + Field = Practice" (Bourdieu, 1984, p. 101) with respect to connecting tracking structures to supplemental learning opportunities, and self-study habits.

Chapter 3

METHOD

Data Source

This chapter develops the research methods used in the study. More specifically, the data source, instrumentation and variables, and analytic approach are specified and discussed. The chapter discusses why the data source is appropriate, how dependent and independent variables are coded, how and why the cross-level interactions are created, and how the multilevel logistic and ordinal models are developed.

Data are from the Programme for International Student Assessment (PISA) 2006 conducted by the Organisation for Economic Co-operation and Development (OECD). PISA 2006 includes academic examinations on a randomly drawn sample of 15-year-old students in fifty-six participating countries. It also gathered rich contextual information about families and schools from student and principal questionnaires.

PISA 2006 was implemented at randomly sampled high schools in the third or fourth month of the three year-high-school-education in Japan. The size of Japanese sample is 5,952 students within 185 high schools. The report on PISA 2006 by National Institute for Educational Policy Research (2007) describes that the research team that administers PISA utilized a two-stage cluster sampling method to select sampled schools. First, high schools were divided into four categories: academic public schools, vocational public schools, academic national/private schools, and vocational national/private schools. Second, the team randomly selected schools to have a specific number of students that would proportionally reflect the population (age cohort nationwide) in each category. Third, students were randomly chosen from the selected schools. As a result, each school includes an average of 32 students. A final student weight and replicated

weights are used for all analyses presented in this study.

The nationally representative Japanese data for PISA 2006 includes contextual information based on questionnaires about students' families and schools. It is important to note that some school characteristics should not be associated with student performance. Since PISA 2006 was conducted among freshmen (tenth graders) of high schools in the third or fourth month of the Japanese academic year, there was very limited time for school characteristics to have effects on student performance. As Knipprath (2010) argues in her correlational study using Japanese PISA 2000, 2003 and 2006 data, since "students had been sliced into rather homogeneous groups based on entrance examinations just a few months before the PISA data were gathered" (p. 403), the "PISA data in Japan are more suitable to study the issue of tracking than of school effectiveness" (p. 403).

Variables in the Model

Dependent Variables

This study examines three dependent variables: 1) shadow education (i.e., education paid for outside of school), 2) supplemental free lessons provided at schools, and 3) self-learning hours. The three dependent variables were constructed based on two PISA student questionnaire items by OECD (2005b) and students' responses to them.

Shadow education and supplemental free lessons. The following items were combined into one measure, in order to clarify who takes shadow education and/or additional free lessons provided at schools. Students checked "Yes" or "No" to six items respectively.

Q32 What type of out-of-school-time lessons do you attend currently (if any)?

These are lessons in subjects that you are learning at school, that you spend extra time learning outside of normal school hours. The lessons might be held at your school, at

your home or somewhere else. These are only lessons in subjects that you also learn at school.

a) <One to one> lessons with a <teacher> who is also a teacher at your school

b) <One to one> lessons with a <teacher> who is not a teacher at your school

c) Lessons in small groups (less than 8 students) with a <teacher> who is also a teacher at your school

d) Lessons in small groups (less than 8 students) with a <teacher> who is not a teacher at your school

e) Lessons in larger groups (8 students or more) with a <teacher> who is also a teacher at your school

f) Lessons in larger groups (8 students or more) with a <teacher> who is not a teacher at your school (p. 26)

Since this study's purpose is to assess who begins to prepare for higher education in order to examine tracking effects on students' educational choices and study habits, the three types of lessons (one to one, lessons in small or larger groups) are not separately used but, rather, are combined to define (1) *shadow education* (i.e., lessons with a teacher who is not a teacher at the student's school and (2) *additional free lessons provided at schools* (i.e., lessons with a teacher who is also a teacher at the student's school).

These constructed variables are consistent in meaning within the Japanese educational context. Some students' siblings, parents, or neighbors may be "a teacher who is not a teacher at [the child's] school," but this is likely a rare case. Moreover, since teachers in Japan are not supposed to conduct additional lessons for their financial profit, "a teacher who is also a teacher at [the child's] school" should provide this additional instruction without compensation.

By using responses to Q31, I identified which students studied mathematics by receiving lessons outside of the normal school day (i.e., *attending outside-of-school-time lessons*). Then, I used responses to Q32's (a), (c) and (e) to identify which students received some types of lessons "*with a teacher who is also a teacher at [the child's] school."* This should indicate additional free lessons provided at schools. In a similar way, responses to Q32's (b), (d) and (f) were utilized to create a variable which indicates who studied mathematics by attending lessons outside of the normal school day "*with a teacher who is not a teacher at [the child's] school."* This variable should define whether a student purchased shadow education lessons.

Preliminary descriptive data suggests 13.6% of the beginning high school students obtained some type of family-paid education in mathematics, which could include more than one type of lessons. Eighteen percent received additional free lessons with a teacher who was also a teacher at the student's school.

Self-learning hours. The item "the time spent studying or doing homework by yourself" was used to define students' "self-learning hours" in mathematics. The item is as follows:

> *Q31 How much time do you typically spend per week studying the following subjects? For each subject, please indicate separately: the time spent attending regular lessons at your school; the time spent attending out-of-school-time lessons (at school, at home or somewhere else); the time spent studying or doing homework by yourself. <An hour here refers to 60 minutes, not to a class period> (p. 24)*

Self-learning hours was coded from 0 to 3 to indicate how long students study mathematics by themselves (i.e., coded 0 = no time; 1 = less than two hours a week; 2 = two or more but less than four hours a week; 3 = four or more a week). Preliminary descriptive analysis

shows the percentage in each category as 25.2% (no time), 47.8% (less than 2 hours), 18.6% (2 to 3.9 hours), and 7.5% (4 or more hours).

Independent Variables

At the individual (student) level of the model, major explanatory variables include student SES, academic attitude, female (gender), and math score. At the school level, variables include school SES, school rank (tracking location), city size (two dummy-coded variables: city and large city), public/private, and general/vocational education.

Student socioeconomic status (student SES). As an individual SES indicator, the PISA index of economic, social and cultural status was used. A report by OECD (2007) describes that the index "was derived from the following variables: the international socioeconomic index of occupational status of the father or mother whichever is higher; the level of education of the father or mother whichever is higher converted into years of schooling" (p. 211). Also, it includes "the index of home possessions obtained by asking students whether they had at their home: a desk to study at, a room of their own, a quiet place to study, a educational software, a link to the Internet, their own calculator, classic literature, books of poetry, works of art (e.g. paintings), books to help with their school work, a dictionary, a dishwasher, a DVD player or VCR, three other country-specific items, as well as the number of cellular phones, televisions, computers, cars and books at home" (p. 211). The report by OECD (2007) also provides a rationale for why these variables were included; "socio-economic status is usually seen as being determined by occupational status, education and wealth (p. 333). Principal component analysis, which is "standardised to have an OECD mean of zero and a standard deviation of one (p. 211)," was used to develop the index. The analysis was performed for every participating country, and

"patterns of factor loadings were very similar across countries" (p. 333), with internal consistency of the index ranging from 0.52 to 0.80 (p. 333).

Academic Attitude. This dichotomous variable is created based on students' responses to the following item in the PISA student questionnaire by OECD (2005b).

Q36 In general, how important do you think it is for you to do well in the subjects below?

a) <School science> subjects

b) Mathematics subjects

c) <test language> subjects (p.30)

Students are asked to choose one of the four levels of importance for each subject: "Not important at all," "Of little importance," "Important," and "Very important."

The translated version of this item is published by the National Institute for Educational Policy Research (2007). The item's meaning was slightly different in Japanese. The re-translated version of the item is: How important do you think it is for you to receive a good grade in the subject below: 1) Science, 2) Mathematics and 3) National language. This means that the Japanese students were asked if they believe that it is important for them to "receive a good grade (in school)" instead of "do well." Thus, the "academic attitude" variable based on the students' responses should mean how strongly they care about their grades in high school, representing their dispositions (habitus) towards the academic subjects.

To figure out students who perceive that studying the academic subjects is "very important," students who chose "very important" for both mathematics and languages are coded 1 as the "academically-oriented habitus group." The other students are coded 0 as the "less academically-oriented habitus group." Preliminary analysis indicates 33% of the sampled

students belong to the “Academically-oriented habitus group” and 66% of them are in the “Less academically-oriented habitus group.” Both mathematics and “national languages” (equivalent to “English” in the United States) are included to have a balanced “academic attitude,” neither just mathematics/science nor the arts/humanities.

This variable should be included in the analyses because this represents students’ academic dispositions, while individual (student) SES consists of parental occupational and educational background and home possessions including the number of books at home, reflecting family SES, not students’ dispositions.

Female (gender). Females were coded as 1, and males were coded as 0.

Student math score (performance). Five plausible values in mathematics were provided for analyses and should be used simultaneously. These values represent academic performance on mathematics that tenth graders demonstrated in the third or fourth month of the three-year high school education.

School SES. Individual SES was aggregated at each school to create this variable.

School rank. This variable indicates the student’s tracking location; that is, each school’s aggregate mean score of individuals’ math performance (five plausible values ranging from 200 to 800) was created standardized (OECD mean =500; standard deviation = 100). The average score for each school is intended to represent its academic rank in the hierarchal academic ranking system. Because the students in the sample had been in their high schools for only three or four months, it is reasonable to assume that there was virtually no or very little high school effect on their academic performance in mathematics. This variable seems to depict the well-defined hierarchal academic ranking system (e.g., skewness of 0.03 and kurtosis of -0.44 suggest the data are normally distributed). One test of the validity of this approach for ranking

schools according to their academic outcomes is whether the resulting school rankings differentiate student behavior in expected ways. Regarding the variable as a measure of tracking, as previously noted, Knipprath's (2010) correlational study using Japanese PISA data from 2003 and 2006 presents the case clearly since "students had been sliced into rather homogeneous groups based on entrance examinations just a few months before the PISA data were gathered" (p. 403), the "PISA data in Japan are more suitable to study the issue of tracking than of school effectiveness" (p. 403).

City size. A questionnaire filled out by school principals includes an item about a size of community where each school is located, according to OECD (2005a). Preliminary descriptive analysis states a percentage in the following four categories as 5.8% (a small town: 3,000 to about 15,000 people), 29.1% (a town: 15,000 to about 100,000 people), 40.6% (a city: 100,000 to about 1,000,000 people) and 24.5% (a large city: with over 1,000,000 people). Two dummy-coded variables were created: city and large city.

Public/Private School. Preliminary descriptive analysis shows that 30.9% of students attend private schools (coded 1), while 69.1% attend public schools (coded 0).

General/vocational education school. Almost 25% (24.7%) of students attend high schools in vocational education and 75.3% of them study in general education high schools. As for PISA 2006, schools were sampled for each general/vocational category (National Institute for Educational Policy Research, 2007). Thus, every sampled school did not have the other class; the schools have exclusively general education classes or vocational education classes.

Interactions. In multilevel modeling, cross-level interactions indicate the influence of a variable at a higher level of the data hierarchy on a relationship specified at a lower level. The following cross-level interactions will be included when the first two research questions are

tested: (1) between individual SES and school rank (i.e., individual students' tracking locations may facilitate higher-SES students taking shadow education, representing the capital conversion from economic capital to cultural capital); (2) between individual SES and school SES (i.e., even after controlling for school rank, higher-SES students in high-SES schools may begin taking extra lessons to attempt to go on to better higher education institutions); (3) between individual math performance and school rank (i.e., lower math performers in highly ranked schools may take additional lessons); and, finally, (4) at the individual student level of the model, an interaction between individual SES and individual math performance is also investigated (i.e., lower math performance with high-SES may be more likely to pay for lessons to improve/remedy the student's low academic performance, representing capital conversion from economic capital to cultural capital).

As for the third research question, students' study habits defined the number of hours that they study by themselves, the same three cross-level interactions will be observed for the following reasons: (1) between individual SES and school rank (i.e., higher SES students in higher school rank may study longer than others); (2) between individual SES and school SES (i.e., even after controlling for school rank, higher SES students in higher SES schools may study by themselves to prepare them for higher education); and (3) between individual math performance and school rank (i.e., lower math performers in highly ranked schools may study longer for going on higher education institutions). The final interaction (4) concerns the possible contingent relationship between individual SES and individual math performance (i.e., high SES students with low math performance may study longer to remedy their skills for future higher education).

Analyses

For first research question on students' educational choice, I will conduct two multilevel logistic regression analyses to assess whether individual characteristics and school structural characteristics are related to students' (1) likelihood to purchase additional instructional lessons and (2) likelihood to obtain additional free instructional lessons at public/private schools. To answer the second question on students' study habit shaped by one's tracking location and his/her educational choice under the influence of the tracking structure, I will conduct a multilevel ordinal regression analysis to investigate how individual characteristics and school structural characteristics are related to the duration of self-studying hours.

Defining the Multilevel Logistic Regression Model

Multilevel models are usually built in a number of steps. For the first research question with the two dependent variables, a model needs to be formulated for two-level multilevel regression analyses with a dichotomous outcome. Because the data are hierarchical and the outcomes are dichotomous (i.e., which means they result from a sampling distribution other than a normal distribution), the analyses require a different type of modeling approach from the typical ordinary least squares (OLS) regression model used with a continuous outcome and where individuals are not selected from within higher-order social groups (like schools).

Level-1 model. According to Heck and Thomas (2009), at level 1 (i.e., the student level), models with categorical outcomes are viewed as having three parts: a categorical outcome with a specific sampling distribution that has a mean and variance (μ, σ^2), a linear regression that produces a predictor (η) of *y*, and link function (e.g., logit, probit) which is used to link the expected values of the categorical outcome *y* to the predicted values of *y* (Hox, 2002; McCullagh & Nelder, 1989; Raudenbush & Bryk, 2002).

The level-1 sampling model for a typical 2-level analysis with continuous outcome is defined as:

$$Y_{ij} \mid \mu_{ij} \sim NID(\mu_{ij}, \sigma^2), \tag{3.1}$$

where the level-1 outcome Y_{ij} given a predicted value μ_{ij}, is approximately normally and independently distributed (NID) in the population with an expected value of μ_{ij} and constant variance σ^2 (Raudenbush, Bryk, Cheong, & Congdon, 2004). As Heck and Thomas note, for a categorical outcome, however, this expected value must be transformed, so the predictions are constrained to lie within a particular interval (e.g., 0 or 1 in the case of a dichotomous outcome). When *Y* is dichotomous or a proportion, the sampling distribution is specified as *binomial* (μ, n), rather than normal, with mean μ and the number of trials represented as n. The mean can be interpreted as the probability of success. For this type of outcome, the focus is on determining the proportion of successes (π) in a sequence of *n* independent trials or events. In other words, in a binomial distribution, the probability of success does not change over successive trails. The expected value of Y will then be

$$E(Y \mid \pi) = n\pi, \tag{3.2}$$

and the variance will be

$$Var(Y \mid \pi) = n\pi(1-\pi). \tag{3.3}$$

Because the mean and variance are not independent of each other (as in Eq. 3.2 and 3.3) a separate error structure in not included in the level-1 model (Hox, 2010).

For a dichotomous outcome, the probability (π) of the desired outcome (i.e., $Y = 1$) for a given predictor coefficient for individual *i* in group *j* can be represented as

$$\text{Prob}(Y_{ij} = 1|X_{ij}) = \pi_{ij}, \tag{3.4}$$

where π is the probability $Y = 1$ in the population given X_{ij} .

The relationship between the probability that an event occurs ($Y = 1$) versus does not occur ($Y = 0$) can be expressed with the logit link function which represents a fairly easy transformation of the expected scores of Y by taking the log of the probabilities of each event occurring. More specifically, the expected values of Y, for a given X, can be transformed, so they are constrained to lie within a particular interval (i.e., between 0 and 1 for a dichotomous outcome). The logit coefficient (η) is the log of the odds of the event coded Y =1 as opposed to $Y = 0$. For individual i in school j we can obtain the log of the odds of the probability of desired event occurring, as a function of a set of predictors as follows:

$$\eta_{ij} = \log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_{0j} + \beta_{1j}x_{1ij} + \beta_{2j}x_{2ij}, +...+ \beta_{pj}x_{pij}. \tag{3.5}$$

Therefore, a log odds coefficient is a ratio of two probabilities. To illustrate, if the probability of receiving an outside lesson is 0.5, then 0.5/0.5 = 1, the corresponding natural log (1) = 0, since there is an equal probability of each outcome occurring. If the probability of receiving an outside lesson is 0.9, then the odds will be greater than 1.0 [0.9/(1-0.9) = 9, and natural log(9) = 0.602]. If the probability of the desired outcome is less than 0.5, the odds will be less than 1.0. Therefore, although the predicted value for π can take on real value, the probability $Y = 1$ will vary between 0 and 1 (Heck & Thomas, 2009). One of the desirable features of using the logit link is that odds ratios can be obtained (e^{β}), where e is approximately 2.71828 and β is the specific log odds coefficient (so if the log odds of β = 0, the odds ratio equals 1). Odds ratios are typically easier to interpret than log odds. As mentioned previously, in Eq. 3.5 there is not a

typical individual residual term in the level-1 model, since the expected value (or mean) and its variance cannot be independently estimated.

Level-2 model. As Heck and Thomas (2009) note, at the school level, the model is consistent with the typical multilevel formulation. For example, a simple model with one predictor (W_j) can be formulated as follows:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_1 + u_{0j}, \tag{3.6}$$

where β_{0j} is outcome, γ_{00} represents the school intercept, γ_{01} is a structural parameter associated with a school-level covariate (w_1), and u_{0j} represents error in predicting the outcome. As a first step, the slope coefficients describing level-l relationships (from 3.4) are typically defined as fixed:

$$\beta_{1j} = \gamma_{10} \tag{3.7}$$

$$\beta_{2j} = \gamma_{20}.$$

At the school level, residual terms (u_{1j} and u_{2j}) can be added for defining level-1 slopes (e.g., β_{1j} and β_{2j}) as randomly varying if desired. Residuals are assumed to be normally distributed in the population with mean = 0 and variance typically standardized (Raudenbush & Bryk, 2002).

Ordinal regression. Answering the third research question requires an ordinal regression model. A common choice is a proportional-odds model, which is an extension of the basic dichotomous model previously described. In this formulation, the model expresses the individual's likelihood of falling into category c, and there are C possible categories ($c = 1,\ldots,C$). The difference, however, for an ordinal outcome is that the categories are ordered. Ordinal response models predict the probability of a response being at or below any given outcome category. We can predict the probability of a higher category of reported self-study hours versus

being below that category, given the predictors; that is, the outcome is generally defined as the probability of being at or below the cth category, as denoted by:

$$P(Y \leq c) = \pi_1 + \pi_2 + ... + \pi_c . \tag{3.8}$$

Because this is a proportional-odds formulation, only the first *C-1 categories* ($Y_c, ..., Y_{C-1}$) for case *i* in unit *j* are estimated, since the cumulative probability must always be 1.0 for the set of all possible outcomes. The advantage of using a proportional odds model is that the relationships can be described in one set of coefficients provided some basic assumptions can be met (e.g., dependent variables increase or decrease systematically across the categories of the outcome).

At level 1, the log odds (logit), each of the ordinal responses of individual *i* in group *j* can be specified as a linear expression assuming cumulative odds:

$$\eta_{cij} = \log\left(\frac{\pi_{cij}}{1-\pi_{cij}}\right) = \beta_{0j} + \sum_{q=1}^{Q} \beta_{qj} X_{qij} + \sum_{c=2}^{C} \theta_c . \tag{3.9}$$

Eq. 3.9 indicates that there is a series of thresholds, or cutpoints(θ_c), beginning with the second threshold (*c* =2…*C*), that separates the ordered categories of the outcome. Only *C*-1 cutpoints, including the intercept, are actually needed since the cumulative logit for the last ordered category is redundant. In Eq. 3.9, the lowest threshold (i.e., for η_{1ij}) is redefined as the intercept β_{0j} (so θ_1 is assumed to be zero). This is done in the multilevel formulation, so that the intercept parameter can be allowed to vary randomly across groups (as specified with the subscript *j*). However, the second threshold (θ_2), and any subsequent thresholds in Eq. 3.9, are fixed to be invariant across groups (i.e., they have no *j* subscript) to maintain measurement invariance across the groups (Hox, 2010). They have no substantive meaning and, therefore, are

not included in tables presented in Chapter 4. The level-2 model is specified in the same manner as indicated in Eqs. 3.6 and 3.7.

Chapter 4

RESULTS

This chapter presents the results of the study. It begins with descriptive statistics and correlation matrices of variables in the subsequent multilevel models. Then, results of the three multilevel logistic/ordinal regression analyses are presented in a series of steps. The first two logistic analyses consist of four models; Model 1 is a null model without any independent variables, Model 2 includes students' background variables, Model 3 is a full model with both student and school variables, and Model 4 is a full model with statistically significant interaction terms retained. Outcomes of the last analysis with the ordinal dependent variable (self-learning hours) only include Models 1, 2 and 3, since no statistically significant interaction term was found.

Descriptive Statistics

To provide a foundation for understanding of results of the main multilevel logistic and ordinal regression analyses that follow, descriptive statistics are first presented. Missing data can be a problem in multilevel analyses, depending upon the extent to which the data are missing and whether or not the data are missing at random. There are a number of available strategies for dealing with missing data. One acceptable approach is to use multiple imputation, which results in generating a number of data sets with random plausible values imputed for missing data using the EM (expectation maximization) algorithm. EM is a common method for obtaining ML estimates with incomplete data which has been shown to reduce bias due to missing data (Peugh & Enders, 2004). These can be saved as separate data sets and then analyzed.

In Table 4.1, the plausible value (PV) variables for math represent final imputed values for missing values on individuals. The values are imputed from a full consideration of

information that is present as well as a consideration of missing data patterns. The five plausible value data sets are used in developing the final estimates of variable effects in the later analyses. According to the PISA official report (2007), the scale describing student achievement in math was created to have a mean score of 500 among OECD countries,

> …with about two-thirds of students across OECD countries scoring between 400 and 600 points (As a comparison, the 25 European Union countries that participated in PISA 2006 have an average of 497 score points). (p. 42)

Because Japanese students performed relatively well, the means of the five plausible values (PVs) in mathematics are considerably higher than the average, at approximately 523. The standardized deviations (SD) of these scales are a little smaller than the average of 100 (i.e., at approximately 91), which suggests the distribution of math scores for Japan is somewhat reduced compared with other countries. In other words, Japanese students perform considerably above the mean and are less varied compared with the averages across countries in the study. Likewise, the mean for student socioeconomic status (SES), which is referred to as the "index of economic, social and cultural status PISA 2006" in the original dataset, is -0.01 (i.e., about at the grand mean of 0) and the SDs are also a bit smaller at 0.7 (rather than 1.0). The skewness and kurtosis estimates suggest that all variables fall within normal limits.

To facilitate interpreting the results of the multilevel analyses, continuous variables such as student SES and the math outcome variables in the analyses are standardized as summarized in Table 4.1. All student-level variables summarized in the table are weighted with the normalized final student weight.

Table 4.1.
Student Background Continuous Variables (Standardized)

	N	Min	Max	Mean	SD	Skewness	Kurtosis
Student SES	5865	-3.80	3.50	0.00	1.00	0.06	-0.46
PV Math 1	5952	-3.87	3.10	0.00	1.00	-0.17	-0.08
PV Math 2	5952	-4.10	3.42	0.00	1.00	-0.20	0.10
PV Math 3	5952	-4.13	3.34	0.00	1.00	-0.19	0.02
PV Math 4	5952	-4.37	3.69	0.00	1.00	-0.18	-0.05
PV Math 5	5952	-4.34	3.62	0.00	1.00	-0.21	-0.01

There are two categorical variables at the student level: Female (gender) and academic attitude. Table 4.2 shows 33% of the sampled students are considered to have academically oriented *habitus*, compared to 66% of the students who are described as less academically oriented.

Table 4.2.
Categorical Variable (Gender) at Student Level

		N	Percent
Gender			
	Male	2984	50.1
	Female	2968	49.9
Academic Attitude			
	Less Academically Oriented	3928	66.0
	Academically Oriented	1965	33.0
	Missing	59	1.0

Table 4.3 shows the descriptive statistics for the school-level continuous variables with the normalized school weight applied. All of these variables are standardized (M=0, SD=1) and normally distributed. School SES is an average of student SES at each school, while school rank 1 to 5 represents the average of each school's PV for math.

Table 4.3.
School Level Continuous Variables (Standardized)

	N	Min	Max	Mean	SD	Skewness	Kurtosis
School SES	185	-2.58	2.27	0.00	1.00	-0.08	-0.56
School Rank 1	185	-2.44	2.78	0.00	1.00	0.02	-0.40
School Rank 2	185	-2.49	2.63	0.00	1.00	0.02	-0.43
School Rank 3	185	-2.45	2.71	0.00	1.00	0.06	-0.44
School Rank 4	185	-2.45	2.65	0.00	1.00	-0.01	-0.41
School Rank 5	185	-2.50	2.57	0.00	1.00	-0.01	-0.49

Table 4.4 is a frequency table of school-level dichotomous variables. The table suggests that most schools in the sample are public (77.7%) and are described as general in curricular orientation (66.0%). About 20% of the schools are in large cities with over one million people, and about 34.2% are in cities ranging from ten thousand to one million people. The rest of the schools are in towns, smaller towns or village with populations less than ten thousand people.

Table 4.4.
School Level-Continuous Variables

		Frequency	Percent
School Type			
	Public	144	77.7
	Private	41	22.3
Curriculum Track			
	Vocational	63	34.0
	General	122	66.0
City (Dummy)			
	Other City Size	122	65.8
	City	63	34.2
Large City (Dummy)			
	Other City Size	148	79.9
	Large City	37	20.1

Table 4.5 shows descriptive statistics for the three dependent categorical variables: (1)

“shadow” education (i.e., education paid for outside of school), (2) additional free lessons provided at schools, and (3) self-learning hours. As the table shows, 13.6% of the sampled students take some form of shadow education lessons in mathematics. In addition, about 18% of the students take supplemental free lessons taught by their school teachers. There is overlap between the students who take shadow education and those who take free lessons; that is, approximately 6% of the students obtain both types of extra lessons. About 12% of the sampled students attend only supplemental free lessons, while about 8% of the students only receive shadow education lessons. It should be noted that roughly 26% of the sampled students obtain some type of supplemental instruction in mathematics outside of regular lessons in the third or fourth of their three-year-high school education.

According to MEXT’s national complete survey on this sampled cohort (2011), 53.9% of the students who graduated from high school went on to two- or four-year higher education institutions within 2 years and 8 months after the data for the PISA study were collected. Considering that the PISA data are a weighted stratified national sample, from this national statistics on the studied cohort, we can estimate that about 48.2% (26%/53.9%) of the college-bound students in this cohort began taking some sorts of additional lessons in math early in their high school educational careers. Similarly, approximately 25.2% (13.6%/53.9%) of the college-bound students took shadow education-math lessons, and perhaps 33.4% (18%/53.9%) of the students attended free lessons. Even though these percentages may be a little lower since this cohort’s nationwide graduation rate of high school is 95% (OECD, 2011), the data show that a substantial number of college-bound high school freshmen chose to attend additional instructional lessons in the third or fourth month of their three-year-high school education.

The last dependent variable has four categories which indicate how many hours students

study mathematics by themselves (i.e., coded 0 = no time; 1 = less than two hours a week; 2 = two or more but less than four hours a week; 3 = four or more a week). The table suggests that about 26% of the sample report studying mathematics over two hours per week outside of school.

Table 4.5.
Three Dependent Categorical Variables

	Frequency	Percent
Shadow Education Participation in Mathematics		
No	5072	85.2
Yes	811	13.6
Missing	69	1.2
Supplemental Free Lesson Participation in Mathematics		
No	4812	80.9
Yes	1070	18
Missing	70	1.2
Self-Learning Hours in Mathematics		
4 up to 6 hours or more	447	7.5
2 up to 4 hours	1109	18.6
Less than 2 hours	2848	47.8
No time	1499	25.2
Missing	50	0.8

Correlation Matrixes

Table 4.6 presents the correlation matrix of school-level variables. For this presentation, the five school-rank correlations are averaged in the table. School SES is significantly and strongly correlated to the school rank variables (.730), to school type (.373), which because of coding implies school SES is somewhat higher in private schools, to curriculum track (.499), which suggests school SES is higher in general- education schools, and large city, which indicates school SES is higher in large-city schools (.182). Additionally, private schools tend to be general-education schools and are located in areas described as “large city” where more than one million people live. There is also a significant positive relationship between curriculum track

and school rank (.389), which indicates that general curricular schools are significantly higher in school rank.

Table 4.6.
Correlations between School Level Variables

	School SES	School Type	Curriculum Track	School Rank	City	Large City
School SES	1	.373**	.499**	.730**	0.107	.182*
School Type (Private 1, Public 0)		1	0.199**	-0.045	0.016	.244**
Curriculum Track (General 1, Vocational 0)			1	.389**	0.033	0.122
School Rank				1	0.059	0.113
City (Dummy 1 or 0)					1	
LargeCity (Dummy 1 or 0)						1

**Significant at the 0.01 level (2-tailed)
*Significant at the 0.05 level (2-tailed)

Table 4.7 presents the correlation matrix of student-level variables. Because of the large student sample, some of the statistically significant correlations are relatively small in size (i.e., with correlation coefficients smaller than .15). Student SES is significantly correlated to five math scores (.306), which mean higher SES students are good at mathematics, to academic attitude (.065) which suggests students with higher SES students have academically oriented habitus, to shadow education participation (.154), which indicates that students whose SES are higher purchase shadow education lessons, to supplemental free lesson participation (.043), which implies higher SES students attend free lessons taught by school teachers, and to self-study math (-.222), which because this variable is reverse coded, suggests that students with higher SES study mathematics by themselves longer.

In addition to these relationships, the five math-score PVs are significantly related to female (-.108), which means that male students' scores are higher than female students' scores, to shadow education participation (.09), which implies that students with higher math scores take shadow education lessons, to supplemental free lesson participation (-.03), which indicates that students with lower math scores attend supplemental free lessons, to reverse-coded self-study hours (-.28), which mean that high math performers study longer by themselves, and academic attitude (.078), which suggests that students with higher math scores have academically oriented habitus. Academic attitude is also significantly correlated to shadow education participation (.03), which means that students with academically oriented habitus purchase shadow education lessons, to supplemental free lesson participation (.05), which implies that students with academically oriented habitus attend supplemental free lessons and to reverse-coded self-study hours (-.13), suggesting students whose habitus is academically oriented study longer by themselves. Female is negatively correlated to shadow education participation (-.03) and supplemental free lesson participation (-.05), which mean that females students do not take these lessons as often as male counterparts do, and to reverse-coded self-study hours (-.05) , which indicate that female students study longer by themselves. Shadow education participation, supplemental free lesson participation and reverse-coded self-study hours (negative) are also correlated one another; that is, students who take shadow education lessons (-.20) and free lessons (-.16) study longer.

Table 4.7.
Correlations between Student-Level Variables

	SES	Math Score	Female	Academic Attitude	Shadow Education	Free Lesson	Self-Study Hours
SES	1	.306**	-0.009	.065**	.154**	.043**	-.222**
Math Score		1	-0.108**	0.078**	0.09**	-0.03*	-0.28**
Female			1	0.011	-0.03*	-0.05**	-0.05**
Academic Attitude				1	0.03**	0.05**	-0.13**
Shadow Education					1	0.27**	-0.20**
Free Lesson						1	-0.16**
Self-Study Hours							1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Research Question 1-1/ Shadow Education

Model 1: Null Model

Table 4.8 shows results of Model 1. Results of all models were averaged with five plausible values. The first model provides an estimation of the probability that a student enrolls in shadow education. The intercept log odds is -2.21. The intercept in the equation can be interpreted as the log odds a student will take shadow education when all the other variables in the model are 0. In this case, of course, there are no other variables in the model. If the probability of the event coded 1 (taking shadow education) and the probability of not taking shadow education were the same (i.e., .50/.50) the odds would be 1, and log(1) = 0. Therefore, if the log odds are positive, it suggests the event coded 1 is more likely to occur than the event coded 0 (Azen & Walker, 2011). In this case, since the log odds are negative, it is more likely that students in the population do not obtain shadow education lessons. Because the log odds is a difficult metric to interpret, the odds ratio is often reported (Hox, 2010). Positive log odds

therefore translate into odds ratios greater than 1.0, while negative log odds translate into odds ratios less than 1.0.

In this case, in Table 4.8 the odds ratio is 0.11, which suggests that only a relatively small portion of the sample obtains shadow education lessons. For example, an intercept odds ratio of .20 would suggest students are only about 1/5 as likely to take shadow education lessons as to not take them. For ease of understanding, for small odds ratios, it is often easier to reverse the direction of prediction (i.e., by forming a ratio of 1/0.11). In this case, the odds of not taking shadow education (versus taking shadow education) would then be about 9.09 (suggesting students are about 9.1 times more likely not to take shadow education lessons as to take them).

We can also use the following formula to predict the population probability of taking shadow education from the odds ratio (e^{β}):

$$\pi = \frac{e^{\beta}}{1 + e^{B}} \tag{4.1}$$

In this case, we have 0.11/(1 + 0.11), which is 0.11/1.11, or 0.099. Therefore, the predicted probability that a student in the sample will take shadow education lessons is about 0.10 (or approximately 10% of the population).

Model 2: Student Background Variables

As Table 4.8 describes, student SES, math score and female are all significant predictors. Academic attitude variable is not included in this model since it was insignificant, that is, it did not contribute to the probability that students take shadow education lessons.

Table 4.8.
RQ1-1: Fixed Effect

	M1			M2		
	Estimates	SE	Odds Ratio	Estimates	SE	Odds Ratio
School Level						
Intercept	-2.21****	0.094	0.110	-2.12****	0.099	0.120
Student Level						
SES				0.247****	0.052	1.280
Score				-0.155*	0.090	0.857
Female				-0.175*	0.099	0.839

* p < .10, **p < .05, *** p < .01, **** p < .001.

The second model in Table 4.8 suggests the intercept log odds shifts slightly when the level-l variables are added. The intercept log odds can now be interpreted as the log odds of taking shadow education when the student is male (coded 0), of average SES (coded 0), and obtaining an average score (0**).**

The results suggest that SES is significantly related to likelihood to obtain shadow education, holding the other variables constant. More specifically, a 1-SD increase in student SES increases the odds of taking shadow education by a factor of 1.28. This can be interpreted as a 28% increase in the odds of taking shadow education, holding the other variables in the model constant. There was some evidence that student math score was negatively related to the probability of taking shadow education (OR = .857, $p < .10$), suggesting students with higher math scores are less likely to obtain shadow education lessons (i.e., a 1-SD increase in math score would be related with a 14.3% decrease in odds of obtaining shadow education), holding other variables constant. Females are also less likely to obtain shadow education lessons compared with males (OR = .839, $p < .10$), again holding other variables constant.

Model 3: Full Model (Student Background and High School Variables)

The third model in Table 4.9 adds the school-level predictors. As the model results suggest, student SES, math score and female remain significant after school level-variables were added to this model.

Turning attention to the school predictors, in Model 3, school SES, general/vocational, school rank and city are significant predictors of the probability that students will seek shadow education lessons. The findings suggest that a 1-SD increase in school SES increases the odds of obtaining shadow education lessons by a factor of 1.537, holding other variables in the model constant. This represents a 53.7% increase in the odds of purchasing lessons from the shadow education industry. For students who attend general-education schools, the odds of obtaining shadow education lessons are increased by a factor of 1.618 times compared to their counterparts in vocational schools, holding other variables constant. Also, school rank is significant; suggesting that for students who attend schools that are ranked 1 SD above the grand mean of schools, the odds of obtaining shadow education lessons are increased by a factor of 1.3 compared with their peers in less academically-inclined schools, holding other variables constant. For city, the odds ratio is 1.328, which suggests that for students who attend schools located in cities whose population ranges from ten thousand to one million people, the odds of obtaining shadow education are increased by 32.8% compared to their peers in the smaller population centers (under about 100000 people), holding other variables constant.

Table 4.9.
RQ1-1: Fixed Effect

	M3				M4			
	Estimates		SE	Odds Ratio	Estimates		SE	Odds Ratio
School Level								
Intercept	-2.422	****	0.195	0.089	-2.469	****	0.189	0.085
School SES	0.429	****	0.122	1.537	0.452	****	0.123	1.572
Private	-0.275		0.186	0.760	-0.304		0.189	0.738
General Edu	0.481	**	0.235	1.618	0.471	**	0.226	1.602
School Rank	0.262	*	0.140	1.300	0.274	**	0.136	1.316
City	0.283	*	0.168	1.328	0.273		0.165	1.314
Large City	0.239		0.173	1.270	0.187		0.174	1.206
Student Level								
SES	0.139	****	0.053	1.149	0.123	**	0.057	1.131
Score	-0.396	****	0.110	0.673	-0.395	****	0.112	0.674
Female	-0.215	**	0.099	0.807	-0.226	**	0.100	0.798
SES*School SES					0.131	****	0.045	1.139

* = p < .10, ** = p < .05, *** = p < .01, **** = p < .001.

Model 4: Full Model with a Significant Interaction Term

Table 4.9 retains a significant cross-level interaction between student SES and school SES, along with the three significant student-level predictors and four significant school-level predictors (i.e., city is no longer significantly related to obtaining shadow education). Importantly, these results of this final model suggest that one's decision of purchasing shadow education lessons is shaped by both individual student and school contextual factors.

Regarding the school-level variables, for students who attend schools where school SES is one SD above the mean, the odds of taking shadow education are increased by 1.572 times ($p < .001$) compared with their peers at more average schools in terms of SES, holding other variables in the model constant. Similarly, the odds of taking shadow education for students who

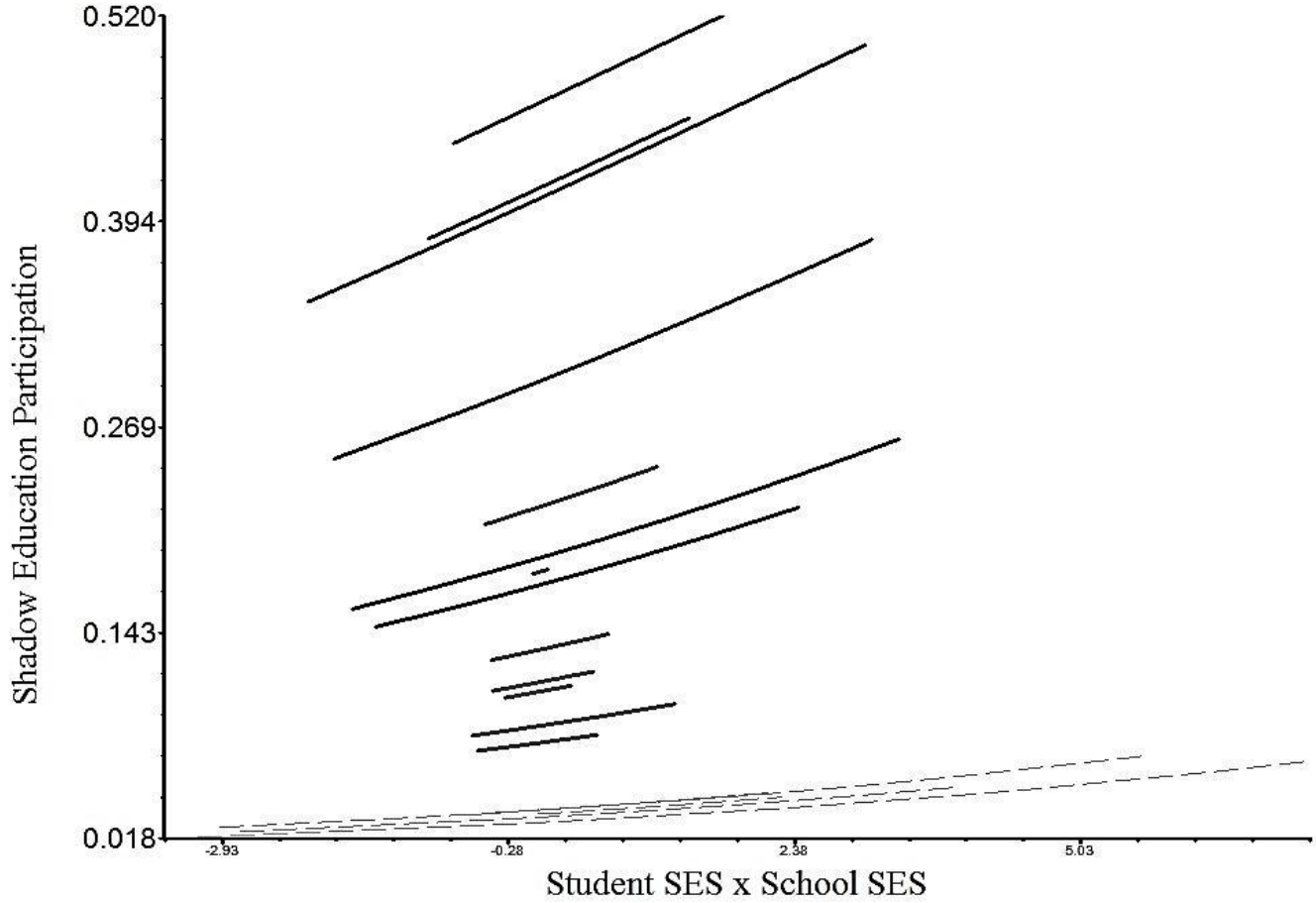
attend general-education schools are also increased by a factor of about 1.6 times compared to students attending vocational schools, while controlling the other variables. For school rank, the odds ratio is 1.316. This suggests a 1-SD increase in school academic rank is associated with a 1.316 increase in odds of students obtaining shadow education compared with students attending schools of average academic standing in the population, holding other variables in the model constant. Moreover, if students attend high schools ranked 2 SD above the mean (i.e., the top 2-3% of academically-ranked schools in the population), the odds of obtaining shadow education are increased by 1.732 times (1.316 x 1.316 = 1.732 times), or about 73.2%, holding the other variables such as the other two tracking-variables, school SES, and curriculum track (general/vocational education) constant. This implies competition is stronger in higher academically-ranked schools.

The significant cross-level interaction in Model 4 indicates that that school SES composition moderates the strength (OR = 1.139) of the individual SES-shadow education relationship within schools; that is, the strength of the student-level relationship is contingent on levels of school SES composition. This result suggests that one's decision of purchasing shadow education lessons is shaped by both student and school factors. More specifically, as school SES composition increases, students at any SES standing will have increased odds of obtaining shadow education lessons, holding other variables constant. For example, for an individual 1-SD above the mean in SES attending a school at the grand mean of school SES, the odds of obtaining shadow the odds of obtaining education are increased by a factor of about 1.131. For that same individual now placed in a school 1-SD above the mean in school SES, the odds of obtaining shadow education are increased by about 1.29 (1.13 x 1.14 = 1.29), holding the other variables constant. The positive interaction therefore implies a stronger likelihood of a given

individual obtaining shadow education as she or he attends a high school with higher SES composition. Figure 4.1 visually summarizes this result, confirming students in schools with high SES (SSES) are more likely to take the additional charged lessons. Contrary to what might be expected (i.e., lower SES students in lower SES school settings being more likely to obtain shadow education), the figure expresses that lower SES students in lower SES schools are not likely to obtain shadow education.

Figure 4.1.

The Relationship between SEMATH (Shadow Education Math) and the Interaction Term (Student SES and School SES): With 0.1 probabilities of groups (schools) and 25th/50th/75th percentiles of School SES



This figure was created with PV Math1. Bold black line = higher school SES; bold gray line = average school SES; dotted gray line = lower school SES

Research Question 1-2/ Supplemental Free Lesson

Model 1: Null Model

Model 1 provides an estimation of the odds that a student enrolls in supplemental free lessons taught by school teachers. The intercept log odds is -1.593, which can be interpreted as the log odds a student would attend supplemental free lessons when all the other variables in the model are 0. Since the log odds are negative, it is more likely that students do not take supplemental free lessons. In Table 4.10 the odds ratio is 0.203, which suggests that the odds of obtaining supplemental free lessons versus not obtaining them is about 1 to 5. We can confirm this by examining the odds of not attending supplemental free lessons versus taking them (1/0.203), which is 4.93. Using Eq. 4.1, we can obtain the predicted probability of obtaining free supplemental math lessons in the population as 0.169 [.203/(1+.203) = 0.169].

Model 2: Student Background Variables

Table 4.10 shows that the intercept log of the second model changes slightly because of added student-level predictors. The results indicate that student SES is not significant, while math score (Academic Performance), female, and academic attitude contribute to explaining whether individuals are likely to obtain free math lessons taught by their school teachers. Academic attitude's odds ratio suggests that students who have an academically-oriented habitus (i.e., 1-SD above the average student's level) are 1.334 times more likely to take supplemental free lessons in mathematics (a 33.4% increase in the odds of attending supplemental free lessons) than their peers of average habitus, holding the other variables in the model constant. Student math score was negatively related to the probability of obtaining free lessons in math (log odds = .79, $p < .001$), suggesting that for a 1-SD increase in math score, the odds of obtaining free supplemental lessons is reduced by a factor of 0.790 (or 21%) compared with students having

average math scores, holding other variables constant. Additionally, female students are less likely to obtain supplemental math-lessons outside of regular lessons at their schools, as the odds of taking supplemental free lessons decrease by about 31% (OR = .693) compared with males.

Table 4.10.
RQ1-2: Fixed Effect

	M1			M2		
	Estimates	SE	Odds Ratio	Estimates	SE	Odds Ratio
School Level						
Intercept	1.593****	0.079	0.203	1.565****	0.113	0.209
Student Level						
SES				0.048	0.046	1.049
Score				-0.236****	0.060	0.790
Female				-0.366****	0.117	0.693
Academic Attitude				0.288****	0.080	1.334

* = p < .10, ** = p < .05, *** = p < .01, **** = p < .001.

Model 3: Full Model (Student Background and High School Variables)

As Table 4.11 describes that large city is the only significant school-level-predictor. The three student-level variables remain significant. The findings suggest that when students attend schools located in large city (i.e., having one million or more people), they are less likely to take supplemental lessons: the likelihood of taking supplemental free lessons is decreased by about 42.8% compared with students in the reference set of cities.

Table 4.11
RQ1-2: Fixed Effect

	M3				M4			
	Estimates		SE	Odds Ratio	Estimates		SE	Odds Ratio
School Level								
Intercept	-1.466	****	0.187	0.231	-1.494	****	0.185	0.224
School SES	0.109		0.121	1.115	0.136		0.110	1.146
Private	0.266		0.193	1.305	0.249		0.194	1.283
General Edu	0.082		0.179	1.085	0.063		0.177	1.065
School Rank	0.116		0.133	1.124	0.118		0.130	1.126
City	-0.137		0.185	0.872	-0.162		0.182	0.851
Large City	-0.559	***	0.222	0.572	-0.621	****	0.199	0.537
Student Level								
SES	0.012		0.047	1.012	0.043		0.042	1.044
Score	-0.299	****	0.066	0.742	-0.296	****	0.067	0.744
Female	-0.380	****	0.116	0.684	-0.382	****	0.116	0.683
Academic Attitude	0.286	****	0.079	1.332	0.285	****	0.079	1.330
SES * School SES					0.109	**	0.048	1.115

* = p < .10, ** = p < .05, *** = p < .01, **** = p < .001.

Model 4: Full Model with a Significant Interaction Term

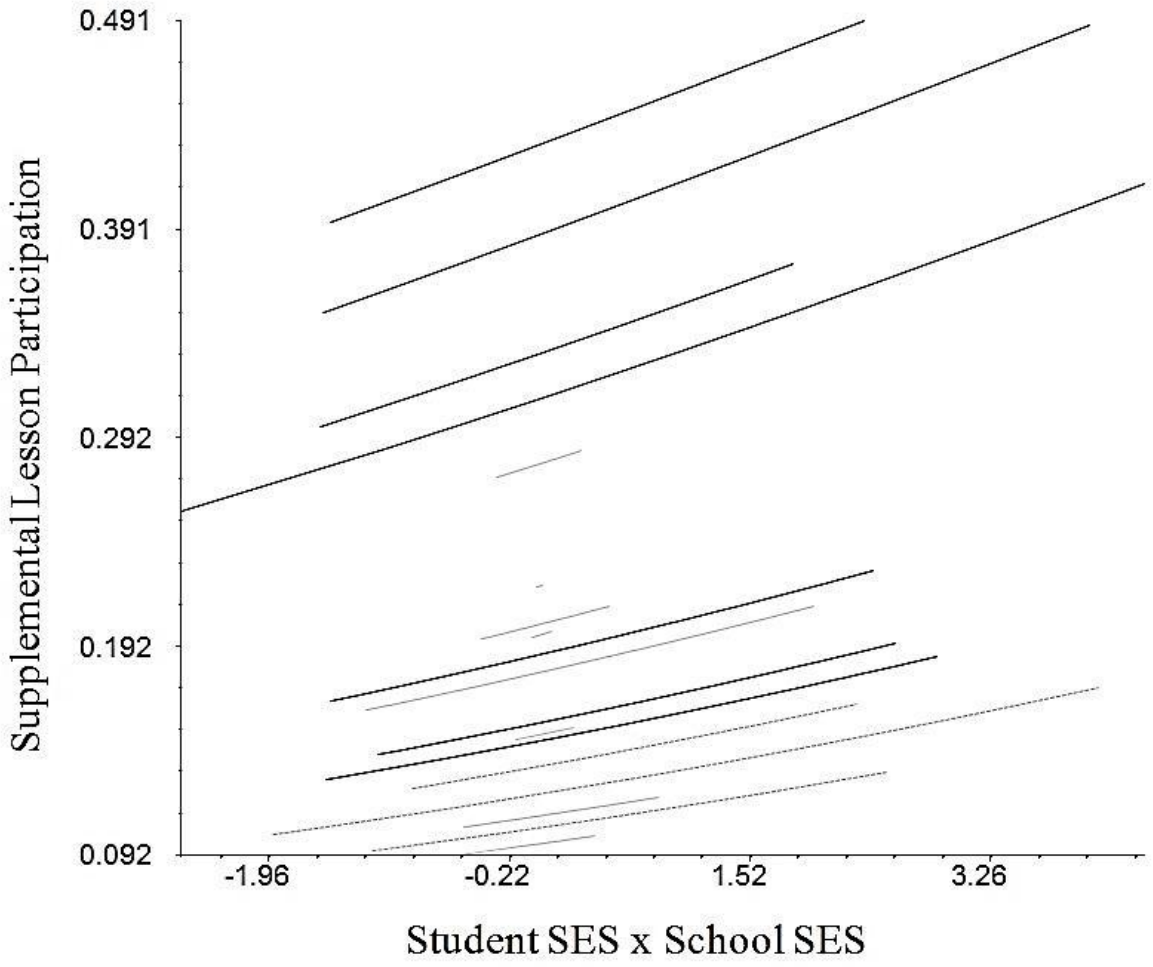
As Table 4.11 suggests, in Model 4, once again the only significant school level-predictor is large city. Similar to Model 3, students whose schools are located in large cities are less likely to take additional lessons from their teachers; the odds of obtaining the lessons are decreased by 46.3% (OR = 0.537) compared with students attending schools in the reference cities (small towns). The student-level significant variables suggest (holding the other variables constant) that (1) when students' math scores are 1-SD above the mean, the likelihood of taking fee lessons is decreased by a factor of 0.744 (or 25.6%) compared with students with average math scores, (2) the odds of female students obtaining free lessons are reduced by a factor of 0.683 (or 31.2%) compared with males, and (3) students with academically-oriented habitus are more likely to obtain free lessons than students of average habitus. For example, for a 1-SD increase in

academic orientation, students' odds of obtaining free supplemental lessons is increased by 1.33 times (or 33%) compared with their peers of average habitus.

In Model 4, once again, the cross-level interaction between student SES and school SES is statistically significant ($p < .05$). This implies that likelihood of obtaining free supplemental lessons is again conditional on school SES composition. More specifically, for an increase of 1-SD in individual SES, the probability of a student obtaining fee lessons is increased by a factor of 1.044 compared to a peer of average SES, holding other variables in the model constant. If those two students are placed in a school 1-SD above the mean in school SES composition, the odds of the individual student with 1-SD higher SES than his peer obtaining free supplemental math lessons is now increased by a factor of 1.164 (1.044 x 1.115 = 1.164), or 16.4%, holding other variables constant. Figure 4.2 shows that, although the relationship is not as clear as for obtaining shadow education participation, there is still a tendency for high-SES students in high-SES schools to obtain supplemental free lessons, not the other way around.

Figure 4.2.

The Relationship between SEMATH (Supplemental Free Math Lessons) and the Interaction Term (Student SES and School SES): With 0.1 probabilities of groups (schools) and 25th/50th/75th percentiles of School SES



This figure was created with PV Math1; bold black line = higher school SES, bold gray line = average school SES; dotted gray line = lower school SES

Research Question 2/ Self-Learning Hours

Model 1: Null Model

For the ordinal outcome (reported hours of self-study in math), the four categories are ordered from lowest (no time) to highest (4-6 or more hours). Model 1 in Table 4.12 provides an estimation of the log odds that a student reports studying mathematics by him/herself the highest

category versus combined lower categories. The thresholds specify the relationship between the log odds and the observed categorical outcome, but have no substantive meaning in interpreting the model (Hox, 2010). The estimated log odds, therefore, determines which categorical response is observed. For example, if the estimated log odds falls below the first threshold, which is specified as the intercept (-3.136) in a multilevel formulation so it may be allowed to vary randomly across schools in the multilevel model, the lowest category is observed (no time spent). The subsequent thresholds are considered as fixed at the group level to maintain measurement invariance (Hox, 2010). Since the intercept log odds are negative, it is more likely that most students report lower categories (versus higher categories) of studying mathematics by themselves (i.e., less than two hours a week or no time spent). Indeed, in Table 4.5, about 48% and 25% report studying less than 2 hours or spending no time studying math.

Model 2: Student Background Variables

In Table 4.12, for Model 2 the student-level-predictors student SES, math score, female, shadow education participation, supplemental lesson participation, and academic attitude are significant in explaining the duration of time students report studying math by themselves during a typical week. For ordinal outcomes, the odds ratio for the logit model represents the odds of the highest category occurring as compared to all lower categories combined. In other words, it is a cumulative odds ratio representing the increased predicted odds to be the highest category relative to the lower categories for each unit increase in the predictor. The change in odds ratio related to a 1-unit change in the predictor is therefore independent of the specific response category (Hox, 2010).

To examine the relationships in Table 4.12 in more detail, because academically-oriented habitus is a standardized score, for a 1-SD increase in student academically-oriented habitus, the

predicted odds of being in the highest self-study category (4-6 hours or more) versus the lower categories are increased by a factor of 1.436, or are 1.436 times greater, than for students of average habitus, holding other variables in the model constant. Similarly, for student SES, a 1-SD increase in student SES increases the odds of being at the highest category of self-study versus the combined lower categories by a factor of 1.191 (or 19.1%) compared with their peers of average SES, holding other variables constant. For students whose math scores are 1-SD above the mean, the odds of being at the highest category versus the lower categories of self-study are 1.226 times greater (22.6%) than their peers having average math scores, holding other variables constant. Female students are more likely to report being at the highest category of self-study hours versus the combined lower categories compared with males (OR = 1.392, $p < .001$), an increase of about 39.2% compared with males.

Importantly, obtaining shadow education lessons and supplemental free lessons are positively related to the odds of students reporting being in the highest category versus lower categories of math self-study (OR =1.567 and 1.987 respectively, $p < .001$). More specifically, for students who report obtaining shadow education, the odds of reporting they are at the highest category of self-study versus below is increased by a factor of 1.567 (or 56.7%) compared with their peers who did not obtain shadow education, holding other variables in the model constant. For students who participated in free supplemental lessons, the odds of reporting they are at the highest category of self-study versus below are increased be a factor of 1.987 (or 98.7%) compared with their peers who did not obtain free extra lessons, other variables held constant.

Table 4.12.
RQ2: Fixed Effect

	M1			M2		
	Estimates	SE	Odds Ratio	Estimates	SE	Odds Ratio
School Level						
Intercept	-3.136****	0.115	0.043	-3.745****	0.158	0.024
Student Level						
SES				0.175****	0.038	1.191
Academic Attitude				0.362****	0.068	1.436
Score				0.204****	0.045	1.226
Female				0.331****	0.084	1.392
Shadow Edu				0.449****	0.096	1.567
Free Lesson				0.686****	0.093	1.987

*p < .10, **p < .05, ***p < .01, ****p < .001.

Model 3: Full Model (Student Background and High School Variables)

In the complete model in Table 4.13, at the school level, school academic rank, SES composition, general education school, and large city are significantly related to hours of self-study, while private school and city are not. Possible interactions were examined; however, since none was significantly related to perceptions of self-study hours, this is the final model. To examine these variables in more detail, for students who attend high schools academically ranked 1-SD above the grand mean, the odds of being in the highest category of math self-study versus lower categories are increased by 1.659 times (a 65.9% increase) compared with their peers who attend high schools at the grand mean, controlling for other variables in the model. Regarding SES composition, for a 1-SD increase in school SES, the odds of students reporting being in the highest self-study category versus the lower categories are increased by 1.25 times (or a 25% increase) compared with their peers in schools at the grand mean, holding other variables

constant. Being in general-education schools also influences students' reported hours of self-study in math (OR = 1.79); that is, compared with students in vocational schools, students in general-education schools are 1.79 times more likely to report being in the highest category of reported math self-study rather than the lower categories (an increase of 79%), holding other variables constant. It should be noted that students whose schools are located in large cities are less likely to report being in the highest category of math self-study versus the lower categories (OR = .592) compared with their fellow students who reside in the reference group of smaller cities (under 100,000 people), holding other variables in the model constant. This represents a reduction in odds of 40.8% compared with their peers in the reference group.

Turning to the student-level part of the model, all student level-variables are significant predictors of the length of self-studying. For student SES, students whose family background SES is 1-SD above the grand mean are about 1.2 times more likely to report being in the highest category of self-studying versus the lower categories than their peers of average family SES, holding other variables constant. Student math score is also related to reported math self-study hours. The odds of being in the highest category of self-studying hours versus the lower categories are increased by about 9% for a 1-SD increase in math score (OR = 1.089), holding other variables constant. Female students are 1.37 times more likely than males to report being in the highest category of self-studying versus lower categories, holding other variables constant. Furthermore, students who obtain the two types of supplemental lessons inside/outside of their high schools tend to report studying longer. Holding other variables constant, for students who obtained shadow education (versus those who did not), the odds ratio of being in a higher category versus the combined lower categories is increased by a factor of 1.522 or about 52%; while for students who obtained supplemental free math lessons (versus those who did not), the

odds ratio of being in the highest category versus combined lower categories is increased by a factor of approximately 2.0 (or about a 100% increase). Finally, an increase of 1-SD in academically-oriented *habitus* results in an odds ratio for being in the highest category of math self-study versus the combined lower categories that is 1.459 times greater, holding other variables constant.

Table 4.13.
RQ2: Fixed Effect

	M3			
	Estimates		SE	Odds Ratio
School Level				
Intercept	-3.734	****	0.204	0.024
School SES	0.223	**	0.105	1.250
Private	-0.073		0.162	0.930
General Edu	0.582	****	0.152	1.790
School Rank	0.506	****	0.113	1.659
City	-0.260		0.162	0.771
Large City	-0.525	****	0.170	0.592
Student Level				
SES	0.136	****	0.040	1.194
Academic Attitude	0.378	****	0.069	1.459
Score	0.085	*	0.051	1.089
Female	0.317	****	0.085	1.374
Shadow Edu	0.420	****	0.097	1.522
Free Lesson	0.696	****	0.096	2.006

* = p < .10, ** = p < .05, *** = p < .01, **** = p < .001.

Summary of Findings

The findings suggest that school SES, school type (i.e., general/vocational), school academic rank, size of the surrounding population center (city), student SES, student math score, and gender shape whether students purchase shadow education lessons. Moreover, a cross-level

interaction between student SES and school SES suggested that high school student composition moderates the effect of student SES on likelihood of obtaining additional paid math instruction. For obtaining supplemental free math lessons, the results suggest that school variables have little influence in defining who obtains these lessons; that is, only the size of the surrounding population center (i.e., large city) affected the likelihood of obtaining supplemental free lessons. This implies a greater measure of equity in student access to supplemental free lessons in math across the high school settings compared with obtaining shadow education. At the student level, gender, academic attitude, and the interaction between student SES and school SES composition were significantly related to the probability of obtaining supplemental free math lessons. Finally, students' reported length of self-studying is influenced by school SES composition, school type (i.e., general/vocational), school academic rank, size of surrounding population center, student SES, student math score, student academic attitude, gender, and participation in shadow education, and supplemental lesson participation. These results are discussed in further detail and conclusions and implications are drawn in the last chapter.

Chapter 5

DISCUSSION, IMPLICATIONS AND CONCLUSIONS

Summary of Study and Purpose

This study investigated tracking effects on students' educational choice and behavior that shape their educational trajectories. This represented an initial attempt to document how high school students' tracking location influences their choice of gaining learning opportunities inside/outside high schools and how these choices contribute to explain how much effort one exerts along with tracking and family effects. This study reveals who begins preparing for higher education and how both student- and school-level factors shape students' preparation in the forms of obtaining additional learning opportunities and in increasing the duration of the math self-study.

Four main concepts theories were used to frame the study: academic tracking and its effects (Oakes, 2005), theory of practice (Bourdieu, 1984), capital conversion (Bourdieu, 1984, 1986; Lynch & Moran, 2006) and learning capital (Kariya, 2009a). The first framework, tracking effects, underpinned the entire study, and the three others were included to investigate how tracking effects emerge in the forms of students' educational choice and study habits. Sorting students into different tracks based on their academic performance is one of the main structural mechanisms of schooling which reinforces and intensifies existing learning inequities (Oakes, 2005). Academically rigorous learning opportunities (e.g., college preparatory courses) are provided to those in higher academic tracks. Bourdieu's (1984) theory of practice explains how such educational practices are generated. This study included both school and student-level variables to operationalize Bourdieu's theory of practice, which is summarized as (Habitus x Capital) + Field = Practice (See Chapter 1). In addition to this formula, the concept of capital

conversion Bourdieu, (1986) helps clarify how possessing a certain type of capital benefits advantaged individuals in terms of education. Finally, the concept of learning capital (Kariya, (2009a) is useful in highlighting the meaning and significance of investigating unequal distribution of learning opportunities and effort (i.e., self-learning hours) under the influence of the school academic tracking system. According to Kariya (2009a), learning competency/capital is "a combination of eagerness to learn, good learning habit, initiating active learning, and learning how to learn" (p. 94), and it has become much more important in the rapidly changing world. This study interpreted learning competencies/capital as aspects of *habitus* in learning, which when considered with capital and field, help to identify school and family factors that lead some students to take certain actions that benefit them educationally.

Discussion of the Findings

Research Question 1-1

The results of the multilevel logistic regression empirically supported the research hypothesis; students in highly-ranked schools were more likely to seek extra instructional lessons outside of their public/private high schools than those in school of lower academic rank. This suggests the presence of tracking effects which influences students' choices of obtaining supplemental lessons in mathematics to enhance/remedy their academic performance. The other variable that indicates one's tracking location is the type of curriculum in the school attended (general or vocational). The results indicated students in general education schools were significantly more likely to take shadow education lessons. It is also important to highlight that schools' academic ranking was significant, even after this variable which represent curriculum tracking was controlled.

In addition to these two tracking variables (school type and academic rank), school SES

composition should be understood as a consequence of sorting students into different tracks based on their academic performance because preliminary analyses indicated school SES and academic rank were highly correlated. More specifically, high SES students were likely to attend more competitive schools as a result of the existing high school entrance examinations. It should be emphasized that the school SES composition effect was observed to be much stronger than the effect of the school's academic rank. Results also indicated that the cross level-interaction between student SES and school SES composition additionally contributed to a higher likelihood of obtaining shadow education lessons; that is, students with higher family SES were more likely to take shadow education lessons, and this likelihood was enhanced when they attended high-SES schools, which were likely to be the best schools in each region.

As for results of the other non-tracking school-level-variables, school type (i.e., public or private) did not affect likelihood of obtaining shadow education, and size of the surrounding population center in which the high school was located produced mixed results. Attending a high school in the "large city" category did not influence students' choice of gaining additional lessons in the shadow education industry, while attending a high school within the "city" category was significant. One possible explanation for this latter finding may be because there are greater SES-disparities in large cities.

Students' level of math performance was negatively and significantly related to likelihood of obtaining shadow education, with low performers being more likely to seek learning opportunities—presumably to remedy their low performance. Moreover, females were less likely to obtain shadow education lessons. This result is consistent with the well-documented fact that male students tend to be good at mathematics during high school and subsequently major in math/science related fields in college, leading them to have higher-paying jobs (e.g., Bobbitt-

Zeher, 2007).

Regarding shadow education, therefore, the study's findings indicate that it is clear that the existing tracking system intensifies learning opportunity-gaps based on the relationship between individuals' SES background and likelihood of entering the shadow education market. Through the high school entrance examinations, higher-SES students tend to be clustered in high-academic, high-SES schools, and these students are more likely to take additional lessons to enhance/remedy their performance early in their high school educational careers. This suggests they choose to begin preparing for the next academic stage (college education) in such an early time. These may explain why students at competitive high schools are likely to gain admission to higher-ranked universities as documented (e.g., Ono, 2001).

Research Question 1-2

The hypothesis for obtaining free supplemental lessons was partially supported. School academic rank, school SES composition, and individual student SES background were not significantly related to likelihood of obtaining free supplemental lessons. On the surface, this suggests greater equity in the distribution of free extra learning opportunities between schools in the population—that is, the presence of such supplemental opportunities do not appear to be directly denied at the institutional level. Importantly, however, the interaction term between student SES and school SES composition was significant. This more complex relationship that was discovered implies that the tracking system contributes more indirectly to learning opportunity-gaps through the clustering of individuals *within* their schools according to socioeconomic background. More specifically, the existing system encourages higher-SES students to obtain greater types of learning opportunities—whether they are paid for or free, and those high-SES individuals who are in high-SES schools are even more likely to obtain free

supplemental lessons. Moreover, academically-oriented students were more likely to obtain the free lessons. Since *habitus* (whether being academically oriented or not) is shaped through early family socialization (Bourdieu & Wacquant, 1992), this unequal distribution of free lessons reveals another aspect of the social distribution of learning, since students with academically-oriented dispositions (*habitus*) willingly obtain more learning opportunities from their school teachers for free.

According to the findings, student-level factors (i.e., academic attitude, student SES background) and the interaction between student SES and the school-level context of student SES composition shape individuals' decisions to obtain additional free-of-charge lessons. It is important to emphasize that this unequal distribution of learning opportunities through one's choice is observed even when lessons are free of charge; that is, higher-SES students in high-SES schools are further advantaged in having greater learning opportunities provided within their schools without cost, presumably, to enhance their likelihood of doing well in mathematics, and likely resulting from increased parent social demands for stronger academic curriculum within the school. These school effects are addition to the individual's academic attitude effect on obtaining supplemental lessons which is shaped by his/her family SES.

Students' math scores and female were negatively related to likelihood to obtain supplemental free math lessons. This suggests students who were poor in mathematics male students were more likely to seek additional learning opportunities to enrich/remedy their performance in school. Further, residing in the "large city" category was negatively significant. A follow up-descriptive analysis also noted that the percentage of students taking free lessons at each school in the "Large City" category was the lowest at about 16%, while it was somewhat higher in the "Small Town" (19%), "Town" (17%) and "City" (19%) categories. It may be that

the presence of a number of shadow education institutions in urban areas may reduce the schools' need to offer supplemental free lessons; schools may depend on the shadow education industry for remedying students' poor performance in mathematics, which may result in the unintended effect of widening learning opportunities gaps.

It is important to discuss further why there is a different set of findings between Research Questions 1-1 and 1-2. The results suggest student SES was significant and academic attitude was not significant in explaining students' likelihood to purchase shadow education lessons. In contrast, only academic attitude (and not student SES) was significant in students' likelihood to obtain free supplemental lessons taught by school teachers. These contrasting findings seem to suggest that who may make decisions of obtaining each type of lessons. Since student SES is essentially family SES, which is comprised of parental occupation, educational background, and home possessions), this variable may indicate parental SES, but not students' *habitus* directly. On the contrary, academic attitude refers more directly to students' dispositions (*habitus*) regarding academic subjects. Considering these differences, it is understandable that students' family SES was significant in explaining whether they obtain shadow education lessons, while students' disposition (*habitus*) played a significant role when students decided whether to attend free lessons in schools. This could mean that higher SES parents with the economic means and high academic expectations influence students to take shadow education lessons right after the students enter high schools; that is, obtaining shadow education lessons may not be students' own choice but, rather, a combination of strong parental influence and students' decisions, even at the high school level.

When it comes to free lessons, students' disposition (*habitus*), as defined by academic attitude, played a direct and significant role, but not direct parental influence (as represented by

family SES), according to the findings. For obtaining free lessons, parental influence may be more indirectly expressed. More specifically, it should be emphasized that, since the cross-level interaction term between student SES and school SES is significant with both analyses (shadow education/supplemental free lessons), SES-based unequal distribution of learning opportunities exist through one's choice of gaining extra instructional lessons, contingent on positioning within the larger hierarchical tracking system of high schools. Parent influence may be more indirect and expressed within higher-SES high school settings. Overall, the tracking effects appear to be much stronger for shadow education lessons because of the three significant independent school level-tracking factors leading to direct gaps in educational opportunities and more subtle and conditional for free supplemental lessons.

Research Question 2

The results of the study supported the main hypotheses and extended Kariya's (2000b) findings that there were substantial differences in hours of self-learning among eleventh graders, depending on students' family background and school academic rank. Specifically, the findings indicated that school tracking effects as defined by school academic rank, SES composition, general curriculum orientation (i.e., general or vocational school) shaped how long students reported studying mathematics by themselves during a typical week. This tendency for longer study resulting from particular high schools attended likely helps their positioning for further education by structuring or re-shaping their *habitus* as a result of this self-study behavior. The reported self-study was differentiated by all the student-level variables in the model (i.e., SES background, math performance, academic attitude, gender, shadow education and free education participation). Among these factors structuring how much effort one exerts in studying mathematics, it is understandable that students who chose to attend additional lessons study

longer, since they are probably supposed to complete assignments from these extra lessons along with assignments given by school teachers in regular lessons.

At the school-level, school SES, curriculum type (general/vocational) and academic rank represent direct tracking effects on student study habits; that is, they are consequences of sorting students based on entrance examinations. Also, decisions regarding obtaining shadow education were influenced by all of these direct tracking factors, which implies that the decision to obtain shadow education lessons is an indirect an socially-distributed result of the existing high school tracking system. The results also suggested that obtaining supplemental free lessons was also partly shaped by the interaction between individuals and their school contexts (i.e., especially apparent for high-SES students within high-SES schools); this "more hidden" participation is another indirect consequence of the tracking system which was illuminated by the multilevel modeling approach used in the study. At the student-level, both student (family) SES and academic attitude differentiated how long students' reported studying mathematics by themselves. This suggests that both parental and students' dispositions (*habitus*) structure their studying practice, assumingly contributing to improving students' performance in mathematics and leading to enhanced learning practices and likely future opportunities.

Higher SES students, higher math performers, females, and academic-oriented students tended to study longer hours. Since high SES/performing students were more like to be attending competitive and high-SES schools, the combined influences of school tracking effects and family effects are substantial in shaping students' study habits. The results also suggested that the "large city" category was negative and significant in explaining students' math self-study habits. One possible explanation may be because there are great disparities in urban areas in terms of SES level. Also, this could be explained by the presence of more places for tenth graders to go to

socialize with friends in large cities rather than in suburban and rural areas.

Implications

For Theory

There are several important theoretical implications based on the findings of this study. Before laying out each implication in details, Bourdieu's (1984) theoretical equation should be discussed in relation to the findings.

(Habitus x Capital) + Field = Practice

As argued in Chapter 1, this model was modified with the multilevel nature of educational data (i.e., nested field) as follows.

((Habitus x Capital) + Sub-Field) + Field = Practice

Student SES represents parental *habitus* and economic/cultural/social capital combined, while academic attitude shows students' *habitus* (dispositions toward school academic performance). The first research question can be operationalized as follows:

Individual SES (*habitus* x capital) + specific school location (subfield) within the high school system (field) = choice for additional lessons (practice)

The findings of Research Question 1-1 then generally support the relationships outlined since student SES (*habitus* x capital) was significant on level 1 of the model and school tracking effects (e.g., academic rank, curriculum track, SES x student SES, Curriculum orientation) which define the school's (subfield) location as somewhere within the larger hierarchical school-based tracking system (field) result in differential choices to purchase instructional lessons in the shadow education industry (Practice).

The findings of Research Question 1-2 also generally highlight the proposed relationships, since student academic attitude (*habitus* x capital) and school tracking effects (i.e.,

interaction of student SES and school SES composition) which define the school's (subfield) location within the larger hierarchical system (field) result in differential choices to obtain free supplemental lessons taught by teachers in the school (Practice).

Research Question 2 can be operationalized as the following:

Individual SES and academic attitude (*habitus* x capital) + specific school location (subfield) within the high school system (field) = hours of study (practice)

The results of the second research question also supported the proposed model. Student SES and academic attitude (*habitus* x capital) and school tracking effects (i.e., academic rank, SES composition, curriculum track, participation in shadow education, participation in free supplemental lessons) which define the school's (subfield) location within the larger hierarchical system (field) result in differential time spent studying mathematics (practice).

Tracking effects on individuals' educational choices outside of regular lessons. Consistent with Carbonaro's (2005) findings regarding tracking effects on social agents shaping their achievement, this study's primary purpose was to unpack tracking effects on social agents' educational choices and behaviors. The primary hypothesis was that the tracking effects on social agents could be observed by looking at informal school lessons and studying habits. The findings of this study revealed that students' school tracking location influenced their choices and behaviors with respect to obtaining additional academic lessons in math as well as their study habits. Both of these presumably enhance students' academic skills needed to increase their performance on post high-school examinations.

From a broader standpoint, the tracking effects on social agents' practices of obtaining additional lessons are important to identify, especially, in a time that neo-liberal policies are prevalent. Such policies including school choice emphasize student/parental choices and self-

responsibility for the consequences of educational choices, even though social agents' choices (practice) are generated with the interaction between the individual's *habitus* and capital in a field (the educational system) which can be shaped by policies. The tracking system and its effects on social agents exacerbate the existing social inequities in educational opportunities, not only inside, but also outside of school educational activities (regular lessons) whose quality and quantity are also different based on schools' specific academic tracking locations.

Tracking effects on how much effort social agents exert. The findings of the study clarified that the three types of instructional lessons (sub-fields) shape the amount of efforts one exerts (practice) within the academic tracking system (field) and, additionally, provided insight regarding how additional instructional lessons (shadow education lessons and supplemental free lessons in school) within the academic expectations of the specific high school attended (i.e., one's position within a high school within in the larger field) contribute to generating their self-learning time. This practice shapes or re-structures the individual's *habitus* (learning capital), which generates next practices.

This learning practice is generated in relation to sub-fields; the length of self-studying hours is influenced not only by one's tracking location, but also by whether one takes extra lessons. These choices are also shaped by one's school tracking location. Considering that students in highly-ranked schools tend to receive longer and more demanding regular instructional lessons and tend to purchase/take additional lessons, the school-based tracking system sorts students into sub-fields to study longer by themselves. In other words, one's tracking location (sub-field) and obtained extra instruction (practice in the first sets of analyses) structure his/her different levels of self-study effort (another practice), which serves to widen achievement and *habitus*-gaps that already exist. As argued, higher-SES students tend to have

academically-oriented *habitus* which generates practices (self-studying longer) that re-shape their already-academically oriented *habitus*. Moreover, one's *habitus* at one time generates a practice in relation to his/her capital and field, and this practice or experience re-shapes the *habitus*.

The findings of the study suggest that one's family background (capital and family *habitus*), academic attitude (student' *habitus*) and tracking location (sub-field) in the hierarchal ranking system (field) maintains this cycle. By attending highly-ranked schools and taking additional lessons, high-SES students' learning aspects of *habitus* (learning capital) becomes more academically oriented, as they are exposed to further learning opportunities. On the contrary, low-SES students are more likely to be in lower-ranked high schools, and they are less likely to have additional learning opportunities as their choice. This leads to having fewer experiences to shape their *habitus* in the academically-oriented way, since they have fewer chances to be exposed to learning opportunities. This gap between these social agents with different level of capital and *habitus* seems to become wider and wider because the field (the tracking system) sustains and intensifies it. Without understanding this cycle intensified by the tracking system, how much effort one exerts would be taken as individual choice in a meritocratic sense, hiding the effects of tracking which widen the existing inequality.

Academic tracking and shadow education. There is a relationship between the formal educational system (field) and one's choice (practice) in finding learning opportunities in the shadow education industry. This is consistent with the argument proposed by Maton (2008) and Reay (2004) concerning how the relationship between one's *habitus* and field generate practices. According to the findings of this study, how the formal education is arranged affects social agents' choices in the shadow education market. This should be considered to improve the formal

education system; that is, students'/parents' choices in gaining additional learning opportunities are not independent from the influence of how the formal educational system is organized.

Based on the findings, selective high schools seem to be "hot houses", which as Smyth (2009) argues;

> Participation in private tuition is found to be higher in schools with a strong orientation to higher education, that is, where teachers expect their students to go on to college and these expectations are also held by students. These are disproportionately schools with a high concentration of middle-class students so the interaction between social class mix and expectational climate may result in a 'hot house' effect with students feeling under pressure to excel academically. In this way, shadow education and formal schooling may be interlinked, with academic pressure within the school context fuelling the demand for private tuition. (p. 19)

Higher SES students tend to attend competitive general education high schools that facilitate opportunities for these students to convert their economic capital to better academic performance; how the educational system is structured helps social agents take certain types of strategies outside the formal schooling in order to advance their position.

Capital conversion. The concept of capital conversion explains how schools help maintain social class. According to Bourdieu (1984), one example of capital conversion as a social class reproduction strategy is the conversion from economical capital to academic credentials (e.g., types of diplomas, diplomas from more desirable institutions). The findings of this study support the hypothesis; higher-SES students (with parental support) tend to conduct capital conversion by purchasing extra learning opportunities in the educational market (shadow education industry) in order to improve their academic performance, since it is assumed higher

academic performance will help these students to gain a more competitive academic credential, an institutional form of cultural capital, at higher education institutions. It is already documented that higher SES parents attempt to help their children to succeed academically by finding appropriate shadow education lessons (e.g., Park et al., 2011). The findings add new information about how tracking, which is the essential feature of formal schooling, intensifies this trend and therefore widens opportunity gaps.

The importance of academic-oriented habitus when opportunities are available. The other important contribution of this study is to determine which students choose to study more without considering one's economic capital by examining who is more likely to take supplemental free lessons offered by school teachers. The findings show that students who have academically-oriented *habitus* and students with stronger SES backgrounds attending high-SES schools are more likely to take the supplemental free lessons. These students choose to attend the extra lessons to study mathematics, presumably to enhance/remedy their academic performance, expecting that resultant gains in academic performance will enable them to enter competitive universities in order to eventually receive a more highly-valued diploma, an institutionalized form of cultural capital. It is crucial to point out that "high-SES schools" are created by the tracking-policy; that is, how the formal education system is structured influences students' choices which are generated by their learning aspects of *habitus* (learning capital) in relation to their capital and sub-field rank (tracking' location) within the larger field (i.e., the larger academic ranking system). The students' choices of obtaining additional lessons and their learning experience constantly shape their *habitus*, leading to the next academically-oriented *habitus*.

Who gains learning capital and its consequence. In this study, learning capital is

considered as learning aspects of *habitus*, and the findings underline that students' *habitus* plays a role in unequal distribution of learning opportunities through their educational choices inside/outside high schools. Kariya (2009a) argues that learning capital has high convertibility. This essentially highlights the importance of *habitus* (learning aspects of *habitus*) in this century. He contends that learning capital can be converted into other forms of capital. From this standpoint, as argued in Chapter 1, Kariya's argument is different from Bourdieu's argument. Bourdieu (1986) proposes that capital conversion from economic capital to another form of capital requires less effort and less cost compared to capital conversion from cultural capital to another form of capital.

In contrast, Kariya (2009a) suggests that in this era, especially in the Japanese context, convertibility of learning capital, *habitus* in learning, became prominent. Converting learning capital into another form of capital requires less effort and less cost; *habitus* in learning becomes capital which has high convertibility, helping social agents who hold it to advance their social position, while *habitus* in learning keeps shaping itself. Kariya's (2009a) argument regarding learning capital can be viewed as a revision of Bourdieu's (1986) concepts of "*habitus*," "forms of capital," and "capital conversion." As Bourdieu (1984, 1986) contends that convertibility of capital is a foundation of strategies to ensure reproduction of capital for intergenerational transmission of capital, which reproduces individuals' social positions, it is important for theory building to understand how learning capital is accumulated and who benefits from it in a social field (i.e., in this case, an educational system). The findings of this study reveal that higher-SES students tend to be in a position to have learning opportunities that presumably re-shape their *habitus* to be academically oriented more and more. The tracking system facilitates those advantaged students to accumulate learning capital (learning aspects of *habitus*); that is, the

system accelerates the cycle of unequal accumulation of learning capital.

"Choice" in U.S. The findings of the study suggest that higher-SES students tend to purchase additional lessons, and this tendency is intensified by tracking (one's tracking location) when such learning opportunities are available. In contrast to Japan, in the United States there is no formal tracking in secondary education. However, course-taking patterns, which are socially distributed, serve as a type of curricula tracking (Friedkin & Thomas 1997; Heck et al., 2004; Lucas 1999). Tracking effects can be observed by examining achievement gaps between students who take advanced placement (AP) courses versus those who take the more typical curricular courses. In U.S. context, there could be a number of "sub-fields" in high schools; for example, high school juniors may take an AP English course and a regular math course during the same semester. The findings of the study seem to suggest that those effects from a combination of sub-fields influence students to exercise certain strategies, should shadow education become prevalent in the United States, as it currently is reported to be growing (e.g., Claudia Buchmann et al. , 2010). Even without the shadow education industry, students/parents could currently have the following choices: Attending a neighboring public school, going to a public charter school, applying for private schools, or moving to another school district to attend a "better" public school, charter school, or private school.

With a growing shadow education industry, the number of possible choices would be much more complex. Attending public school and getting a remedial tutoring could be a popular choice. Some may attend a famous private school and also go to shadow education group lessons in specific subjects to enrich their performance. Families with tight budget but high aspirations may use online-tutoring services (e.g., students receive instructions from online English speaking tutors who live in India via Skype). In addition to a number of combinations of schooling and

shadow-education lessons, there could be a variety of shadow-education services (e.g., enrich/remedial tutoring, small/large group lessons, motivational lessons). With a large number of choices, it is getting much more difficult for students/parents to make a "right" choice. They need to think of their future plan and have to mobilize their economic, cultural and social capital to make this choice which can be constantly changed until results of college admissions become clear. In this environment, high-SES students/parents seem to have advantage and, as this study found, there are tracking effects on these educational choices; that is, one's choice is shaped by both family and school. As the shadow education industry grows, some public and private schools may begin to offer free supplemental lessons to attract prospective students. Even if these lessons are free of charge, there would be some contextual and *habitus* effects on free-lesson participation, as this study noted.

Lastly, these choices generated by one's *habitus* and tracking location affect how long one studies by him/herself in math (e.g., preparing for AP/IB and SAT general/subject exams). As the shadow education becomes widespread, this relationship could be a scenario in any countries; More specifically, sorting students into different tracks (or course-taking patterns) intensifies the existing inequality through some students' having a larger number of choice options to obtain additional learning opportunities. This represents an emerging mechanism of tracking effects on achievement and stratification processes, as parental influences are substantial (transmitting their advantages to their children through making "good" choices).

For Practice and Policy

Although this study's main focus is to theoretically assess tracking effects on individuals' educational choices (strategies) and study habits (educational practice/effort, which re-shapes one's *habitus*/learning capital), there are policy implications that consider the Japanese social and

cultural context. I believe that policy implications discussed in this section could be applied to any level of the educational system in Japan: national, prefectural and municipal level. It is because, while high schools are administrated by each prefecture's board of education, the existence of the school-based tracking system remains the same across Japan. While tracking effects might be stronger or weaker in specific contexts, especially, due to regional differences, I contend that policy implications of this study are valid over some local differences inside Japan and could be relevant to other countries' educational systems in which some forms of tracking exist with the shadow education industry.

The findings show that there are tracking effects on students' choice of obtaining shadow education lessons and the length of self-studying hours along with student-level effects and the interaction between student SES and school SES composition. There should be some policies to weaken negative effects of the high school tracking system; the tracking system (the field) contributes to generate students' choices (practice), widening learning opportunities based on their SES (capital) and *habitus* (learning capital), in addition to known tracking effects that can be observed inside schools such as track-differences in terms of the quality of teaching, peer pressure, teachers' expectation and so forth. I will first explain why de-tracking would not work, and then lay out three major policy implications along with detailed arguments: (1) providing more learning opportunities with low-SES students, especially, at low ranked high schools, (2) reconsidering how high schools select students and (3) implementing early interventions.

De-tracking. Following arguments by Oakes (2005), one may insist on de-tracking the system to eliminate tracking effects. However, this progressive policy would be likely to produce unintended reversed consequences. As Kariya and Rosenbaum (1999) empirically show with Japanese data, de-tracking the high school stratified system creates "bright flight"; families with

economic means send their children to private schools rather than to de-tracked public schools. They demonstrate that prefectures which de-tracked high schools came to provide less access to the most competitive universities (University of Tokyo and University of Kyoto) and resulted in internal tracking instead of school-based tracking. As the authors suggest, “In an effort to reduce social inequality, progressive prefectures have created other forms of inequality, forms that present even clearer obstacles to youth whose families cannot afford private school tuition” (Kariya and Rosenbaum, 1999, p. 225). De-tracking the high schools seems (1) to increase inequality, according to one’ economic level, (2) to create internal tracking by teachers and school principals at public schools, and (3) to strengthen SES effect on private junior high school attendance, limiting educational opportunities at private schools to those who can afford it. These outcomes of the de-tracking the high school ranking system exemplify that higher SES families employ educational strategies to benefit their own youth by reacting to the egalitarian de-tracking policy that would be perceived as decreasing the quality of their educational opportunities at public schools.

As found in this study, de-tracking high schools would probably facilitate high-SES students who do not/cannot go to private schools to attend shadow education institutions if they perceive that de-tracked schools offer insufficient quality/quantity of learning opportunities. Students’/families’ economic capital, which enables individuals to attend shadow education lessons and academic-oriented *habitus* that tends to choose to gain more learning opportunities, become increasingly important. This creates or maintains the opportunity gap.

One may claim that Ministry of Education, Culture, Sports, Science and Technology (MEXT) could abolish the tracking system nationwide including private schools that are ranked in the tracking system, given the fact that MEXT funds private schools that are supposed to

follow the national curriculum guidelines. If this were realized, again, high SES students would be likely to seek learning opportunities in the shadow education industry, while some may consider attending international/American schools that are outside MEXT jurisdiction, requiring a higher volume of economic capital. In fact, this trend is reported in South Korea. According to Nakamura (2002a), South Korea de-tracked academic high schools because of harshly competitive entrance examinations for high schools since 1974. This de-tracking includes not only public but also private high schools. Although the original goal to alleviate the competition was, to some degree, achieved, a number of high school students view their high school's lessons as not meeting their academic level. Nakamura (2002a) argues this to be a structural factor that facilitates shadow education participation.

It should also be highlighted that de-tracking would create internal tracking (Kariya & Rosenbaum, 1999). This is also observed in the United States; a comprehensive high school still "tracks" students, as observed in one's course taking pattern which corresponds with his/her SES (Heck et al., 2004). Whether tracking is school-based or inside-school, tracking effects would emerge in some forms.

Thus, de-tracking does not seem to be an effective policy to alleviate tracking effects despites its egalitarian intention, since high-SES students would take strategies to maintain and to advance their positions in any given field.

Providing more learning opportunities with low- SES students, especially, at low- ranked high schools. There should be some policies that directly aim at helping low-SES students. However, discussions regarding inequalities in educational achievement have been avoided in Japan because any merit system in schools would be considered as discriminative, even though inequality in achievement based on social stratum has consistently existed in the postwar period

(Kariya, 2001). According, to Kariya (2001), a distinctively Japanese view on merit systems as discriminative emerged in 1950s. During this period, educators faced students who were not able to go to high schools because of their low socioeconomic level. Educators recognized the relationship between one's economic situation and likelihood of going on to secondary education and sympathized with those who could not attend high schools due to their limited financial situation.

As Japan entered an age of high economic growth in 1960s and poverty became less of a problem, the relationship between social class and academic achievement (poverty and low achievement) gradually disappeared in educational debates, but the view, "merit system as discriminative education" has remained. Because of this, the view has solidified that equal education means arranging educational activities so that students do not feel a sense of being discriminated against by being classified according to academic merit (Kariya, 2001). In effect, viewing social class differences as a factor in academic achievement is problematic because it makes low social class-students feel they are being discriminated against. Also, differentiation based on one's merit was avoided since it would harm orders of school communities (Kariya, 2009b). In consequence, inequality as a structural or class problem has been ignored in educational policy and practice in Japan (Kariya, 2001).

While inequality in achievement due to social class is overlooked, it does exists in Japan (Kariya, 2001; Tsuneyoshi, 2008). As the results of this study reveal, high-SES students/parents attempt to take strategies to advance their positioning inside/outside of schools in the existing tracking system. Thus, there should be a policy of providing more learning opportunities with low-SES students, especially, at low ranked high schools that are disadvantaged from the current tracking system; there are eight detailed policy implications under this category.

Revising school curriculum. General education but low-ranked schools have to have longer and high quality instructions for regular lessons to weaken tracking effects. As Hallinan (1994) argues, "[e]fforts to reform the practice should be directed toward improving the quantity and quality of instruction at all track levels, particularly the lower ones, to eliminate the instructional disadvantages of tracking that some students experience" (p. 84).

Offering supplemental lessons. Supplemental free lessons should be offered at general education but low-ranked schools that low-SES students tend to attend. Also, it needs to be highlighted that schools in small towns and rural areas may have to begin providing free additional lessons at 10th grade level because it is known that top level high schools in such areas offer free supplemental lessons due to shortage of shadow education institutions, but students who go to other levels of schools do not receive such opportunities. Otherwise, it would be difficult for these students to go on to higher education. Another important point based on the findings is that all students have to be encouraged or even mandated to attend supplemental lessons in low-SES schools to remedy low-SES students' academic performance, since students with academically-oriented *habitus* tend to "choose" to attend the free lessons.

Ireson (2004) explains examples of this policy issue by summarizing studies in the United Kingdom. The UK government invested in extracurricular activities aiming to raise students' academic achievement. These activities called "Study Support" were to provide learning opportunities with disadvantaged students (Ireson, 2004). She argues that these structured after-school programs benefited students with disadvantaged backgrounds. Without such policy-efforts, low-SES students would have no additional opportunity to exploit their potential; public schools intensify inequality of educational opportunities by not offering necessary help with disadvantaged students.

Offering scholarships for shadow education schooling. In addition to improving public schools, to rectify opportunity and achievement gaps based on SES, policy makers may consider (1) reducing taxes on cram schools and private tutoring providers that enable them to cut down their tuition so that it becomes affordable for lower-SES students, (2) providing special voucher for lower-SES students to receive extra lessons, and (3) providing lower-SES students with supplementary classes and tutoring services at public schools or through contracted service providers. These policies would help low-SES students who have less opportunity but need to remedy or to enrich their performance.

Some may argue that the shadow education industry hinders the formal school system from equalizing learning opportunities. While this point seems to be valid, limiting or banning shadow education would be unlikely to work as expected. Lee, Lee and Jang (2010) describes a South Korean case of banning shadow education and its failure in 1980;

> The conflicts between legal bans on private tutoring and individual desires to seek private tutoring lead to the emergence of illegal and secrete shadow education practices and an increase in the cost of private tutoring because of the growing risks. (p. 104)

As hypothesized and partially confirmed with the empirical data in this study, social agents with a high volume of economic, cultural and social capitals and academically oriented *habitus* find ways to advance their position in a field; easing its demand of shadow education (choices for such social agents) would be unrealistic to achieve.

Coordinating with shadow education institutions. To help students effectively learn, low/middle ranked schools may coordinate with neighboring shadow education institutions to have a comprehensive lesson/study plans.

College/career counseling. Students who attend low and middle academic-level schools

should be informed about what they need to do in order to go on to higher education in the first year of their high school education, given the finding that high-SES students at competitive high schools already initiate actions for preparing themselves for higher education in the first semester of the three year high school life. High-SES students in academically high-level schools are more likely to be exposed to find out what to do to enter competitive universities both at home (family effect) and at schools (tracking effects). Also, staggering volume of information about higher education intuitions are given to those who attend shadow education institutions. These gaps need to be filled at public high schools.

Teacher education. Teachers/teacher candidates at the secondary education need to know tracking effects. By knowing the effects, they may be able to avoid labeling students at low ranked schools, have high expectation on students, and understand importance of providing remedial lessons as early as possible.

Putting more funding into low-ranked schools: more teachers. Some tracking advocates may insist that homogenous class is easy to teach, but considering the empirical fact that a majority of students tend to have non-academically oriented *habitus* in low-ranked schools, teaching at such schools may not be easy at all, while students in high ranked schools have academically oriented *habitus* (disposition) toward academic subjects, meaning they are motivated and manage themselves to learn. Unequal distribution of learning capital (learning aspects of *habitus*) should be considered to aid more resources including a larger number of teachers to conduct smaller size classes at low ranked, especially, general education high schools where students do not learn specialized skills.

At elementary and middle school level (compulsory education), Japan has done progressive distribution of educational resources (Kariya, 2010), while it may be insufficient due

to achievement gaps based on students' SES. Progressive distribution of resources would alleviate the existing learning opportunities gaps.

Improving low ranked private schools. According to PISA 2006's data, there are a number of low performing general-education-private high schools in Japan. At such schools, a majority of students are not from high SES, but from middle or lower SES families; this is problematic in terms of equality. It can be assumed that these schools are mainly for students who fail to enter public schools or avoid taking the entrance examinations for public schools. Although these private high schools require tuition, they function as low track-schools that do not provide much learning opportunities with their students to academically succeed.

Reconsidering how high schools select students. To rectify SES-based opportunity and achievement gaps that exist at high school entrance examinations, the way of selecting students may be reconsidered. According to Kariya (2009) "[s]ome high schools and universities now place more emphasis on student achievement reported in school transcripts and accept students on the basis of recommendation by their high schools instead of only through the regular examination procedure" (p. 97). This admission office style that universities in the United States practice may intensify the SES-based achievement gap, since this selection method seems to benefits high-SES students who tend to have a high grade point average. Also, middle school teachers may highly evaluate these students because of their high volume of cultural capital and academically-oriented *habitus* and give them higher grades and writing convincing letters of recommendation, without considering that these students successfully develop their academic skills and learning capital due to high socioeconomic background.

In fact, while ninth graders themselves decide which high school to apply for, they do not solely make this important choice. LeTendre (1996) provides rich qualitative descriptions about

how middle school students choose which high school to apply for in Japan. By applying institutional theory, he contends that middle school teachers help construct students' choices for high schools via placement counseling, and points out distribution tables that indicate hierarchal academic rank of high schools are used to "pre-cool" students' aspiration. As he explains:

> Yet students are not isolated actors who are working out their own margins of success or failure. Teachers guide students into certain sets of choices on the basis of a mixture of universalistic (grades and test scores) and particularistic (gender, family background, interests) criteria. (p. 210-211)

It is important to emphasize that family background impacts on grades, test scores and interests, meaning that students' educational aspiration and their choice are not independent. In addition to this argument, if selection method for high schools becomes more complicated and subjective than it is, it would probably be difficult for low SES students/parents to go through the system. LeTendre and his colleagues (2003) argue, in their comparative study between the United States, Germany and Japan, the exiting American way of high schools disadvantages low SES students:

> The emphasis on individual autonomy, choice, and range of curricular options is truly striking. It sets the United States apart from Japan, Germany, and most other national systems the world over. But the concomitant emphasis on flexibility appears to produce widespread confusion. Because families differ dramatically in their knowledge of the system, the confusion creates opportunities for differential impact of family background and increases general concerns that the system has become unfair. (p. 79)

As the further suggest:

> The major difference we see is that in Germany and Japan the most common forms of differentiation are clear to most people, and the selection mechanisms are also familiar. In

> the United States, the emphasis on the individual and on the ideal of individual freedom drives a highly decentralized system with very idiosyncratic features. At every level of the system, participants state that they wish to maximize the individual' chances for success, and there is substantial confusion over the process of selection. (p. 80 – 81)

In relation to this argument, the way of selecting students for high schools should be reassessed in Japan as well. The SES effect may be weaker if the selection is completed with a simple written exam because (1) teachers' subjective bias due to SES may be reduced (i.e., while pre-cooling students' aspiration still functions when students select which high school to apply for) and (2) a simple criteria of selection may be easier for low SES students/parents to comprehend and deal with. It should be noted that students who attend shadow education institutions at middle/high schools receive advices from such institutions which wish these students to succeed for their own business interests; the number of students who successfully enter competitive high schools/universities is crucial for these organizations to attract future students (customers). Since high-SES students are more likely to attend and to receive these advices, this may also contribute to widen inequality.

Also, there is a possibility that high-SES parents are more active than their counterparts to gather information and talk with teachers to help their children to be more competitive; as researched in the United States, parents at middle schools actively seek a chance to let their children enter higher mathematics courses (Useem, 1992); at elementary school level, educated parents tend to discuss educational matters with their teachers, while low-SES parents tend to avoid talking with teachers, especially, about academic matters (Lareau, 1987).

With a complicated selection process, whether one has a high volume of cultural capital would likely be more important. Yamamoto and Brinton (2010) used the 1995 Social

Stratification and Mobility survey (SSM) which includes a randomly selected sample of people age twenty to sixty nine in order to conduct multiple regression analysis. They found that "objectified cultural capital exerts a powerful effect at the transition from middle school to high school, probably through teachers' recommendations" (p. 75). Students' SES and attendance of shadow education were significant in predicting which level of high school one attends. As for final educational attainment, effects of objectified cultural capital and of shadow education became insignificant after the quality of high school was controlled. They speculate that objectified cultural capital and attending shadow education indirectly affects one's final educational attainment via high school's academic level.

> We suggest that educational systems affect whether embodied cultural capital functions primarily to enhance human capital or, alternatively, to provide signals to teachers through its effect on students' habitus. Similarly, objectified cultural capital may be relevant only at certain educational transitions such as those that rely on teachers' subjective judgment of the "fit" of a student and his or her family context for a given educational destination (i.e., application to a particular high school, in the case of Japan). (p. 78)

Yamamoto and Brinton (2010) also argue that the embodied cultural capital "plays a role in contributing to students' academic performance through its enhancement of motivation and learning skills, both of which are important for human capital development" (p. 79); their definition of embodied form of cultural capital sounds similar to learning capital that Kariya (2009a) proposes.

In addition to their arguments, I argue that the importance of *habitus* (learning capital) becomes more prominent in recent context, since some students receive admission by admission

office-selection which requires a high GPA, letters of recommendation from teachers and interviews. Furthermore, in some prefectures, GPA is included to calculate a final score of the one-time entrance written examination (e.g., Kanagawa prefecture). The same argument should be applied to recent changes in the way universities select students.

Reconsidering how universities select students. This study reveals that high-SES students tend to implement capital conversion by attending shadow education lessons under the influence of the tracking effects in the first semester of three-year high school education. It should be highlighted that this capital conversion is executed at such an early stage of high school education. One of the reasons for this early action could be the trend that universities became to admit a larger number of students based on recommendation and by admissions office; therefore, students need to do well consistently. In fact, according to MEXT (2008b), in 2008, 35.4% of enrolled students at national, public and private universities were admitted by admission on recommendation (*Suisen nyushi)* which generally require students' high GPA along with interviews and/or essay writing.

Specifically, based on the report, I calculated percentages of students admitted by traditional entrance written examination (*Ippan nyushi*), admission on recommendation (*Suisen nyushi)* recommended by high schools with desirable GPA, and admission office style which is similar to the practice that U.S. higher institutions excises. Only 48.6% of the students at private universities successfully received admission by taking the traditional entrance written examination, 41.2% of the enrolled students were admitted by admission on recommendation (*Suisen nyushi*) without taking the traditional examination, and 9.6% of them used the admission office style. Since 77.5% of enrolled students attend private schools in Japan (2008a), the number of students (50.8%) attending universities without taking the traditional writing

examination is substantial. As for national universities, 12.3% of enrolled students got accepted for admission based on recommendation (*Suisen nyushi)* and 2.5% by admission office, while about 17% of the entire four-year college students attend national universities: 2.2% and 1.6% respectively for public universities that have only 4.5% of the entire enrolled four-year university students.

In the past, passing an entrance written examination was the major and almost dominating way to enter universities. However, this has greatly changed as demonstrated. It can be said, as Tsuneyoshi (2008) argues, Japan became a post-entrance-exam society, compared to other societies that focus on academic credentials like South Korea.

As ways of getting into universities diversify, receiving good grades and convincing letters of recommendation from high school teachers become important for being admitted to universities. This social context may facilitate higher-SES families to do capital conversion in the very first semester of high school education to advance their social positioning. As a field changes, social agents with a high volume of capital tend to react first. This should be considered to analyze effects of changes in entrance examination processes by high schools and universities.

Implementing early interventions. Kariya (2010) argues that Japan was considered as a highly egalitarian society in which "distributions of Japanese students' test scores are narrower than in other countries, including the United States (p. 55)" based on international comparative examinations like TIMMS (Trends in International Mathematics and Science Study) and PISA. However, he discusses that this is no longer the case; the distributions of testing scores of Japanese students are not as narrow as those of other countries' in recent years. Following this and his other studies, I believe that MEXT has to take SES-based-achievement gaps seriously and needs to have comprehensive policy interventions, not only at the high school level which

has negative tracking effects that widen the opportunity and achievement gaps, but also at earlier stages of education that also have the SES-based achievement gaps.

Informing parents and students about high school tracking effects. It would be ineffective to implement some policy interventions once students enter high schools in the tracking system. In fact, academic competition seems to be ended for low-SES students at high school entrance examinations. As argued in Chapter 2, Nakanishi (2000) investigated who successfully entered competitive universities among students who failed to enter competitive high schools by using the national survey of social stratification and social mobility (SSM) gathered in 1985 and 1995. She found that students who once failed to enter competitive high schools but later on succeeded to enter competitive universities were from higher-SES families, and then she argued that everybody seems to have a chance to succeed to enter competitive universities in Japan, but in reality, this chance is only open to students with high family-SES levels. Her study does not explain how this occurs.

The findings of this study point toward shadow education as one of the major sources explaining why high-SES students who had once failed at the high school entrance examination succeeded in entering competitive universities. Even if these students do not attend any shadow education institutions, they may possess academically-oriented *habitus* and a high volume of cultural and social capital derived from family background. Regardless of the reasons behind Nakanishi's (2000) findings, it can be said that students who attend non-competitive high schools have difficulty in overcoming the negative tracking effects if their family SES is not high; the tracking system legitimates existing inequality, while university-entrance-processes look meritocratic. At least, parents and students should be informed about this harsh reality; middle/low SES students who attend less selective high schools are less likely to attend selective

universities if they do not intentionally employ any additional strategies to overcome the negative effects of the high school tracking system.

Needs for early interventions: K to 9. As results of the study suggest, students' practices are shaped by which instructional lessons (sub-fields) students take and which high school they attend (sub-field in the field, the ranking system) in relation to students' capital and *habitus*. Policies should aim at restructuring students' *habitus* to be academically oriented at low- and middle-ranked schools. However, since the achievement gap due to one's SES already exists at the secondary education level, where high-SES students tend to go to competitive high schools and low-SES counterparts are more likely to attend low ranked general education or vocational high schools, it seems to be clear that policies that focus on the high school level would be insufficient to alleviate social inequality.

Also, even with some policies that specifically target the high school tracking system, it may be difficult to reduce the opportunity gaps (1) because high-SES students tend to conduct capital conversion in any given field to maintain and to advance their position, and (2) it may be too late to re-structure low-SES students' *habitus* to be academically oriented at this stage. Equalizing learning opportunities should be implemented, by not only providing mere learning opportunities inside the formal education, but also helping disadvantaged students to have academically-oriented *habitus* (i.e., a high volume of learning capital) that can further shape their future practices.

To help low-SES students have academically-oriented *habitus* that generate practices toward academic goals, it may be necessary to do so as early as possible. This should begin in pre-kindergarten, since it is well-documented in U.S. that students from low SES families are already disadvantaged at the Kindergarten level (e.g., Lee & Burkam, 2002). Head Start is one of

the known early intervention programs in the United States.

Recent policy trends against early interventions. Even though strengthening pre-K-9 education is necessary to minimize learning opportunity gaps which appear at the secondary education level, the recent trend of educational policies in Japan seems to go in the opposite direction. Fujita (2010) criticizes the third wave of educational reform which began in the 1980s and still persists today in Japan. He argues that these reforms are based on "neoconservatism, neoliberalism, and market fundamentalism" (p. 18). As he argues:

> These reforms changed the organizing principle of the school system from equal opportunity to individual choice, gradually restructuring the system to expand differentiation of the learning process and educational opportunity according to students' ability and their family backgrounds both within school (ability grouping) and among schools (school ranking and selectivity based on school choice). (p. 19)

Fujita (2010) goes on to suggest:

> The newly emerging problem in Japan is not an issue of simple educational inequality due to family background at an individual level, but the inequality mediated by the institutional differentiation of localities and schools that has been produced by policies dominated by neoliberal and market-fundamentalist ideology. (p. 33)

Then, by showing data, he contends that the percentage of applicants has increased for national private junior high schools in Tokyo and the Tokyo metropolitan area; most of these schools are selective. Fujita (2010) calls this phenomena as "rich flight" like "white flight" that the United States experienced.

Low percentage of public expenditure on education. It should be noted that Japan spends a relatively low percentage of public financial resources on education. In fact, it is the lowest

among 28 surveyed OECD countries, according to OECD (2010). As of 2007, public expenditure on educational institutions as a percentage of GDP (gross domestic product) is only 3.4%, while the international average is 5.2%. Specifically, the percentage of public spending for primary and lower secondary education is 2.0% (2.4% is the OECD average), and for upper secondary education it is only 0.8% (the OECD average is 1.2%). This reflects average large-class sizes at elementary and middle schools in Japan. More specifically, the average class size for elementary education is 28 pupils, while the OECD-average is 21.6 and Japan is ranked the 3rd worst out of 27 countries. The average class size of middle schools in Japan is 33 students, while its international average is 23.7 students (i.e., Japan is ranked 22nd out of 23 nations).

Also, it is crucial to highlight Japan's high private educational spending: 33.3% (the OECD average is 17.4% with Japan ranked the 4th worst out of 24 nations); especially, at pre-primary education level (for children 3 years and older). At this level, 56.2% of financial sources are from private sources against the OECD average of 20.3%. Tertiary education has a similar trend: 67.5% by private sources whereas 30.9% is the OECD average. Since the data are from 2007, these percentages are reflections of educational policies by the Liberal Democratic Party (LDP). While the Democratic Party, which has been in power since 2009, seems to increase its public expenditure on education, no date is available to confirm if the public expenditure increases significantly.

To conclude this section in policy implications, I would like to quote from the second edition of the prominent study about tracking by Oakes (2005). As she notes, at most schools, "choice has become an increasingly salient factor in placing students into tracks, shifting the responsibility for differentiated opportunities, resources, and expectations from the school to the students. With choice, students in lower level classes have only themselves to blame (p. x)" for

their academic consequences. The findings of this study highlight the importance of students' choice not only inside but also outside schools and how the existing inequality widens through students' choices.

Limitations of the Study

There are at least four limitations of this research which attempts to quantify concepts in complex organizational and social processes. First, some may point out that creating the high school ranking variable based on PISA's testing scores is inappropriate, since what PISA assesses and what high school entrance examinations test differ. The Trends in International Mathematics and Science Study (TIMSS) by the International Association for the Evaluation of Educational Achievement (IEA) may be more suitable, since it assesses what students learn in school. This criticism seems to be valid to some extent. However, I believe that there are not great differences between TIMSS and PISA in terms of assessing academic skills and their distribution. In fact, as Fujita (2010) argues, while TIMSS is assumed to assess subject-based knowledge and PISA is designed to evaluate generative academic ability, both TIMSS and PISA basically measure the same ability. He illustrates this point with results of the Japanese national test conducted in 2007 and 2008. This national exam has two parts: the first part is an achievement test like TIMSS assessing accumulated knowledge, and the second one is more like PISA investigating if students have ability to solve problems based on their knowledge. Fujita (2010) shows the strong correlation between these two parts' scores taken by six and ninth graders in both 2007 and 2008, and contends that both types of questions basically assess the same academic ability. This argument can be applied to differences between PISA and TIMSS. As Fujita (2010) insists, the correlation between the two types of questions is high, especially, when it comes to mathematics. In relation to this dissertation, correlation of ninth graders' mathematics between scores in Part A

(TIMSS-type-test) and Part B (PISA-type-test) is worth mentioning; 0.83 for 2008 and 0.83 for 2007. As he argues, these are stable and high correlations; it is reasonable to assume that students who do well with TIMSS-type tests also perform well with PISA-type questions and vise versa. Thus, using PISA to create the school ranking variable has some validity, while it should be admitted that there is no direct measure of the ranking system.

Second, although the study examines students' enrollment in extra paid or provided instruction, it should be noted the data do not allow the investigation of the actual reasons why students take the lessons (remediation or enrichment); the individual reasons students may have affect their choices in unknown ways. It is highly likely, however, that taking additional lessons in mathematics during the first semester of the high school education in Japan implies students' intention to go on to higher education.

Third, although it is a common and almost unavoidable limitation for any quantitative studies investigating effects of socioeconomic status, it should be noted that the individual measure of socioeconomic status (individual SES) indirectly represents one's SES background. It would have been better to have a variable for each separate concept of capital: economic, social, and three forms of cultural capital (embodied, objectified and institutionalized). Likewise, more direct items that capture one's *habitus* would be desirable.

Fourth, it would have been better if PISA had been designed as a longitudinal study. In that case, this study could have excluded potential alternative explanations of findings more rigorously.

Future studies should consider these limitations to assess relationships between the formal educational system's arrangement and students' choices and behaviors that contribute to explain processes of social reproduction/stratification.

Conclusions

This study assesses tracking effects on students' educational choice and studying behavior that shape their educational trajectories. Results of this study show how the tracking system intensifies the opportunity-gap in learning mathematics among students with different backgrounds and academic attitudes. Results of multilevel logistic and ordinal regression analyses reveal how the high school tracking system maintains and intensifies inequality; higher SES students choose to take more learning opportunities while they tend to be in higher ranked/high SES/general education-schools which provide rigorous college preparation lessons, and attending such schools influence how long they study mathematics by themselves. Under the influence of the tracking, students select whether to take additional instructional lessons, and this decision, in turn, shapes their studying habits (i.e., the length of self-studying hours) along with the tracking effects. These results clearly show students' decision of gaining additional instructional lessons and how much effort they exert to study are not independent from their family background and tracking location in the hierarchal ranking system. Despite the main four limitations, the study provides concrete evidence of the conditions under which students would likely seek extra math lessons and one practical impact (i.e., hours of self-studying) of their choices.

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