The Effect of Private Junior High School Attendance on Educational Expectations and Academic Self-Concept in Japan*

ISS Discussion Paper Series
F-188
September 2017

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Key words: Private school, educational expectation, academic self-concept, propensity score matching, Japan

*The earlier version of this paper was presented at the summer meeting of the Research Committee on Social Stratification and Mobility (RC28) of the International Sociological Association held in Columbia University, New York, August 7-10, 2017. The author acknowledges support from the Japan Society for the Promotion of Science (JSPS) KAKENHI Grant Number 26780482. The revised Japanese version of this paper is to appear at the Volume 101 of the *Journal Educational Sociology* [Kyouiku Shakaigaku Kenkyuu] edited by the Japan Society of Educational Sociology.

Abstract

This study examined the effect of private junior high school attendance on students' educational expectations and academic self-concept in Japan using propensity score matching as the methodology. The study used the 8th grade student data from 2001 TIMSS (Trends in International Mathematics and Science Study) in Japan. The results suggest that advancement to a private junior high school makes it easier for students' educational expectations to increase when compared to students with similar characteristics attending a public junior high school. Specifically, it is easier for students of lower SES to experience this increase in educational expectations. Furthermore, advancement to a private junior high school makes it easier for students' academic self-efficacy to decrease compared to students with similar characteristics attending a public junior high school. Among the students in private junior high schools, those with comparatively high academic achievements are more likely to experience a decrease in their academic self-efficacy. These results together suggest that private junior high schools in Japan have both positive and negative academic impacts, and that these effects may differ by student characteristics, especially favoring students of lower socioeconomic status.

1. Introduction

Since the latter half of the 1980s, an increasing number of students in Japan have been entering private junior high schools. According to the School Basic Survey of the Ministry of Education, the percentage of students enrolled at private junior high schools was approximately 3% in the early 1980s, but increased to over 5% in the mid-1990s and to more than 7% by 2000.

Indicated as background for this trend is an increase in the number of households choosing private schools consequent to a change in public schools to a five-day schedule (while private schools continue to hold classes on Saturdays) (Takeuchi et al. 2006). Further reasons include parental anxiety about the change to "*yutori* education" (offering a reduced number of curriculum hours and content) in public schools resulting from the revision of the Curriculum Guidelines by the Ministry of Education, Culture, Sports, Science and Technology in 2002 (Nishimura 2006).

In the academic fields of educational sociology and economics, the topic of selecting private schools is frequently argued in relation to the socioeconomic background of households. Parental education and occupational status as well as household income are repeatedly identified as characteristics determining which students will choose private schools (Kataoka 2009; Kobari 2004; Tachibanaki and Matsuura 2009). Furthermore, regarding the work of mothers, full-time homemakers are indicated as being more suited for providing the emotional support and dedication of time required from parents of students who will sit for the private junior high school entrance exams (Hirao 2004; Tachibanaki and Matsuura 2009). The tendency to select a private school is especially strong in urban areas, for both junior high and elementary school examinations (Kataoka 2009). In terms of academic abilities, on average, the higher a student's grades, the more likely that student will desire to attend a private school (Hida 1993).

While the background of students proceeding to private junior high schools has thus become clearer, Japanese research is limited on the effects stemming from what occurs after a student has entered a private junior high school. One exception is Nishimaru (2008), who reported that educational attainment more readily increases for students who attend national or private

junior high schools. This was attributed to the continued curriculum through junior high school to senior high school at the same institution, eliminating the need to sit for a separate high school entrance exam. Tsumura, Nishimaru, and Oda (2011) found that among recent cohorts born from 1971–1980, the effects on the years of educational attainment were significant for persons who attended a private junior high school. However, these reports focused on the effects on educational attainment; therefore, the impacts on students during their enrollment in private junior high schools remain unclear. Consequently, this paper examines the impacts on students' educational expectations (i.e., what level of schooling they expect to achieve) and academic self-concept as effects observed during enrollment at a private junior high school.

The merits of attending a private junior high school are promoted in magazines and at *juku* (private preparatory schools where students receive special training for entrance exams). Furthermore, private junior high schools have an established positive public image. Parents urge their children to attend private schools based on their expectations regarding the positive aspects including unique educational policies, high public esteem, and the fact that attendance makes it easier for a student to advance to university (Hida 1993). However, there are still unanswered questions regarding educational expectations and academic self-concept. Compared to equivalent-level students in public schools, do students at private junior high schools truly experience the effects they hope for?

2. Research on the Effects of Private Schools

While Japanese research has not focused on the effects of private schools, since the 1980s, many studies have been published overseas, especially in the United States. The contemporary debate continues on various topics including methods of analysis and interpretation. Using the High School and Beyond (HS&B) survey, Coleman and his colleagues claimed that enrollment at private high schools (especially in Roman Catholic high schools) had certain effects in terms of scholastic abilities and advancement to university (Coleman et al. 1982). From the following year and thereafter, using longitudinal data from HS&B, studies criticizing Coleman's analysis methods and findings were published

(Alexander and Pallas 1983; Willms 1985). In response, Coleman's group reanalyzed the data by utilizing the characteristics of longitudinal data, and again found certain effects due to enrollment at private high schools. They especially highlighted major impacts on the scholastic abilities of students from households of low socioeconomic status (SES) (Coleman and Hoffer 1987). Using the same data, a further study found that enrollment at Catholic high schools was especially effective for minority students, specifically African-American students with low household income (Bryk et al. 1993). Results of an analysis of PISA (Programme for International Student Assessment) by the Organisation for Economic Co-operation and Development (OECD) indicate that in multiple nations, it is possible that enrollment in a private high school has positive effects on academic performance (Dronkers and Robert 2008).

Meanwhile, other studies have not determined such positive effects for private schools, including the National Assessment of Educational Progress (NAEP) for elementary and junior high students in the United States and the Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K), which tracks students from preschool through middle school. One study claimed that public schools have a greater impact on scholastic abilities when analyzed while controlling a plethora of school-level factors (Lubienski and Lubienski 2014).

Thus, at least in the research conducted outside Japan, there are mixed findings regarding the effects of private schooling and the extent of these effects when they do exist. A general statement of such effects is difficult, especially since the survey periods, levels of education focused on, and analysis methods vary. Even if the effects of private schools exist, their extent may be minimal (Alexander and Pallas 1983). However, when viewed from the perspective of heterogeneous effects, private schools (especially Catholic high schools) are considered as having stronger effects for students who come from households with non-affluent socioeconomic backgrounds, and major evidence opposing these findings has yet to emerge (Bryk et al. 1993; Coleman and Hoffer 1987). The present paper considers these findings in its investigation of the effects of private junior high schools in Japan.

3. Previous Studies on Educational Expectations and Academic Self-Concept

3.1. Mechanisms related to Educational Expectations

As effects of private junior high schools, this paper focuses on educational expectations and academic-related self-concept. Until now, many studies have identified a strong relationship between educational expectations and actual educational attainment. Numerous prior studies focusing on the mechanisms that shape such expectations exist, both abroad and in Japan (Fujita 1979; Sewell et al. 1969). Prior research presented the idea that educational expectations are formed at an early period and impacted by family SES including parental education, occupation, and household income. Other studies clarified that factors related to social stratification do not have fixed effects, but are changeable as students progress through their school years and encounter various forms of guidance, organizational culture, academic "tracks," and the influence of teachers and fellow students (Andrew and Hauser 2011; Bozick et al. 2010; Nakamura 2010; Ojima 2001). In research using panel data in the United States, 40% of the students surveyed made an unchanging decision regarding educational expectations during their school years from the 4th grade in elementary school to the 11th grade in high school (year 2 of senior high school in Japan). The remaining 60% of surveyed students changed their educational expectations during the same academic years (Bozick et al. 2010).

Prior research also determined that students from non-affluent households more readily change their level of educational expectations. According to Bozick et al. (2010), students with higher SES are sent signals from surrounding others that uniformly encourage them to advance to university. In this case, these students' level of educational expectations is easily fixed at an early period. Conversely, students with lower SES are not subject to similar uniform messages. Furthermore, the scarcity of their possessed resources readily changes their level of educational expectations based on the influences of their surroundings. Applying these findings to the present study, I hypothesize that among the students attending private junior high schools, those with lower SES are more likely to change their educational expectations. As such, I hypothesize that students with lower SES—surrounded by fellow students with high expectations—are more likely to experience an increased level of educational expectations, because of these novel stimulations. Conversely,

it is possible that the level of educational expectations of students with higher SES is more difficult to change, despite attending a private junior high school. The following hypotheses summarize the abovementioned points:

Hypothesis 1: Students are more likely to have higher educational expectations if they attend a private junior high school (compared to students with similar characteristics who attend a public junior high school).

Hypothesis 2: Students with lower SES are especially more likely to have higher educational expectations if they attend a private junior high school.

3.2. Mechanisms of Academic Feelings of Self-Efficacy

The subjective index of students' academic self-concept has been employed in many studies in the field of educational psychology. In this and other fields, the academic self-concept is noted as an important factor impacting academic achievement and educational attainment. If students have self-confidence and a strong motivation regarding their schoolwork, such feelings are not only important in themselves, but also related to desirable study habits and improved scholastic abilities, all of which likely affect educational attainment.

Thus, feelings of academic self-efficacy can be defined as students showing confidence that when placed in a certain situation, they have the abilities to achieve their goals. This self-efficacy is not only due to inherent individual differences, but has aspects that are changeable based on environmental effects. The consciousness of self is formed socially by comparing oneself to surrounding others. This has previously been explained in sociology in the context of the "relative deprivation" caused by comparisons with a reference group (Ishida 2015; Merton 1957). This framework has been introduced into the context of education-related research such as the "Big Fish Little Pond" effect. These studies have found that one's self-consciousness has aspects that are relatively determined by comparing the self to a reference group (Furuta 2016; March 1987; Toyama 2008).

One environment where self-consciousness is especially vulnerable to such effects is when the provided guidance divides students into groups based on their

abilities. For example, when student abilities are evaluated based on the schools they attend, all students affiliated with a high-ranking school are automatically included in the student group having high academic abilities. Thus, if no students around oneself have low academic abilities—that is, having no one with whom to compare oneself boosts one's own feelings of self-efficacy—it is easier for self-efficacy to decrease (Chmielewski et al. 2013; Marsh et al. 1995). This hypothesis is assumed to hold for the private junior high school students who are the focus of this paper. In other words, if the academic abilities of one's peer group—fellow students serving as one's reference group—is high overall, then relative deprivation occurs. Students affiliated with such student groups are more likely to experience a decrease in their academic feelings of self-efficacy.

Regarding the academic self-efficacy of students in this situation, it is assumed that the higher the academic abilities, the more vulnerable the student to a decrease in self-efficacy. For example, when students with high academic abilities choose to attend a public school characterized by wide-ranging levels of student academic abilities, capable students may be ranked high in academic ability in the school overall, with a corresponding increase in self-efficacy. However, if they attend a private junior high school, which includes students with mostly homogenous family backgrounds, they may be overwhelmed by other students with relatively higher academic abilities and fail to reach the top, despite high academic skills. This results in a decrease in self-efficacy. The above discussion thus leads to the following two hypotheses:

Hypothesis 3: Students are more likely to have lower academic self-efficacy if they attend a private junior high school (compared to students with similar characteristics who attend a public junior high school).

Hypothesis 4: Students with higher academic achievements are especially more likely to have a lower academic self-concept if they attend a private junior high school.

4. Data and Method

4.1. Data

To investigate the issues described in this paper, data from the Trends in International Mathematics and Science Study (TIMSS) conducted by the International Association for the Evaluation of Educational Achievement (IEA) was employed. Since 1995, TIMSS has been conducted once every four years. The subjects are 4th grade elementary school students and 8th grade middle school students (in Japan, this is second-year junior high school students) in participating countries. The most recent survey was conducted in 2015 in more than 60 countries and regions worldwide. The sample for each country or region for each of the survey years and grades was approximately 150 schools and 4,500 students. Thus, the survey data can be employed to appropriately ascertain country/regional-level trends and changes in students' academic abilities and learning status. The surveyed academic subjects were mathematics and science. The study reported in this paper used data from the 2011 Japan survey of 8th grade students, based on student and school questionnaire items.

The 2011 TIMSS survey was conducted in March in Japan, which is the end of the academic school year for second-year Japanese junior high school students (National Institute for Educational Policy Research 2013). Thus, at the time of the survey, students had already experienced approximately two years of schooling since entering junior high school, which was considered appropriate timing for investigating the effects of entrance to a private school.

4.2. Variables

Table 1 provides an overview of the major variables used in the analysis. "Private junior high schools," the treated variable, is a category comprised of both national and private junior high schools. Overall, selectivity among national junior high schools is just as high as for private junior high schools, accompanied with a smaller variation in students' academic achievement. Therefore, I do not consider it problematic to consider national junior high schools as equivalent to private junior high schools. Within the stratified sampling framework of the study presented in this paper, which targets second-year junior high school students in Japan, the "national

and private schools" variable comprises a single stratum. The other strata comprise four strata, with public schools divided according to the size of the municipality (metropolitan district, city, etc.) in which they are located (National Institute for Educational Policy Research 2013).

Mathematics achievement is used as the index for academic ability (a covariate in this study) [(1)], because it easily expresses differences due to "willful acquisition" (i.e., student study habits and efforts) and is considered an important subject in private junior high school entrance exams. Conforming to this decision, mathematics is also used as the target school subject for academic self-efficacy.

Considerations regarding entrance to private junior high schools must take into account that in certain localities, the majority of students attend public schools and the selection of a private school may not be an option (owing to the absence of a private school in the local area). Thus, certain regions are excluded from the analysis, as described hereafter. First, responses in the questionnaire for schools in the lowest population category were excluded—a population of 3,001–15,000 persons in the municipality (city, town, village, "ward" for Tokyo's 23 ward districts). Similarly, schools responding that they were located in the smallest category for site of residence ("small town or village") were excluded. Note that there was a partial overlap of these schools and those responding as such. Consequently, the results of four public schools (total of 128 students) were excluded from the analysis.

Furthermore, excluding variables with missing data meant that ultimately, the number of cases used for analysis were as follows: 278 students attending national or public schools (number of schools: 11 including 7 private and 4 national schools), and 1,914 students attending public schools (number of schools: 111)[(2)].

[Insert Table 1 here]

4.3. Method of Analysis

The study reported in this paper aimed to quantifiably measure the effects of private junior high schools. Here, effects cannot be accurately deduced by comparing the mean values of the dependent variables of students in public schools

with those of students in private schools. This is because, as shown in prior research, students who are more likely to attend private junior high schools already tend to have a high academic achievement and parental education, which may lead to ostensible differences in outcomes. Therefore, we need to discover independent effects due to attendance at public schools (e.g., effects of the school curriculum, school environment, and so on). To do so, it is necessary to appropriately control for various factors that make it easier for someone to advance to a private junior high school. In this process, only a portion of all students in public schools is suitable for a comparison with students attending public junior high schools. Thus, the focus must be on public school students who, although they have entered a public junior high, have similar characteristics that would have made it as easy for them to enter a private school as those who did.

Based on these considerations, for an in-depth investigation of causal effects, this study employed a propensity score analysis (Guo and Fraser 2010; Rosenbaum and Rubin 1983). This method is appropriate when remarkable differences are evident (i.e., when there is bias in data distribution) between two groups, namely a treated group (in this paper, students attending private junior high schools) and a control group (students attending public junior high schools). In education studies, this method is applied in research on private school selection, advancement to university, and in Japan, investigations on *juku* attendance, for example (Nakazawa 2013).

Propensity score analysis employs a framework of counterfactual assumptions to conduct an analysis when the simultaneous observation of two phenomena is not possible in the real world. An example is when one wants to compare effects that would have occurred when the same individual had attended both a private junior high school and public junior high school (Morgan and Winship 2007). When this comparison is not for a single individual, but for fixed groups, it makes it possible to reproduce situations with similarity. Considering the themes of this paper, propensity score analysis enables a comparison based on the following assumption and question: “For students with the same characteristics including parental education, family background, and academic achievement, what differences are observed when one group attends public junior high schools and another group

private junior high schools?"

The propensity score refers to the conditional likelihood (probability) of a phenomenon occurring under certain predicted conditions. For example, in selecting a private school, we may ask: "To what extent was it easy for this student to enter a private school?" In many cases, there is a high tendency for students with higher academic achievement and parental education to enter a private school. Using the propensity score, "matching" these students with students having similar or identical levels of certain conditions, but who went on to attend a public school, can be performed. The differences between the two student groups are then considered as effects. Note that when selecting the covariates to be used, prior research should be referred to and as many variables as possible selected that can best predict treated variables. This can also impact the final outcome variables (Rosenbaum and Rubin 1983).

Regarding the analysis procedures, first, a logistic regression analysis was conducted using covariates that can impact the selection of a private junior high school and propensity scores were estimated(3). Next, the average treatment effects (ATE) were estimated using cases for which the scores for the treated and control groups were balanced.

Matching, stratification, and weighting are the main types of analysis performed using propensity scores. Nearest-neighbor matching was applied in this study, which entailed grouping "close" propensity scores into pairs one by one (Guo and Fraser 2010)(4). In this study, the final outcome was derived by performing a further multiple regression analysis using the matched data and comparing these results to those of the multiple regression analysis, which employed data from before the matching procedure(5).

Figures 1 and 2 show the distribution of propensity scores before and after matching. No changes occurred in the subjects in the treated group pre- and post-matching, and the score mean was 0.25. Conversely, major selection and reduction occurred after matching (post-matching) for subjects in the control group. As a result of exclusion (via matching) of subjects with low propensity scores, while the mean score was 0.11 before matching, this increased to 0.25 after matching, the same value as for the treated group. The figures show that the distribution of post-matching

propensity scores became remarkably well balanced.

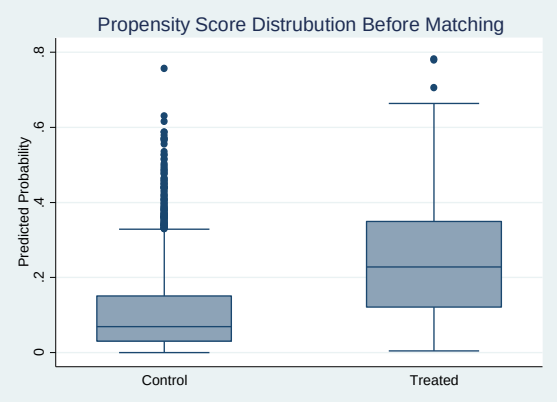

Figure 1. Propensity Score Distribution Before Matching (vertical axes show rate of advancement to a private junior high school)

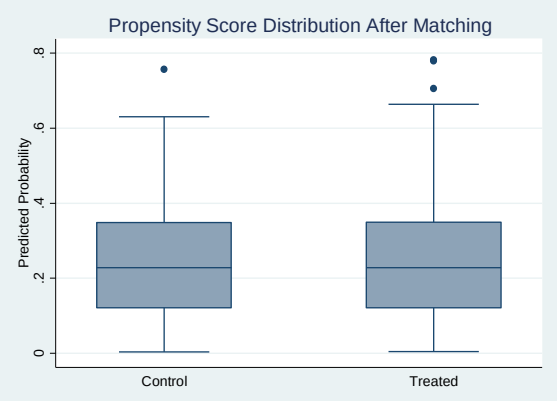

Figure 2. Propensity Score Distribution After Matching (vertical axes show rate of advancement to a private junior high school)

5. Results of the Analysis

5.1. Descriptive Statistics Before and After Matching

Table 2 shows the mean values of major variables before and after matching for the treated and control groups. The treated group comprises students who enrolled in private schools, and the control group those who enrolled in public schools. For all covariates, after matching, all differences lost significance. As public junior high school students with the same conditions as private junior high students were chosen, even in the control group, students with relatively high

academic achievements and high SES backgrounds were selected.

Regarding the dependent variables (educational expectations and self-efficacy in mathematics), with matching, differences between the treated and control groups are equivalent to the ATE. This suggests that after matching, attendance at a private junior high school extended the number of years of educational expectations by approximately 0.4 years compared to attendance at a public junior high. Conversely, self-efficacy in mathematics decreased by 1.1 points.

[Insert Table 2 here]

5.2. Educational Expectations

Table 3 provides the results of the multiple regression analysis before and after matching for educational expectations (in number of years). Although not shown in the table, before Model 1, in which a multiple regression analysis was conducted using only private junior high school as the predictor variable, the results will be the same as the difference in mean values after matching, as shown in Table 2. Model 1 introduces all covariates as control variables. Compared to models for which a multiple regression analysis was conducted before matching and no covariates were introduced after matching, the private junior high school coefficient is somewhat small at .352. However, even though the present model applies stricter criteria, enrollment at a private junior high school is still indicated as having increased educational expectations.

Model 2 was designed to demonstrate the heterogeneity of private school effects as expressed in Hypothesis 2. Here, to more easily investigate the interactions of each variable with private schools, some covariates were changed to a more treatable form. First, principal component analysis was performed so that the covariates of father's education, mother's education, number of books at home, and home educational resources could be summarized into an index expressing family SES. In addition, mathematics achievement and family SES were divided into three categories based on the number of cases.

Considering alone the interaction terms of Model 2 clarifies that when

students with low SES enter a private junior high school, the increase in their educational expectations is significantly higher than that of students who come from a middle-level SES. This was assumed to some extent based on the pre-matching multiple regression analysis. However, the newly calculated results after matching indicate a stricter causal effect, despite the relatively small coefficient. Meanwhile, no significant effects emerged for students with high SES, despite their enrollment in private junior high schools. It can be claimed that enrollment in a private junior high by a student with high SES does not do much to increase the student's educational expectations.

[Insert Table 3 here]

5.4. Self-Efficacy in Mathematics

Table 4 provides the results of the multiple regression analysis before and after matching for self-efficacy in mathematics. The private junior high school coefficient for Model 1 after matching is roughly the same as the ATE shown in Table 2. The results here indicate somewhat large effects in the negative direction compared to the results of the multiple regression analysis before matching. Thus, the results confirm that students are more likely to have lower self-efficacy in mathematics if they attend a private junior high school.

Model 2 was designed to demonstrate the heterogeneity of private school effects as expressed in Hypothesis 4. The post-matching interactions show that compared to students with low academic achievement, middle or high-achieving students are more likely to decrease self-efficacy in mathematics. These results are more reliable having undergone the post-matching multiple regression analysis.

[Insert Table 4 here]

5.4. Nature of the Effects of Private Junior High Schools

The analyses thus far clarifies that enrollment at a private junior high school

has certain effects on the educational expectations of students and on their academic-related self-efficacy. However, what mechanisms generate such effects? From among the various characteristics of private junior high schools, which cause these effects? To further investigate, I first refer to the framework of Coleman et al. (1982). In private schools in the United States, academic abilities in languages and mathematics were higher than in public schools. Coleman and his colleagues attempted to explain these differences using observable indices. They investigated the levels and effects of various indices related to coursework and homework, student behavior, and attitudes. Their examination of private and public schools revealed that the advantages related to academic skills in private schools could be explained by using variables that could be manipulated by specific policies.

Further studies refined this framework for school effects, for example, research on the mechanisms of tracking effects (Gamoran 1986; Karlson 2015; Pallas et al. 1994). Here, the effects of tracking on academic achievement and educational attainment were explained through three aspects: instructional effects, interpersonal (peer) effects, and institutional (symbolic) effects. Possibly, the effects clarified in this study on educational expectations and self-efficacy in mathematics can be explained using this framework.

TIMSS data includes various indices concerning school characteristics in addition to the variables investigated in the present study(6). Regarding instructional effects, for the schools analyzed in this study, the average weekly number of instructional hours for mathematics was 220 minutes for private schools and 156 minutes for public schools. The time spent on homework per week was 32.7 minutes for private schools and 24.7 minutes for public schools(7). However, incorporating these variables into the models used in Tables 3 and 4 does not explain the coefficients for private schools, or the results for educational expectations and feelings of self-efficacy.

Next, for peer effects, we may consider school mean academic achievement and its standard deviation as indicators of high-achieving and homogeneous peer groups. For the schools analyzed, the mean academic achievement in math were 639.2 for private junior schools and 575.6 for public junior high schools, with private schools having a lower distribution of scores

within individual schools. Similarly, when the mean academic achievement and standard deviations for each school were incorporated into Tables 3 and 4, the coefficients for private schools demonstrated an observable decrease in self-efficacy only. Thus, the data showed that the academic self-concept of private junior high school students is at the least impacted by comparisons with the reference group, namely fellow classmates with high academic abilities. Otherwise, while private schools showed somewhat higher means for items related to student learning and behavioral norms, when these were incorporated into the models, no significant effects were observed. For institutional effects, since examination using observable data is difficult, I limited the paper to present only the framework.

Based on the above, the fact that incorporating mean academic achievement partially explained the self-efficacy of students indicates that even in a public school with similarly high achievement level, a decrease in self-efficacy in mathematics could be observed for that school, as shown in this study for private schools. Although we did not observe such a school in the data of this study, an example of a junior high school with high academic achievement in Japan is one that provides integrated junior and senior high schools within one public school. This type of school has grown in popularity in recent years.

Nevertheless, observable factors other than those described above cannot provide a more detailed explanation of the mechanisms involved in the effects of private junior high schools. Thus, it can be assumed that certain independent factors and mechanisms apply in private junior high schools, and possibly these factors have yet to be observed. For example, numerous factors remain unobserved among the special characteristics of private junior high schools such as guidance for entrance exams and interactions among students and between students and teachers. I intend to examine this aspect in my future research.

6. Conclusion and Discussion

A summary of the findings obtained in this study follows. Advancement to a private junior high school makes it easier for students' educational expectations to increase when compared to students with similar characteristics attending a public

junior high school. Specifically, it is easier for students of lower SES to experience this increase in educational expectations. Furthermore, advancement to a private junior high school makes it easier for students' academic self-efficacy to decrease compared to students with similar characteristics attending a public junior high school. Among the students at private junior high schools, those with comparatively high academic achievements are likely to experience a decrease in their academic self-efficacy. Thus, as described, Hypotheses 1–4 were all supported.

These results suggest both positive and negative academic-related effects that occur while students attend private junior high schools in Japan. In general, an increase in educational expectations is viewed positively. While the extent of this effect did not even extend on average to half a year, students from lower SES levels were found to benefit most from it. The decrease of self-efficacy in mathematics is generally a negative result. This aspect became prominent after comparing superior students with relatively high SES attending public junior high schools, who comprised the present study's control group. In other words, regarding students with similar abilities and characteristics, it is easier for students attending public junior high schools to gain a high level of self-efficacy, as they compare themselves to surrounding others. Regarding a decrease in self-efficacy (defined in this paper as feeling that mathematics is difficult or that one's grades in that subject are not good), different individuals experience this decrease differently. In the challenging environment of a private school, even when experiencing a setback, the negative aspects of decreasing self-efficacy are likely only temporary, as long as students work diligently with their fellow students to improve and extend their own abilities.

The suggestions obtained from this study can serve as food for thought in the continuing discussion on the legitimacy of dividing students based on their abilities, based on the findings of tracking studies. When configuring tracks, instruction is provided according to student abilities. As such, an increase is expected in the effects and efficacy of teaching. However, there is consensus that group and course divisions based on abilities frequently overlap with issues of class and race (Hallinan 1994; Oakes 2005; Tsuneyoshi 2008). To enter a private junior high school in Japan, academic abilities enabling one to pass the entrance examination process are required, the preparation for which (e.g., attendance at a

juku) requires a substantial financial burden and parents' support. Therefore, one concern is that private schools tend to select students from relatively higher SES backgrounds. However, if the analysis in this paper applies to the "real life" situation, if students with high academic abilities but low SES enter a private junior high school (for example, through economic aid provided for skilled students with special needs), then their educational expectations may increase, as these students best enjoy the resources and opportunities provided in a private school environment. For academically and financially advantaged students, our findings suggest the necessity of investigating certain demerits in terms of self-concept (i.e., lower self-efficacy) resulting from attending a private junior high school. Certainly, it is important whether the problem is simply that students are divided according to their abilities, and that the gathering of students with similar SES supports and strengthens inequality. However, future considerations should extend to considering the possibility of heterogeneous effects, whereby the merits obtained from private school enrollment differ for different students, to better elucidate conceptual meanings arising from the way educational system is institutionalized.

The present paper has two limitations. First, some caution is required because of the small number of private junior high schools (including a portion of national junior high schools) and number of enrolled students used as the data in this paper. This stems from the fact that Japan has a low ratio of students who attend national and private schools at the junior high school level (there is no problem with the sample-extraction framework of TIMSS itself). Therefore, similar variable sets from the 2003 and 2007 data were integrated and used for a supplementary analysis. For these sets, a trend similar to the results in this study was confirmed(8).

Second, another aspect of this study that requires caution is that the data used was cross-sectional and collected from a specific point in time. This paper employed the propensity score matching method, considered the more aggressive approach to the causal inference. Nevertheless, for a portion of the variables, it is possible that time-related changes were not strictly considered. In this study, the academic score for mathematics was one index used to facilitate "ease of entrance" to a private junior high school. While this may express the status of mathematical abilities before junior high, possibly, these achievements changed under post-

entrance (i.e., while attending private junior high school) influences. Still, it is difficult to imagine that the absolute academic abilities of individual students underwent drastic deviations according to whether the student entered a private junior high school. The author emphasize that the use of academic scores in mathematics was intended to serve as a “rough” (general) indicator of students’ academic ability.

This study used quantitative methods to investigate the effects of attending a private junior high school, which have not yet been sufficiently investigated in Japan. To examine this theme in the future, two directions are conceivable. One method is to use panel survey data that tracks students from elementary school to junior high school, and while carefully considering temporal order, to quantitatively clarify the effects of attending a private junior high school. Another method is to interview students attending private junior high schools, their parents and guardians, and teachers, and to observe classroom instruction, academic-path guidance, and aspects of school life to determine the formation of consciousness and desires regarding academic pathway selection and approaches to schoolwork (e.g., do teacher expectations have an impact, and/or are there effects due to interactions with other students, etc.). This will entail an accumulation of cases based on qualitative observations. Applying various types of approaches as such will likely lead to a more general and systematic understanding of the effects of private junior high schools in Japan.

Footnotes

(1) TIMSS data has five plausible values for each index of academic achievement. When academic achievement is used as a dependent variable, all five plausible values should be used in the calculation. However, when academic achievement is used as an independent variable, it is common practice to use the average of these five plausible values (Buchmann and Park 2009). This paper also adopts this method.
(2) Although calculations were performed by supplementing missing values using multiple imputation (MI), as no major differences occurred in terms of the main results (outcomes), this study simply excluded the missing values.

(3) The “p-score” command in Stata (Becker and Ichino 2002) was employed to create the propensity scores. When confirming the distribution of propensity scores, as the common support domain, we confirmed specific overlaps between the treated and control groups. In this study, we considered that individuals in the control group (n=35) who scored less than the minimum values of the treated group as not included in the common support domain. Matching was performed after excluding these individuals.

(4) In the paired nearest-neighbor matching, differences in propensity scores were within a 0.25 standard deviation (Guo and Fraser 2010).

(5) The method whereby covariates are introduced to the post-matching data for further regression analysis was considered effective as a “doubly robust estimator” (Hoshino 2009).

(6) Referenced here are responses from the teacher questionnaires, student questionnaires, and school questionnaires.

(7) However, mean scores for the number of items taught in the separate domains of numbers and algebra, figures, and probability, were around 50 for both private and public schools. Thus far, as can be concluded from the schools surveyed here, despite few differences in terms of basic instructional parameters, private schools spend more time engaged in teaching these items in detail than do public schools.

(8) However, since there is less data from 2003 and 2007 for the variable concerning parental involvement in education than in the 2011 survey, matching accuracy was somewhat weaker for this variable.

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Table 1. Overview of Variables

Variables	Explanation
Outcome Variables	
Educational expectation (in years)	Junior high school=9 years; high school=12 years; specialty school, vocational school, junior college=14 years; specialty university/academy (meteorological university, national defense academy, etc.)=15 years; university=16 years; graduate school=18 years; "Do not know" responses were treated as missing values.
Educational expectation (university dummy)	Desire to attend university or graduate school=1, other=0
Self-efficacy in mathematics	Four items (survey questions) were used: "I usually do well in mathematics," "Mathematics is more difficult for me than for many of my classmates," "Mathematics is not one of my strength," "I learn things quickly in mathematics." For each of the four items, responses were indicated as follows (note that items 2 and 3 were reverse coded): "Strongly agree" = 4 to "Completely disagree" = 1. The four items are then summed in total (for scores of 4–16).
Treatment Variable	
Private junior high school	Students attending national or private junior high schools=1, Public junior high schools=0
Covariates	
Mathematics achievement	Average of five plausible variables on mathematics achievement, with a scale having an international mean of 500 and an international standard deviation of 100.
Father's education	Final educational level of father converted to number of years of education (codings are same as educational expectation (in years) above).
Mother's education	Final educational level of mother converted to number of years of education (codings are same as educational expectation (in years) above).
Number of books at home	Number of books owned by family: almost none (0–10 books)=1, enough for one book shelf (11–25 books)=2, enough for one bookcase (26–100 books)=3, enough for two bookcases (101–200 books)=4, enough for three or more bookcases (more than 200 books)=5.
Home educational resources	Total number of items owned among 11 items: Computer, study desk, personal books (other than textbooks), own room, Internet connection, calculator, dictionary, mathematical puzzle sold at bookstores, astronomical telescope, globe, illustrated plant reference book (for total scores of 0 to 11)
Female dummy	Female=1, Male=0
Foreign-born dummy	Student born outside of Japan=1, Born in Japan=0
Age	Continuous variable considering a student's birth year and birth month
Academic involvement of parents	Four items (survey questions) were used: "My parents ask me what I am learning at school," "I talk about my schoolwork with my parents," "My parents make sure that I set aside time for my homework," "My parents check if I do my homework." For each of the four items, responses were indicated as follows: "Strongly agree" = 4 to "Completely disagree" = 1. The four items were then summed in total (for scores of 4–16).
Use of computer at home	Computer used at home=1, No computer used at home=0

Table 2. Descriptive Statistics Values for Dependent Variables and Covariates Before and After Matching

			Before Matching			After Matching		
	Treated Group/ Private School (N=278)		Control Group/ Public School (N=1914)		Difference with Treated Group	Control Group/ Public School (N=278)		Difference with Treated Group
	Mean	S.D.	Mean	S.D.		Mean	S.D.	
Outcome Variables								
Educational expectation (in years)	15.950	(.873)	14.728	(1.723)	1.221 ***	15.568	(1.341)	.381 ***
Educational expectation (university dummy)	.921	(.270)	.569	(.495)	.351 ***	.809	(.394)	.112 ***
Self-efficacy in mathematics	9.263	(2.611)	9.032	(2.821)	.231	10.320	(2.746)	-1.058 ***
Covariates								
Mathematics achievement	636.212	(66.542)	575.004	(79.807)	61.208 ***	633.843	(68.690)	2.369
Mathematics achievement (standardized)	.792	(.808)	.048	(.970)	.744 ***	.763	(.834)	.029
Father's education	15.162	(1.998)	13.778	(2.202)	1.384 ***	15.194	(1.737)	-.032
Mother's education	14.665	(1.754)	13.381	(1.813)	1.284 ***	14.737	(1.674)	-.072
Number of books at home	3.378	(1.251)	3.039	(1.227)	.339 ***	3.374	(1.103)	.004
Home educational resources	8.791	(1.313)	7.994	(1.556)	.798 ***	8.842	(1.259)	-.050
Female	.622	(.486)	.511	(.500)	.111 ***	.604	(.490)	.018
Foreign born	.025	(.157)	.007	(.085)	.018 **	.007	(.085)	.018
Age	14.460	(.288)	14.478	(.287)	-.018	14.444	(.304)	.016
Academic involvement of parents	9.770	(3.206)	9.228	(3.236)	.541 **	9.432	(3.101)	.338
Use of computer at home	.921	(.270)	.869	(.337)	.051 *	.935	(.247)	-.014

Note: Regarding academic achievement in mathematics, standardized variables were used when calculating propensity scores.

Table 3. Multiple Regression Analysis for Educational Expectations (in number of years) Before and After Matching

	Before Matching				After Matching			
	Model 1		Model 2		Model 1		Model 2	
	Coef.	S.E.	Coef.	S.E	Coef.	S.E	Coef.	S.E
Private junior high school	.454	(.078) ***	.506	(.123) ***	.352	(.091) ***	.157	(.135)
Math achievement (middle)—Reference								
Math achievement (low)	-.832	(.087) ***	-.816	(.088) ***	-.498	(.133) ***	-.501	(.134) ***
Math achievement (high)	.573	(.071) ***	.577	(.072) ***	.238	(.122)	.229	(.124)
Family SES (middle)—Reference								
Family SES (low)	-.721	(.083) ***	-.766	(.086) ***	-.169	(.101)	-.379	(.170) *
Family SES (high)	.375	(.059) ***	.445	(.064) ***	.150	(.094)	.067	(.172)
Female	-.032	(.056)	-.021	(.056)	.079	(.092)	.088	(.091)
Foreign born	-.528	(.347)	-.487	(.349)	.524	(.176) **	.503	(.176) **
Age	.126	(.103)	.109	(.104)	.099	(.150)	.078	(.150)
Academic involvement of parents	.043	(.009) ***	.044	(.009) ***	-.002	(.015)	.000	(.015)
Use of computer at home	.240	(.119) *	.225	(.119)	-.301	(.143) *	-.286	(.138) *
Private j.h.s. * mid SES —Reference								
Private j.h.s. * low SES			1.098	(.256) ***			.420	(.200) *
Private j.h.s. * high SES			-.315	(.143) *			.160	(.193)
Constant	12.625	(1.479) ***	12.849	(1.489) ***	14.486	(2.177) ***	14.865	(2.176) ***
N	2192		2192		556		556	
R2	.325		.333		.139		.145	

Table 4. Multiple Regression Analysis for Self-Efficacy in Mathematics Before and After Matching

	Before Matching				After Matching			
	Model 1		Model 2		Model 1		Model 2	
	Coef.	S.E.	Coef.	S.E	Coef.	S.E	Coef.	S.E
Private junior high school	-.889	(.268) ***	-.017	(.301)	-1.081	(.278) ***	-.075	(.325)
Math achievement (low)—Reference								
Math achievement (middle)	1.487	(.122) ***	1.459	(.126) ***	1.458	(.251) ***	2.167	(.370) ***
Math achievement (high)	3.442	(.153) ***	3.584	(.160) ***	2.776	(.297) ***	3.554	(.329) ***
Family SES (low)— Reference								
Family SES (middle)	.357	(.128) **	.343	(.127) **	.573	(.249) *	.549	(.248) *
Family SES (high)	.512	(.145) ***	.496	(.145) ***	.154	(.264)	.140	(.263)
Female	-.885	(.109) ***	-.883	(.106) ***	-1.077	(.239) ***	-1.085	(.220) ***
Foreign born	.121	(.459)	.217	(.458)	.186	(.734)	.328	(.737)
Age	-.288	(.175)	-.258	(.177)	-.925	(.366) *	-.828	(.373) *
Academic involvement of parents	.001	(.015)	.002	(.015)	.009	(.034)	.014	(.033)
Use of computer at home	.133	(.118)	.119	(.117)	.208	(.364)	.163	(.361)
Private j.h.s. * low achievement — Reference								
Private j.h.s. * middle achievement			-.327	(.531)			-1.458	(.457) **
Private j.h.s. * high achievement			-1.329	(.347) ***			-1.582	(.560) **
Constant	11.753	(2.544) ***	11.295	(2.569) ***	22.422	(5.426) ***	20.555	(5.551)
N	2192		2192		556		556	
R2	.305		.309		.267		.284	