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Too Close to Use: Social Visibility, Stigma, and the Paradox of Learning Support Programs[†]

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Abstract

This study identified a paradoxical phenomenon in learning support programs for low-income household children: while these programs effectively enhance skills, proximity to home hinders participation. Using an administrative panel dataset from Amagasaki City, Japan, we estimated a probit model to analyze participatory behavior, and employed a treatment effect model to evaluate the program's impact on skill development and its underlying mechanisms. Our findings are twofold. First, locating classrooms within a student's own school district significantly reduces the probability of participation. This is not due to physical distance but rather "welfare stigma," as children fear their socioeconomic status becoming known to classmates. Second, while no average effect was found across all participants, students with high attendance and long-term participation showed significant increases in arithmetic/mathematics and Japanese language scores, driven by an increase of study hours. These results reveal a critical policy trade-off: accessibility can inadvertently increase social visibility and discourage uptake.

Keywords: Learning support; Cognitive skill; Non-cognitive skill; Administrative data; Welfare stigma; Program take-up

JEL Classification: I20, I24, I28, I38

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1. Introduction

When public learning support classrooms targeting children from low-income households are established near their homes, participation rates are expected to increase. Indeed, standard economic theory treats the physical distance to educational facilities as a commuting cost, suggesting that shorter distances increase utilization probability (Card, 1993; Duflo, 2001). However, this study demonstrates that, although these programs yield educational benefits, children tend to avoid participating when the support center is located within their own school district. The issue is "being too close." This proximity increases the risk of being seen by classmates, prompting students to avoid participation due to the fear of social stigma. Welfare stigma is well-documented among adults (Moffitt, 1983; Currie, 2004; Ko and Moffitt, 2024), and adolescents are known to avoid programs to hide perceived low ability from peers (Bursztyn and Jensen, 2017; Bursztyn et al., 2019; Friedrichsen et al., 2018). However, empirical evidence on stigma-induced avoidance among younger school-age children remains virtually absent. Overcoming this overlooked barrier provides vital insights for both program design and understanding the behavior of children in poverty.

Educational inequality remains a universal policy challenge. Children from low-income households have relatively low academic achievement and non-cognitive skills (Heckman and Masterov, 2007; Lareau, 2011), and these disparities create persistent inequalities in educational attainment, employment, and lifetime earnings (Bowles et al., 2001; Cameron and Heckman, 1998; Heckman et al., 2006; Keane and Wolpin, 1997, 2001; Lindqvist and Vestman, 2011). Learning support programs have been implemented in many countries, including Japan, to address these gaps. Despite significant public investment providing academic tutoring, learning environments, and mentoring during after-school hours and weekends, rigorous

empirical research on the effectiveness of this intervention and participation behaviors remains scarce.

Two fundamental questions arise. First, does learning support improve the educational outcomes of children from low-income households? Second, why do many eligible children not participate, despite the programs being free and geographically accessible? Although answering this second question has profound implications for program design and targeting, it has received little attention in the literature.

This study thus addresses these two questions using detailed administrative data from Amagasaki City, Hyogo Prefecture. Specifically, we constructed a unique panel dataset by merging three types of administrative records: Learning Support Records, Amakko Survey, and Basic Resident Register. This dataset allowed us to precisely understand the characteristics of students from public assistance and low-income households, which was previously difficult, and to empirically examine participation behavior, the effects of learning support, and the underlying mechanisms through which these effects occur.

Learning support programs in Japan target children from low-income households, including those receiving public assistance. These programs provide academic tutoring, advice on improving lifestyle habits and nurturing environments, and information/counseling regarding future paths, such as education and employment. Currently, they are implemented in approximately 66% of municipalities nationwide (Ministry of Health, Labour and Welfare, 2024). While existing research has explored the origins of these programs[1] and identified practical challenges and countermeasures based on small-scale surveys or interviews with staff and officials,[2] there has been almost no rigorous verification of their specific effects on students.

[1] For the origins of learning support, see Matsumura (2016).

[2] Studies based on small-scale surveys or interviews regarding field-level challenges include Uchida (2014), Obayashi (2020), Sakamoto (2018), Tanaka et al. (2019), Narisawa (2018), and Matsumura (2017). Abe and Matsumura (2020) analyzed the characteristics of program users based on an integrated database of surveys on children's living conditions across five prefectures (Tokyo, Chiba, Nagano, Hiroshima,

Three primary reasons exist for this lack of research. First, because learning support programs are centered at the municipal level, management systems and the content of support (target students, selection methods, and specific interventions) vary by region, making comparative studies difficult. Second, the selection process for participating students is often unclear and does not involve random assignments, making it challenging to measure policy effects. Third, data on children from households receiving public assistance typically suffer from small sample sizes and difficulties in data acquisition, owing to sensitive family environments. Nevertheless, verifying the effectiveness of learning support is considered crucial for breaking the "cycle of poverty."

This study primarily conducted three types of analysis. First, we employed a probit model to analyze the characteristics of elementary and junior high school students who participated in learning support programs. We utilized information on school district boundaries and center locations as identification variables (instrumental variables) that affect program participation but do not directly influence students' academic performance or non-cognitive skills. Specifically, we constructed identification variables based on whether a learning support center was located within a student's school district. While this variable strongly predicts participation, school district boundaries in urban areas are administrative divisions unrelated to the quality of support centers or student outcomes; thus, the exclusion restriction is considered satisfied.

Second, by defining students who participated in the program as the treatment group and those who were invited but declined as the control group, we estimated the Average Treatment Effect (ATE) and the Average Treatment Effect on the Treated (ATET) of the program on students' test scores in Japanese and arithmetic/mathematics, as well as on their non-cognitive skills (Extraversion, Agreeableness, Conscientiousness, Emotional Stability). Third, using the

and Kochi).

same methodology as in the second analysis, we examined the impact of learning support on students' study time.

The analysis yielded the following results. First, a paradoxical phenomenon was revealed regarding participation behaviors in learning support programs. While administrators assumed that a "long distance to the center" was the primary barrier to participation, the results contradict this assumption. The analysis reveals no significant relationship between physical distance to the center and participation behavior. Instead, the probability of participation decreases significantly when the learning support center is located within the student's own school district. This suggests that students strategically avoid participation due to the social stigma of being identified as members of a public assistance household. This pattern of stigma avoidance is more pronounced among students who participate in a program over a long period, suggesting that students considering multiyear participation have a stronger tendency to strategically avoid the centers within their own living environment. These results highlight a fundamental tradeoff in program designed for low-income groups: enhancing physical accessibility can paradoxically deter participation by increasing social visibility. Thus, simply placing programs closer is insufficient without addressing this visibility.

This study finds positive associations between consistent participation in learning support programs and improved educational outcomes. The estimations, using an endogenous treatment effect model to address potential selection bias, indicate that students with high attendance rates and long-term participation tended to show higher arithmetic and mathematical scores. Furthermore, among female students, significant improvements were observed in both Japanese language scores and extraversion. An analysis of the underlying mechanisms suggests that active participation is linked to an increase in weekly study time by four to five hours. This indicates that the program provides more than just individual tutoring; it also offers an environment that fosters study habits. These results are consistent with the prior

findings that well-designed after-school learning support can improve both cognitive and non-cognitive skills (Dobbie and Fryer, 2011; Kraft, 2015; Leos-Urbel, 2015).

The primary contribution of this study lies in providing the first rigorous empirical evidence that welfare stigma exists among elementary and junior high school student. While a substantial literature documents stigma-driven avoidance of public programs among adults (Moffitt, 1983; Currie, 2004; Ko and Moffitt, 2024) and image-conscious behavior among adolescents (Bursztyn and Jensen, 2017; Bursztyn et al., 2019; Friedrichsen et al., 2018), direct evidence for younger school-age children has been virtually absent. Our findings demonstrate that even elementary and junior high school students are acutely aware of their social image within their school community, strategically avoiding participation in free public programs when it risks revealing their welfare status to peers. This result has broad implications not only for the design of anti-poverty programs but also for our understanding of how social stigma shapes behavior at a far earlier stage of life than previously recognized. This central finding is enabled by two further contributions. First, we construct a unique linked administrative dataset covering low-income children in Amagasaki City---a population that is extremely difficult to study due to small sample sizes and strict data access constraints---allowing us to observe both participation decisions and educational outcomes with a precision unavailable to prior work. Second, we show that school district boundaries, which determine the social visibility of program attendance rather than physical distance per se, serve as valid and powerful instrumental variables for identifying the causal effects of program participation. This methodological insight may prove useful in evaluating other stigmatized social programs beyond the learning support context.

The policy implications of this study are as follows. First, to mitigate welfare stigma, it is necessary not only to optimize the location of learning support centers but also to grant students the autonomy to select their preferred class. This can be achieved by selecting locations that

are less visible to peers from the same school district. Furthermore, by relaxing geographical constraints and allowing students to choose their preferred class, the program can significantly improve participation rates. Second, program capacity should be expanded to eliminate the unmet demand for learning opportunities (the "waiting list" problem). This study also revealed that, for a center with a capacity of 120, a cumulative total of 111 students were placed on waiting lists between 2018 and 2023 and forced to forgo participation due to overcapacity. Establishing additional centers is thus recommended to resolve this supply demand mismatch. Third, incentive designs and environments that promote sustained utilization should be developed. We found that students with higher attendance rates and long-term participation can improve their skills. Therefore, it is highly desirable to adjust programs to stimulate students' motivation and enhance the quality of centers as psychological "secure places" to encourage students to continue attending in the long term.

The remainder of this paper is organized as follows. Section 2 describes Amagasaki City's institutional background and its learning support programs. Section 3 presents the data and descriptive statistics. Section 4 explains the empirical strategy and reports the results concerning participation behavior, program effects, and the underlying mechanisms. Finally, Section 5 concludes with a discussion of the findings and their implications for policy design.

2. Institutional Background

The learning support program for children was expanded nationwide since Ministry of Health, Labour and Welfare launched the "Social Place-Making Support Project" for public assistance recipients in 2011. In Amagasaki City, this program has been continuously implemented since 2012 as an NPO-commissioned project. The Act on Self-Reliance Support for the Needy, enacted in 2013, now covers not only households receiving public assistance, but also other low-income households receiving school expense subsidies. The objective of the

program is to "secure places for children in the community, provide supplementary learning support including motivation for learning, implement experiential learning fostering sociality and relationships, lead to high school enrollment, and prevent the 'cycle of poverty'" (Amagasaki City, 2019).

The target participants are children from the 4th grade of elementary school to the 3rd grade of junior high school from households receiving public assistance or facing economic distress. The program is conducted at four centers selected to ensure geographical balance across the city,[3,] with each center having a capacity of 30 students. Each center is staffed by one supervisor (e.g., a former junior high school teacher) and two to three assistants (e.g., university students), with at least one male and one female staff member per site. The program consists of supplementary learning support—assisting students with school homework and review/preparation by addressing areas where they struggle—and experiential learning, such as occasional lectures by professionals or outdoor activities. The centers operate during weekday evenings (17:00–20:00) and Saturday mornings. The program typically runs twice a week, but is expanded to three times a week during summer vacations. Participation does not necessarily commence in April; students can join at any time if there is a vacancy. Given that high school advancement is the primary goal, students are generally expected to continue the program until the end of their third year of junior high school. However, approximately 20% of students chose to take a leave of absence or withdraw for various reasons. While rare, some students request transfers to different centers, which is permitted depending on the vacancy status. Furthermore, students who graduate their third year of junior high school are allowed to continue participating if they seek further guidance regarding their future career paths or daily lives.

[3] At program inception in 2012, only two centers were established. One additional center was added in 2015 and another in 2018, resulting in a total of four centers operating within the city.

The procedures for participating in the learning support program differ depending on household category (i.e., whether the household receives public assistance or is economically distressed). For students from households receiving public assistance, an "intention survey" targeting all households with children from the first grade of elementary school to the second grade of junior high school has been conducted since 2018. Namely, caseworkers conduct home visits to interview guardians and assess the need for learning support. While there are no codified criteria for this assessment, the need is generally deemed high in cases where academic concerns exist, such as "the student wishes to advance to high school but lacks sufficient academic ability (junior high students)," "the student plan to attend a part-time/night high school but could reach a full-time high school with additional effort (junior high students)," or "the student struggles with foundational skills, such as not having mastered multiplication tables (upper elementary students)." When a caseworker determines that support is necessary, they distribute brochures on the spot and encourage participation. If the number of applicants exceeds the center's capacity, priority is given to third-grade junior high school students preparing for upcoming entrance examinations.

By contrast, for other low-income households, the process begins when a guardian directly visits the "Work and Life Support Center" for consultation. Guidance is provided if the counselor determines that support is necessary, considering the family's financial situation, the lack of a suitable learning environment at home, and if the guardian desires to use the service. The critical difference from households regarding public assistance lies in the starting point: rather than the administration (caseworkers) taking the lead in assessing needs and providing guidance, the process is initiated by the guardians.

Amagasaki is a municipality of approximately 460,000 residents adjacent to Osaka City. Its urban structure characterized by a mixture of industrial, commercial, and residential areas is common to many established urban areas across Japan. The city faces significant socio-

economic challenges, as evidenced by its high rates of public assistance recipients (approx. 4%, compared to the national average of 1.6%) and school expense subsidies (approx. 25%, compared to 15% nationally). The "school district" unit analyzed in this study is a standard administrative framework within the Japanese public-school system. The mechanism by which these districts function as a source of social stigma is common throughout the country. Therefore, using Amagasaki City as a case study is highly effective for illuminating the structural mechanisms of educational inequality common to both urban and rural areas across Japan. For these reasons, the analytical methods and findings of this study are broadly applicable to other municipalities and countries with similar institutional frameworks.

3. Data

This study utilizes a panel dataset covering 2018–2023, constructed by merging three administrative sources of Amagasaki City, Hyogo Prefecture: Learning Support Records, Amakko Survey, and the Basic Resident Register.

The Learning Support Records consist of two data sets: the Intention Survey and Attendance Records. The Intention Survey records the guidance process and participation intent for students from households receiving public assistance. Specifically, it details whether a caseworker deemed the student to need support as a result of a home visit, whether guidance was provided, and whether the student/guardian wished to participate. The reasons for refusal are also documented for those who declined, with a high response rate of 90.4%.[4] This dataset also includes student IDs, academic years, grade levels, school codes (elementary and junior high school districts), and guardian employment status. The Attendance Records include student IDs, academic years, grade levels, classroom used, start and end dates, and records of

[4] The reasons for declining participation are categorized as follows (multiple responses allowed): “Guardian showed no interest,” “Child showed no interest,” “Center location is too far,” “Existence of a waiting period,” “Schedule conflict,” and “Other.”

any leave or withdrawal. Furthermore, they include center operation dates and entry, exit, and stay durations for each student, thus allowing the calculation of attendance rates, total hours spent at the center, and the overall duration of enrollment. Owing to strict privacy protection, the names of the school districts where the children reside or where the learning support facilities are located have not been disclosed. Instead, all districts are represented numerically to ensure that the specific regions remained unidentifiable. However, we can still identify whether a learning support classroom is located within a student school district. In the Japanese urban context, school districts are geographically compact and typically provide walking-distance access; thus, they serve as a meaningful institutional measure of proximity, while preserving anonymity.

The Amakko Survey (Amakko Step-up Survey) is an annual assessment conducted between December and January, targeting students from the first grade of elementary school to the second grade of junior high school. It consists of academic achievement tests (Japanese, arithmetic/mathematics, English, science, and social studies) and a questionnaire on daily life, family environment, attitudes toward learning, and school environment. This dataset provides student test scores, assessments of non-cognitive skills, student IDs, academic years, school codes, grade levels, and class assignments.

The Basic Resident Register includes data such as household IDs, individual IDs, academic years, year and month of birth, gender, relationship with the head of the household, and school district. Based on this register, we constructed variables reflecting household structure such as single-parent status, number of siblings, birth order (whether the student is the eldest), and the age of the youngest sibling in the household.

These three datasets were merged based on student IDs and academic year. The analysis focused on students who participated in the learning support program and those who were

encouraged to participate but declined.[5]

Several aspects of the merging process warrant further investigation. First, while the Learning Support Records contained 5,321 entries, only 3,228 matched the Amakko Survey data.[6] This discrepancy is likely because a high proportion of the program participants were in the third grade of junior high school, a grade not covered by the Amakko Survey, and some students were absent on the day the survey was administered. Second, although the Learning Support Records and the Basic Resident Register should theoretically correspond, 258 students could not be matched. This is because the recording periods for the two statistics differed, and students who moved into or out of the city during non-overlapping periods were excluded. Ultimately, the analytical sample consisted of 216 students who participated in the program[7] and 559 students who were deemed in need of support by caseworkers but declined to participate. The descriptive statistics for these two groups are presented in Table 1.

[Insert Table 1 Here]

For academic achievement, standardized scores (z-scores) for Japanese and arithmetic/mathematics were used, being calculated based on the mean and standard deviation of each academic year and grade. Regarding noncognitive skills, the Amakko Survey included questions based on the Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness) on a four-point scale. These were also standardized for analysis. However, Openness was excluded from the analysis, as it was not

[5] In addition, data on height and weight and number of students/classes in schools were used. As the Amakko Survey only records the current school district (i.e., the elementary school district of a current junior high student would be unknown), the height/weight records were used to supplement historical school district data. Class size data were used to construct variables representing the socioeconomic environment of each student's classroom.

[6] The Intention Survey (2018–2023) contains 5,321 entries. This includes 288 participants and 53 students on waiting lists (a category added in 2022). Of the 3,460 non-participants, 1,159 were deemed in need of support and 1,025 of those were actually provided with guidance. Moreover, 2,244 students were judged not to need support and status was unclear for 57 students. The remaining 1,573 entries were for students in grades 1–3, who are ineligible for the program.

[7] Of these participants, seven were from low-income (non-public assistance) households.

surveyed in 2023. Additionally, a small percentage of students did not respond to all questionnaire items, resulting in slight variations in sample size across the variables.

Family environment variables, including a single-parent dummy, eldest child dummy, age of the youngest sibling, and number of siblings, were constructed using the Basic Resident Register. These variables were limited to students whose relationship to the household head was defined as "child," "grandchild," or "stepchild of the mother."[8] This covers 99.79% of the students in the Amakko Survey data, which we consider representative. Finally, based on the parental employment data in the Learning Support Records, dummy variables were created to indicate whether the household head or both parents were unemployed.

To accurately measure the impact of learning support on students' academic achievement and noncognitive skills, participation bias should be mitigated as much as possible. To do so, we utilized several explanatory variables that influence program participation but are not expected to directly affect students' academic or non-cognitive outcomes (identification variables). These include variables for distance to the center, center occupancy rates, and students' socioeconomic environments at the school class level.

Two types of distance variables were constructed: (1) a dummy variable indicating whether a learning support center is located within the student's elementary or junior high school district and (2) a categorical dummy variable measuring the distance between the student's school district and the school district where the center is located on a four-point scale. In addition, because each center has a fixed capacity, applicants must be placed on a waiting list if the number of applications exceeds this limit. The occupancy rate for each center was calculated by dividing the center's capacity by the number of students provided with program guidance.[9]

[8] For example, if a household head lives with a younger sibling who is between the 4th grade of elementary school and the 2nd grade of junior high school, that sibling is excluded from the analysis.

[9] The determination of which center is closest to each student is inferred from the geographic relationship between the school districts where the four centers (Centers A, B, C, and D) are located and students' residential school district. Specifically, (1) students living in a school district where a center is located are assumed to attend that specific center. (2) If a student's residential district does not have a center but an adjacent district does, the student is assumed to attend the center in the adjacent district. If two or more adjacent districts have centers, it is assumed there is a 50% probability of attending either and ratios are calculated accordingly. (3) If no center exists in either the residential or adjacent

Furthermore, as proxies for the socioeconomic environment, the proportion of students receiving public assistance and single-parent households for each school class to which a student belongs were calculated.

Table 2 compares the mean values of the Japanese and arithmetic and mathematics test scores; non-cognitive skill assessments; and time spent watching television, studying, and playing video games among the four groups (grades 4–8): (1) students from non-public assistance households, (2) students who participated in the learning support program, (3) students deemed in need of support by caseworkers but who did not participate, and (4) students deemed not in need of support. For ease of interpretation, raw scores were used for the academic and noncognitive assessments.

[Insert Table 2 Here]

Table 2 shows that students from households receiving public assistance had lower academic achievements than those from non-recipient households. Notably, there is almost no difference in academic performance between students who participated in the program and those who were deemed "in need" but did not participate.[10] The test scores of the students judged by caseworkers as "not in need" of support are slightly higher than those considered "in need." Regarding non-cognitive skills, students from public assistance households exhibited lower levels of agreeableness and conscientiousness than their peers from non-recipient households.

Furthermore, while students from non-recipient households spent more time watching television than those from public assistance households, study time for program participants was surprisingly the longest among all groups. Non-recipient students studied two to three hours longer than non-participating students from public assistance households. Conversely,

districts, the likely center is inferred based on actual attendance data of other students from the same school district.

[10] Among students deemed "in need" who did not participate, academic test scores in Japanese and arithmetic/mathematics vary significantly depending on the reason for refusal. For instance, scores were relatively high for those citing "Center location is too far" or "Existence of a waiting period," whereas scores were relatively low for those whose reason was "Child showed no interest."

students from public assistance households spent more time playing video games than those from non-recipient households.

4. Empirical Analysis

4.1. Estimation Method

This section describes the methodology used to estimate the ATE and ATET of participation in the learning support program on students' test scores in Japanese and arithmetic/mathematics, as well as on their non-cognitive skills.

Let y_{0j} and y_{1j} represent the outcomes (test scores or noncognitive assessments) for student j if the student does not participate in the learning support program and if the student participates in the program, respectively. If t_j is defined as a binary indicator (dummy variable) equal to 1 if student j participates in the learning support program, and 0 otherwise, observed outcome y_j for each student can be expressed by the following equation:

$$y_j = t_j y_{1j} + (1 - t_j) y_{0j} \tag{1}$$

Let x_j be a vector of student characteristics that influence test scores in Japanese and arithmetic/mathematics, as well as non-cognitive assessments. x_j includes gender, family environment variables (single parent dummy, eldest child dummy, age of youngest sibling, number of siblings, and parental employment status dummies), grade dummies, year dummies, and school district dummies (school districts are divided into five categories). Furthermore, x_j includes students' test scores and non-cognitive assessments from the previous period by following a value-added model.

Let w_j be a vector of explanatory variables representing student characteristics that influence the decision to participate in a learning support program. Participation behavior was

estimated using a probit model, as shown in equation (3). The key difference between x_j and w_j is that, while x_j includes lagged academic performance and non-cognitive scores, w_j does not. Conversely, w_j includes distance variables to the learning support center, occupancy rate of the center nearest to the student's residence, and socioeconomic environment variables of the student's school class. These variables were used to identify the model.

(2) $$y_j = x_j\beta + \delta t_j + \epsilon_j$$

(3) $$t_j^* = w_j\gamma + u_j$$

$$t_j = \begin{cases} 1, & if\ t_j^* > 0 \\ 0, & \text{otherwise} \end{cases}$$

We assume that parameters β and δ take the same values for students who participate in the learning support program and those who do not. However, the distribution of the error term (ϵ_j) is assumed to differ between non-participants (ϵ_{0j}) and participants (ϵ_{1j}). These error terms (ϵ_{0j} and ϵ_{1j}) and u_j are assumed to follow a trivariate normal distribution with a mean of 0. As these terms are mutually correlated, the decision to participate in a learning support program is determined endogenously. The covariance matrix was specified as:

$$\begin{bmatrix} \sigma_0^2 & \sigma_{01} & \sigma_0\rho_0 \\ \sigma_{01} & \sigma_1^2 & \sigma_1\rho_1 \\ \sigma_0\rho_0 & \sigma_1\rho_1 & 1 \end{bmatrix}$$

The hazard ratio (inverse Mills ratio), h_j, derived from the probit model is expressed by the following equation:

$$h_j = \begin{cases} \dfrac{\phi(w_j\hat{\gamma})}{\Phi(w_j\hat{\gamma})} & t_j = 1 \\ -\dfrac{\phi(w_j\hat{\gamma})}{\{1-\Phi(w_j\hat{\gamma})\}} & t_j = 0 \end{cases}$$

Parameters $\beta,\ \delta,\ \gamma,\ \sigma_0,\ \rho_0,\ \sigma_1,\ \rho_1$ are estimated based on the moment conditions assuming that the error term of the probit equation (u_j) and the mean and variance of the error terms of the outcome equations (ϵ_{0j} and ϵ_{1j}) are uncorrelated with the regressors $x_j, h_j,\ t_j,\ w_j$.[11]

4.2. Participation Behavior

This section estimates the probit model in equation (3) to clarify the characteristics of students who are likely to participate in the learning support program.[12] To mitigate selection bias, distance to the center, occupancy rate of each center, and socioeconomic environmental variables at the school class level were used as identification variables.

The distance to the learning support center—specifically, the dummy variable indicating whether a center exists within a student's school district and the distance between the student's district and the district where a center is located—is considered a valid instrument that satisfies the exclusion restriction for the following reasons. The school attendance boundaries (school districts) for public elementary and junior high schools in Japan are established by the municipal boards of education under Article 5 of the Order for Enforcement of the School Education Act. These boundaries are primarily demarcated based on long-standing

[11] Let u_t be the mean of the error term in the probit model and u_m the mean of the error term in the outcome equation. Furthermore, let u_{v0} and u_{v1} denote the variances of the outcome error term for the non-participation and participation groups, respectively. Under the moment conditions assuming zero correlation between these four variables ($u_t,\ u_m,\ u_{v0}$ and u_{v1}) and $x_j,\ t_j h_j,\ (1-t_j)h_j,\ w_j$, we estimate parameters $\beta,\ \delta,\ \gamma,\ \sigma_0,\ \rho_0,\ \sigma_1,$ and ρ_1. For further technical details, refer to the "etregress" command documentation in the Stata manual.

[12] In the probit estimation, lagged test scores for Japanese and arithmetic/mathematics were not included as explanatory variables. This is because a correlation between the lagged scores and the error term of the probit function might exist and would lead to endogeneity issues. To verify whether lagged scores should be included, the instrumental variable probit model was estimated with the scores from the first year of participation as instrumental variables (excluding data where the lagged score and the first-year score were identical for students with two years or less of participation). The results show that the regression coefficients for the lagged scores were not significant, and no correlation was observed; therefore, they were excluded from the explanatory variables.

geographical features (e.g., major roads, rivers, and railway lines) and historical administrative divisions. Crucially, these districts are not delineated in response to contemporary variations in household income or student academic performance. In Amagasaki City, students are assigned to specific schools based strictly on their residential address under a mandatory assignment system. Therefore, the school district boundaries can be treated as an exogenous source of variation, independent of the placement of learning support centers or the unobserved characteristics of the students. This supports the validity of our instrumental variable approach using school district dummies.

To address potential endogeneity—specifically the concern that learning support centers might be disproportionately located in districts with higher concentrations of public assistance or single-parent households—we examined the distribution of these socioeconomic characteristics across three groups: (1) students with a center in their elementary school district, (2) students with a center only in their junior high school district, and (3) students with no center in either district. We compared the proportions of public assistance recipients and single-parent households at the school-class level among these groups. The results indicated that while the proportion of public assistance recipients was slightly higher in Group 2 compared to Group 3, no statistically significant differences were found between Groups 1 and 3, or between Groups 1 and Group 2. Regarding the ratio of single-parent households, Group 3 actually exhibited a higher proportion, showing a statistical difference from Groups 1 and 2. These findings suggest that the presence of a center in a student's school district is not systematically correlated with a higher concentration of economically distressed households, thereby supporting the validity of using school district boundaries as an exogenous factor.

To examine the impact of geographical factors on participation behavior from multiple perspectives, distance variables were defined for the following three cases. First, four types of dummy variables were used: whether a center exists within the student's residential elementary

or junior high school district (Elementary District dummy, Junior High District dummy) and whether the student's residential district is adjacent to a district where the center is located (Elementary District Adjacent dummy, Junior High District Adjacent dummy). Second, dummy variables indicating adjacency to a district with a center were further divided into four types based on which of the four centers (defined as Centers A, B, C, and D) the student's district was adjacent to (Adjacent to Center A, Adjacent to Center B, etc.). Finally, we identified residential elementary and junior high school districts for all students and created four distance-based dummy variables to represent their proximity to the center district. Distance Dummy 1 shows whether as center exists within the student's own residential elementary school district. Distance Dummy 2 means that the student's elementary district is adjacent to the center's elementary district, and both are within the same junior high school district. Distance Dummy 3 describes that the student's elementary district is adjacent to the center's elementary district, but they belong to different junior high school districts. Distance Dummy 4 points that the student's elementary district is not adjacent to the center's elementary district, but the student's junior high school district is adjacent to the center's junior high school district. These variables were constructed such that a smaller number indicates a closer physical distance to the center. By comparing the results of these three cases, we examined how the definitions of distance and school districts influenced participation behaviors.

Regarding the definition of participation in the learning support program, students who began participating after October—immediately preceding the administration of the Amakko Survey in December and January—as well as those who withdrew from the program before the survey was conducted, were excluded from the analysis. Conversely, students who were provided with guidance but remained in the statuses of "on waiting list," "application pending," or "declined" and did not actually utilize the centers were defined as "non-participants."[13]

[13] Given the significant number of students currently on waiting lists or in the application process (111 students between 2018 and 2023),

Table 3 presents the probit model estimation results. Column (1) shows the results using distance variables consisting of the Elementary District dummy, Junior High District dummy, and their respective adjacency dummies. Column (2) employs the Elementary and Junior High District dummies, along with specific adjacency dummies for each of the four centers (Centers A, B, C, and D). Column (3) provides the results using progressively defined distance variables: Distance Dummy 1–4.

[Insert Table 3 Here]

Regarding individual attributes, the coefficient on the female dummy variable is positively significant (0.211–0.238), indicating a higher probability of participation among girls than boys. Conversely, the coefficient on the number of siblings (−0.213 to −0.211) and the unemployment dummy for the household head (−0.261 to −0.228) are negatively significant. The lower participation rate in households where the head is unemployed suggests a situation in which the student may be forced to take on a young caregiver role, such as being involved in domestic chores or childcare. Other variables representing family structure (age of the youngest sibling, eldest child dummy, single-parent dummy), the both parents unemployed dummy, the center occupancy rate,[14] and the proportion of public assistance households and single-parent households within the school class did not show significant correlations.

The coefficients on the Elementary District and Junior High District dummies, indicating the presence of a center within the student's own school district, are negatively significant in columns (1) and (2). This suggests that the probability of participation decreases when a center is located within the student's own residential school district. Furthermore, in column (1), the

we also considered an alternative definition of participation. Specifically, students who were guided to the program and either joined, applied, or were placed on a waiting list were defined as participants, while those who were guided but declined were defined as non-participants. The regression results using this definition were largely consistent with the main results.

[14] When we defined participants as students who were guided to the program and either joined, applied, or were placed on a waiting list, while we classified those who declined as non-participants, the coefficient for the center occupancy rate was positively significant. This result indicates that a higher occupancy rate is associated with an increase in the number of students wishing to participate.

coefficient on the elementary district adjacency dummy is also negatively significant, revealing that students tend to avoid centers located in school districts immediately adjacent to their own. By contrast, the results in column (3) for Distance Dummies 1–4, which measure the physical proximity between the student district and the center district, show that most coefficients are insignificant. This indicates that participation was not primarily driven by physical distancing.

Two major conclusions can be drawn from these results. First, contrary to the literature, there is little to no correlation between distance and participation in learning support programs. Second, as the school district dummy remains negatively significant, even after controlling for occupancy rates and socioeconomic variables (e.g., the proportion of public assistance households), it is clear that students do not participate because of "crowding." Rather, they harbor a social stigma—a desire not to let classmates or neighbors know that they are receiving support—and consequently avoid participating in their immediate living environments.

The interpretation that the lower participation rate within one's own school district is driven by "Welfare Stigma," rather than general social avoidance or fear of bullying, can be explained by the institutional background of the program. Since eligibility is strictly limited to households receiving public assistance or those in economic hardship, the act of attending these classes signals to the community that one's family is in poverty. Furthermore, the fact that the application process involves home visits and individual recruitment by caseworkers reinforces children's awareness that they are receiving "government aid." Given that some students explicitly request to change their center locations, it is natural to interpret this avoidance of local centers as a strong rejection of the visibility of their poverty, rather than a simple matter of interpersonal relations.

To examine how participation behavior in learning support programs varies by attendance frequency (participation rate) and duration, we classified participants into the following five categories and estimated the models accordingly: (1) all participants, (2) students with average

participation rate of 40% or higher, (3) students with a duration of participation of one year or longer, (4) students with a duration of participation of two years or longer, and (5) students with an average participation rate of 40% or higher and a duration of participation of at least one year. [15]

These estimation results are presented in Table 4. The analysis reveals that for, category (2)—the sample with an average participation rate of 40% or higher—the coefficients on the elementary and junior high school district dummies were negative but not statistically significant. By contrast, for all other cases except category (2), the school district dummies showed negative and statistically significant coefficients. Notably, the negative marginal effects tended to be larger for students with longer participation durations. This finding suggests that students intending to participate in learning support over a longer period may harbor a stronger sense of resistance toward centers being located within their own residential school districts.

[Insert Table 4 Here]

In summary, while girls are more likely to participate than boys, the probability of participation decreases if the number of siblings is large or the household head is unemployed. Furthermore, contrary to the administrative assumption that proximity to home is desirable, the results demonstrate that students avoid participating when centers are located within their own school districts.

4.3. Effects on Cognitive and Non-cognitive Skills

This section empirically examines the causal effects of participating in a learning support program on students' cognitive skills (test scores in Japanese and arithmetic/mathematics) and

[15] Students with an average attendance rate of 40% or higher, or those who attended for two years or more accounted for approximately 50% of all participants.

non-cognitive skills (Big Five personality traits). Table 5 presents the estimation results for the ATE on the entire target population and the ATET when all participants are defined as the treatment group.[16] According to Table 5, the coefficients on ATE and ATET are not statistically significant for any of the indicators, including Japanese, arithmetic/mathematics, and non-cognitive skills. These insignificant results may be attributed to the inclusion of a certain number of registered students whose attendance rates were remarkably low or whose stay durations were extremely short. Specifically, the average attendance rate was only 36%, with 27% of the registered students never attending a session. Furthermore, the average duration of stay was confirmed to be as short as 40 minutes.

The low participation rates among students may be attributed to the psychological burden of receiving support, specifically the effect of "stigma." In fact, a report by the Japan Management Association Research Institute[17] (2020) indicates that many municipalities identify stigma as their primary concern. Consequently, local governments are forced to exercise extreme caution in publicity and implementation—for instance, by concealing the exact locations of the centers or adopting inclusive enrollment systems that do not strictly limit eligibility. The impact of stigma extends beyond physical absence to the psychological state of participating students. Psychological defenses to protect self-esteem may hinder concentration on learning, resulting in a decline in educational effectiveness through "passive participation." In short, the psychological barriers created by stigma likely trigger both physical non-participation and a loss of motivation, thereby obstructing the inherent effectiveness of the program. [18]

[16] A similar analysis was performed using an instrumental variable approach, where the participation dummy was used as the explanatory variable, with distance to the center, center occupancy rates, and students' socioeconomic variables serving as instruments. The results were nearly identical.

[17] The Japan Management Association Research Institute conducts research and consulting projects to support policy-making and strategic planning for government agencies.

[18] Two supplementary analyses were conducted. First, to compare the students deemed not in need of support with the participants, we merged the data for these two groups and performed an instrument variable analysis with the participation dummy as the explanatory variable and the distance to the center, center occupancy rates, and students' socioeconomic variables as instruments; however, the coefficient on the participation dummy was not significant. Second, to compare non-public assistance students with participants, we used a matching method to select students from the non-recipient group who shared the same (1) grade, (2) school, and (3) gender, and who had the closest scores in Japanese and arithmetic with students in participants. This matching analysis also yielded no significant coefficients. These results may be attributed to the weak predictive power of the instruments in these specific sub-samples or to substantial unobserved differences between participants and these comparison groups that the available data cannot capture.

[Insert Table 5 Here]

To estimate the effects of the learning program, we redefined students with high attendance rates and long durations as participants. Specifically, ATE and ATET were estimated for three cases: (1) students with an average attendance rate of 40% or higher; (2) students who had attended the program for two years or more; and (3) students with at least one year of participation and an attendance rate of 40% or higher. However, limiting the sample based on variables such as attendance rates and participation duration introduces selection bias due to endogenous stratification. Therefore, rather than generalizing these estimates as rigorous causal effects, we position this supplemental and suggestive analysis as a means to confirm the potential magnitude of the program's impact on the specific subgroup that received a sufficient treatment dose. The results in Table 6 show that, for those with an attendance rate of 40% or higher, the coefficient on arithmetic/mathematics was 0.662 (equivalent to an increase of approximately 10 points) and was positively significant. For the group with an attendance rate of 40% or higher and more than one year of continuous participation, both the ATE (0.807) and ATET (0.720) showed high levels of significant positive effects on arithmetic/mathematics performance. However, the estimated coefficient on Emotional Stability was negative and significant for these groups. This suggests that the increased time dedicated to studying through the learning support program may cause psychological stress for these students.

[Insert Table 6 Here]

According to Carneiro and Heckman (2003) and Cunha et al. (2006), the effectiveness of interventions such as learning support tends to diminish as children grow older. However, Kautz et al. (2014) introduced cases in which positive effects remain observable for girls even

at later ages. Based on these prior studies, the heterogeneity of treatment effects by gender was examined by adding an interaction term between the female dummy and the participation dummy to the model (Table 7), based on three cases with different participants: (1) all participants, (2) the group with an average attendance rate of 40% or higher, and (3) the group with a participation duration of two years or more.

[Insert Table 7 Here]

For specification (1), the coefficient on the female dummy was 0.155 and was positively significant, consistent with the results in Table 5. The estimated coefficient on the interaction term between the female dummy variable and participation was 0.365 and was positively significant, indicating that participation in the learning support program was positively correlated with Japanese language scores for girls. Conversely, for Emotional Stability, the coefficient on the interaction term was −0.365 and negatively significant, suggesting that participation may lead to a decrease in emotional stability among female students. In specification (2), while the coefficient on the female dummy remained positively significant (0.181), the coefficient on the interaction term for Japanese scores (0.294) was positive, but no longer statistically significant. However, for Extraversion, the coefficient on the interaction term was 0.485 and positively significant, showing a positive correlation. In specification (3), the coefficient on the female dummy was positively significant (0.132), and the one on the interaction term for Japanese scores was 0.377 and positively significant. These results suggest that participation in learning support is positively correlated with Japanese language achievement and extraversion among girls, with effects more likely to manifest among students who participated for a sustained period. The positive effect on Japanese language scores was also confirmed by Bessho et al. (2019), who analyzed the impact of after-school learning.

As the four learning support centers are located in different areas, their effectiveness may vary due to regional characteristics. To examine this issue, we added interaction terms between the center dummies (with Center A as the baseline) and a participation dummy to the explanatory variables. The results are shown in Table 8A. For arithmetic/mathematics, the coefficient on the interaction term for Center D was −0.324 and negatively significant, indicating a negative correlation. Table 8B shows the average test scores, non-cognitive assessments, attendance rates, and stay durations for the four centers. The negative results for Center D likely stem from the fact that students at this center had lower arithmetic/mathematics scores, lower average attendance rates, and shorter stay durations than the students at other centers. Regarding extraversion, the coefficient on the interaction term for Center B was −0.356 and negatively significant. The average extraversion score for students at Center B was 2.51, which was lower than that for students at the other three centers. For agreeableness, the coefficient on the interaction term for Center C was −0.471 and negatively significant. The students at Center C had the lowest average agreeableness score of 2.61. These findings suggest that positive peer effects exist within each center.

[Insert Tables 8A and 8B Here]

To investigate whether program participation influences students' outcomes other than academic and non-cognitive skills, we utilized five items from the Amakko Survey which were evaluated on a four-point scale as dependent variables: "Eating breakfast every day," "Enjoying going to school," "Believing that knowledge gained through learning will be useful in future work or life," "Desiring to develop one's abilities as much as possible," and "Having strengths for which teachers or friends praise." Additionally, a dummy variable for "Desiring a university degree or higher" was introduced for junior high school students. Table 9 presents the results for three cases with different definitions of participants: (1) all participants, (2) students with

an attendance rate of 40% or higher, and (3) students who had attended for two or more years. When “Enjoying going to school” was the dependent variable, the ATE coefficient in case (2) was 1.397 and positively significant. For “Desiring a university degree or higher,” both the ATE and ATET coefficients were positive and significant in cases (2) and (3). These results indicate that students who actively participate develop a sense of fulfillment in school life and a positive outlook for the future.

[Insert Table 9 Here]

In summary, no significant associations were observed for the overall participant group, owing to the inclusion of students with low attendance rates or short stay durations. However, positive outcomes were observed among girls, particularly in terms of Japanese-language scores and extraversion. Furthermore, for students with high attendance rates or long-term participation, positive correlations were found with arithmetic/mathematics scores, school enjoyment, and aspirations for higher education. These results suggest that substantial engagement with the program is associated with improved academic and non-cognitive outcomes.

4.4. Mechanisms: Study Time

Section 4.3 demonstrated that students who actively participated in the learning support program tended to achieve higher scores in Japanese and arithmetic/mathematics. The mechanism underlying this academic improvement is considered the “increase in study time” brought by program participation. Indeed, the descriptive statistics in Table 2 indicate that students who participated in the support program study approximately three hours more per week than those who declined guidance.

This section verifies the causal effect of learning support on study time, based on ordinary least squares (OLS) and endogenous treatment effect models. Three cases were analyzed: (1) all participants, (2) the group with an average attendance rate of 40% or higher, and (3) the group with a participation duration of two years or more (Table 10).[19]

[Insert Table 10 Here]

These results support mechanisms of academic improvement. First, the OLS results showed that, while the increase in study time for all participants (1) was 4.25 hours per week, the increase was more pronounced in the high-attendance group (2) at 5.86 hours and the long-term participation group (3) at 4.81 hours. The effect of creating additional study time was most prominent among students with high participation density (attendance rate).

A similar trend has been confirmed by the estimations, accounting for endogeneity (ATE/ATET). For the group with an attendance rate of 40% or higher (5) and those continuing for two years or more (6), a significant and substantial increase in study time (approximately 5–6 hours per week) was observed. However, the lack of significant results in the analysis for all participants (4) is likely due to the inclusion of students who are registered but do not actively attend (i.e., those with extremely low attendance rates).[20] These results suggest a significant association: students with high attendance and long-term participation developed a habit of studying four to five hours longer per week, which led to improved performance in Japanese and arithmetic/mathematics.

Regarding other attributes, students who are female, having a higher age for the youngest sibling in the household, and possessing high "conscientiousness" are likely to increase study time. These results confirm that learning support programs function beyond merely providing

[19] A similar analysis was conducted using an instrumental variable approach, with the participation dummy as the explanatory variable and the distance to the center, center occupancy rates, and students' socioeconomic variables as instruments. The results were largely consistent with the main findings.

[20] The fact that the OLS coefficients in column (1) are larger than the ATE/ATET estimates in column (4) suggests the possibility of a positive bias in the OLS coefficients due to endogeneity (e.g., selection on unobservable).

a physical space; they play a crucial role in improving academic performance by helping children establish consistent study habits.

4.5. Suspension, Continuation, and Attendance Determinants

To maximize the effectiveness of the learning support program, this section analyzes the attributes of students who suspended or withdrew from the program, as well as the characteristics of those who exhibited higher attendance rates and longer durations of participation. As stated in Section 2, approximately 20% of the participants suspended or discontinued using the program. Meanwhile, the analyses in Sections 4.3 and 4.4 have revealed that students with high attendance rates and long-term participation had significantly improved arithmetic and mathematics scores. To ensure the success of the intervention, it is important to identify the factors that hinder continuous participation and those that promote active engagement.

We first conducted a probit analysis using a dummy variable indicating "suspension or withdrawal" as the dependent variable to examine the factors that prevent students from continuing. Next, we performed an OLS analysis using attendance rate and duration of participation as dependent variables. In both analyses, academic achievement, non-cognitive skills, family environment, and lifestyle habits were used as the explanatory variables. Table 11 presents the results.

[Insert Table 11 Here]

First, regarding the factors associated with program suspension or withdrawal (columns (1) and (2) in Table 11), the coefficient on agreeableness among non-cognitive skills is positive and significant, as is the coefficient on time spent playing video games. This suggests that students with a high propensity for socialization and leisure activities tend to prioritize peer

relationships and refrain from attending class. In terms of individual attributes, the coefficients on the female dummy and the single-parent household dummy are both positive and significant, whereas the coefficient on the eldest child dummy is negative and significant. These results indicate that female students and those from single-parent households face a higher risk of discontinuing the program, whereas the eldest children are more likely to persist. Furthermore, the coefficient on the Junior High School District dummy is negative and significant, suggesting that once students begin participating, closer physical proximity may increase the probability of continuing.

Next, we examined the characteristics of students with high attendance rates and long attendance durations (columns (3) and (4) of Table 11). Regarding the attendance rate, the coefficient on study time was positive and significant, whereas the one on the number of siblings was negative and significant. This reflects that students who have already established study habits and those with relatively few domestic responsibilities utilize the centers more frequently (although reverse causality is also possible, where high participation leads to longer study times). Regarding participation duration, the coefficients on Extraversion and Emotional Stability were positive and significant. This suggests that students who are more proactive in social interactions and emotionally stable tend to utilize support programs over a longer period. Moreover, the finding that the duration of participation was significantly longer at a specific center (Center C) indicated that the operational environment of each center may influence student persistence.

4.6. Counterfactual Participation Rates

This section simulates the probability of participating for students who are currently not targeted for program guidance when the number of support centers is increased. As indicated by the data in Table 2, even students who were deemed “not in need of participation” by

caseworkers have lower academic scores in Japanese and arithmetic/mathematics than students from non-public assistance households. Therefore, if the center capacity was expanded by establishing additional centers, and guidance was extended to these groups, a greater number of students could improve their academic performance.

Using the probit model described in Section 4.2, we estimated the potential participation rate of currently unguided students under the counterfactual scenario that they "had received guidance." As shown in Figure 1 and Table 12, the results revealed that the participation probability of students not currently targeted for guidance was approximately 10 percentage points higher across all grades than those who received guidance. This finding suggests that, while students currently prioritized for guidance may struggle to participate because of their severe circumstances, students not yet targeted possess a high latent motivation to participate. These results indicate that it is possible to support a wider range of students by creating excess capacity in learning support centers and broadening their eligibility.

[Insert Figure 1 Here]

[Insert Table 12 Here]

5. Conclusions

This study empirically analyzed the impact of learning support programs on the cognitive and noncognitive skills of elementary and junior high school students using administrative microdata from Amagasaki City, Hyogo Prefecture. Conventionally, research on learning support has been limited to small-scale questionnaires and interviews with program coordinators and teachers. Empirical analyses investigating the effects of the programs on students' cognitive and non-cognitive abilities have been limited due to several challenges, including regional variations in management systems and support content, lack of transparency

in participant selection processes, small sample sizes, and difficulty in accessing individual-level data.

By utilizing a unique panel dataset that links Amagasaki City's Learning Support Records, the Amakko Survey, and the Basic Resident Register, this study overcomes these hurdles and examines participant behaviors and program effectiveness. The analysis yielded the following findings.

First, regarding participation behavior, while the physical distance from the center does not have a direct impact, students avoid participating when centers are located within their own school districts or in immediate neighborhoods. This suggests that social stigma—the desire to avoid having their status as public assistance recipients known by classmates or neighbors—acts as a psychological barrier to participation within their own daily living environment.

Second, no uniform effect was observed in the overall participant group. This lack of overall significance is likely due to the presence of a subset of registered students with low attendance rates and short duration stay. However, heterogeneous effects were observed based on the individual attributes and actual usage patterns. Regarding gender differences, the analysis identified significant positive associations between female students and their scores in Japanese language and extraversion. Furthermore, a positive correlation was observed between higher arithmetic/mathematics scores and students who maintained high attendance or participated in the program over a long period.

Third, an increase in study time was identified as the underlying mechanism for these effects. Active participants in the learning support program spent an additional four to five hours per week studying. These results empirically demonstrate that this increased study time contributes to improving students' cognitive and non-cognitive abilities.

The empirical results have three policy implications. First, to prevent a decline in participation due to welfare stigma, it is necessary not only to optimize the location of learning

support centers but also to grant students the autonomy to select their preferred class. This analysis reveals that the probability of participation decreases when a center is located within a student's own school district. It also suggests that students harbor social stigma. According to Amagasaki City, learning support centers are primarily located in multi-purpose buildings near railway stations, and most participants commute from areas distant from these locations. Therefore, the risk of being identified by acquaintances while commuting is low; furthermore, entering and exiting these buildings is less noticeable due to their multi-purpose use. Consequently, the primary barrier to participation appears to be psychological resistance to encountering classmates within the confined space of the classroom, rather than the risk of exposure through "physical proximity," such as being seen on the way to the center. When establishing new centers, administrative authorities should look beyond simple physical proximity. Instead, they should consider locations where students are less likely to encounter classmates or introduce a selection system that allows students to choose from multiple centers.

Second, expanding center capacity and eliminating the issue of students on waiting lists are essential. The simulation analysis demonstrated that students not currently targeted for guidance exhibited lower academic performance than non-recipient households, yet their latent motivation to participate was 10 percentage points higher than that of the currently guided group. In fact, a cumulative total of 111 students (academic years 2018–2023) have been placed on a waiting list, forcing them to forgo participation. To resolve the issue of waiting lists, it is necessary to expand center capacities and actively extend guidance to those currently excluded from priority lists. By addressing this high latent demand, the overall academic level of a region can be increased.

Third, it is vital to develop incentive designs and environments that encourage persistent use. The effectiveness of learning support is reflected in an increase in weekly study time of four to five hours. Specifically, students with high attendance rates and long-term participation tended

to show higher scores in arithmetic and mathematics. Systems that boost children's motivation based on their attendance and duration of participation, such as priority access to experiential learning programs or recognition of small-milestone achievements, should be enhanced. Furthermore, for groups at high risk of withdrawal, such as girls from single-parent households, it is necessary to ensure continuous utilization by providing tailored support that addresses individual needs, such as flexible operating hours and household-conscious outreach.

Data Availability Statement

The data used in this study were obtained from Amagasaki City, Japan under a data-use agreement. The dataset contains sensitive personal information on welfare-receiving households and their children that cannot be made publicly available owing to legal and ethical restrictions under Japan's Act on the Protection of Personal Information. Data access requires formal approval from Amagasaki City and is subject to Japanese-language communication and institutional review procedures. Researchers interested in accessing data or learning about the application process should first contact the corresponding author, who can facilitate communication with the municipal government. The statistical code used in the analysis is available from the corresponding author upon request.

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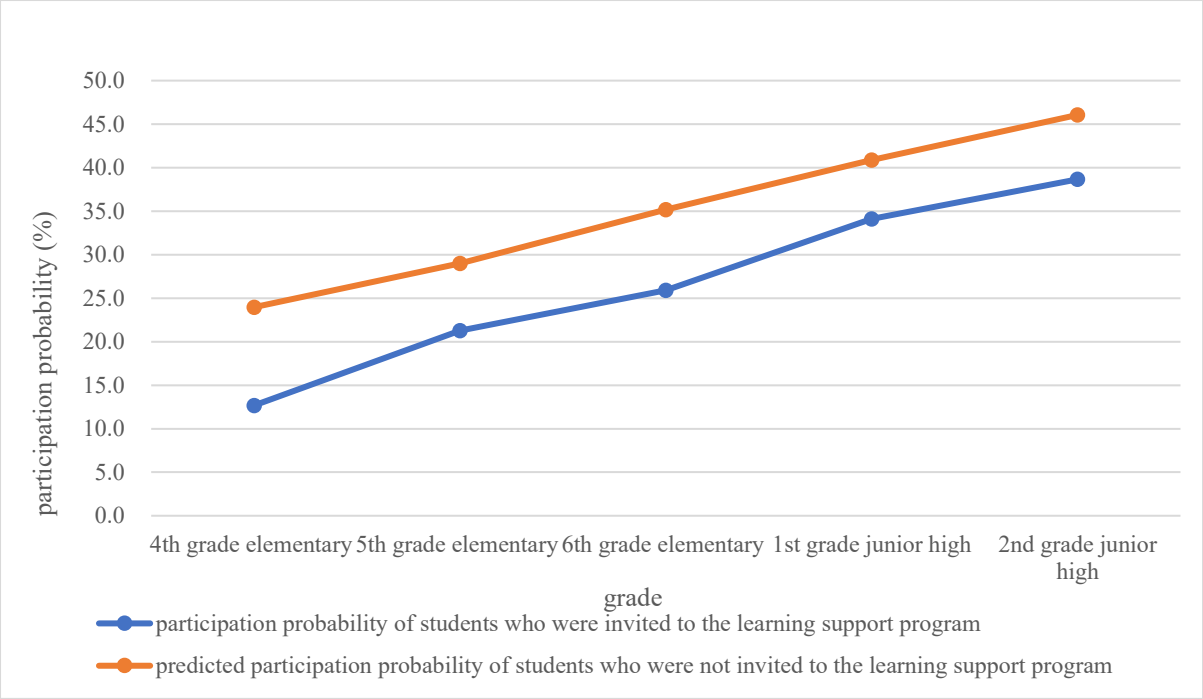

FIGURE 1 . SIMULATION OF PARTICIPATION PROBABILITIES (%)

TABLE 1—DATA DESCRIPTION

	Participants			Non-participants		
	Obs.	Mean	Std. dev	Obs.	Mean	Std. dev
Japanese Score (Standardized)	154	-0.902	0.992	559	-0.844	1.008
Math Score (Standardized)	154	-1.032	0.870	559	-0.962	0.958
Extraversion (Standardized)	150	0.065	0.967	547	0.041	1.001
Agreeableness (Standardized)	149	-0.278	1.005	546	-0.181	1.067
Conscientiousness (Standardized)	149	-0.256	1.013	548	-0.214	1.011
Emotional Stability (Standardized)	149	-0.103	0.995	547	0.031	1.010
TV Time (Hours/Week)	148	8.622	6.788	553	10.66	7.231
Study Time (Hours/Week)	151	9.589	6.048	554	5.428	5.232
Game Time (Hours/Week)	151	12.39	8.095	554	12.88	7.361
Female Dummy	154	0.539	0.500	559	0.429	0.495
Age of the Youngest Sibling	153	10.93	3.015	553	10.27	3.166
Number of Siblings	153	2.242	0.946	553	2.483	1.120
Eldest Child Dummy	154	0.266	0.443	554	0.251	0.434
Single-parent Dummy	154	0.786	0.412	554	0.838	0.369
Household Head Unemployed Dummy	154	0.429	0.496	559	0.476	0.500
Both Parents Unemployed Dummy	154	0.097	0.297	559	0.055	0.229
Elementary School District Dummy	154	0.026	0.160	559	0.089	0.286
Junior High School District Dummy	154	0.240	0.429	559	0.188	0.391
Adjacent Elementary District Dummy	154	0.149	0.358	559	0.252	0.435
Adjacent Junior High District Dummy	154	0.526	0.501	559	0.385	0.487
Capacity/Guided Students Ratio	154	0.493	0.105	559	0.476	0.094
Public Assistance Ratio in Class	154	0.065	0.031	559	0.065	0.031
Single-parent Household Ratio in Class	154	0.187	0.065	559	0.187	0.072

Note: The total number of participants in this table is 154, compared to the 216 mentioned in the main text. This is because the analysis excludes (1) students who enrolled from October onwards (just before the December/January Amakko Survey) and (2) those who withdrew from the program prior to the survey.

TABLE 2—COMPARISON OF ACADEMIC TEST SCORES (JAPANESE AND MATHEMATICS), NON-COGNITIVE ABILITIES, AND THREE CATEGORIES OF TIME USAGE

	Non-Public Assistance Households	Participants	Non-participants (Guided)	Non-participants (Not Guided)
Japanese Score	58.43	43.48	43.56	46.56
Math Score	61.36	42.05	43.82	47.73
Extraversion (1–4 scale)	2.58	2.69	2.64	2.58
Agreeableness (1–4 scale)	3.01	2.74	2.82	2.89
Conscientiousness (1–4 scale)	2.59	2.22	2.32	2.42
Emotional Stability (1–4 scale)	2.11	2.20	2.19	2.07
TV Time (Hours/Week)	11.25	8.81	10.66	10.30
Study Time (Hours/Week)	8.23	9.15	5.43	5.81
Game Time (Hours/Week)	10.08	12.16	12.88	11.98
Observations	88,146	216	559	1,303

TABLE 3—STUDENTS' PARTICIPATION BEHAVIOR IN LEARNING SUPPORT

	(1)		(2)		(3)	
	Coef.	Marginal effect	Coef.	Marginal effect	Coef.	Marginal effect
Female Dummy	0.211 *	0.054 *	0.170	0.043	0.238 **	0.062 **
	(0.116)	(0.030)	(0.118)	(0.030)	(0.115)	(0.030)
Age of the Youngest Sibling	-0.037	-0.009	-0.037	-0.009	-0.036	-0.009
	(0.027)	(0.007)	(0.027)	(0.007)	(0.028)	(0.007)
Number of Siblings	-0.213 ***	-0.055 ***	-0.211 ***	-0.053 ***	-0.211 ***	-0.055 ***
	(0.073)	(0.018)	(0.073)	(0.018)	(0.073)	(0.019)
Eldest Child Dummy	-0.103	-0.026	-0.084	-0.021	-0.111	-0.029
	(0.148)	(0.038)	(0.149)	(0.038)	(0.147)	(0.038)
Single-parent Dummy	0.072	0.018	0.002	0.001	0.058	0.015
	(0.192)	(0.049)	(0.194)	(0.049)	(0.191)	(0.050)
Household Head Unemployed D.	-0.254 **	-0.065 **	-0.228 *	-0.058 *	-0.261 **	-0.068 **
	(0.124)	(0.031)	(0.124)	(0.031)	(0.124)	(0.032)
Both Parents Unemployed D.	0.312	0.08	0.266	0.068	0.286	0.074
	(0.274)	(0.070)	(0.275)	(0.070)	(0.272)	(0.071)
Public Assistance Ratio	-0.589	-0.151	-0.233	-0.059	-0.852	-0.221
	(2.080)	(0.532)	(2.075)	(0.527)	(2.055)	(0.533)
Single-parent Household Ratio	-0.978	-0.25	-1.062	-0.27	-0.827	-0.215
	(0.933)	(0.238)	(0.948)	(0.240)	(0.939)	(0.243)
Capacity/Guided Students Ratio	1.341	0.343	1.317	0.334	1.165	0.302
	(0.816)	(0.208)	(0.817)	(0.206)	(0.803)	(0.207)
Elementary School District D.	-0.995 ***	-0.255 ***	-0.953 ***	-0.242 ***		
	(0.319)	(0.080)	(0.311)	(0.078)		
Junior High School District D.	-0.508 ***	-0.13 ***	-0.867 ***	-0.22 ***		
	(0.188)	(0.048)	(0.230)	(0.057)		
Adjacent Elementary District D.	-0.380 *	-0.097 *				
	(0.204)	(0.052)				
Adjacent Junior High District D.	-0.014	-0.004				
	(0.197)	(0.050)				
Adjacent to Center A			-0.184	-0.047		
			(0.208)	(0.053)		
Adjacent to Center B			0.106	0.027		
			(0.152)	(0.039)		
Adjacent to Center C			-0.212	-0.054		
			(0.165)	(0.042)		
Adjacent to Center D			-0.708 ***	-0.18 ***		
			(0.257)	(0.065)		
Distance Dummy 1					-0.524 *	-0.136 *
					(0.281)	(0.072)
Distance Dummy 2					-0.421	-0.109
					(0.271)	(0.070)
Distance Dummy 3					-0.198	-0.051
					(0.237)	(0.061)
Distance Dummy 4					0.047	0.012
					(0.283)	(0.073)
Constant	0.767		1.140		0.817	
	(0.722)		(0.732)		(0.750)	
Pseudo R2	0.123		0.131		0.112	
Observations	706		706		706	

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 4— STUDENTS' PARTICIPATION BEHAVIOR : RESULTS RESTRICTED TO SUBSAMPLES BASED ON PARTICIPATION RATES AND YEARS OF ATTENDANCE

	All				Attendance ≥ 40%				Duration ≥ 1 Year				Duration ≥ 2 Years				Attendances ≥ 40% & Duration ≥ 1 Year			
	Coef.		Margin		Coef.		Margin		Coef.		Margin		Coef.		Margin		Coef.		Margin	
Female Dummy	0.211	*	0.054	*	0.411	***	0.062	***	0.249	**	0.059	**	0.356	**	0.064	**	0.473	***	0.063	***
	(0.116)		(0.030)		(0.155)		(0.023)		(0.122)		(0.029)		(0.144)		(0.026)		(0.167)		(0.022)	
Age of the Youngest Sibling	-0.037		-0.009		-0.073	**	-0.011	**	-0.026		-0.006		-0.085	**	-0.015	**	-0.046		-0.006	
	(0.027)		(0.007)		(0.036)		(0.005)		(0.029)		(0.007)		(0.034)		(0.006)		(0.039)		(0.005)	
Number of Siblings	-0.213	***	-0.055	***	-0.317	***	-0.048	***	-0.217	***	-0.051	***	-0.263	***	-0.047	***	-0.276	**	-0.036	**
	(0.073)		(0.018)		(0.099)		(0.015)		(0.078)		(0.018)		(0.094)		(0.017)		(0.107)		(0.014)	
Eldest Child Dummy	-0.103		-0.026		-0.100		-0.015		-0.110		-0.026		-0.216		-0.039		-0.132		-0.018	
	(0.148)		(0.038)		(0.197)		(0.030)		(0.155)		(0.036)		(0.183)		(0.033)		(0.213)		(0.028)	
Single-parent Dummy	0.072		0.018		-0.195		-0.030		0.085		0.020		0.230		0.041		-0.210		-0.028	
	(0.192)		(0.049)		(0.235)		(0.036)		(0.197)		(0.046)		(0.224)		(0.040)		(0.241)		(0.032)	
Household Head Unemployed D.	-0.254	**	-0.065	**	-0.208		-0.031		-0.360	***	-0.085	***	-0.334	**	-0.060	**	-0.305	*	-0.040	*
	(0.124)		(0.031)		(0.167)		(0.025)		(0.131)		(0.031)		(0.153)		(0.027)		(0.181)		(0.024)	
Both Parents Unemployed D.	0.312		0.080		0.502		0.076		0.361		0.085		0.217		0.039		0.524		0.069	
	(0.274)		(0.070)		(0.322)		(0.049)		(0.279)		(0.066)		(0.324)		(0.058)		(0.331)		(0.044)	
Public Assistance Ratio	-0.589		-0.151		2.270		0.344		0.090		0.021		-3.355		-0.605		3.393		0.449	
	(2.080)		(0.532)		(2.716)		(0.412)		(2.178)		(0.514)		(2.691)		(0.484)		(2.955)		(0.391)	
Single-parent Household Ratio	-0.978		-0.250		-0.085		-0.013		-0.900		-0.212		0.615		0.111		0.313		0.041	
	(0.933)		(0.238)		(1.211)		(0.184)		(0.962)		(0.226)		(1.152)		(0.208)		(1.270)		(0.168)	
Capacity/Guided Students Ratio	1.341		0.343		0.707		0.107		0.904		0.213		1.660		0.299		0.364		0.048	
	(0.816)		(0.208)		(1.115)		(0.169)		(0.884)		(0.208)		(1.063)		(0.191)		(1.232)		(0.163)	
Elementary School District D.	-0.995	***	-0.255	***	-0.604		-0.092		-1.285	***	-0.303	***	-1.802	***	-0.325	***	-1.041	**	-0.138	**
	(0.319)		(0.080)		(0.396)		(0.060)		(0.387)		(0.090)		(0.501)		(0.089)		(0.515)		(0.068)	
Junior High School District D.	-0.508	***	-0.130	***	-0.313		-0.047		-0.559	***	-0.132	***	-0.757	***	-0.136	***	-0.529	**	-0.070	**
	(0.188)		(0.048)		(0.241)		(0.036)		(0.196)		(0.045)		(0.230)		(0.041)		(0.256)		(0.034)	
Adjacent Elementary District D.	-0.380	*	-0.097	*	-0.182		-0.028		-0.426	**	-0.101	**	-0.678	***	-0.122	***	-0.288		-0.038	
	(0.204)		(0.052)		(0.278)		(0.042)		(0.213)		(0.050)		(0.236)		(0.042)		(0.295)		(0.039)	
Adjacent Junior High District D.	-0.014		-0.004		0.000		0.000		0.004		0.001		-0.040		-0.007		-0.076		-0.010	
	(0.197)		(0.050)		(0.260)		(0.039)		(0.206)		(0.048)		(0.261)		(0.047)		(0.273)		(0.036)	
Constant	0.767				0.814				0.459				-0.552				0.145			
	(0.722)				(0.971)				(0.772)				(0.922)				(1.067)			
Pseudo R2	0.123				0.184				0.129				0.192				0.223			
Observations	706				619				683				643				611			

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 5—EFFECTS ON STUDENTS' COGNITIVE AND NON-COGNITIVE SKILLS

	Japanese		Arithmetic/Math		Extraversion		Agreeableness		Conscientiousness		Emotional Stability	
ATE	-0.109		0.099		0.041		0.341		0.192		-0.203	
	(0.307)		(0.275)		(0.428)		(0.480)		(0.442)		(0.475)	
Lagged Value	0.673	***	0.689	***	0.466	***	0.318	***	0.396	***	0.301	***
	(0.038)		(0.033)		(0.040)		(0.047)		(0.045)		(0.050)	
Female Dummy	0.201	***	-0.006		0.016		-0.012		-0.044		-0.053	
	(0.067)		(0.059)		(0.085)		(0.099)		(0.090)		(0.097)	
Age of the Youngest Sibling	-0.011		-0.012		-0.019		-0.008		0.005		-0.019	
	(0.016)		(0.015)		(0.018)		(0.024)		(0.022)		(0.020)	
Number of Siblings	-0.052		-0.045		-0.099	*	0.108	*	0.008		0.011	
	(0.042)		(0.037)		(0.053)		(0.060)		(0.056)		(0.060)	
Eldest Child Dummy	-0.067		-0.043		-0.017		-0.007		0.002		-0.094	
	(0.083)		(0.069)		(0.099)		(0.118)		(0.111)		(0.102)	
Single-parent Dummy	0.064		0.067		-0.051		-0.035		0.044		-0.138	
	(0.094)		(0.074)		(0.138)		(0.153)		(0.127)		(0.126)	
Household Head Unemployed D.	-0.063		-0.106	*	-0.066		-0.012		-0.073		-0.152	
	(0.067)		(0.060)		(0.083)		(0.098)		(0.091)		(0.093)	
Both Parents Unemployed D.	-0.004		-0.113		-0.069		-0.235		0.031		-0.308	
	(0.174)		(0.132)		(0.205)		(0.259)		(0.208)		(0.238)	
ATET	-0.511		0.058		0.234		0.419		0.396		-0.518	
	(0.450)		(0.311)		(0.459)		(0.540)		(0.486)		(0.497)	
Observations	534		534		461		457		460		457	

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 6—RESULTS RESTRICTED TO SUBSAMPLES BASED ON PARTICIPATION RATES AND YEARS OF ATTENDANCE

	Japanese	Arithmetic/Math	Extraversion	Agreeableness	Conscientiousness	Emotional Stability
Attendance ≥ 40%						
ATE	0.216	0.662 *	-0.166	-0.717	-0.419	-1.144 **
	(0.377)	(0.394)	(0.457)	(0.507)	(0.546)	(0.535)
ATET	-0.849	0.564	0.028	0.814	0.979	-1.478 *
	(0.744)	(0.515)	(0.665)	(0.732)	(0.715)	(0.805)
Observations	465	465	395	392	394	392
Duration ≥ 2 Years						
ATE	-0.163	0.319	0.076	-0.357	-0.363	-0.124
	(0.270)	(0.233)	(0.353)	(0.439)	(0.467)	(0.388)
ATET	-0.165	0.334	0.273	0.58	0.125	-0.666
	(0.321)	(0.280)	(0.448)	(0.457)	(0.432)	(0.447)
Observations	483	483	413	409	412	411
Attendance ≥ 40% & Duration ≥ 1 Year						
ATE	0.151	0.807 ***	-0.299	-0.587	-0.467	-0.787
	(0.293)	(0.308)	(0.424)	(0.462)	(0.502)	(0.525)
ATET	-0.49	0.72 **	-0.328	0.677	0.5	-1.287 *
	(0.523)	(0.382)	(0.645)	(0.650)	(0.670)	(0.761)
Observations	459	459	390	387	389	387

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7—HETEROGENEITY BY GENDER

	Japanese	Arithmetic/Math	Extraversion	Agreeableness	Conscientiousness	Emotional Stability
All Participants						
Female Dummy	0.155 **	-0.053	0.007	0.045	-0.064	0.042
	(0.076)	(0.066)	(0.101)	(0.115)	(0.106)	(0.112)
Female × Participation D.	0.365 ***	0.159	0.044	-0.197	0.021	-0.365 **
	(0.139)	(0.124)	(0.155)	(0.199)	(0.170)	(0.184)
Observations	534	534	461	457	460	457
Attendance ≥ 40%						
Female Dummy	0.181 **	-0.080	0.001	0.017	-0.093	0.116
	(0.082)	(0.070)	(0.106)	(0.121)	(0.112)	(0.127)
Female × Participation D.	0.294	0.300	0.485 *	-0.428	-0.049	-0.367
	(0.234)	(0.228)	(0.248)	(0.295)	(0.300)	(0.320)
Observations	465	465	395	392	394	392
Duration ≥ 2 Years						
Female Dummy	0.132 *	-0.077	0.001	0.033	-0.045	0.043
	(0.072)	(0.065)	(0.103)	(0.115)	(0.104)	(0.110)
Female × Participation D.	0.377 **	0.107	0.138	-0.349	0.099	-0.139
	(0.180)	(0.149)	(0.207)	(0.250)	(0.232)	(0.232)
Observations	483	483	413	409	412	411

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 8A—HETEROGENEITY BY CENTER

	Japanese	Arithmetic/Math	Extraversion	Agreeableness	Conscientiousness	Emotional Stability
Center B × Participation D.	-0.263	-0.116	-0.356 *	-0.274	-0.381	-0.032
	(0.197)	(0.195)	(0.209)	(0.274)	(0.244)	(0.294)
Center C × Participation D.	-0.088	-0.171	0.183	-0.471 *	-0.356	-0.367
	(0.163)	(0.156)	(0.229)	(0.277)	(0.278)	(0.290)
Center D × Participation D.	-0.257	-0.324 *	0.357	-0.113	-0.216	-0.246
	(0.208)	(0.175)	(0.285)	(0.301)	(0.243)	(0.303)
Observations	534	534	461	457	460	457

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 8B—DESCRIPTIVE STATISTICS BY CENTER

	Center A	Center B	Center C	Center D
Japanese Score	48.41	42.96	42.97	38.21
Math Score	46.40	42.54	43.55	37.44
Extraversion (1–4 scale)	2.59	2.51	2.79	2.92
Agreeableness (1–4 scale)	2.84	2.66	2.61	2.67
Conscientiousness (1–4 scale)	2.32	2.06	2.08	2.27
Emotional Stability (1–4 scale)	2.16	2.45	2.00	2.03
Avg. Attendance Rate	0.44	0.43	0.36	0.27
Avg. Stay Time (min.)	50.22	42.51	35.30	25.82

TABLE 9—IMPACT ON LIFESTYLE HABITS, ATTITUDES, AND VALUES

	Eating breakfast every day	Enjoying going to school	Believing that knowledge gained through learning will be useful in future work or life	Desiring to develop one's abilities as much as possible	Having strengths for which teachers or friends praise	Desiring a university degree or higher
All Participants						
ATE	-0.337	0.366	0.155	0.154	0.328	0.137
	(0.352)	(0.395)	(0.405)	(0.442)	(0.424)	(0.303)
ATET	-0.262	0.418	-0.318	0.606	0.16	0.133
	(0.376)	(0.449)	(0.424)	(0.494)	(0.501)	(0.334)
Observations	523	528	526	527	525	387
Attendance ≥ 40%						
ATE	-0.756	0.404	0.302	0.435	0.316	0.398 *
	(0.479)	(0.496)	(0.427)	(0.539)	(0.458)	(0.241)
ATET	-0.47	1.397 **	-0.042	1.212	0.252	0.447 *
	(0.602)	(0.672)	(0.588)	(0.771)	(0.695)	(0.252)
Observations	460	461	459	460	458	349
Duration ≥ 2 Years						
ATE	-0.175	0.081	-0.488	-0.313	0.070	0.174
	(0.343)	(0.381)	(0.402)	(0.387)	(0.415)	(0.197)
ATET	-0.254	0.374	-0.554	0.303	-0.124	0.363 *
	(0.349)	(0.381)	(0.403)	(0.457)	(0.410)	(0.219)
Observations	475	480	478	479	477	373

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively.

TABLE 10—IMPACT ON STUDY TIME (HOURS/WEEK)

	(1)		(2)		(3)		(4)		(5)		(6)	
	OLS		OLS (Attendance ≥ 40%)		OLS (Duration ≥ 2 years)		ATE		ATE (Attendance ≥ 40%)		ATE (Duration ≥ 2 years)	
ATE	4.251	***	5.856	***	4.807	***	3.496		6.548	***	5.033	**
	(0.546)		(0.716)		(0.719)		(2.422)		(2.349)		(2.379)	
Female Dummy	1.125	***	1.105	**	1.033	**	1.133	**	1.153	**	1.038	**
	(0.430)		(0.442)		(0.448)		(0.441)		(0.487)		(0.453)	
Age of the Youngest Sibling	0.240	**	0.265	**	0.275	***	0.243	**	0.254	**	0.275	***
	(0.102)		(0.107)		(0.106)		(0.102)		(0.107)		(0.105)	
Number of Siblings	0.281		0.363		0.432		0.286		0.314		0.430	
	(0.262)		(0.275)		(0.273)		(0.283)		(0.306)		(0.275)	
Eldest Child Dummy	0.242		0.087		0.285		0.248		0.067		0.281	
	(0.516)		(0.529)		(0.537)		(0.505)		(0.516)		(0.529)	
Single-parent Dummy	-0.468		-0.578		-0.405		-0.480		-0.595		-0.406	
	(0.673)		(0.680)		(0.700)		(0.668)		(0.695)		(0.682)	
Household Head Unemployed D.	0.237		0.212		0.242		0.237		0.199		0.241	
	(0.438)		(0.456)		(0.460)		(0.446)		(0.454)		(0.454)	
Both Parents Unemployed D.	1.757	*	1.366		1.973	*	1.777	*	1.352		1.962	*
	(0.990)		(1.025)		(1.072)		(0.976)		(1.030)		(1.053)	
TV Time (Hours/Week)	0.034		0.023		0.035		0.035		0.022		0.035	
	(0.029)		(0.030)		(0.031)		(0.028)		(0.030)		(0.030)	
Game Time (Hours/Week)	-0.013		-0.017		-0.029		-0.013		-0.017		-0.029	
	(0.030)		(0.031)		(0.032)		(0.029)		(0.030)		(0.031)	
Extraversion	-0.032		0.013		-0.090		-0.034		0.015		-0.089	
	(0.203)		(0.216)		(0.218)		(0.198)		(0.211)		(0.212)	
Agreeableness	0.008		-0.006		-0.020		0.006		0.000		-0.018	
	(0.211)		(0.224)		(0.223)		(0.207)		(0.219)		(0.219)	
Conscientiousness	0.917	***	0.846	***	0.899	***	0.916	***	0.850	***	0.899	***
	(0.226)		(0.239)		(0.240)		(0.221)		(0.233)		(0.234)	
Emotional Stability	-0.320		-0.284		-0.309		-0.314		-0.287		-0.309	
	(0.210)		(0.216)		(0.226)		(0.206)		(0.211)		(0.222)	
ATET							4.552		4.542		4.706	*
							(2.820)		(4.181)		(2.516)	
Observations	678		597		619		678		597		619	
Adj. R-squared	0.154		0.166		0.143							

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. "D." denotes a dummy variable.

TABLE 11—DETERMINANTS OF SUSPENSION AND PARTICIPATION INTENSITY

	(1) Suspension: Coef.		(2) Suspension: Marginal effect		(3) Attendance Rate OLS		(4) Duration OLS	
Japanese Score	-0.027		-0.006		0.034		0.151	
	(0.266)		(0.058)		(0.030)		(0.171)	
Math Score	-0.010		-0.002		-0.032		0.085	
	(0.262)		(0.057)		(0.034)		(0.195)	
Extraversion	0.195		0.042		-0.016		0.204	*
	(0.176)		(0.038)		(0.021)		(0.119)	
Agreeableness	0.414	**	0.09	**	-0.029		0.097	
	(0.177)		(0.036)		(0.021)		(0.121)	
Conscientiousness	-0.245		-0.053		0.022		-0.075	
	(0.180)		(0.038)		(0.022)		(0.126)	
Emotional Stability	-0.239		-0.052		0.019		0.232	*
	(0.183)		(0.039)		(0.023)		(0.130)	
TV Time (Hours/Week)	-0.006		-0.001		0.001		-0.006	
	(0.024)		(0.005)		(0.003)		(0.016)	
Study Time (Hours/Week)	0.020		0.004		0.012	***	0.005	
	(0.028)		(0.006)		(0.004)		(0.021)	
Game Time (Hours/Week)	0.067	***	0.015	***	0.000		0.006	
	(0.022)		(0.004)		(0.003)		(0.016)	
Female Dummy	1.166	***	0.253	***	-0.042		-0.061	
	(0.428)		(0.085)		(0.049)		(0.284)	
Age of the Youngest Sibling	0.115		0.025		-0.014		-0.071	
	(0.080)		(0.017)		(0.010)		(0.059)	
Number of Siblings	0.394		0.086		-0.055	*	-0.218	
	(0.292)		(0.062)		(0.031)		(0.177)	
Eldest Child Dummy	-0.792	*	-0.172	*	0.047		-0.290	
	(0.431)		(0.090)		(0.053)		(0.306)	
Single-parent Dummy	1.522	**	0.33	**	-0.060		-0.486	
	(0.618)		(0.125)		(0.070)		(0.400)	
Household Head Unemployed D.	-0.417		-0.09		0.062		-0.153	
	(0.361)		(0.077)		(0.046)		(0.262)	
Both Parents Unemployed D.	-0.427		-0.093		0.122		0.585	
	(0.865)		(0.188)		(0.100)		(0.574)	
Public Assistance Ratio	5.251		1.139		1.459	**	-0.094	
	(5.536)		(1.188)		(0.718)		(4.128)	
Single-parent Household Ratio	1.037		0.225		-0.498		-0.973	
	(2.747)		(0.594)		(0.354)		(2.034)	
Capacity/Guided Students Ratio	2.454		0.532		-0.126		1.261	
	(2.721)		(0.587)		(0.305)		(1.755)	
Elementary School District D.	-0.553		-0.12		-0.134		0.065	
	(1.016)		(0.220)		(0.143)		(0.825)	
Junior High School District D.	-1.323	*	-0.287	*	0.062		-0.094	
	(0.689)		(0.143)		(0.068)		(0.391)	
Center B Dummy	-0.021		-0.005		0.089		0.402	
	(1.044)		(0.226)		(0.107)		(0.615)	
Center C Dummy	-0.228		-0.049		-0.020		1.475	***
	(0.719)		(0.156)		(0.085)		(0.489)	
Center D Dummy	-1.157		-0.251		0.012		1.131	*
	(1.180)		(0.253)		(0.118)		(0.676)	
4th grade Elementary Dummy	0.436		0.095		0.139		0.922	
	(1.094)		(0.237)		(0.111)		(0.640)	
5th grade Elementary Dummy	0.281		0.061		-0.015		0.332	
	(0.686)		(0.149)		(0.089)		(0.511)	
6th grade Elementary Dummy	0.726		0.158		0.109	*	0.629	*
	(0.507)		(0.108)		(0.063)		(0.364)	
1st grade Junior Dummy	0.629		0.136		0.010		0.369	
	(0.425)		(0.090)		(0.051)		(0.295)	

Observations	143	144	144
Adj. R-squared	0.406	0.211	0.368

Notes: Standard errors are between parentheses. ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. “D.” denotes a dummy variable.

TABLE 12—ACTUAL AND PREDICTED PARTICIPATION PROBABILITIES FOR STUDENTS BY INVITATION STATUS

	Participation probability of students who were invited to the learning support program	Predicted participation probability of students who were not invited to the learning support program
4th grade elementary	12.7	24.0
5th grade elementary	21.3	29.0
6th grade elementary	25.9	35.2
1st grade junior high	34.1	40.9
2nd grade junior high	38.7	46.1