【論文】

A Study about Cumulative Advantage and Disadvantage of Students' Educational Aspirations Inequality Analysis with Panel Data

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Abstract

This study investigated the importance of the primary effect in the formation of educational aspiration among junior high school students in Japan with the mechanism of the formation of inequality in educational attainment as explained by Boudon (1974).

According to Boudon, when deciding when to pursue higher education, the secondary effect is more important than the primary effect. Therefore, the students' academic gap (primary effect) will gradually weaken the influence and the direct influence of the social class (secondary effect) will increase influence. However, in previous studies, attention to the primary effect was inadequate, so in this study, we examined the Boudon model in detail with the panel data of academic achievement.

Analyses revealed that (1) students with higher socio-economic status have higher initial status of academic achievement and their academic ability rises with age, (2) educational aspiration is higher for students whose initial status of academic ability is high and whose academic ability has increased with age, (3) educational expectations for children are higher as highly educated parents, (4) parents' educational expectations strongly influence their child's educational aspiration, and (5) there is no direct influence of parents' educational level on child's educational aspiration..

According to these results, both primary and secondary effects in the Boudon model are important in the formation of junior high school students' educational aspiration. In addition, the analysis of panel data of academic achievement revealed that students' educational inequality caused by family background disadvantage will continue to chain and accumulate.

1. INTRODUCTION

The educational attainment of people in modern society has been detached from *ascribed* status and is now associated with *achieved status* (Parsons, 1951). However, while disparities in educational attainment between social classes are slightly narrowing, they still remain in many parts of the world (Breen, Luijkx, Müller, & Pollak, 2011). A similar trend has also been observed in Japan (Kondo & Furuta, 2011).

The origins of inequality in educational attainment stem from the family: specifically, the socioeconomic status of one's family. Furthermore, the greater the congruence between the cultural values embraced in a child's home and the school's culture, the more easily the child can complete educational activities, which leads to

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disparities in academic performance. The process of how a privileged upbringing works to the individuals' advantage or disadvantage in their subsequent academic activities and job acquisition and how it is harnessed by and accumulated in the individual can be explained using the concept of cumulative advantage and disadvantage (DiPrete & Eirich, 2006; Ishida, 2017). Individual inequality grows out of predetermined differences such as social class and sex. Further, inequality at the starting point of one's life continuously affects one's subsequent academic records as well as acquisition of occupational status. Ishida (2017) divided the patterns of how inequality in family background persists in an individual into three types: (1) "chain and persistence of disparities," where starting-point inequality does not change over time; (2) "accumulation and expansion of disparities," where starting-point inequality expands with time; and (3) "narrowing and eliminating disparities," where starting-point inequality narrows with time. Ishida (2017) then analyzed the relevance of social class, educational achievement, first occupation, and current occupation using data from the Japanese Life Course Panel Survey to determine which of these patterns most reflected Japanese society. His analysis revealed that "chain and persistence of disparities" is the most pertinent.

However, the Japanese Life Course Panel Survey constitutes a follow-up study that chiefly focuses on changes in life during and after one's adulthood; hence, it is somewhat insufficient as data for elucidating the process that leads to inequality in academic achievement. Thus, this article aims to reveal the mechanisms involved in students' forming of learning aspirations based on the analysis of panel data from Japanese elementary and middle school students and to provide empirical data concerning the linkages between and accumulation of disparities in school-age children.

A theoretical framework to describe the mechanism by which such class-based inequality in education is intergenerationally maintained and reproduced can be seen as early as in Boudon (1974), who divided this mechanism into primary and secondary effects. That is, according to Boudon, these mechanisms include the following: (1) inequality in people's educational attainment varies depending on factors that create disparities in academic ability (primary effects), and (2) when a student decides to advance to higher education, standards of academic performance vary depending on their social class, making academic abilities more important for getting into university the lower the child's class. The distinctive feature of Boudon's model is that it discusses inequality in educational attainment both as a cultural heritage mechanism and as a decision mechanism based on social position. Boudon (1974) pointed out that even if one were hypothetically able to control differences in academic abilities, class differences would still affect advancement to higher education due to secondary effects, making secondary effects more important than primary effects. That is, among upper-class children and working-class children with the same academic abilities, it is more likely that upper-class children will choose to go to university.

Breen and Goldthorpe (1997) focused on Boudon's (1974) secondary effects to advance their argument. They devised the following categories of secondary effects: (1) *relative risk aversion* (hereafter RRA), (2) *differences in ability and expectations of success*, and (3) *differences in*

resources, with RRA as the most important factor among them. RRA can be summarized as follows. First, assume that there are three socioeconomic classes in industrialized societies: the service class, working class, and underclass. Children from the service and working classes act to maximize the likelihood that they will remain in the same class as their parents or move higher. In other words, people use higher education specifically as a means of minimizing their chances of downward social mobility, which would prevent them from remaining in the same social class as their parents. Thus, the basis of recurring social hierarchies lies in occupational hierarchies, and educational attainment is a means of RRA.

As Jackson and Jonsson (2013) showed, secondary effects manifest differently from country to country. They are influenced by countries' deep-rooted social structures and education systems. Some empirical studies have also been conducted to validate the Boudon model and RRA hypothesis in Japan (Fujihara, 2011; Furuta, 2008; Iwamoto, 1990; Kezuka, 2013; Nakazawa, 2010; Taromaru, 2007). However, most previous studies have been based on analyses of data obtained by asking subjects about their past academic performance. As Boudon (1974) pointed out, educational decision-making does not just happen once; it happens every time a student advances to the next grade or schooling level in the education system. If this fact is taken into account, then identifying the nature of educational disparities would require data on academic performance from multiple points in time.

The purpose of this paper is thus to identify the mechanisms of student educational planning using follow-up survey data from elementary and middle school students and their parents and to examine the intergenerational transmission of educational disparities in Japan. The analysis of such longitudinal data was used to assess the applicability of the Boudon model and the RRA hypothesis to Japanese society.

2. Literature Review

Previous studies have attempted to validate RRA in Japanese society (Fujihara, 2011; Furuta, 2008; Kezuka, 2013; Nakazawa, 2010; Taromaru, 2007); however, due to differences in data, variables, and methods of analysis, their findings are inconsistent with one another. Kezuka (2013) identified the influence of Japan's "qualification society" (*gakureki shakai*) as described by Dore (1976) as the primary reason for this. The later a country modernizes, the more people advance to higher education merely to build up their resumes rather than to enter a certain field. Educational qualification (*gakureki*) in Japan has been repeatedly described not as a means of attaining social status in the future but as an end in itself (Takeuchi, 1995).

As shown earlier, RRA is a model that expresses how people use education as a means of avoiding downward mobility in terms of socioeconomic class based on their occupation. Because of this, it is questionable whether RRA can be directly applied to Japan's qualification society. Kikkawa (2006) proposed the *downward educational mobility aversion* hypothesis (hereafter DEMA), arguing that because "*gakureki* is the driving force" of Japanese society, the social position people work to avoid losing is not that corresponding to their parents' occupation but rather to their parents' *gakureki*. DEMA is characterized by the tendency, for example, of a parent who is a college graduate to expect their

child to be at least a college graduate, while a parent who is a high school graduate will be accepting of their child only completing high school.

Using 2005 data from the Japan National Survey of Social Stratification and Social Mobility (hereafter the SSM survey) to validate the RRA hypothesis in Japan, Kondo and Furuta (2013) confirmed the following pattern: Whether the parent is a high school graduate has a greater effect on the child graduating from high school, and whether the parent is a college graduate has a greater effect on the child obtaining more advanced educational qualifications. However, they pointed out that while there are pronounced disparities in educational attainment due to the father's occupation, no other mechanism is at play besides the disparity in resources, so, unlike RRA in European countries, RRA in Japan is not predicated by intergenerational occupational mobility. In other words, their analysis arguably supports the idea that the essence of the mechanism that maintains and reproduces inequality in educational attainment in Japan is not parental occupation but parental educational attainment.

However, what is emphasized in validating the RRA hypothesis is the psychological mechanism of avoiding downward mobility (Stocké, 2007; Van de Werfhorst & Hofstede, 2007). Using psychological mechanisms to explain the intergenerational transmission of inequality has been carried out in the domain of social psychology (Alexander, Entwisle, & Bedinger, 1994; Davis-Kean, 2005); validating the RRA hypothesis can thus be regarded as a sociological attempt. However, Nakazawa (2010, pp. 224–225) stated as follows about the mismatch between the RRA hypothesis and Japanese society:

RRA is a theoretical framework that addresses the following question: Why do disparities in educational advancement based on social class continue to exist despite the insignificant physical cost of doing so and despite the expansion of education? In a society (e.g., in England) that keeps the cost of educational advancement to a minimum, it is not surprising that attention would be focused on the psychological mechanism of the individual. Japan, however, is characterized by the broad penetration of the following mentalities: [1] The economic cost of higher education is enormous; [2] most students who enter university are able to graduate, and one's academic performance in university is of little importance; and [3] university entrance exams are typically meritocratic "mass events," so at least there is the idea that educational advancement requires at least a certain level of academic achievement. Furthermore, the expansion of education has gradually increased the number of people advancing to higher education, making it risky to get one's first job after graduating high school. Thus, Japan's society has become one where the advantages of educational advancement are uncertain, but the disadvantages of not advancing are readily apparent. This inhibits the middle-class psychological mechanism in RRA that says, *"better to just get a job rather than kill oneself trying to get into college."* Points [1] and [3] also show that this means that physical constraints such as economic cost and academic performance make themselves felt before psychological mechanisms do, make it impossible to advance at all without satisfying those re-

quirements. (Text in parentheses added by author)

Such concerns have prompted studies on the mechanism behind disparities in educational attainment in Japan to focus on points [1] and [3] mentioned by Nakazawa (2010).

An individual's academic performance is closely connected to his/her educational attainment. Indices of academic performance have been used in analytical models to validate the RRA and DEMA hypotheses in Japan as well. For example, Taromaru (2007) and Furuta (2008) analyzed SSM data using subjects' retrospective self-assessment of their ninth-grade academic performance as a variable, which showed a positive correlation between educational attainment and ninth-grade academic performance. In addition, the analysis in Nakazawa (2010), which used subjects' retrospective self-assessment of their 12th-grade academic performance as a variable to analyze data from the Japanese General Social Survey (JGSS), shows a correlation between high school academic performance and advancement to university or college.

Previous studies have also used panel data to analyze the correlation between students' educational aspirations and their academic performance at a given schooling stage. Mimizuka (1986) used an analysis of panel data on middle school students to show that as a student's self-assessment of their academic performance improves or worsens, their aspirations intensify or wane accordingly. Middle school students develop a mentality around educational advancement that reflects the relative position of their academic performance within the group of students to which they belong. Upon conducting a similar analysis, Kariya and Rosenbaum (1987) found that Japanese middle school students develop their educational aspirations according to self-assessment of their academic performance and self-select according to changes in their academic performance.

The burden of college tuition expenses is also a contributing factor to disparities in educational attainment. A considerable proportion of college tuition expenses relies on private expenditure (Nakazawa, 2016), and more specifically, it is usually the parents who shoulder that burden (Yano, 2011). According to the *White Paper on Education, Culture, Sports, Science and Technology* 2009 (Ministry of Education, Culture, Sports, Science and Technology, 2009), if a middle-class family has two children attending private universities, their educational expenses constitute over half of the parents' mean disposable income. The fact that the burden of university and college tuition has increased inequality in educational opportunities was also supported by a trend analysis in Kondo (2005).

3. Study Rationale

As this review shows, many empirical studies have been conducted using the RRA and DEMA hypotheses to validate the social-class theory of inequality in educational attainment in Japan (Fujihara, 2011; Furuta, 2008; Kezuka, 2013; Nakazawa, 2010; Taromaru, 2007). Regarding their analytical models, they have focused on parental occupation, parental educational attainment, and parental expectations for their child's occupation/educational attainment. However, there have not been any studies conducted to validate the RRA and DEMA hypotheses in Japan using panel data with parent-child pairs.

The following points are important when using parent-child pair data for validation. It is of-

ten unclear whether the essence of the downward mobility avoidance mechanism (be it RRA or DEMA) represents the parents' desires or the child's educational ambitions. Furthermore, by using an interdependence model to analyze data on pairs of high school students and their mothers, Fujihara (2009) found that while mothers' educational expectations of their children were defined by parental educational attainment and household income, high school students' educational aspirations were defined by their own academic performance.

Meanwhile, validation must be done with panel data on academic performance at multiple points in time. Academic ability is by no means a fixed quantity in the first place. As in the panel data analyses in Mimizuka (1986) and Kariya and Rosenbaum (1987), educational aspirations are sometimes affected by changes in academic performance. It has also been found that early failures in a student's school career can have lasting negative effects on their subsequent school life (Alexander, Entwisle, & Kabbani, 2001).

Thus, parents develop educational expectations for their children (1) according to their social status and desire to pass their educational attainment and occupation status on to their children and (2) according to predicted educational expenditure based on their household resources. From the child's perspective, they consider future career paths that they feel are attainable given their subjective assessment of their own academic performance. However, among the experimental studies on RRA and DEMA that have been conducted so far, there have not been any based on panel data that contain both (1) data on parents' educational attainment, occupation, household resources, and educational expectations for their children, as well as (2) data on children's academic performance at multiple points in time. As a result, it has not been possible to understand (1) which aspects of a household's resources are most influential or (2) the point in time at which students' academic performance is most influential regarding their educational aspirations. Figure 1 displays the analytical model used in this paper, based on the above research aims.

4. Methods

4.1. Data

The data used in this paper were obtained from the Japan Education Longitudinal Study (JELS) (Research representative: Hiroaki MIMIZUKA, Ochanomizu University), which is a three-wave panel study that was conducted from 2003 to 2010 in the Kantō and Tōhoku regions. Wave 1 was conducted when the subjects were third graders, Wave 2 when they were sixth graders, and Wave 3 when they were ninth graders. The data used in this paper were obtained from paper questionnaires provided to the students. These data were merged with data from a survey of their guardians conducted when the students were ninth-graders.

To collect the data, we sent requests to approximately half of the schools in the Kantō region and all the public schools in the Tōhoku region through the prefectural and municipal boards of education. Fourteen elementary schools and eight middle schools in the Kantō region and 21 elementary schools and 10 middle schools in the Tōhoku region agreed to participate in the survey.[1)]

A total of 1,118 responses were collected in the Kantō region in Wave 1 (third grade) (re-

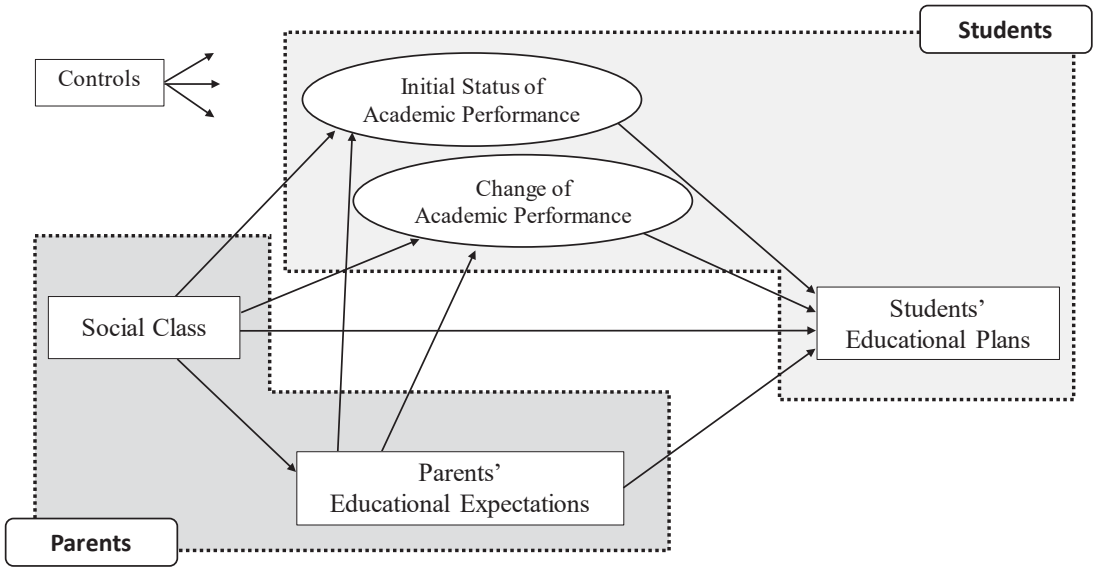

Figure 1. Analytical model used in the present study.

sponse rate = 96.3%) and 921 responses in the Tōhoku region (response rate = 98.5%). To link the data, cases in which the three surveyed points in time could be linked were extracted, and cases with missing values for students' educational aspirations, which is the final dependent variable, were excluded. The resulting linked sample size was 563 students in the Kantō region and 500 in the Tōhoku region, for a total of 1,063 cases, 760 of which could be matched with parent-indexed data. This means that approximately 71.5% of the guardian survey data is linked to students who could be tracked at all three points in time.

There was significant sample attrition for girls in the Tōhoku region. However, it has been found that there is no considerable bias in parental educational attainment as perceived by the student (Nakanishi, 2014), which was one of the items on the student questionnaire, nor was any bias in parental educational attainment found in cases where parent-indexed data could be matched.

4.2. Procedures and Measures

The variables used in the analysis were measured using the following instruments.

Students' questionnaire. To measure students' educational aspirations, a variable obtained from the ninth-grade questionnaire was used. Students were asked which stage of schooling was the highest that they would like to complete, and the corresponding number of years was used in the analysis (middle school: 9, high school: 12, college/vocational school: 14, university: 16, graduate school: 18). For academic performance, the variables for the self-assessed grade on the questionnaire given in each wave of the study was used. The question was: *Compared to your peers in your (homeroom) class, how well are you doing in school?* Students responded on a scale from 1 to 5, with 5 being the

highest.

Parents' questionnaire. The parents' questionnaire assessed the following areas:

(1) Social class: This was based on items obtained from the questionnaire provided to the parents. For parental educational level, whether each parent was a college graduate was recorded (non-responses were recorded as "*gakureki* unknown"). The father's occupation was recorded according to the classification in Nakazawa (2010) of "service class" for specialized/managerial work, "non-manual class" for clerical/sales work, and "manual class" for other/employed. While these categories are based on the eight categories in the SSM and so do not align perfectly with Breen and Goldthorpe's (1997) theoretical framework, they are related to a certain extent.

(2) Household resources: Parents were asked about their family's overall (gross annual) household income. The following values were recorded and used as continuous variables. ¥2M or less = 200, between ¥2 and ¥3M: 250, between ¥3 and ¥4M: 350, between ¥4 and ¥5M: 450, between ¥5 and ¥6M: 550, between ¥6 and ¥7M: 650, between ¥7 and ¥8M: 750, between ¥8 and ¥9M: 850, between ¥9 and ¥10M: 1,000, between ¥10 and ¥12M: 1,200, between ¥12 and ¥15M: 1,350, and over ¥15M: 1,500.

(3) Parents' educational expectations: When the students were in ninth grade, their parents were asked which educational level they would like their children to continue until, and this was used for the variable *parents' educational expectations*. For the analysis, the number of years (middle school: 9, high school: 12, college/vocational school: 14, university: 16, graduate school: 18) was used as a continuous variable.

(4) Cultural capital: Parents were asked how many books they had in the house, and that number was used as an indicator for the household cultural environment. The number was quantified as follows and used as a continuous variable. Less than 10 books = 10, less than 25 books = 25, less than 100 books = 100, less than 200 books = 200, less than 500 books = 350, 500 or more books = 500.

Controls. Sex and survey area were used as control variables. "Female" was the base category; thus, male = 1 and female = 0 were used in the coding process.[2)]

5. Analysis

To examine the research aims of this paper, the latent variables were extracted from the grade data obtained at multiple points in time and input into a structural equation model. Figure 2 displays the analytical model used in this study, which was constructed based on Wang and Wang (2012, p. 179). y values are students' self-assessed academic performance, with y_0 representing third-grade academic performance, y_1 representing sixth-grade academic performance, and y_2 representing ninth-grade academic performance. The data from each observation point were considered to be observed variables, and their intercepts and slopes (I and S in the figure) were assumed to be latent variables. x consists of variables that were assumed to be basically fixed over time, such as the student's social class and sex. The factors I and S were analyzed with x as an independent variable (i.e., the conditional growth curve model). z refers to the desired years of schooling (as a ninth grader), PEE was the parents' expected years of schooling. Setting z as the dependent variable and x, I, S, and PEE as independent

variables made it possible to determine (1) the effect of students' initial academic performance and effects of subsequent changes in it on students' educational expectations and (2) the connection between students' educational expectations and those of their parents. By checking these paths one by one, it was possible to examine the mediating relationships between variables in each path.

Models were estimated using Mplus, version 7.31 (Muthén & Muthén, 1998–2012). Model fit was evaluated using the maximum likelihood ratio test statistic (chi-square), which, if significant, indicates a poor fit. Because models with sample sizes over 200 are frequently significant, three supplemental measures of model fit were used: the root mean square error of approximation (RMSEA), Tucker Lewis index (TLI), and comparative fit index (CFI). Convention dictates that RMSEA is below .05, and TLI and CFI are close to 1.0 (Bollen & Curran, 2005). A two-tailed test was used to evaluate the direct effects, and bootstrapping (sample size 2,000) was used to evaluate the indirect effects.

6. Results

6.1. Descriptive Statistics and Correlation Coefficients of Variables

Table 1 shows the mean and standard deviation by sex of the variables used, as well as sex differences. Table 2 provides an overview of the correlation coefficients between each variable.

The following findings should be noted. First, a strong positive correlation of between .332~.558 was found in the self-assessed academic performance observed at three points in time and whose intercept and slope were set as latent variables. Second, examining the correlation between students' educational expectations and their self-assessed academic performance at the three points in time—third grade .207, sixth grade .332, and ninth grade .496—suggests that this correlation was stronger with each successive year of schooling. Third, a strong positive correlation was found between students' educa-

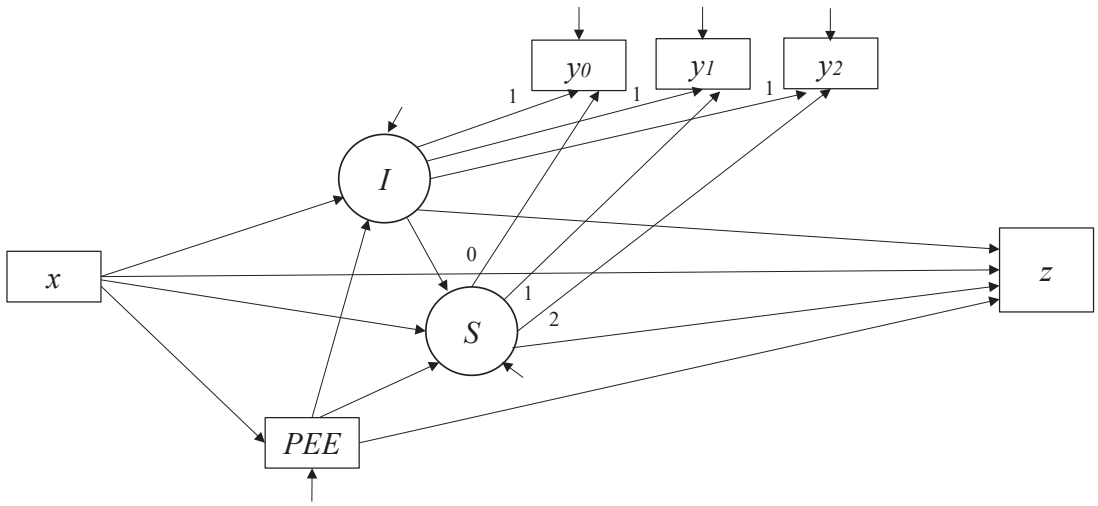

Figure 2. The structural equation model used in the present study.

tional expectations and the variables that were defined as indicators of social class and household resources. The correlation coefficients between students' educational expectations and (a) father's educational attainment (.330) and (b) household income (.342) were also high. Fourth, there was an extremely high positive correlation coefficient of .660 between students' educational aspirations and parents' educational expectations.

6.2. Structural Equation Modeling Results

Figure 3 shows the results of inserting the variables shown in Table 1 into the working hypothesis model shown in Figure 1 and performing the SEM. All the values are standardized partial regression coefficients, and the arrows on the solid lines show statistically significant paths at a significance level of less than 5%.

First, calculating the statistics to determine the model's overall goodness of fit yielded the following values: $\chi 2$ (df = 14) = 25.167, CIF = .991, TLI = .964, RMSEA = .033. With CIF and TLI close to 1.0 and a RMSEA of under .5, the model can be judged as sufficiently good.

Table 3 shows the direct, indirect, and total effects of each variable. First, the variables that were recognized to have direct effects on parents' educational expectations were *father's education, father's job, household income*, and *num-*

Table 1. *Means, Standard Deviations, Sample Size, Minimum, and Maximum for All Model Indicators*

Variable	*N*	*Mean*	*S.D.*	*Min.*	*Max.*
Students' educational plans	760	14.5	1.9	9.0	18.0
Academic performance at 3rd grade	719	3.3	1.0	1.0	5.0
Academic performance at 6th grade	723	3.1	1.0	1.0	5.0
Academic performance at 9th grade	755	3.0	1.2	1.0	5.0
Father's education					
University	760	0.3	0.5	0.0	1.0
Not university	760	0.5	0.5	0.0	1.0
Unknown	760	0.2	0.4	0.0	1.0
Mother's education					
University	760	0.1	0.3	0.0	1.0
Not university	760	0.7	0.4	0.0	1.0
Unknown	760	0.2	0.4	0.0	1.0
Father's job					
Service class	760	0.3	0.5	0.0	1.0
Non-manual class	760	0.1	0.3	0.0	1.0
Manual class	760	0.5	0.5	0.0	1.0
Parents' educational expectations	675	14.6	1.7	9.0	18.0
Household income	720	620.1	308.6	200.0	1500.0
Cultural capital					
Number of books at home	758	118.3	120.7	10.0	500.0
Students' gender (male = 1)	760	0.5	0.5	0.0	1.0
Area (urban area = 1)	760	0.4	0.5	0.0	1.0

Table 2. *Correlation Matrices for Study Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Students' educational plans													
2 Academic performance at 3rd grade	.207												
3 Academic performance at 6th grade	.332	.454											
4 Academic performance at 9th grade	.496	.362	.558										
5 Parents' educational expectations	.660	.230	.328	.494									
6 Father's education (University =1)	.330	.194	.203	.253	.415								
7 Mother's education (University =1)	.191	.163	.165	.153	.244	.384							
8 Service class	.221	.152	.129	.174	.318	.478	.255						
9 Non-manual class	.086	.073	.082	.083	.085	.097	.041	-.276					
10 Manual class	-.267	-.193	-.177	-.220	-.358	-.516	-.268	-.749	-.430				
11 Household income	.342	.174	.210	.224	.398	.420	.339	.415	-.018	-.381			
12 Number of books at home	.304	.160	.211	.209	.339	.383	.360	.244	.067	-.276	.391		
13 Students' gender (Male = 1)	.007	-.072	-.036	-.037	.045	.002	-.035	-.034	-.006	.036	-.014	-.078	
14 Area (Urban area = 1)	.180	.139	.117	.071	.232	.304	.125	.222	.039	-.236	.311	.178	-.097

Note: Significant two-tailed correlations are marked in boldface.

ber of books at home. Thus, a child whose father has a high social status, whose family has a high household income, and whose home environment is culturally rich would be expected to pursue a lengthy education.

Next, the results of analyzing the factors related to *academic performance* were interpreted as follows. *Mother's education* was the only variable that was recognized to have a direct effect on the intercept of *academic performance*, and its effect was positively significant. As Table 3 shows, no variable was found to have a significant indirect effect on the intercept of *academic performance* as mediated through *parents' educational expectations*. However, the indirect effects of the variables *father's education, father's job, household income*, and *number of books at home* on the slope of *academic performance* as mediated through *parents' educational expectations* were all positively significant. Moreover, the estimated value of the indirect effect of parents' educational expectations on the slope of *academic performance* was extremely high at .769.

Finally, the results of analyzing the factors in *students' educational aspirations* were interpreted as follows. Among variables that could be recognized as having a direct effect on students' educational aspirations, the intercept and slope of *academic performance* and *parents' educational expectations* were positively significant. However, in Table 2, *parents' educational expectations* had the highest correlation coefficient with *students' educational aspirations*. In Figure 3, the estimates for each of those variables are as follows: intercept of *academic performance* = .097, slope of *academic performance* = .332, and *parents' educational expectations* = .151, making the slope of *academic performance* the most influential on students' educational aspirations. Fur-

thermore, the fact that the direct effect of the intercept of *academic performance* remains suggests that early failures in an individual's school career tended to negatively influence their subsequent educational aspirations.

Table 3 also shows that *father's education, household income*, and *number of books at home* had a significant positive mediating effect on *students' educational aspirations*. What this result suggests is that *father's education, household income*, and *number of books at home* transmit their effects through *parents' educational expectations* and the slope of their *academic performance* all the way to the *students' educational aspirations*. Meanwhile, *father's job* only affected *parents' educational expectations*. That is, it can be said that the essence of the reproduction of educational inequality in Japan has less to do with occupational hierarchies than it does with *father's education, socioeconomic level*, and *cultural capital*.

7. Discussion

This paper analyzed the mechanisms through which intergenerational educational inequality is transmitted based on panel data of Japanese primary and middle school students and survey

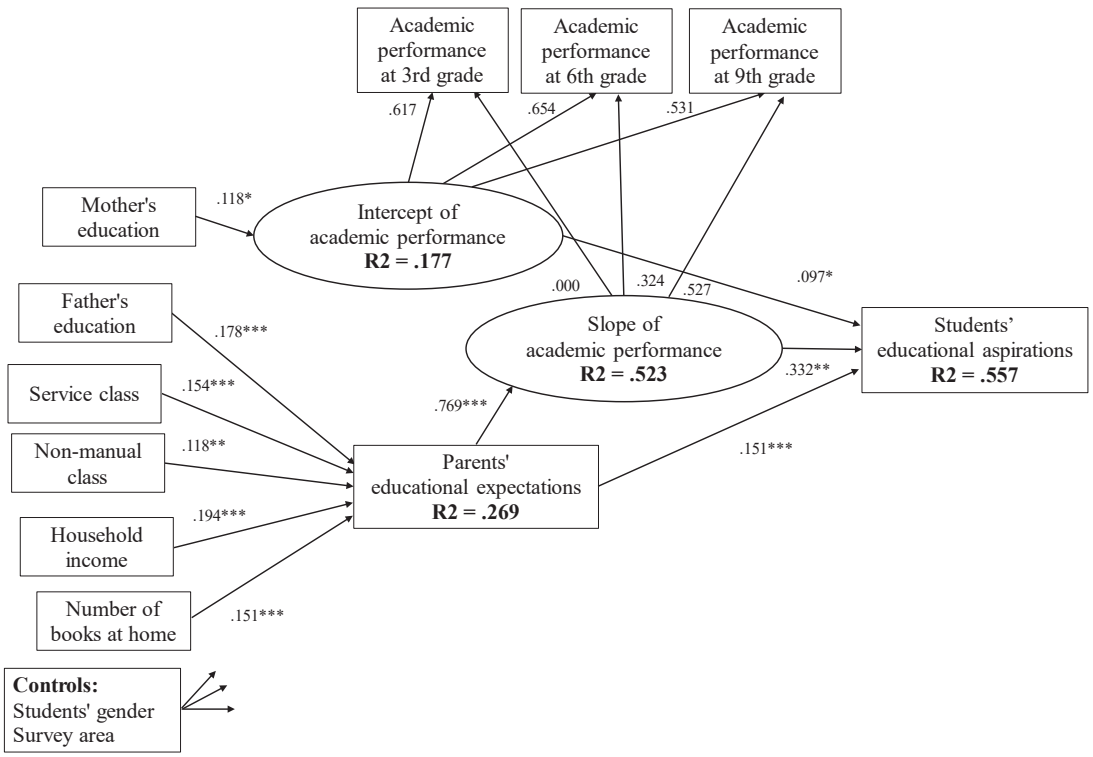

Figure 3. The effect of social class on students' educational expectations. Model fit statistics: $\chi^2 = 25.167$, df = 14; p = .033; CIF = .991; TLI = .964; RMSEA = .033; Path coefficients are standardized; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 3. *Standardized Direct, Indirect, and Total Effects*

Predictor	Dependent variables	Direct effect	Indirect effect	Total effect
Father's education	Parents' educational expectations	.178 ***	----	.178
	Intercept of academic performance	.049	.019	.068
	Slope of academic performance	.047	.137 ***	.184
	Students' educational plans	.025	.134 **	.159
Mother's education	Parents' educational expectations	.015	----	.015
	Intercept of academic performance	.118 *	.002	.120
	Slope of academic performance	−.091	.011	−.080
	Students' educational plans	.010	−.009	.001
Service class	Parents' educational expectations	.154 ***	----	.154
	Intercept of academic performance	.063	.017	.080
	Slope of academic performance	−.093	.118 ***	.025
	Students' educational plans	−.005	.073	.068
Non-manual class	Parents' educational expectations	.118 **	----	.118
	Intercept of academic performance	.115	.013	.128
	Slope of academic performance	−.064	.091 **	.027
	Students' educational plans	.024	.065	.089
Household income	Parents' educational expectations	.194 ***	----	.194
	Intercept of academic performance	.084	.021	.105
	Slope of academic performance	−.046	.149 ***	.103
	Students' educational plans	.064	.116 **	.180
Number of books at home	Parents' educational expectations	.151 ***	----	.151
	Intercept of academic performance	.061	.016	.077
	Slope of academic performance	−.005	.116 ***	.111
	Students' educational plans	.059	.100 **	.159

Note: Direct effects were determined with a two-tailed test; indirect effects were determined using bootstrapping; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

data from their parents, taking the RRA hypothesis into account. The findings of this paper can thus be summarized as follows.

First, only the variable of mother's education level affected the initial status of academic performance. This may suggest, consistent with Lareau (2003) and Heckman (2006), that when a child is young, their home environment shapes their early academic performance. The fact that initial academic performance affects students' final educational aspirations, albeit with a small coefficient, also suggests that educational inequality is rooted in family background and accumulates within individual students (DiPrete & Eirich, 2006).

Second, the factors influencing parents' educational expectations are diverse—including father's education level, father's job, household income, and cultural capital—and their standardized coefficients were all nearly the same. The fact that mother's education level was not significant suggests that parental edu-

cational expectations are influenced by the social class factor originating in the father.

Third, none of the variables of father's education level, father's job, household income, or cultural capital were observed to have a direct effect on the slope of students' academic performance. However, those variables were found to have a significant effect that was mediated through students' educational aspirations. This shows that Japanese children gradually internalize their parents' educational expectations, with academic performance often corresponding to their family's socioeconomic status. Figure 3 shows that students develop their educational aspirations according to self-assessment of their academic performance.

Fourth, using SEM to examine the mediating effects revealed that the essence of the reproduction of educational inequality in Japanese society lies in the father's education level, economic level, and cultural capital. The finding that the father's education level is the essence of disparities in *gakureki* (educational attainment) in Japan supports the DEMA hypothesis, as described in Kikkawa (2006). This finding is also consistent with Fujihara (2011).

With these results in mind, the applicability of the RRA hypothesis to Japanese society will now be considered. The initial discussion of RRA in Breen and Goldthorpe (1997) states that the basis of intergenerationally recurring social hierarchies lies in occupational hierarchies, and educational attainment is a means of RRA. However, in Japanese society, *gakureki* can easily become an end in itself rather than a means of attaining a higher social status (Kikkawa, 2006; Takeuchi, 1995). As a result, the DEMA hypothesis was devised to reflect the fact that in Japanese society, the extent to which people work to avoid moving downward in social class (in relation to their parents) is not related to parents' occupations but their *gakureki* levels.

What both RRA and DEMA emphasize is the psychological mechanism of downward mobility avoidance. However, RRA presupposes a society like those of Western European countries, where the costs of advancing to university are kept to a minimum; in a society like Japan's, where the educational costs at the university level are enormous, predicted economic costs are given precedence over psychological mechanisms (Nakazawa, 2010). In addition, in Japan, there is an extremely high number of students who graduate university within the standard period of study, and academic performance in university is of little importance (Taromaru, 2007; Yano, 2011). On the other hand, the perception that educational advancement requires at least a certain level of academic achievement is widespread (Nakazawa, 2010).

Upon considering the applicability of cumulative advantage and disadvantage to Japanese society taking into account these points and this paper's analysis, the essence of the intergenerational transmission of educational inequality in Japanese society is as follows. Parents develop educational expectations for their children (1) according to their social status and (2) the predicted educational expenditure based on their household resources, with the aim of passing their educational attainment and occupational status on to their children. Children, meanwhile, (3) shape their academic performance in a way that conforms to their parents' educational expectations and (4) decide on an educational plan that corresponds to their own subjective assessment of their academic performance. These findings were revealed using panel data on par-

ent–child pairs. The major contribution of this study lies in its detailed interpretation of the reproductive mechanism of educational inequality in Japanese society, based on the use of panel data on parent–child pairs.

However, it is necessary to limit the interpretation of this paper's findings to ninth graders' educational aspirations. It may be the case that when a student is in 12th grade or in some other situation in which they must make choices about their future path, the effects of initial disparities in academic ability vanish, and other aspects such as the burden of educational expenses increase in importance. However, in Japan, not only have there been few opportunities to analyze panel data on students, analyses of the mechanism of intergenerational transmission of educational inequality using panel data on parent–child pairs have also been extremely rare. Educational inequality is not only determined by one's academic abilities or attitudes at a given point in time; it can also be regarded as the linkage/accumulation of inequality between households (DiPrete & Eirich, 2006; Ishida, 2017). A certain degree of this paper's significance lies in its ability to show, with a focus on RRA and DEMA and through its analysis of panel data, one aspect of the process through which inequalities in educational attainment originating in the family are linked and accumulate.

This paper will conclude with a discussion of the study's limitations and recommendations for future research. Since it was the students' ninth-grade educational aspirations that were used as the dependent variable, it is necessary to observe subsequent changes in students' attitudes. Further research focusing on the tracking effect after students enter high school (10th grade) is required. The fact that information about social class and families was recorded at only one point in time is also an issue. Since this is a monograph study, the extent to which its results can be generalized is another limitation. However, as Nakazawa (2010, p. 219) pointed out, validating a model that incorporates the RRA and DEMA hypotheses would require considerably long-term panel data, and "complete data" are virtually nonexistent. Therefore, the findings obtained from the data analysis in this paper are limited, and the future accumulation of studies using panel data is anticipated.

Endnotes

1) Since the data used in this paper were distributed and collected through schools, students' *academic ability* and *social class* features were similar among schools; thus, the estimated standard error in the analysis may be too small. Since the intra-class correlation coefficient of the correct response rate in Wave 1 was only about .08 (~8%), its effect on the standard error was also considered to be small.
2) Non-responses for each variable were removed list-wise, then missing cases were filled in using *full information maximum likelihood* in Mplus ver. 7.31 (Muthén & Muthén, 1998–2012) and included in the analysis cases.

ACKOWLEDGEMENTS: This work was supported by JSPS KAKENHI [Grant-in-Aid for Scientific Research (B) Number 16330164, 19330185, 21330190 (Research Representative: Hiroaki Mimizuka), 16300230 18300245 (Research Representative: Katsuko Makino)], Ochanomizu University COE program "Studies of Human-Development from Birth to Death," and Ochanomizu University Global COE program" Science of Human Development for Restructuring the 'Gap-Widening Society'."

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