Gearing up for university entrance examinations: Untangling relationships between school tracking, high school seniors' educational expectations, and their efforts

Ryoji MATSUOKA

Abstract

The Japanese high school education system is strongly differentiated. Hierarchically ranked schools are known to function as tracks that influence students' educational expectations and studying habits. Previous studies regarding the high school tracking system indicate an educational expectations gap between schools, and other research shows an association between school rank and later educational attainment. These studies imply the tracking effect on students' studying habits; students have higher educational expectations partly due to higher tracks, and then, facilitated by these higher tracks, they study hard to achieve higher educational attainments. Since this has never been empirically examined with nationally representative data, this study aims to untangle the relationships between school tracking, high school seniors' educational expectations, and their efforts when college admissions are approaching. To reveal tracking effects on students' studying habits, or efforts, this study utilizes large-scale data from a national survey on high school senior's academic ability administered by the Curriculum Research Center at the National Institute for Educational Policy Research in 2005. Results of a multilevel mediation analysis indicate that students' family backgrounds and school-based tracks differentiate their educational expectations (whether advancing to a four-year university or not). This shapes if they spend long hours studying (more than three hours a day), indicating the tracking effect on students' effort, which possibly leads to higher educational attainments.

High School Tracking

Tracking in education means that students are divided into different courses. As students from advantaged families tend to be placed in higher academic tracks and are thus being prepared for higher education, tracking legitimates social inequalities (Lucas, 1999; Oakes, 1985, 2005). In the United States, academic and vocational tracks were abolished and upper secondary schools became comprehensive. However, tracking effects remain in the form of course-taking patterns (Hallinan, 1994; Oakes, 2005). Students from high socioeconomic status (SES) families tend to take college preparatory courses (Heck, Price, & Thomas, 2004), while their counterparts are likely to enroll in courses that do not prepare them for college education (Oakes, 1985, 2005).

In Japan, studies on upper secondary education point out a strongly differentiated high school education system. Hierarchically ranked schools are known to function as between-school tracks. The tracking effects of this system are evident in numerous aspects: high school rankings are related to educational aspirations/expectations (e.g., Taki, 2011a, 2011b), content of regular lessons (Kikuchi, 1986), students' culture (Rohlen, 1983), student-teacher relationships (Knipprath, 2010), spontaneous motivation to study (Aramaki, 2002; Kanbayashi, 2008), effort or study habits/behaviors (Kanbayashi, 2007; Kariya, 2001; Matsuoka, 2013b, 2013c, 2013e), and attending additional lessons outside regular school lessons (Matsuoka, 2013c, 2013d). Importantly, higher school rankings are associated with advancing to higher ranked universities (Ono, 2001), higher final educational attainment (Yamamoto & Brinton, 2010), and attending competitive universities (Kariya, 2011). Two studies edited by Hida, Mimizuka, Iwaki, & Kariya (2000) and by Ojima (2001) assess whether tracking effects have changed between two points of time, revealing that the tracking system and its effects

remain. A recently conducted study (Kariya, 2011) also demonstrates the persistence of the tracking system's structure and its effects.

Tracking, Educational Expectations, and Educational Attainment

Previous studies regarding the high school tracking system show an educational expectations gap between schools. Higher school rankings and/or curriculum tracks (general and vocational education) are associated with higher educational aspirations/expectations (Arakawa, 2009; Arakawa, 2001; Hata, 1977; Honda, 2008, 2009; Katase, 2005; Nakamura, 2002, 2003; Onai, 1998; Takeuchi, 1981; Taki, 2011a, 2011b; Yoshimoto, 1984). Other studies show the association between school rank and later educational attainment; students in higher ranked schools tend to obtain higher educational attainments (Brinton, 2009; Ehara, 1973; Iwaki & Mimizuka, 1983; Nakanishi, 2000; Ono, 2001; Yamamoto & Brinton, 2010). These researches imply tracking effects on students' studying habits; students have higher educational expectations partly due to higher tracks, and then study hard to accomplish higher educational attainments, which is facilitated by the higher tracks. In other words, among the relationships between tracking (school rankings), educational expectations, and educational attainment, actors' behaviors in the social structure should be included, indicating the observable high school students' efforts differentiated by school-based tracks in the hierarchically ranked high school system. This mechanism could be inferred from Fujita's (2001) study by using regional data of high school seniors at the beginning of the academic year, which shows that in addition to school rank and curriculum track (vocational education or not), high school seniors' educational aspirations significantly predict their studying time at home.

Rationale of the Study and Research Questions

Previous studies focusing on high school students in Japan (e.g., Kariya, 2001) indicate an uneven effort; the amount of effort differs according to family backgrounds and school tracks (ranking), which conceals a relationship between family-socioeconomic status and educational attainment. A recent study using a nationally representative sample of high school freshmen (Matsuoka, 2013e) confirms that school rankings, school curriculum (general or vocational), and school SES (SES composition) (e.g., Raudenbush & Bryk, 2002) differentiate high school freshmen's studying hours. In the meantime, Fujita (2001) indicates that students' educational aspirations relate to how much time they spend studying at home, but his study's data is limited; his sample comprised 1063 students in the Tokyo metropolitan area and 376 students in a city in a remote prefecture, *Tottori*. Kanbayashi (2007) also attempted to include high school sophomores' educational aspirations to predict their learning time outside school; however, because most students in the highest track aspire to advance to higher education, it was excluded from the analysis. In addition, both studies (i.e., Fujita, 2001; Kanbayashi, 2007) employed a single-level modeling analysis with a small number of schools. As such, the effects of school tracking factors have not yet been sufficiently tested.

Briefly, prior tracking studies do not empirically show how tracking factors (i.e. school rank, curriculum track, and school SES) differentiate students' studying behaviors. Clarifying this tracking mechanism should help us understand the relationship between school tracking, educational expectations, and final educational attainment, filling the gap between the two sets of studies (educational expectations gap between schools and the relation between school rank and subsequent educational attainment). For this purpose, it is desirable to assess high school seniors rather than freshmen or sophomores to observe tracking effects as students' study behaviors are likely to be more homogenous within tracks and more consequential to final educational attainment, since college admissions, the critical educational selection, are approaching in the last year of high school education. Therefore, this study examines tracking effects on high school seniors' efforts when college admissions are about three months away. More specifically, this study asks the following two research questions.

Research Question 1: Does the tracking system differentiate students' efforts in the 12th grade?

Based on previous studies, this study hypothesizes that tracking factors (school rank, school curriculum, and school SES) differentiate if twelfth grade students spend a substantial amount of time studying to prepare for the oncoming university entrance examinations. Students who study more than

three hours during the period of the survey administration are considered to prepare for written examinations for relatively competitive college admission.

Research Question 2: How does differentiation occur between school-based tracks?

The literature indicates disparities between schools regarding the SES of students (e.g., Matsuoka, 2013d, 2013e), and school rankings differentiate high school students' educational aspirations (e.g., Honda, 2008, 2009; Katase, 2005; Taki, 2011a, 2011b) and learning time (e.g., Kanbayashi, 2007; Kariya, 2001; Matsuoka, 2013e). In addition, Fujita (2001) demonstrates the association between educational aspirations and levels of effort. Building on these studies, this study hypothesizes that tracking factors (school rank, school curriculum, and school SES) first differentiate students' educational expectations (whether to advance to four-year colleges), which then shape if they spend long hours studying about three months before college admissions. Students in the same schools (tracks) tend to have relatively similar educational expectations; thus, students' levels of effort would also be homogeneous within tracks.

Methods

Data

The study utilizes large-scale data from a national survey on high school senior's academic ability administered by the Curriculum Research Center at the National Institute for Educational Policy Research.[(1)] The survey was administered on November 10th, 2005, and targeted seniors in national, public, and private full-time high schools (Curriculum Research Center/National Institute for Educational Policy Research, 2007b). Through random sampling, students were assigned to take a set of tests in 3 of 12 academic disciplines (e.g., some students took tests on national language, world history, and geoscience, while others completed tests on different disciplines). For each academic discipline, two tests—paper test A and B—were used. Exam questions were similar in terms of content and academic level (Curriculum Research Center/National Institute for Educational Policy Research, 2007b). In principal, two classes were selected from each school, and one test (either paper test A or B) was administered to each class.

This study uses data including students' test scores on 'national language A' and responses to the "student questionnaire" (Curriculum Research Center/National Institute for Educational Policy Research, 2007a) that all students completed regardless of the academic disciplines on which they were tested. In other words, the presented results are based on the data of students who took "national language A"[(2)]: 14,819 students in 447 schools.[(3)]

Variables

Student-Level Variables

One continuous and four dichotomous variables were created at the student level. Two dichotomous dependent variables were Educational Expectations and Studying Long Hours.

Educational Expectations (EE): This dichotomous variable indicates whether students expect to advance to four-year higher education institutions based on their responses to Question 2-11: "Which post-graduation plan do you wish for the most?" (p. 127, Curriculum Research Center/National Institute for Educational Policy Research, 2007a). Students' responses were categorized as follows: "university," "two-year college," "professional school," "other post-secondary education," "getting employed," "others," and "non-response" (Curriculum Research Center/National Institute for Educational Policy Research, 2007a). "University" was coded as 1, and all others as 0. Since "two-year college" is included as a category in the questionnaire, "university" should refer to higher education institutions offering four-year undergraduate programs. Essentially, this variable shows if high school seniors are bound for college in November, which is about three months before the beginning of the college entrance examinations period (e.g., The National Center Test for University Admissions is administered in mid-January every year).

Studying Long Hours: This variable, which indicates students' weekday studying behavior, is the dependent variable differentiated by tracking factors (e.g., school rank). This study coded students' responses to the following question: Q2-3 "How much time do you spend studying outside of school lesson hours per day? (Choose one) (Do not include weekends. Include the time spent in *juku* and *yobiko* and with a private tutor)" (p. 117, Curriculum Research Center/National Institute for Educational Policy Research 2007a). Students selected one of six categories: "none at all or almost none," "less than 30

minutes," "more than 30 minutes and less than 1 hour," "more than one hour, less than two hours," "more than two hours, less than three hours," and "more than three hours." Those who selected "more than three hours" were coded 1, and all others were coded as 0. Considering that they were high school seniors and the survey was administered in November, students spending more than three hours studying outside school lessons are presumed to exert as much effort as possible on preparing for upcoming college entrance examinations.[4]

Score: The number of correct answers out of 25 exam questions was added to indicate a test score on national language A. Students' test scores were standardized (mean = 0, standard deviation =1).

Family Background (FB): The survey did not include any direct questions regarding students' social class or SES, which is conventional for education-related surveys in Japan. Thus, this study refers to studies in a report (Chiba Prefectural Committee for Investigating and Improving, 2008) that analyzed prefectural data of a 2007 national survey on students' academic performance in terms of how indirect measures of family background were created and used in their analyses.[5] To create indirect measures of SES, the study used students' responses to the following two items on the common student questionnaire: Q2-7 "Do you eat breakfast before going to school?" and Q2-8 "Do you check what to bring to school a day before or in the morning of the school day?" Students who selected "always" for both items were coded as 1, and all others as 0.[6] This dichotomous variable indicates if students have relatively advantaged family backgrounds, implying higher SES. Admittedly, this variable is not a well-measured SES indicator, but appears to sufficiently show between-school SES disparities, as results are reasonable and consistent with the literature.

Female: Female students are indicated as 1, and their male counterparts as 0.

School-Level Variables

Two variables are commonly used in tracking studies in Japan: school rank shows positioning in the vertically hierarchical academic tracking system, while general/vocational education indicates curriculum tracking. In addition, Matsuoka (e.g., 2013d, 2013e) used school SES, a composition of student SES, as a tracking factor, because high school admissions position higher SES students in higher tracks (e.g., Yamamoto & Brinton, 2010).[7] Following the literature, this study developed three school tracking factors, namely school rank, general education, and school FB, which is a composition of students' family background.

School Rank: Students' scores were averaged at each school to indicate relative positioning in the ranking system. This variable was standardized (mean = 0, standard deviation = 1).

General Education: Schools with a general education curriculum were shown as 1, and those with other curricula (i.e. vocational and comprehensive, called "*sogo*") were indicated as 0. Note that there is no school with the two in the data, and "*sogo*" (N = 16) was coded as 0[8].

School FB: Students' family backgrounds were averaged at each school and then standardized (mean = 0, standard deviation = 1).

School EE: Students' educational expectations were averaged at each school and then standardized (mean = 0, standard deviation = 1).

Private/National: Private and national schools were indicated as 1, and conventional public schools as 0.

Analysis

Descriptive statistics were performed, and then intra-class correlation coefficients of three variables (student score, educational expectations, and studying long hours) were computed. A cross-tabulation table was also developed to determine if school rank and school curriculum (general education and the others) are associated with interested variables. Then, a multilevel mediation model, as shown in Figure 1, was created to answer the two research questions[9], and then operationalized using Mplus 7.2 (Muthén & Muthén, 1998-2012). Multilevel modeling was applied, as students are nested in schools,[10] and mediation techniques were used to clarify the differentiation of students' efforts between school-based tracks. As no random slopes were found, a random intercept model was specified. This model shows that variation in the intercept was estimated to indicate between-school differences in each dependent variable (i.e., educational expectations and studying long hours) while all slopes were fixed. This suggests

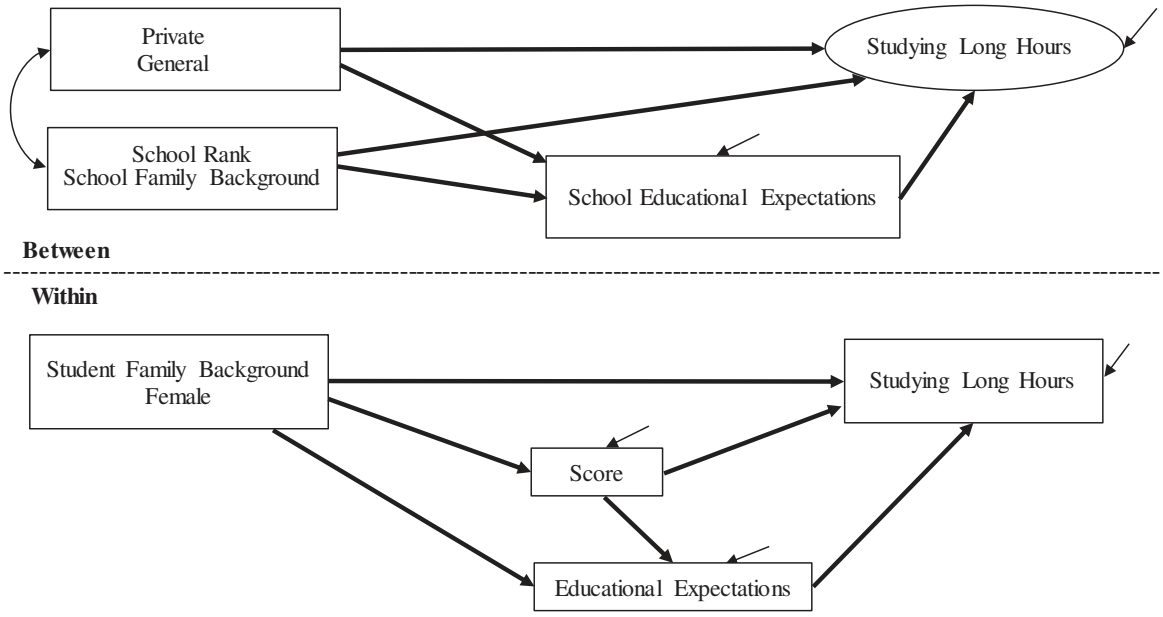


Figure 1. Conceptual Model

that the effects of independent variables do not differ across schools.

Results

Descriptive Statistics and Intra-class Correlation Coefficient (ICC)

Table 1 presents the descriptive statistics for continuous variables. Table 2 indicates frequencies of dichotomous variables at both student- and school-levels.

ICCs of student score, educational expectations, and studying long hours were estimated to observe a between-school variation in each variable: 0.524, 0.585, and 0.588 respectively. These ICCs indicate that 52.4%, 58.5%, and 58.8% of the variation is between schools respectively, implying great between-school disparities.

The tracking studies in Japan demonstrate that these between-school differences are related to tracking structures, specifically school rank and school curriculum. To verify if this is the case with the data, a crosstab was created as shown in Table 3. Four school rank categories were created based on the continuous variable "school rank." Family background, educational expectations, and studying long hours are raw variables, and show a percentage of students who were coded as 1 (advantaged family background, being college bound, and studying more than three hours per weekday).

While family background is admittedly an insufficient measure of SES, it shows a pattern parallel to that documented in the literature. Schools with school rank above 1 SD (the top 16%) have the highest percentage of students from an advantaged family background (39.8%), then college bound (92.7%), and who study more than three hours per weekday (65.0%). In contrast, those with school rank below -1 SD (the bottom 16%) have the lowest percentage for each: 14.7%, 15.7%, and 1.3% respectively. There is a clear association between school rank and these percentages. Curriculum tracks also appear to function as indicated in previous studies. Schools with a general education curriculum have higher percentages of students from higher SES families, have college expectations, and exert effort to study more than three hours per weekday.

Predicting "Studying Long Hours"

To further investigate the relationships between tracking factors and students' study behavior, a multilevel mediation model was created. Figure 1 presents the final model of the relationships between the variables, indicating that school educational expectations mediate the effects of the three tracking factors, namely school rank, general, and school family background on between-school variation in studying long hours. Likewise, at the student level, educational expectations mediate the effects of family background and score on students' studying behavior. Student score also mediates some family background effects.

Table 1. Descriptive Statistics for Continuous Variables

		N	Min	Max	Mean	SD	Skewness	Kurtosis
School Level								
School Rank	STD	447	−2.425	1.873	0	1	−0.085	−0.850
School FB	Raw	447	0	0.680	0.261	0.132	0.423	−0.304
	STD	447	−1.983	3.137	0	1	0.423	−0.304
School EE	Raw	447	0	1.000	0.512	0.349	0.052	−1.537
	STD	447	−1.470	1.399	0	1	0.052	−1.537
Student Level								
Score		14819	−3.465	1.55	0	1	−0.742	0.281

STD = Standardized

Table 2. Frequencies of Dichotomous Variables

		N	%
School Level (N = 447)			
Curriculum Tracks	General (1)	322	72.0
	Others (0)	125	28.0
School Type	Private/National (1)	141	31.5
	Public (0)	306	68.5
Student Level (N = 14819)			
Sex	Female (1)	7155	48.3
	Male (0)	7664	51.7
Family Background	Advantaged (1)	3987	26.9
	Others (0)	10832	73.1
Educational Expectations	Four-year college (1)	7938	53.6
	Others (0)	6881	46.4
Studying Long Hours	More than 3 hours (1)	3694	24.9
	Others (0)	11055	74.6
	Missing	70	0.5

Table 3. School Averages by School Track Factors

	N	Family Background (Advantaged)	Educational Expectations (College-bound)	Studying Long Hours (More than 3 hours)
School Rank				
Above 1 SD	91	39.8%	92.7%	65.0%
From 0 to 1 SD	130	29.8%	67.0%	27.7%
From −1 SD to 0	151	20.4%	30.4%	5.5%
Below −1 SD	75	14.7%	15.7%	1.3%
Curriculum Tracks				
General	322	28.2%	62.2%	29.9%
Others	125	20.9%	23.1%	6.5%
Total	447	26.1%	51.2%	23.3%

To test these relations, a multilevel mediation analysis was conducted. Table 4 shows results at the school (between) level, Table 5 at the student (within) level, and Figure 2 presents estimates of the relevant variables in the conceptual model.

According to Table 4, the three tracking factors directly and indirectly shape students' efforts in studying long hours. At the between-level, the random

Table 4. Predicting "Studying Long Hours": the Between Level

	Estimate		S.E.
School Level (N=447)			
Studying Long Hours: Threshold	3.015	***	0.255
School Rank	0.716	***	0.126
General	−0.195		0.271
School FB	0.153	*	0.068
School EE	1.097	***	0.151
Private	−0.626	***	0.153
School Educational Expectations: Intercept	−0.507	***	0.049
School Rank	0.688	***	0.031
General	0.489	***	0.059
School FB	0.120	***	0.030
Private	0.481	***	0.053
Mediation Effects through School EE on Studying Long Hours			
School Rank	0.755	***	0.110
General	0.536	***	0.098
School FB	0.132	***	0.036
Private	0.528	***	0.099
Residual Variances			
Studying Long Hours	0.719	***	0.097
Educational Expectations	0.229	***	0.017
Information Criteria			
Akaike (AIC)	72006.377		
Sample Size Adjusted BIC	72117.021		

* = p < .05, *** = p < .001
S.E. = Standard Error

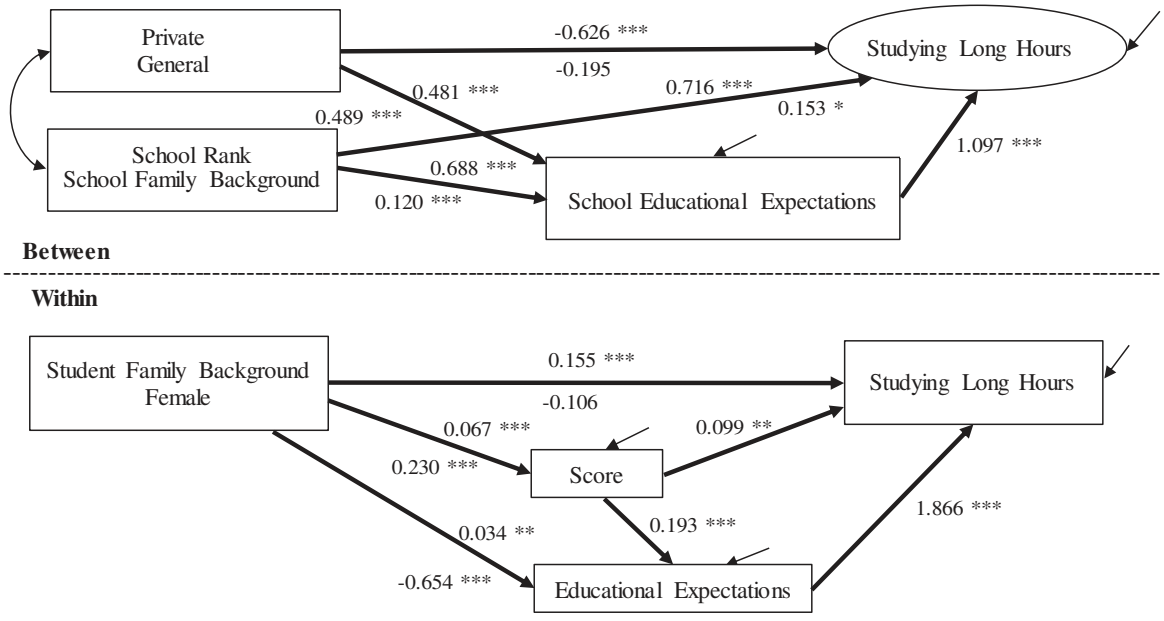
intercept of "studying long hours" is in an oval as it is the continuous latent variable that varies across schools.[11] The part of the model describing the level 2 (between-level) indicates a liner regression of the random intercept of "studying long hours." More specifically, school rank, general, and school FB (family background) first relate to school EE (educational expectations). Higher school rankings, general education curriculum, and higher school FB are positively associated with between-school variation in educational expectations. In other words, students in schools with such characteristics tend to expect to advance to a four-year university. School educational expectations differentiated by school rank, general education, and school FB are then associated with between-school variation in "studying long hours." These mediation effects appear to be significant, shown in Table 4. More specifically, 0.755 is an estimate of the effect that schools with school rank 1 SD above the mean influence between-school variation in "studying long hours" through school educational expectations. General education schools and schools with school FB 1 SD above the mean also demonstrate indirect effects through school educational expectations on "studying long hours" at 0.536 and 0.132 respectively. In addition to these indirect effects, direct effects of tracking factors are observed. While general education is insignificant, school rank and school FB are significant predictors of between-school variation in "studying long hours."

Likewise, Table 5 shows a similar pattern in the relationships between variables at the student level. As Figure 2 indicates, family background first relates to score, when students' sex is controlled. Then, score and family background are significant predictors of educational expectations. Specifically, students whose score is 1 SD above the mean are 1.213 times more likely and those with an advantaged family back-

Table 5. Predicting "Studying Long Hours": the Within Level

	Estimate		S.E.	Odds Ratio
Student Level (N=14819)				
Studying Long Hours				
Family Background	0.155	***	0.027	1.167
Female	−0.106		0.065	0.899
Score	0.099	**	0.034	1.104
Educational Expectations	1.866	***	0.114	6.462
Educational Expectations: Threshold	−0.463	***	0.084	
Family Background	0.034	**	0.013	1.035
Female	−0.654	***	0.091	0.520
Score	0.193	***	0.018	1.213
Score: Intercept	−0.111	***	0.009	
Family Background	0.067	***	0.008	
Female	0.230	***	0.017	
Mediation Effects on Studying Long Hours				
Family Background through				
Score	0.007	***	0.002	
Educational Expectations	0.063	***	0.024	
Score/Educational Expectations	0.024	***	0.004	
Residual Variances				
Studying Long Hours	0.719	***	0.097	
Educational Expectations	0.229	***	0.017	
Score	0.982	***	0.028	

** = p < .01, *** = p < .001, S.E. = Standard Error



Coefficients are shown in order of variables in the rectangles. See Table 4 and 5 for details.

Figure 2. Conceptual Model with Results

ground (coded as 1) are 1.035 times more likely to become college bound, while females are significantly less likely (0.520 times) to expect to advance to a four-year college. Furthermore, family background, score, and educational expectations are associated with the likelihood of studying more than three hours per

weekday: 1.167, 1.104, and 6.462 times more, respectively. Clearly, "educational expectations" is the strongest predictor of study behavior. Importantly, family background indirectly influences the behavior through score, educational expectations, and score/educational expectations; mediation effects appear to be significant. Note that an estimate of score is quite low, while "educational expectations" more strongly mediates the relationship between family background and the likelihood of "studying long hours." Figure 2 summarizes the estimates of important variables in the conceptual model.

Discussion

The empirical evidence generated in this study supports the two hypotheses. As Table 3 shows, only 1.3% of students at schools ranked below -1 SD report studying for long hours, while 65% of those at competitive schools (above 1 SD) spend more than three hours studying on weekdays. These different behaviors are partly explained by expectations to advance to a four-year university at both the student and school levels. Importantly, family background variables appear to significantly predict if students hold college expectations at the both levels. Overall, this study provides empirical evidence of unequal effort at the time of upcoming college admissions. In the country where effort is embraced, whether students gear up for (presumably competitive) university entrance examinations partly depends on their family background and the school-based tracks they attend.

This study's results provide new insights regarding tracking effects. More specifically, the findings support Fujita's (2001) study in terms of the relation between students' educational aspirations and studying time at the student level by using a nationally representative sample of high school seniors. In addition, through multilevel modeling using large-scale data, this study's results show that educational expectations significantly predict students' effort at the school level, which Kanbayashi (2007) was not able to show mostly because of limited data. Moreover, this study empirically demonstrates how school tracking factors influence students' study behavior. The mediating effects of tracking factors on efforts illuminate how the tracking structure influences actors, the students.

Implications

This study attempted to connect the two sets of research, namely those on the educational expectations gap between tracks and those on the association between school rank and subsequent educational attainment, by revealing the effects of tracking factors on students' study behavior when university entrance examinations are approaching. Students in competitive high schools (higher tracks) tend to exert substantial effort under the influence of school rank, curriculum, and school socioeconomic composition, all of which influence school-level educational expectations. These tracking effects appear to widen inequality in educational attainments according to students' socioeconomic background, which students do not choose. As the literature and this study empirically demonstrate, disadvantaged students are likely to be in lower tracks, which do not facilitate them in being college bound, resulting in not engaging in the study behavior measured by "exerting substantial effort." Thus, policies should focus on disadvantaged students in lower tracks (e.g., additional tutoring and financial aid for higher education) if the current tracking structure remains.

In terms of research implications, further studies should ideally use longitudinal data that captures students' academic performance during high school years and their immediate educational attainment (i.e., which educational institutions to attend directly after high school graduation). Using such data helps to more persuasively reveal the consequences of the tracking system by establishing causal relations between tracking, students' expectations, and subsequent educational attainment. Finally, detailed information must be gathered to create a more reliable measure of SES.

Notes

(1) The data has no information regarding screening methods by universities such as conventional written examinations, selections by admissions office, and *Suisen Nyūshi* (admission based on high school recommendation). Using data of high school seniors collected in November, Nakamura (2011) shows that college-bound students' learning time differ by the screening methods. Specifically, students using *Suisen Nyūshi* spent less time studying, compared to those taking written examinations. As Nakamura (2011) points out, these students might study for fewer hours because they had already been admitted to universities. Importantly, with some exceptions (Matsuoka, 2013a), *Suisen Nyūshi* tends to be

prevalent among lower ranked universities (Nakamura, 2011) Since this study's aim is to reveal who spends a substantial amount of time studying for university entrance examinations, the lack of information regarding the screening methods is less likely to influence results of the study.

(2) Note that same analyses were performed using data of students completing "national language B." These yield the same patterns of results.

(3) The original data includes 14,944 high school seniors in 447 schools. Due to missing values in students' family background, 196 cases (students) were not used in this study. These cases were excluded from the presented results for the following three reasons: (1) multiple imputation and full information maximum likelihood procedures were applied to deal with the missing values; however, results would not differ with or without these methods; (2) the missing values (N=196) are small (about 1.3% of the sample); and (3) variables used in the above procedures to deal with the missing values are not well measured (e.g., family background).

(4) Note that other ways of coding this variable were tested, but results were very similar. In addition, a dichotomous variable that indicates whether to attend shadow education (i.e., *juku*, *yobiko*, and private tutoring lessons) was created and tested in the final model. This did not change the main findings. Due to a large percentage (12.7%) of missing values regarding shadow education participation, this variable was not included in the presented model and results. As is the case with family background discussed in Note 3, two methods, multiple imputation and full information maximum likelihood, were used to handle the missing data. While results are almost identical with and without shadow education participation, non-missing variables are not well measured. Thus, they were excluded from the model.

(5) This study refers to Chiba Prefectural Committee for Investigating and Improving (2008) as an example of coding an SES variable based on a national survey. The items on the questionnaire and ways of coding in that study and this one are different.

(6) 9419 students (63.6%) selected "always" for Q2-7 (i.e., having "breakfast before going to school"), while the rest of them (5400 students) chose the other responses. As for Q2-8 (i.e., checking "what to bring to school a day before or in the morning of the school day"), 5302 students (35.8%) chose "always" and the others (9517 of them) selected the other responses.

(7) Higher SES students are more likely to be in highly ranked high schools as they tend to academically perform better (e.g., Yamamoto & Brinton, 2010).

(8) "*Sogo*" was not included as an independent variable, since curricula can greatly vary between such schools. Even when it was included in the last model, this study's patterns of findings remain the same.

(9) Following Muthén & Muthén (1998-2012), observed variables are shown as rectangles, while the unobserved variable (i.e., the outcome variable at between-level) is indicated as an oval.

(10) One class was selected from the two classes sampled for national language A. A class essentially means a school; thus, a two-level (students nested in schools) model was applied.

(11) In Mplus, a logit threshold means an intercept with an opposite sign (i.e., in Table 4, an estimate of the threshold for "studying long hours" is 3.015 which is the same as −3.015 of the intercept). See Muthén & Muthén (1998-2012) for details about the multilevel modeling with binary or ordinal outcomes.

Acknowledgments

The data was obtained from a project chaired by Professor Hisakazu Matsushige, Osaka University and managed by Dr. Wataru Senoh, the National Institute for Educational Policy Research. The data was prepared by Dr. Hisanobu Kakizawa and Dr. Shiho Yukawa. A preliminary analysis that this article is based on is documented as the third chapter in a report edited by Matsushige (2014) for the Curriculum Research Center at the National Institute for Educational Policy Research. I thank everyone involved in the project. I am also grateful to the editorial board and anonymous reviewers for their constructive suggestions and comments that helped me improve the manuscript. This work was supported by JSPS KAKENHI Grant Number 26780488.

References

Arakawa, Y. (2009). *"Yumeoi" gata shinro keisei no kozai : Koko kaikaku no shakaigaku [Merits and demerits of forming one's career based on "chasing dreams": Sociology of high school reforms]* (Shohan. ed.). Tokyo: Toshindo.

Aramaki, S. (2001). Gakko seikatsu to shinro sentaku: Koko seikatsu no henka to digaku tandai shingaku [Changes of high school lives and going on to higher education]. In F. Ojima (Ed.), *Gendai kokosei no keiryo shakaigaku: Shinro, seikatsu, sedai [Sociometry of modern high school students: Career options, lives, generation]*. Kyoto: Mineruva Syobo.

Aramaki, S. (2002). Gendaikokosei no gakushuiyoku to shinro kibo no keisei: Shusshinkaiso to kachishiko no koka ni chumoku shite [Learning attitudes and educational expectations of current high school students : The effects of family background and value orientations]. *Kyoikushakaigaku Kenkyu [The Journal of Educational Sociology], 71*, 5-22.

Brinton, M. C. (2009). Social class and economic life chances in post-industrial Japan: The "lost generation". In H. Ishida & D. H. Slater (Eds.), *Social class in contemporary Japan: Structures, sorting and strategies*. New York: Routledge.

Chiba Prefectural Committee for Investigating and Improving. (2008). Heisei 19 Nen Do "Zenkoku Gakuryoku Gakusyu Jyokyo Cyosa" Bunseki Hokoku Syo [Analysis report on "nationwide survey on academic ability 2007"]. Tokyo: College of Education, the University of Tokyo.

Curriculum Research Center/National Institute for Educational Policy Research. (2007a). Heisei 17 nendo kotogakko kyoikukatei jisshijokyo chosa (kotogakko): Pepatesuto chosachukeikekka oyobi shitsumonshichosa shukeikekka [A national survey on high school seniors' academic ability in academic year of 2005 (high schools): Results of paper-tests and of questionnaires]. from http://www.nier.go.jp/kaihatsu/katei_h17_h/h17_h/05001000040007004.

pdf

Curriculum Research Center/National Institute for Educational Policy Research. (2007b). Heisei 17 nendo kotogakko kyoikukatei jisshijokyo chosa no kekka no gaiyo [Summary of results of a national survey on high school seniors' academic ability in academic year of 2005]. from http://www.nier.go.jp/kaihatsu/katei_h17_h/h17_h/05001000040007001.pdf

Curriculum Research Center/National Institute for Educational Policy Research. (2007c). Heisei 17 nendo kotogakko kyoikukatei jisshijokyo chosa no kekka o miruni atatte [For understanding results of a national survey on high school seniors' academic ability in academic year of 2005]. from http://www.nier.go.jp/kaihatsu/katei_h17_h/h17_h/05001000040007002.pdf

Ehara, T. (1973). Kotogakko sotsugyosya no shinrosentaku ni kansuru yoin bunseki -- shingakusya wo cyushin toshite [Analysis of determining factors on high school graduates' career-choice -- Focusing on graduates attending universities]. *Kyoikugaku Kenkyu [Educational Research], 40*(1), 11-22.

Fujita, T. (2001). Gakushujikan no nikkanhikaku: Chugakusei kokosei chosa o motoni [A comparative sociology of study hours between Japan and Korea]. *Bulletin of Joetsu University of Education, 21*(1), 77-93.

Hallinan, M. T. (1994). Tracking: From theory to practice. *Sociology of Education, 67*(2), 79-84.

Hata, M. (1977). Kotogakko kakusa to kyoiku kikai no kozo [School hierarchy and structure of educational opportunity]. *Kyoikushakaigaku Kenkyu [The Journal of Educational Sociology], 32*, 67-79.

Heck, R. H., Price, C. L., & Thomas, S. L. (2004). Tracks as Emergent Structures: A Network Analysis of Student Differentiation in a High School. *American Journal of Education, 110*(4), 321-354.

Hida, D., Mimizuka, H., Iwaki, H., & Kariya, T. (Eds.). (2000). *Kokosei bunka to sinro keisei no henyo [High school student culture and change on career options]* (Shohan. ed.). Tokyo: Gakuzi Syuppan.

Honda, Y. (2008). *Katei kyōiku no airo [Obstacles to home education]*. Tokyo: Keiso shobo.

Honda, Y. (2009). Toritu kokosei no seikatu kodo isiki ni kansuru tyosa hokokusyo [Report about investigating metropolitan high school students in terms of their lives, actions and feeling]. 22-33. http://benesse.jp/berd/center/open/report/toritsu_kousei/2009/pdf/data_04.pdf

Iwaki, H., & Mimizuka, H. (Eds.). (1983). *Koukousei: Gendai no esprit no.195 [High school students: Modern esprit no. 195]*. Tokyo: Sibundou.

Kanbayashi, H. (2007). Kokosei no gakushujikan to medeiasesshokujikan: Sendaiken no kokosei deta o mochiita bunseki [A study of high school students' study hours and media usage hours]. *Tohokugakuindaigaku kyoyogakubu ronshu [Faculty of Liberal Arts Review, Tohoku Gakuin University]*(147), 1-22.

Kanbayashi, H. (2008). Yutori kyoiku ha gakusyu wo kaetaka: Yutori kyoiku donyuzengo no gakusyu ishiki to gakusyu kodo no bunseki [Did relaxed education policy change one's learning?: Analysis on student attitudes and behavior toward study before/after the introduction of relaxed education policy]. In M. Umino & K. Katase (Eds.), *Ushinawareta jidai no kokosei no ishiki [Social attitudes of high school students in "the Lost Period"]*. Tokyo: Yuhikaku.

Kariya, T. (2001). *Kaisoka nihon to kyoiku kiki [Stratified Japanese society and the crisis in education]*. Tokyo: Yushindo.

Kariya, T. (2011). Japanese solutions to the equity and efficiency dilemma? Secondary schools, inequity and the arrival of 'universal' higher education. *Oxford Review of Education, 37*(2), 241-266.

Katase, K. (2005). *Yume no yukue: Kokosei no kyoiku shokugyo asupireshon no henyo [Tracing one's dream: Changes in high school students' aspiration for education and career]*. Sendai: Tohoku University Press.

Kikuchi, E. (1986). Tyuto kyoiku ni okeru tracking to seito no bunka katei [Differentiation and tracking in secondary education]. *Kyoikushakaigaku Kenkyu [The Journal of Educational Sociology], 41*, 136-150.

Knipprath, H. (2010). What PISA tells us about the quality and inequality of Japanese education in mathematics and science. *International Journal of Science and Mathematics Education, 8*(3), 389-408.

Lucas, S. R. (1999). *Tracking inequality : stratification and mobility in American high schools*. New York: Teachers College Press.

Matsuoka, R. (2013a). Book Review on "Educational Expansion and Meritocracy: the Paradox of Examination and Recommendation in Educational Selection" by Takayasu Nakamura. *Social Science Japan Journal, 16*(1), 164-167.

Matsuoka, R. (2013b). Comparative analysis of institutional arrangements between the United States and Japan: Effects of socioeconomic disparity on students' learning habits. *Hikaku Kyoikugaku Kenkyu [Comparative Education Studies], 46*, 3-20.

Matsuoka, R. (2013c). Learning competencies in action: Tenth grade students' investment in accumulating human capital under the influence of the secondary education system in Japan. *Educational Studies in Japan: International Yearbook, 7*, 65-79.

Matsuoka, R. (2013d). School socioeconomic compositional effect on shadow education participation: Evidence from Japan. *British Journal of Sociology of Education*. doi: 10.1080/01425692.2013.820125

Matsuoka, R. (2013e). Tracking effect on tenth grade students' self-learning hours in Japan. *Riron to hoho [Sociological Theory and Methods], 28*(1), 87-106.

Matsushige, H. (Ed.). (2014). *Gakuryoku no kiteiyoin: Bunseki saishu hokokusho [Analyses on determinants of academic achievement: Final report]*. Tokyo: National Institute for Educational Policy Research.

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus User's Guide* (Seventh ed.). Los Angeles, CA: Muthén & Muthén.

Nakamura, T. (2002). Kyoiku asupiration no kanetsu reikyaku [Educational aspirations' warming-up/cooling-down]. In T. Nakamura, T. Fujita & S. Arita (Eds.), *Gakureki senbatsu*

gakko no hikaku shakaigaku : Kyoiku kara miru Nihon to Kankoku [Comparative sociology of academic credentials, selection and schools: Japan and Korea in the light of education] (pp. 73-89). Tokyo: Toyokan Shuppansha.

Nakamura, T. (2003). Educational aspirations and the warming-up/cooling-down process: A comparative study between Japan and South Korea. *Social Science Japan Journal, 2003*(6), 199-220.

Nakamura, T. (2011). *Taishuka to meritokurashi: Kyoikusembatsu omeguru shiken to suisen no paradokusu [Educational expansion and meritocracy: the paradox of examination and recommendation in educational selection]*. Tokyo: University of Tokyo Press.

Nakanishi, Y. (2000). Gakko rank to syakai ido [School rank and social mobility]. In H. Kondo (Ed.), *Nihon no kaiso sisutem 3: Sengo nihon no kyoiku syakai [Japanese social stratification system 3: Education in postwar Japan]*. Tokyo: University of Tokyo Press.

Oakes, J. (1985). *Keeping track : how schools structure inequality*. New Haven: Yale University Press.

Oakes, J. (2005). *Keeping track: how schools structure inequality* (2nd ed.). New Haven, Conn. ; London: Yale University Press.

Ojima, F. (Ed.). (2001). *Gendai kokosei no keiryo syakaigaku: Sinro, seikatu, and sedai [Sociometry of high school students: career options, life, generation]*. Kyoto: Minerva syobo.

Onai, T. (1998). Kogyo syuseki tiiki ni okeru kokokan kakusa to kokosei no seikatu isiki [Disparities among high schools and Students' lives and attitude in industrial complexes-area]. *Tyosa to Syakai riron [Research and Social Theory], 16*, 1-201.

Ono, H. (2001). Who goes to college? features of institutional tracking in Japanese higher education. *American Journal of Education, 109*(2), 161-195.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models : applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.

Rohlen, T. P. (1983). *Japan's high schools*. Berkeley: University of California Press.

Takeuchi, K. (1981). Koko ni okeru gakko kakusa bunka [Differences of school culture by high school cultures]. *Kyoikushakaigaku Kenkyu [The Journal of Educational Sociology], 36*, 137-144.

Taki, H. (2011a). Nichi bei doku ni okeru gakko track to singaku kitai syokugyo kitai: Gakko to syokugyo no setsuzoku ni cyakumoku shite[School tracks and academic and vocational aspiration in Japan, Germany and the United States: Focusing on linkage between school and work]. *Syakaigaku hyoron[Japanese Sociological Review], 62*(2), 136-152.

Taki, H. (2011b). Nihon no koko track to syakaikaiso no kanrenkozo: PISA data wo motiite [Associated structure of Japanese high school tracking and social stratification: By using PISA data]. *Sociologi [Sociology] 55*(3), 37-52.

Yamamoto, Y., & Brinton, M. C. (2010). Cultural capital in East Asian educational systems: The case of Japan *Sociology of Education, 83*(1), 67-83.

Yoshimoto, K. (1984). Koko kyoiku no kaiso kozo to sinro bunka [High school hierarchy and career differentiation]. *Kyoikushakaigaku Kenkyu [The Journal of Educational Sociology], 39*, 172-186.