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Relationships of Parental Involvement and Adolescents' Academic Achievement and Aspiration

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【Abstract】This study investigates two aspects of maternal and paternal involvement. First, what are the associations of parental involvement with adolescents' academic achievement? Second, how does adolescent's educational aspiration mediate the relationship between parental involvement and achievement? Samples of middle school students were analysed separately according to adolescents' gender. The analyses were conducted by using a generalised structural equation modelling. The results show that both maternal and paternal involvement is associated with adolescent's academic outcome even though some differences are also found. Adolescent's educational aspirations mediate the association between parental involvement and academic grade. Among several discussion topics, discussing about adolescents' schooling is more significantly and positively associated with grade.

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1. Introduction

Students' achievement is a major concern in many societies. A number of studies show that parental involvement increases students' achievement and actively encourage it (e.g., Hoover-Dempsey et al., 2005; Blazer, 2009; Galindo and Sheldon, 2012). However, little is known about individual contribution that mothers and fathers make to their children's education since most studies do not distinguish between maternal and paternal involvement. In addition to this, literature is still largely focused on mothers (Kim and Hill, 2015) even though researchers suggest that fathers contribute in important ways (Lewis and Lamb, 2003; Lamb, 1975; Sarkadi et al., 2008). Therefore, it is important to examine the effects of mothers and fathers independently in order to understand the mechanism behind academic achievement better.

Besides, most of the studies use measures aggregating several types of involvement, which makes it difficult to interpret the precise effects of a particular measure (Sui-Chu and Willms, 1996). The present study uses two types of involvement separately: parental discussion and aspiration. Studies show that these types of involvement are positively associated with educational achievement (e.g., Singh et al., 1995; Sui-Chu and Willms, 1996) whereas how these maternal and paternal involvement are associated with educational achievement is still not clear. Investigating how it is associated with academic achievement will inform policymakers and schools about how mothers and fathers can influence their children's performance and help them design better policies to maximize their influence.

This study examines independent effects of maternal and paternal involvement (discussion and aspiration) on male and female adolescents' grade. Also, this study takes into account the indirect effects of parental involvement and examines whether adolescent's educational aspiration mediate the associations between parental involvement and achievement. Samples of middle school students were analysed separately according to their gender by using a generalised structural equation modelling. The unique contribution of this study is that it

reveals that both maternal and paternal involvement are associated with adolescents' grades and aspiration independently. Specifically, two fundamental differences are found. First, while higher maternal aspiration is associated with higher grades for both male and female adolescents, higher paternal aspiration only shows the same effect against females. Second, maternal discussion does not show significance toward educational aspiration, whereas paternal discussion is significant and positive toward both males and females. In this study, an analysis of the differences and similarities between mothers and fathers is provided in light of the realities of family and gender roles in Japan.

2. Literature Review

2.1 Parental Involvement

Parental involvement includes a range of practices that are intended to promote children's motivation and educational achievement. Examples of parental involvement are discussing school with children and monitoring their progress. Hoover-Dempsey and Sandler (1995) state that parental involvement influences educational outcome through three mechanisms: modelling of school related behaviours and attitudes, reinforcing specific aspects of school learning, and instruction. Various studies conclude that parental involvement in children's education has positive impacts on school achievement (e.g., Sui-Chu and Willms, 1996; Englund et al., 2004; Galindo and Sheldon, 2012), attitude (e.g., Fantuzzo et al., 2004; Shumow et al, 2011), and behaviour (e.g., Hill et al., 2004).

However, there are limitations in prior studies. The majority of them examine the effects of parental involvement without distinguishing between mothers and fathers' or only focusing on mothers' involvement. Even though the fathers' influence on child development is often assumed to be subordinate to that of the mothers (McBride et al., 2005), researchers suggest that fathers contribute to their children in important ways (Lewis and Lamb, 2003; Lamb, 1975; Sarkadi et al., 2008). Studies that examine paternal involvement on children's education

are still limited and some of them only examine fathers' involvement. It is not clear if mothers and fathers make an independent contribution toward their children if only one side is examined. For example, Barnett et al. (1992) estimated separate models for mothers and fathers and found that sons' positive relationship with them was related to the son's low levels of psychological distress. However, when variables of sons' relationship with mothers and fathers were examined in the same model, only fathers' relationship was significant. Therefore, it is important to investigate both mothers and fathers effects simultaneously to see their independent effects.

In addition to the limited number of studies that investigate maternal and paternal involvement simultaneously, most of these studies have used aggregates of several types of involvement rather than one specific type of involvement. Using a measure that includes various types of involvement makes it difficult to interpret the precise effects of a particular measure (Sui-Chu and Willms, 1996) and it can also bring different results. For example, Flouri and Buchanan (2004) used a measurement of parental involvement that included four types of involvement (outing with father/mother, father/mother manages the child, father/mother reads to the child, and father/mother is interested in their child's education) and found a positive relationship between both mother and father involvements and educational attainment. However, Hsu et al. (2010), by using a measurement that aggregated other four types of involvement (discussing of career plan, listening to children's thinking, participation in school, and monitoring behaviour), found that only mothers had an influence; and Harris et al. (1998), by defining involvement with six types of involvement (such as closeness, do things together, and if the child want to be like their mother or father when they become an adult), found that only fathers had positive and significant effects .

Therefore, the present study uses each type of involvement separately: parent-child discussion and parental aspiration. There is evidence indicating that certain types of

involvement may be more strongly related to academic achievement than others (Singh et al., 1995; Fan and Chen, 2001; Castro et al., 2015; Fan, 2001). For example, Fan and Chen (2001) conducted a meta-analysis and found that parental aspiration/expectation for children have the strongest effects on academic achievement. Other studies also found positive associations between parental aspiration and academic achievement (e.g., Singh et al., 1995; Castro et al., 2015). In addition to parental aspiration, various studies also show a positive and significant association between parent-child discussion and academic achievement (e.g., Sui-Chu and Willms, 1996; Pong, 1997; Fan, 2001). For example, Sui-Chu and Willms (1996) examined the effects of four types of parental involvement (parents communicating with school, supervising children at home, participating in school activities and discussing school related matters with their children) on academic achievement among middle school students and found that discussion of school-related activities at home had the strongest relationship with academic achievement.

Thus, studies show positive associations of parental aspiration and parent-child discussion on children's academic achievement. However, most of these studies do not investigate mothers' and fathers' effects simultaneously. McBride et al. (2005), however, is an exception. Their study defined parent-child discussion variables by measuring the frequency of parent discussions with children on three different topics (school activities or events, things the child had studied in class, and the child's experience in school) and estimated its effects of the mothers and the fathers on children's achievement. They did not find any significant associations for neither of the parents. However, the study examines children between the ages 5 to 12 altogether and ignores school levels (e.g., elementary and middle school). How parents get involved and the effects of their involvement may differ depending on the children's school level (Hill and Taylor, 2004; Patall et al., 2008). Therefore, the study may fail to examine the precise effects. More studies are needed to understand the effects of mothers' and fathers'

discussion and aspiration on children's academic achievement.

2.2 Gender

Gender is socially constructed through culture and social means (West and Zimmerman, 1987; Connell, 1987). In other words, the behaviour of men and women is heavily shaped by the many pressures that individuals face in society. In the same way, patterns of parental involvement would be different for fathers and mothers as society holds different expectations toward each of them. Hoover-Dempsey and Sandler (1995, 1997) presented a theoretical model to understand why parents choose to become involved. According to the Hoover-Dempsey and Sandler's Model (the HDS model), parents' decision to become involved in their children's education is based on three factors: (1) parental role construction: parents' beliefs about what they are supposed to do in relation to their children's education, (2) parents' self-efficacy for helping children succeed in school, (3) parents' perception of invitations/demands and opportunities for involvement. Hoover-Dempsey and Sandler (1997) contend that parental role construction is the most important factor, and when it is significant, positive involvement decision would be likely to occur. Parental role construction is described in part by general role theory: expectations held by groups for the behaviour of individual members are the major generator of roles and it is learned through experience (Hoover-Dempsey and Sandler, 1997; Biddle, 1986). That is if mothers are expected to involve in their children more compared to the fathers, they are likely to get more involved than the fathers. Likewise, Gender Congruence Theory postulates that parents' roles such as the caregiver and the breadwinner are influenced by their spouses (Maurer et al., 2001) and by the behaviour of other same-sex parents (Maurer and Pleck, 2006). Therefore, mother and father involvement may be different if the expectation that is held toward them and their experiences are different.

Studies and surveys show different expectations towards mothers and fathers. Traditional

gender roles, such as women as caregivers and men as a breadwinner, are still rooted in many societies. For example, according to a survey conducted among Japanese men and women aged from the twenties to thirties, more than 80% answered they preferred wives do more chores than husbands (Cabinet Office Director General for Policies on Cohesive Society, 2015). Moreover, in school textbooks published in several different countries such as Britain, the United States, Singapore and Japan, females are presented as passive and home-oriented whereas males are presented as active and work-oriented (Jassey, 1998). It may imply children how women and men should behave. Researchers claim that these biases may have an impact on their values and personal and cognitive development (Jassey, 1998; Lee, 2014).

In several studies mothers are found to be more supportive and comforting compared to fathers who are more likely to encourage children to take risks, challenges and exploration (e.g., Paquette, 2004; Grossmann et al., 2002; Rogers et al., 2009). Since gender differences are products of socially constructed norms and values, these differences need to be interpreted with caution. However, as a matter of observable outcomes the findings suggest that fathers and mothers may influence their children differently even though both of them play an important role in their children's education. Besides, when their involvement is different, investigating both maternal and paternal involvement simultaneously may help to understand what involvement is more effective for their children's education.

Studies also suggest that mothers and fathers have different influences depending on the gender of their children. Same-gender parent-child relationship is closer than the opposite-gender one. For example, daughters report higher intimacy levels with mothers than fathers (Konishi and Kurokawa, 2007). Likewise, compared to female adolescents, male adolescents report significantly greater emotional and behavioural involvement with fathers (Harris et al., 1998). Other studies also find that girls are more involved with their mothers and boys with their fathers (Starrels, 1994; Crouter et al., 1995).

Only a limited number of studies investigated the effects of mothers and fathers' involvement in relation to their children's gender. Dumka et al. (2009) examined Mexican origin seventh graders and found no relationship between mothers and fathers involvement with male and female school grades. Only mothers' harsh parenting (defined as punitive actions aimed at demonstrating parents' superior position) was significantly related to their daughters' grade. However, the study does not examine both maternal and paternal involvement in the same model. Hence their independent associations are unknown.

2.3 Educational Aspiration

Educational aspiration, which is the highest level of education children would like to attain, is also important for children's education. Studies have reported that educational aspiration in children is a significant predictor of academic achievement (Leung et al., 2010; Jung and Zhang, 2016). A number of studies have examined the effects of parental involvement on children's educational aspiration and they have found positive associations (e.g., Hill et al., 2004; Berzin, 2010; Hill and Wang, 2015; Frostick et al., 2016; McNeal, 2015). For example, Hill and Wang (2015) found that parental monitoring is positively associated with aspiration. Also, McNeal (2015) found that parent-child discussion defined as discussing with parents about school programs, activities, and things studied in class positively predicted children's educational aspiration. However, most of the studies do not examine the effects of maternal and paternal involvement simultaneously.

Only a few studies have examined effects of mothers and fathers in the same study and the results are inconsistent. Lazarides et al. (2016) found that mothers' and fathers' high educational expectations for their children at 7^{th} year contributed to their children's high educational expectations at 9^{th} year positively. However, Geckova et al. (2010) found that mothers' support defined as closeness and availability for chatting does not predict secondary school students' academic aspiration, whereas fathers' support predicts it positively.

Marjoribanks (1998) examined mothers and fathers influence also considering the children's gender and found that mothers' support defined as encouragement for schooling positively associated with both female and male students academic aspiration but fathers' support was only associated with male students.

3. Purpose of the Present Study

The aim of the study is to examine the independent associations of maternal and paternal involvement, parental discussion and aspiration, with children's educational achievement. Also, the study takes into account the indirect associations of parental involvement and examines whether students' educational aspiration mediate the associations between parental involvement and adolescents' achievement. To investigate discussion topics that are more associated, the present study employs six different topics related to adolescents' schooling and their daily lives. It also investigates male and female students separately.

The present study looks into two research questions. 1) Is maternal and paternal involvement associated with adolescents' achievement and educational aspiration independently? 2) Does parental involvement have a more significant associations with same-sex academic grade and aspiration than opposite-sex one? It is expected that both maternal and paternal involvement are associated with adolescents' achievement and aspiration independently (Figure 1). However, it is hypothesised that associations between involvement, achievement and aspiration would be different by parents' gender. Since studies show that fathers are more likely to encourage children to face challenges (Paquette, 2004; Grossmann et al., 2002; Rogers et al., 2009), it is expected that the paternal involvement would have a stronger association on adolescents' educational aspiration. Also, based on the previous literature (Konishi and Kurokawa, 2007; Harris et al., 1998; Starrels, 1994; Crouter et al., 1995), it is hypothesised that same-sex parental involvement is strongly associated with academic grade and aspiration than opposite-sex one.

4. Method

4.1 Data

This study makes secondary use of the Survey of Life Attitudes of Parents and Children (2011)[1]. Sample was selected based on a two-stage stratified random method and the survey was conducted in autumn of 2011, generating a nationally representative data set containing 3,192 ninth graders (14 to 15 years old) and their 3,197 parents. Data collection was conducted by means of two questionnaires: in the students' questionnaire, students provided information on their characteristics (e.g., gender), their academic aspirations, and parental-child discussion. In the parents' questionnaires, either mothers or fathers of the target adolescents were questioned and they provided information such as their characteristics (e.g., educational background), household income, and family background. After excluding missing data, this study arrived at a final sample of 1,801 ninth grade students (861 female and 940 male) and their respective parents.

4.2 Variables

Grade

As a measure of academic achievement, students' grade was used. The measure of students' grade was based on the question from the students' questionnaires: "How are your grades compared to the students from your year?". Answers were coded as follows: 1 = lower, 2 = a little bit lower, 3 = average, 4 = a little bit higher, 5 = higher.

Educational Aspiration of Adolescents

The measure of students' educational aspiration was based on the question from students' questionnaires: "How far do you want to go in your education?". Original responses given

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were 1 = middle school, 2 = secondary school, 3 = vocational school 4 = technical college or junior college, 5 = university, 6 = graduate school. These responses were converted in total years of schooling (from elementary school) that students want to pursue: 9=middle school, 12 = secondary school, 14 = vocational school, technical college and junior college, 16 = university, 18 = graduate school.

Parent-child Discussion

Parent-child discussion was measured with six items from students' questionnaires. Students were asked to rate frequency of conversation regarding six different topics with their mothers and fathers: about episodes from school, about study and grades, about future and life course after graduation, about friends, about society and news, and about hobby and extracurricular activities. All items were rated on a four-level scale and they were coded as follow: 1 = do not talk about it at all, 2 = talk about it rarely, 3 = talk about it sometimes, and 4 = talk about it often.

Educational Expectation of Parents

The measure of parents' educational aspiration was based on the question from parents' questionnaires: "How far do you want your child to go in his/her education?" Respondents also answered their partner's educational aspiration. Responses given were 1 = middle school, 2 = secondary school, 3 = vocational school 4 = technical college or junior college, 5 = university, 6 = graduate school. These responses are converted in total years of schooling (from elementary school) as follows: middle school = 9, secondary school = 12, vocational school, technical college and junior college = 14, university = 16, graduate school = 18.

Control Variables

Several student and family background variables were included in the models to control statistically for important background factors: socioeconomic background, family structure and relationship, type of school, extracurricular activities and other.

Characteristics of adolescents' socioeconomic background are measured by the highest level of education completed by parents, employment status of parents, and household income. The highest level of education completed by the mother and father were asked to parents and the responses are converted in total years of schooling (from elementary school) for each and numbered as follow: middle school = 9, secondary school = 12, vocational school = 14, technical college or junior college = 14, university = 16, graduate school = 18. Type of employment of mothers and fathers was asked in the parents' questionnaires and is categorised as follows: management position (since number of mothers that is categorised in this type is scarce, this category was created only for fathers), regular employment, contractual employment, non-employed, other. Each type of employment status was dummy coded. Household income of the previous year was also reported by the parent. They were asked to choose from twelve ranges of income. For the purposes of this study, the ranges were converted into single numbers by averaging their upper and lower thresholds. All answers are in ten thousands of Japanese Yen: less than 100 = 50, between 100 and 200 = 150, between 200 and 250 = 225, between 250 and 300 = 275, between 300 and 350 = 325, between 350 and 400 = 375, between 400 and 550 = 475, 550 and 700 = 625, between 700 and 850 = 775, between 850 and 1000 = 925, between 1000 and 1200 = 1100, and more than 1200 = 1800.

Adolescents' family structure and relationship were measured by the number of siblings, how adolescents perceive their parents and the relationship between their mothers and fathers. Parents were asked the number of siblings of the adolescents. Students were asked if mothers would listen to them and advice in times of trouble. The same question was asked about fathers.

The dummy variable created for each answer was coded as 1 = yes and 0 = no. Students were also asked if they think that their parents get along well. The answers were rated on a five-level scale and coded as follow: 5 = yes, 4 = maybe yes, 3 = normal, 2 = maybe not, and 1 = no.

Types of school that adolescents were enrolled for were coded for each type of school: public school, national school, and private school.

Lessons adolescents take outside of school and hours of self-studying were also included as control variables. Parents were asked if their children take any lessons besides school: cram school, private teacher lessons, distance learning, and other lessons related to academic subjects such as English lessons and calculation on the abacus. Dummy variables were created for each type of lesson. Hours of study during weekdays and weekends was also measured. For hours of study during weekdays, students chose from six answers. The ranges were converted into single numbers by averaging their upper and lower thresholds. All answers are in hours: not at all = 0, less than 30 min = 0.15, more than 30 minutes and less than an hour = 0.45, more than 1 hour and less than 2 hours = 1.5, more than 2 hours and less than 3 hours = 2.5, and more than 3 hours = 4.5. As for hours of study on weekends, students chose from seven answers: not at all = 0, less than 30 min = 0.15, more than 30 minutes and less than an hour = 0.45, more than 1 hour and less than 2 hours = 1.5, more than 2 hours and less than 3 hours = 2.5, more than 3 hours and less than 4 hours = 3.5, and more than 4 hours = 6.

The city size where the adolescents live is categorised in 5 levels. This study uses the values shown in parenthesis which is the average (unit: ten thousand) between the maximum and minimum population in each size range: town and village = 1, a city that population is less than a hundred thousand = 5, a city where the population is more than hundred thousand = 15, a city where the population is more than two hundred thousand = 60, big city = 150.

The variables mentioned above were used to control adolescents' aspiration and grade except that extracurricular activities and hours of study during weekdays and weekends were

used only to control adolescents' aspiration and not grade. Each maternal and paternal involvement is controlled by income, their educational level, and type of their employment.

4.3 Estimation Method

Generalised structural equation modelling (GSEM), with an ordered logit link for estimating adolescents' grade, was used to analyse the effects of parental involvement. GSEM is a version of structural equation modelling (SEM) that allows for broader applications. SEM can depict relationships among variables by using various types of models and testing patterns of relationships among a set of observed and latent variables (Schumacker and Lomax, 2010). OLS regression is limited in that and it does not allow for simultaneous examination of multiple mediational chains (Bryan et al., 2007). SEM, on the other hand, examines direct and indirect associations simultaneously and tests multiple mediators, multiple dependent variables, complex mediational chains, and specific indirect associations within those complex chains (Bryan et al., 2007; Gunzler et al., 2013). Instrumental variables (IV) could be another option, but in order to use IV, the structure of the model has to be decided beforehand. SEM allows the examination of complex structured models more flexible. The GSEM for this model for the *i*th adolescents is given by:

$$Y_i^* = \gamma_0 + \gamma_1 A_i + \gamma_2 M_i + \gamma_3 P_i + \gamma_4 X_{1,i} + u_i \quad (1)$$

$$Y_i \begin{cases} 1 \;\; if \;\; Y_i^* \leq \mu_1 \\ 2 \;\; if \;\; \mu_1 < Y_i^* \leq \mu_2 \\ \vdots \\ 5 \;\; if \;\; \mu_4 < Y_i^* \end{cases}$$

$$A_i = \beta_0 + \beta_1 M_i + \beta_2 P_i + \beta_3 X_{2,i} + \varepsilon_i \quad (2)$$

$$P_i = \theta_0 + \theta_1 X_{3,i} + \epsilon_i \quad (3)$$

$$M_i = \delta_0 + \delta_1 X_{4,i} + \tau_i \quad (4)$$

Where:

Y_i^* = latent variable of adolescents' educational aspiration, whose values determine what the observed ordinal variable Y_i equals

Y_i = grade of adolescents *i*

A_i = educational aspiration of adolescents *i*

β_0 and γ_o = intercept

M_i = vector of maternal involvement variables

P_i = vector of paternal involvement variables

$X_{1,i}$ = vector of control variables for Eq. (1)

$X_{2,i}$ = vector of control variables for Eq. (2)

$X_{3,i}$ = vector of control variables for Eq. (3)

$X_{4,i}$ = vector of control variables for Eq. (4)

$\varepsilon_i$and u_i = residual term

The direct and indirect associations are all examined in a single model (see Figure 2) by using Eq. (1), (2), (3), and (4). The final models were decided among converged models based on Akaike Information Criterion (AIC) (Akaike, 1987). The AIC measure is used to compare models with differing numbers of latent variables. It aims to identify those models that represent a good compromise between model fit and model complexity and selects most relevant variables to prevent overfitting (Garamszegi and Mundry, 2014; Sauerbrei et al., 2007). Lower values for AIC indicate a better model fit. Therefore, some variables that are not important are dropped from the model based on the AIC. The results did not change significantly from the full model (see Appendix from Table A.1 to A.7 for the detailed results). Each value of AIC for the final models are as follows: for a female model (4894), for a male model (5791).

4.4 Descriptive Statistics

Table 1 provides the descriptive statistics for male and female adolescents. Overall, consistent with previous studies, involvement is more frequent between same-sex parent-adolescents: mothers tend to discuss with female adolescents more frequently compared to male adolescents and fathers tend to discuss with male adolescents more frequently than female adolescents. Likewise, more male adolescents answered that fathers would listen and give advice when they had problems compared to mothers and more female adolescents answered mothers would listen and give advice when they had problems compared to fathers. The descriptive statistics also show that both maternal and paternal aspiration is higher for male adolescents than female adolescents, which reflects traditional gender roles still common in Japan.

5. Results

The results are shown in Table 2 and 3 Results for male adolescents are illustrated in Figure 3 and results for female adolescents are illustrated in Figure 4. Each result is discussed at 5% significant level.

Male Adolescents

The results show that both maternal and paternal involvements are independently associated with male adolescents' grades and aspiration. Also, males' grades are indirectly associated with the positive relations of father-child discussion and parental aspiration (both mothers and fathers) on the adolescent's own aspiration.

As for the associations of parental discussion and grades, results show that discussing school related topics have significant and positive effects: discussing episodes from school with mothers and discussing study and grades with father have positive effects. That is male adolescents tend to get a higher grade as parents discuss school related matter more frequently.

On the other hand, discussing friends with mothers and discussing hobby and extracurricular activities with fathers are negatively associated with grades. For the effects of parental discussion on adolescents' aspiration, discussing future and life course after graduation with fathers is positive and discussing friends is negative. Discussing with mothers does not show significant associations.

As for the effects of parental aspiration, maternal aspiration is positively and significantly related to both grade and aspiration whereas paternal aspiration is only associated with aspiration. However, at 10% significance level, the relationship between paternal aspiration and grades is significant and positive.

Socioeconomic variables that were associated with grades are as follows. Higher levels of education for mothers are positively associated with male adolescent's grades. Among family structure and relationships variables, only relationship of parents has a positive sign. As for extracurricular activities, distance learning is positive, whereas a private teacher is negative. Hours of study during weekends are also positive. Finally, living in a larger city is negatively associated with male's grades. Among socioeconomic variables, fathers' contractual employment is negatively associated with male adolescents' aspiration and household income is positively associated with it. Type of school is not significantly associated with either grade or aspiration.

Female Adolescents

Likewise the results for male adolescents, results show that both maternal and paternal involvements are independently associated with grade and aspiration. Also, discussing specific topics with fathers and maternal and paternal aspiration are positively associated with grade indirectly through adolescents' educational aspiration.

As for the associations of parental discussion and grades, results are similar to male

adolescents. Discussing study and grades with mothers and fathers are positive, whereas discussing hobby and extracurricular activities with fathers are negative. Discussing with fathers about future and life course after graduation has also shown a negative association with grades. For the association between parental involvement and aspiration, discussing society and news with fathers is positively associated with aspiration. As well as the results for male adolescents, discussion with mothers is not significantly associated with aspiration.

As for the effects of parental aspiration, both maternal and paternal aspiration is significantly and positively associated with both grades and aspiration. Results show that both maternal and paternal aspiration is more significantly associated with aspiration (1% significance) than grades (5% significance).

Socioeconomic status is only associated with aspiration and not grades: a higher level of fathers' education and mothers' contractual work has positive associations. Unexpectedly, household income does not have a significant association with either grades or aspiration. As family structure and relationship, compared to the results of male adolescents, different associations are found. Unlike male adolescents, relationship of parents does not have significant effects. On the other hand, when mothers would listen and give advice when she had problems, it is positively associated with grades. Also, number of siblings is negatively associated with grades even though it is not significantly associated with male adolescents' one. As for extracurricular activities, like male adolescents, distance learning is positively associated with the grade. On the other hand, other activities and hours of studying do not have any significant effects. As well as male adolescents, type of school does not have a significant effect. The size of the city also does not have significant effects.

Robustness Check

Robustness of the results was examined for two types of parental involvement: parental

aspiration for male and female adolescents and discussion about study and grades for female adolescents. For these two types, parental involvement is significantly associated with educational outcome for both mothers and fathers and, therefore, there is a possibility that there are multicollinearity issues between maternal and paternal involvement variables (correlation of maternal and paternal aspiration is 0.7486 for females and 0.7048 for males and discussing study and grade is 0.4025).

Firstly, robustness check of the results of paternal aspiration was conducted for both male and female adolescents by dropping observations of mothers that have higher aspiration (533 observations for females and 728 observations for males whose maternal aspiration is 16 and 18 school years): the final sample is 328 for females and 212 for males. Results kept consistent with the original one. Secondly, robustness check of the results of maternal aspiration was conducted for both male and female adolescents by dropping observations of fathers that have higher aspiration (519 observations for females and 719 for males whose paternal aspiration is 16 and 18 school years): the final sample is 342 for females and 221 for males. The effects of the maternal aspiration were consistent with the original one except for female adolescents' grade: maternal aspiration was not significantly associated with female adolescents' grade. Further checks were conducted for female adolescents (total 861 observations) by dropping the variable of paternal aspiration and the results were the same of original one: maternal aspiration is positively and significantly associated with female adolescents' grade and aspiration. Therefore, it is possible that there is a correlation problem and the result of maternal aspiration on female grade might not be robust. Another possible explanation for this is that when paternal aspiration is lower, maternal aspiration is not significantly correlated with female adolescents' grade

Finally, robustness check of the results of discussion about study and grade was conducted for female adolescents. As for the effects of fathers, estimation results using the sample that

dropped mothers often discussing (dropped 430 observations coded as 4 leaving a final sample of 431) showed consistent results with the original one. Likewise, as for the effects of mothers, the estimation result using the sample that dropped fathers discussing it often (dropped 175 observations coded as 4 and the final sample is 765) shows the consistent results with the original one. All the estimation results are presented in Appendix (from Table A.8 to A.13).

6. Discussion

The present study investigates the associations of maternal and paternal involvement and adolescents' academic grade. It also examines the indirect associations of parental involvement and grades through adolescents' educational aspiration. Results show that maternal and paternal involvement are significantly associated with adolescents' grades independently. Also, adolescent's educational aspirations mediate the association between parental involvement and academic grade.

For the relationship between parental discussion and adolescents' grade, discussing study and grades with fathers is positive and significant for both female and male adolescents, whereas discussing it with mothers is only related to female adolescents. Also, discussing episodes from school with the mother is only positively related to male adolescents' grade. Even though these different associations between parental discussion and adolescents' grade are difficult to interpret, the topics that are related to adolescents' schooling seems to be more associated with academic grade compared to other topics.

For the relationship between parental discussion and adolescents' educational aspiration, discussion with fathers is significantly associated with educational aspiration whereas discussion with mothers is not significantly associated with it. It also implies that discussion with fathers is positively associated with academic grade through aspiration. Also, the topics that are positively associated with educational aspiration differ according to the children's gender. Discussing future and life course after graduation is positively associated with males

and discussing society and news with fathers is positively associated for females.

Some possible reasons are considered for this. For the effects of discussing future and life course after graduation with fathers, previous studies show that compared to mothers, fathers are more likely to encourage children to take risks, challenges and explorations (Paquette, 2004; Grossmann et al., 2002; Rogers et al., 2009). Even though gender is socially constructed (West and Zimmerman, 1987; Connell, 1987), these differences may influence adolescents differently. Therefore, it is likely that fathers tend to encourage male adolescents to embrace academic challenges when they discuss future and life course after graduation and it may enhance their academic aspiration. On the other hand, the topic is not significantly associated with female adolescents' aspiration. A possible reason is that fathers do not discuss with female adolescents in the same way as they do when they discuss with males because fathers have a relatively low aspiration towards females (see Table 1). Another explanation is that encouraging academic challenges may not be influential for females.

Two possible backgrounds are considered for the significant association between discussing society and news with fathers and female adolescents' aspiration. Firstly, it is possible that females are less likely to be able to imagine their success in business compared to males since traditional gender roles are still rooted in Japanese society. In addition to this, compared to men, women have fewer opportunities to acquire higher positions at a workplace. Studies indicate that Japanese women face steeper inequality as they move up to higher managerial positions (Yamaguchi, 2013; Yoosik and Yamaguchi, 2016). Indeed, women's percentage share of all managers in Japan is only 11.1%, while the United States shows 42.7% and the United Kingdom 34.2% (International Labour Office, 2015). Secondly, fathers may have more information regarding business compared to mothers. As it is shown, men have more opportunities to acquire higher positions at workplaces and it may enable them to gain more information about business and career. Therefore, for female adolescents, information about

society and news including business from fathers may enable them to imagine their success in business or raise their interests towards the outside world, and in turn, it enhances their aspiration. Also, since these conditions are socially constructed, mothers could also play the same roles as fathers if they had equal working opportunities as them.

For the relationships between parental aspiration and adolescents' grade and aspiration, maternal aspiration is significantly associated with both independent variables for both males and females. Paternal aspiration follows a similar pattern, except that it did not achieve a 5% significance level in the estimation of male's grades (it is significant at 10% level). A possible explanation for the more significant associations from maternal aspiration is that middle school students are more likely to spend time with their mothers (Ueno and Suzuki, 1994). Therefore, mothers may have more opportunities to influence their children's educational aspiration and grade than fathers do.

On the other hand, as for the relationship between parental aspiration and adolescents' aspiration, when the parent is the same sex as the child, the association is stronger: the coefficient of maternal aspiration is 0.367 for male adolescents and 0.441 for female adolescents, the coefficient for paternal aspiration is 0.344 for male adolescents and 0.207 for female adolescents. Likelihood ratio test was conducted to test the differences and the difference was significant at 5% significant level.

Some negative associations are also found. Discussing future and life course after graduation with fathers is negatively associated with female adolescents' grades. Taking into consideration the fact that fathers tend to have higher aspirations toward males, it is possible that the purpose of the discussion might be different depending on if fathers discuss it with female or male adolescents: fathers may discuss with males to encourage them to have higher aspirations, whereas they may discuss with females to intervene when they record bad grades.

Discussing friends has a negative association with male adolescents' educational outcome:

discussing it with mothers is negatively associated with grades and with fathers is negatively associated with aspiration. Mears et al. (1998) found that male adolescents are more likely to have delinquent friends and to be more strongly affected by them than females. Also, affiliating with friends who engaged in problem behaviour was associated with a lower level of academic achievement among middle school students (Véronneau, and Dishion, 2011). Therefore, it is likely possible that the negative associations imply parents' intervention for male adolescents' negative peer relations.

Also, discussing hobby and extracurricular activities with the father is negatively associated with both the male and female students' grade. On the other hand, discussing it with the mother is not significantly associated with them. Lam et al. (2012) found that fathers as compared to mothers are more involved in leisure (e.g., sports, outdoor play, hanging out) and media use activities (e.g., watching TV, reading magazines and newspapers), with their children. Therefore, it is possible that when they discuss hobby and extracurricular activities, it is more likely that they are discussing leisure and fun activities that are not related to academic achievement, which may distract their children from studying. Also, cautious interpretation of results is required because the sample of this study has only ninth graders and the data was collected in autumn. In Japan, competitive high school entrance examinations are administered in winter. Therefore, as ninth graders are preparing for exams, they are likely to be highly stressed and in such a situation, discussing hobby and extracurricular activities may distract them from studying and it is related to their grades and aspiration negatively.

Even though descriptive statistics largely show that mothers discuss with female adolescents more often than males and fathers discuss with male adolescent more frequently than females, results did not show strong tendencies of same-sex parent-adolescent associations between parental discussion and adolescents' educational grade and aspiration. The same-sex parent-adolescents association was found only between parental aspiration and adolescents'

aspiration. The results indicate that even though same-sex parent-adolescent relationship may be stronger in some associations, both maternal and paternal involvement are associated with adolescents' grade and aspiration regardless of their gender.

Limitation

Adolescents' grade was measured based on their reports on five items. Therefore, future studies need to use more objective indicators of achievement. Also, the grade of each subject is not known from the questionnaires and the study could not examine the association between parental involvements on scores of a specific subject. Additionally, concerning the explanation for the negative association of parental involvement, it is not possible to analyse whether a problem of inverse causal relationship explained the previous section applies to this case or not since cross-section data is used in the study. It is also possible that parents get involved more when their children receive good grades and have higher educational aspiration. In this study, it was impossible to analyse such causality because the data used in the present study does not include information on previous grades and achievements. Further study using panel data is needed in order to test the causal relationships. Nevertheless, by controlling for the adolescent socioeconomic status, this study provides important information on the role of mothers and fathers in adolescents' education.

7. Conclusion

The study investigated the associations between maternal and paternal involvement and adolescent's educational outcome. Samples of middle school students were analysed separately according to the adolescents' gender. The analyses were conducted by using a generalised structural equation modelling. The results show that both maternal and paternal involvement are associated with adolescent's academic outcome. Adolescent's educational aspirations mediate the association between parental involvement and academic grade. Also, discussion

topics that are related to adolescents' schooling are more significantly and positively associated with grade.

Results provide valuable insight for educators and policymakers as they develop policies to enhance children's education. Given the findings that both mothers and fathers are associated with adolescents' grades and aspiration, schools and policymakers may need to develop policies to encourage both maternal and paternal involvement. For example, schools can provide seminars for parents to encourage discussion with their children about their study and to learn how to discuss plans for high school entrance exams. Also, public policies designed to increase the time that working parents spend time with their children can be useful as well.

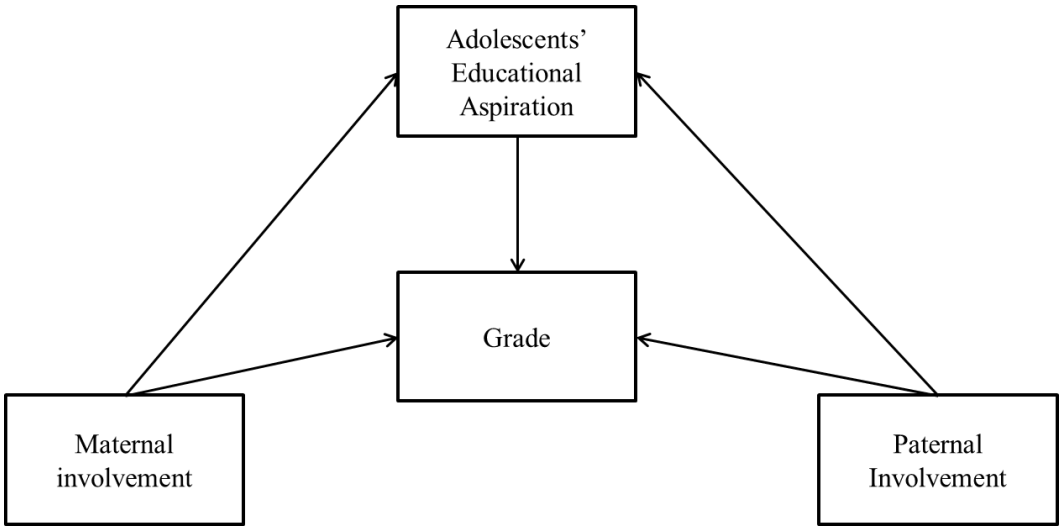

Figure 1 Hypothesised Model

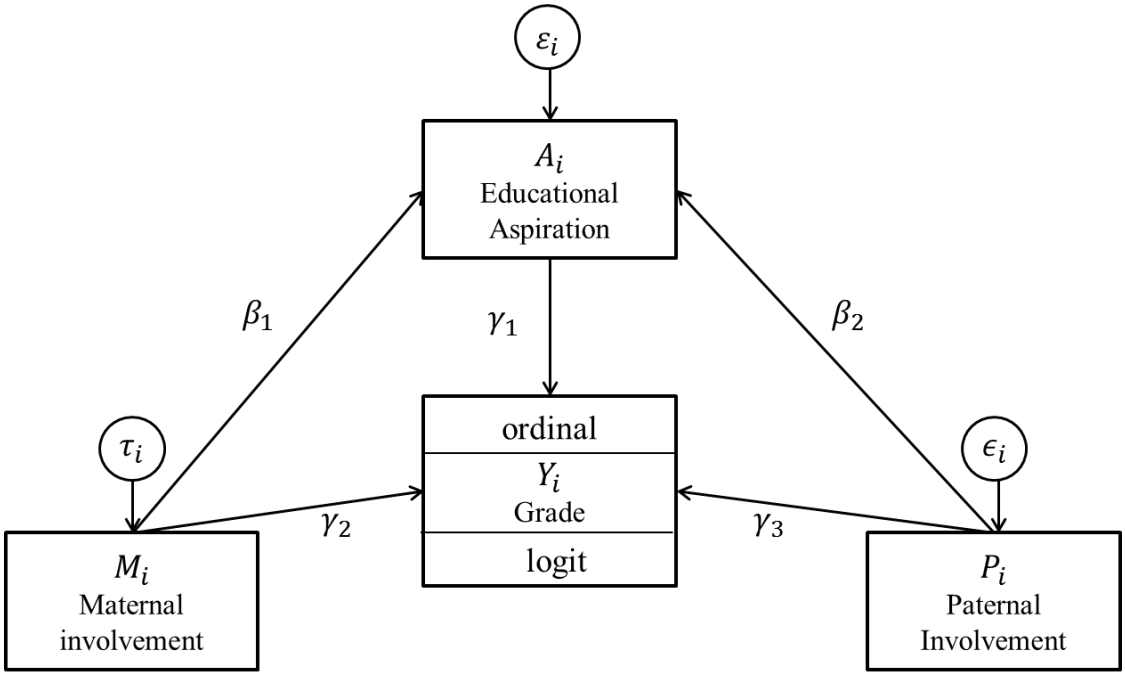

Figure 2 Model of the Associations of Maternal and Paternal Involvement on Adolescents' Educational Outcome

Control variables are omitted from the figure to facilitate visualization.

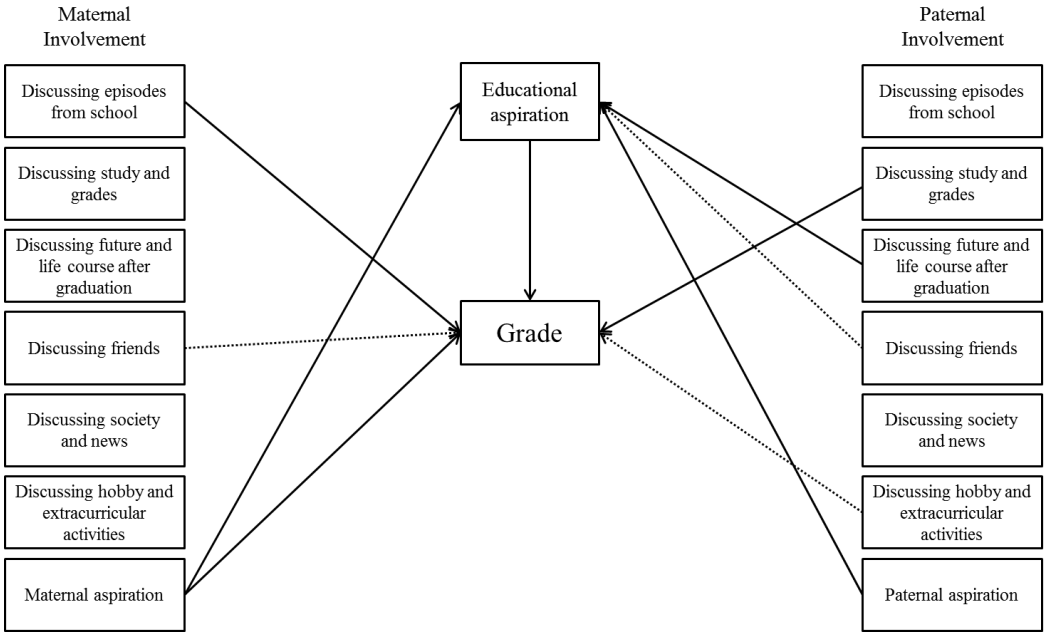

Figure 3 Results for Male Students

GSEM depicting mediation effects of educational aspiration between parental involvement and grade for male students. Solid lines represent positive associations and dotted lines represent negative associations. Only significant paths ($p<.05$) are shown.

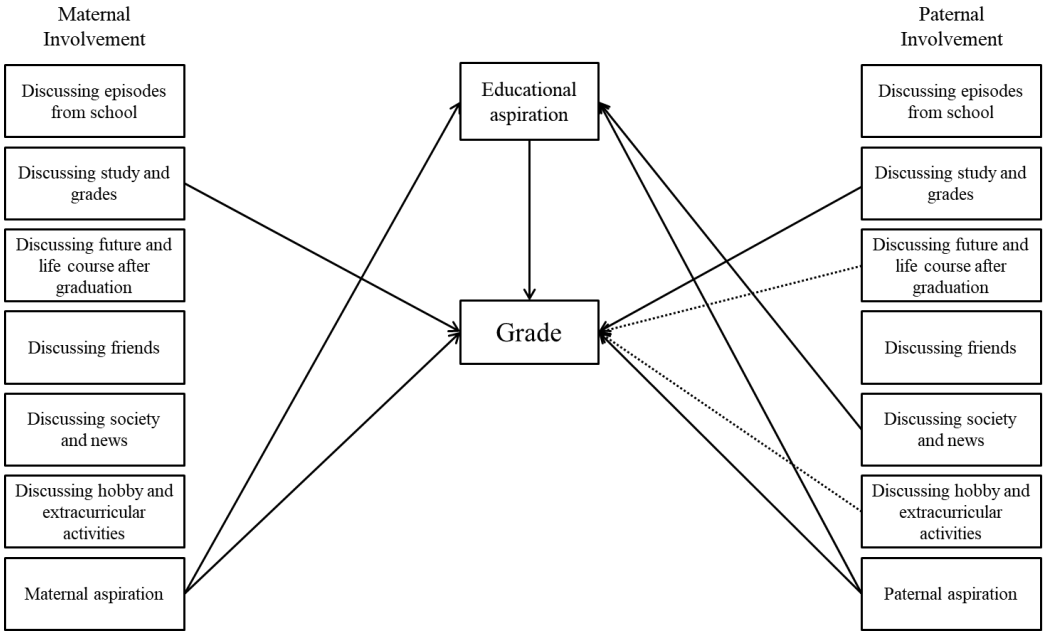

Figure 4 Results for Female Students

GSEM depicting mediation effects of educational aspiration between parental involvement and grade for female students. Solid lines represent positive associations and dotted lines represent negative associations. Only significant paths ($p<.05$) are shown.

Table 1 Descriptive Statistics
(Male: N= 940, Female: N=861)

	Male				Female			
Variable	Mean	Std. Dev.	Min	Max	Mean or %	Std. Dev.	Min	Max
Grade	3.09	1.31	1	5	3.12	1.24	1	5
Adolescents' educational aspiration	15.12	1.79	9	18	15.02	1.48	9	18
Discussion								
Mother: about episodes from school	3.08	0.84	1	4	3.52	0.71	1	4
Mother: about study and grades	3.18	0.78	1	4	3.35	0.76	1	4
Mother: future and life course after graduation	3.09	0.83	1	4	3.28	0.80	1	4
Mother: about friends	2.88	0.92	1	4	3.30	0.86	1	4
Mother: about society and news	2.44	0.96	1	4	2.54	0.94	1	4
Mother: about hobby and extracurricular activities	2.71	0.97	1	4	2.93	1.00	1	4
Father: about episodes from school	2.48	0.94	1	4	2.53	0.99	1	4
Father: about study and grades	2.74	0.92	1	4	2.66	0.96	1	4
Father: future and life course after graduation	2.71	0.93	1	4	2.52	0.96	1	4
Father: about friends	2.29	0.97	1	4	2.21	1.01	1	4
Father: about society and news	2.44	1.01	1	4	2.37	1.00	1	4
Father: about hobby and extracurricular activities	2.53	1.02	1	4	2.34	1.01	1	4
Maternal aspiration	15.38	1.47	12	18	14.99	1.50	12	18
Paternal aspiration	15.28	1.63	9	18	14.85	1.63	12	18
Years of education completed by mother	13.62	1.77	9	18	13.51	1.65	9	18
Years of education completed by father	14.12	2.28	9	18	13.96	2.22	9	18
Mother: regular employment	0.19		0	1	0.20		0	1
Mother: contractual employment	0.51		0	1	0.52		0	1
Mother: other	0.07		0	1	0.07		0	1
Mother: non-employed	0.24		0	1	0.21		0	1
Father: regular employment	0.78		0	1	0.78		0	1
Father: contractual employment	0.06		0	1	0.05		0	1
Father: directors	0.03		0	1	0.05		0	1
Father: other	0.12		0	1	0.11		0	1
Father: non-employed	0.01		0	1	0.02		0	1
Household income	748.96	411.19	50	1800	699.91	378.39	50	1800
Father listens to adolescent and gives advice	0.53		0	1	0.33		0	1
Mother listens to adolescent and gives advice	0.67		0	1	0.72		0	1
Relationships of parents	3.97	1.11	1	5	3.96	1.11	1	5
Number of siblings	1.36		0	4	1.36	0.81	0	5
Public school	0.01		0	1	0.02		0	1
National school	0.11		0	1	0.10		0	1
Private school	0.87		0	1	0.88		0	1
Cram school	0.66		0	1	0.65		0	1
Private teacher	0.05		0	1	0.05		0	1
Distance learning	0.11		0	1	0.15		0	1
Lessons related with academic subjects	0.03		0	1	0.07		0	1
Hours of study during weekdays	1.95	1.44	0	4.5	2.25	1.40	0	4.5
Hours of study during weekends	2.87	2.58	0	7	3.30	2.55	0	7
Size of city	52.39	57.73	1	150	52.96	56.21	1	150

Table 2 Results of GSEM

	Model 1 Male		Model 2 Female	
Variables	Grade	Aspiration	Grade	Aspiration
Adolescents' educational aspiration	0.372***		0.375***	
	(0.048)		(0.062)	
Discussion				
Mother: episodes from school	0.268***	0.0909		
	(0.097)	(0.056)		
Mother: about study and grades			0.327***	
			(0.102)	
Mother: future and life course after graduation	0.167*			
	(0.090)			
Mother: about friends	-0.191**			
	(0.086)			
Mother: about society and news				
Mother: about hobby and extracurricular activities				
Father: about episode from school			-0.135	
			(0.090)	
Father: about study and grades	0.322***		0.367***	
	(0.095)		(0.109)	
Father: future and life course after graduation	-0.177*	0.135**	-0.260**	
	(0.101)	(0.054)	(0.103)	
Father: about friends		-0.151***		-0.0755*
		(0.053)		(0.039)
Father: about society and news	0.103		0.137*	0.168***
	(0.073)		(0.078)	(0.040)
Father: about hobby and extracurricular activities	-0.209***	0.0886*	-0.158**	
	(0.075)	(0.051)	(0.081)	
Maternal aspiration	0.160***	0.367***	0.161**	0.441***
	(0.062)	(0.042)	(0.070)	(0.036)
Paternal aspiration	0.0938*	0.344***	0.139**	0.207***
	(0.055)	(0.039)	(0.062)	(0.035)
Years of education completed by mother	0.0785**			
	(0.038)			
Years of education completed by father		0.0405*		0.0666***
		(0.023)		(0.018)
Employment status (ref. non-employed)				
Mother: regular employment			0.257	
			(0.159)	
Mother: contractual employment				0.153**
				(0.073)
Mother: other				
Father: regular employment			0.303*	
			(0.171)	
Father: contractual employment		-0.586**	0.520	
		(0.248)	(0.325)	
Father: directors				0.245
				(0.164)
Father: other				

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Effect of maternal aspiration on female adolescents' grade has to be taken cautiously since it might not be robust.

Table 3 Results of GSEM (Continuous Part from Table 2)

	Model 1 Male		Model 2 Female	
Variables	Grade	Aspiration	Grade	Aspiration
Household income		0.000318***		
		(0.000)		
Father listens to adolescent and gives advice				
Mother listens to adolescent and gives advice			0.467***	
			(0.155)	
Relationships of parents	0.152***			
	(0.059)			
Number of siblings	0.140*		-0.228***	
	(0.084)	(0.059)	(0.083)	
Type of school (ref. public school)				
Private school				
National school				
Cram school		0.155*		
		(0.092)		
Private teacher	-1.044***		-0.555*	
	(0.279)		(0.304)	
Distance learning	0.380**		0.668***	
	(0.193)		(0.181)	
Lessons related with academic subjects	0.631*			
	(0.373)			
Hours of study during weekdays			0.100	
			(0.063)	
Hours of study during weekends	0.184***		0.0543	
	(0.026)		(0.035)	
Size of city	-0.00247**	0.00126*		
	(0.001)	(0.001)		
Constant		2.856***		4.079***
		(0.529)		(0.394)
Observations	940	940	861	861

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: AIC for Model 1 = 5791 and for Model 2 = 4894.

Appendix

Table A. 1 The Paths of the Parental Involvement that Changed Significance When Estimating Models with All the Variables

Variables	Significance of the final model	Significance of the model with all variables
Female		
Mother: discussion about study and grade → grade (+)	1%	5%
Male		
Father: discussion about future and life course after graduation → grade (-)	10%	5%
Father: discussion about future and life course after gradutaion → aspiration (+)	5%	10%
Father: discussion about friends → aspiration (-)	1%	Not significant
Maternal aspiration → grade (+)	1%	5%

Note: The table shows the paths of parental involvement that had changes at the level which they are significant. The results of estimations using all the control variables are consistent with the final results except that differences of p-value are found in the paths shown in the table above. Estimation results are presented in Appendix B from Table A.2 to Table A.7.

Table A. 2 Results of GSEM for Males with All the Control Variables

	Model 1b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Adolescents' educational aspiration	0.377***															
	(0.049)															
Discussion																
(M1) Mother: episodes from school	0.325***	0.153*														
	(0.116)	(0.081)														
(M2) Mother: about study and grades	-0.0455	0.0741														
	(0.120)	(0.084)														
(M3) Mother: future and life course after graduation	0.205*	-0.0638														
	(0.110)	(0.077)														
(M4) Mother: about friends	-0.262**	-0.0870														
	(0.104)	(0.071)														
(M5) Mother: about society and news	0.00212	0.0249														
	(0.088)	(0.062)														
(M6) Mother: about hobby and extracurricular activities	0.0295	0.0266														
	(0.093)	(0.065)														
(F1) Father: about episode from school	-0.0594	-0.0841														
	(0.110)	(0.077)														
(F2) Father: about study and grades	0.331***	0.0561														
	(0.108)	(0.075)														
(F3) Father: future and life course after graduation	-0.221**	0.128*														
	(0.106)	(0.074)														
(F4) Father: about friends	0.118	-0.0904														
	(0.104)	(0.072)														
(F5) Father: about society and news	0.0927	0.00936														
	(0.088)	(0.062)														
(F6) Father: about hobby and extracurricular activities	-0.231***	0.0739														
	(0.089)	(0.063)														
(MA) Maternal aspiration	0.160**	0.367***														
	(0.063)	(0.043)														
(FA) Paternal aspiration	0.0801	0.340***														
	(0.057)	(0.040)														
Years of education completed by mother	0.0691	-0.00449	-0.00541	0.0119	-0.00148	-0.0171	0.0323*	0.0345*	0.227***							
	(0.046)	(0.032)	(0.017)	(0.016)	(0.017)	(0.019)	(0.019)	(0.020)	(0.027)							
Years of education completed by father	0.0303	0.0448*								-0.00786	0.0321**	0.0169	-0.00663	0.0561***	0.00157	0.329***
	(0.039)	(0.027)								(0.015)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)	(0.022)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A. 3 Results of GSEM for Males with All the Control Variables (Continuous Part from Table A.2)

	Model 1b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Employment status (ref. non-employed)																
Mother: regular employment	-0.195	0.118	-0.150*	-0.0806	-0.0908	-0.142	-0.100	-0.00153	-0.283**							
	(0.193)	(0.137)	(0.085)	(0.080)	(0.085)	(0.094)	(0.097)	(0.099)	(0.135)							
Mother: contractual employment	-0.167	-0.0115	-0.0992	-0.00182	-0.0346	-0.103	-0.137*	-0.0502	0.0295							
	(0.156)	(0.109)	(0.069)	(0.064)	(0.068)	(0.075)	(0.078)	(0.079)	(0.108)							
Mother: other	-0.181	0.0703	0.0293	0.0531	-0.223*	-0.143	-0.0294	0.0702	0.243							
	(0.290)	(0.203)	(0.120)	(0.112)	(0.120)	(0.132)	(0.137)	(0.139)	(0.190)							
Father: regular employment	0.283	0.284								-0.522*	-0.0432	-0.222	-0.272	-0.285	-0.0108	1.062**
	(0.524)	(0.423)								(0.300)	(0.291)	(0.295)	(0.308)	(0.318)	(0.325)	(0.441)
Father: contractual employment	0.512	-0.333								-0.844**	-0.298	-0.547	-0.571	-0.568	-0.402	1.405***
	(0.622)	(0.483)								(0.343)	(0.333)	(0.337)	(0.352)	(0.363)	(0.372)	(0.504)
Father: directors	0.276	0.0671								-0.440	0.0303	-0.0640	-0.144	-0.176	0.0541	1.031**
	(0.580)	(0.457)								(0.325)	(0.316)	(0.319)	(0.334)	(0.344)	(0.352)	(0.477)
Father: other	0.303	0.325								-0.482	0.0203	-0.237	-0.285	-0.0880	0.0963	1.187***
	(0.549)	(0.439)								(0.310)	(0.301)	(0.305)	(0.319)	(0.329)	(0.336)	(0.456)
Household income	4.93e-05	0.000289**	6.79e-05	0.000142**	4.68e-05	5.80e-05	2.28e-05	7.80e-05	0.000907***	4.33e-06	0.000157*	6.56e-05	-9.52e-05	0.000177**	8.82e-05	0.000525***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Father listens to adolescent and gives advice	0.131	0.0155														
	(0.181)	(0.126)														
Mother listens to adolescent and gives advice	-0.128	-0.0962														
	(0.189)	(0.131)														
Relationships of parents	0.144**	0.00294														
	(0.061)	(0.043)														
Number of siblings	0.127	-0.108*														
	(0.086)	(0.060)														
Type of school (ref. public school)																
Private school	-0.325	0.0263														
	(0.229)	(0.150)														
National school	0.224	-0.292														
	(0.517)	(0.383)														
Cram school	-0.183															
	(0.157)															
Private teacher	-1.107***															
	(0.293)															
Distance learning	0.300															
	(0.204)															
Lessons related with academic subjects	0.650*															
	(0.379)															

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A. 4 Results of GSEM for Males with All the Control Variables (Continuous Part from Table A.3)

	Model 1b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Hours of study during weekdays	0.0926															
	(0.064)															
Hours of study during weekends	0.149***															
	(0.034)															
Size of city	-0.00238**	0.00127														
	(0.001)	(0.001)														
Constant		2.650***	3.184***	2.921***	3.124***	3.157***	2.074***	2.205***	11.64***	3.104***	2.209***	2.647***	2.725***	1.778***	2.446***	9.168***
		(0.703)	(0.223)	(0.208)	(0.222)	(0.244)	(0.253)	(0.257)	(0.352)	(0.353)	(0.343)	(0.347)	(0.363)	(0.374)	(0.383)	(0.518)
Observations	940	940	940	940	940	940	940	940	940	940	940	940	940	940	940	940

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: AIC for Model 1b = 42559.

Table A. 5Results of GSEM for Females with All the Control Variables

	Model 2b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Adolescents' educational aspiration	0.382***															
	(0.062)															
Discussion																
(M1) Mother: episodes from school	-0.0147	-0.0123														
	(0.138)	(0.077)														
(M2) Mother: about study and grades	0.334**	0.0422														
	(0.133)	(0.072)														
(M3) Mother: future and life course after graduation	-0.0489	-0.0285														
	(0.125)	(0.068)														
(M4) Mother: about friends	0.0120	0.0160														
	(0.111)	(0.062)														
(M5) Mother: about society and news	-0.00618	-0.00105														
	(0.095)	(0.052)														
(M6) Mother: about hobby and extracurricular activities	0.0548	-0.00835														
	(0.094)	(0.053)														
(F1) Father: about episode from school	-0.117	0.0193														
	(0.115)	(0.064)														
(F2) Father: about study and grades	0.372***	-0.0450														
	(0.116)	(0.064)														
(F3) Father: future and life course after graduation	-0.239**	0.0484														
	(0.116)	(0.065)														
(F4) Father: about friends	-0.0518	-0.0779														
	(0.104)	(0.058)														
(F5) Father: about society and news	0.131	0.169***														
	(0.090)	(0.049)														
(F6) Father: about hobby and extracurricular activities	-0.166*	-0.0171														
	(0.099)	(0.055)														
(MA) Maternal aspiration	0.159**	0.433***														
	(0.071)	(0.037)														
(FA) Paternal aspiration	0.152**	0.204***														
	(0.066)	(0.035)														
Years of education completed by mother	0.0450	0.0221	0.00428	0.0395**	0.0214	-0.00750	-0.0101	0.0101	0.244***							
	(0.049)	(0.028)	(0.016)	(0.017)	(0.018)	(0.019)	(0.021)	(0.022)	(0.031)							
Years of education completed by father	-0.0466	0.0519**								0.0155	0.0560***	0.0373**	0.00260	0.0382**	0.00704	0.289***
	(0.039)	(0.022)								(0.017)	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.024)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A. 6 Results of GSEM for Females (Continuous Part from Table A.5)

	Model 2b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Employment status (ref. non-employed)																
Mother: regular employment	0.297	0.0210	-0.156**	-0.0121	0.0466	-0.0526	-0.0248	-0.0250	-0.0487							
	(0.206)	(0.116)	(0.076)	(0.081)	(0.086)	(0.092)	(0.100)	(0.107)	(0.147)							
Mother: contractual employment	0.0561	0.178*	-0.0940	0.0635	0.0720	-0.0257	0.0251	0.0863	-0.206*							
	(0.170)	(0.096)	(0.063)	(0.067)	(0.071)	(0.076)	(0.083)	(0.088)	(0.121)							
Mother: other	-0.0814	0.226	-0.113	0.0653	0.0304	0.141	0.102	0.290*	-0.0735							
	(0.295)	(0.173)	(0.105)	(0.113)	(0.119)	(0.128)	(0.139)	(0.148)	(0.205)							
Father: regular employment	0.326	0.0995								-0.369	-0.253	-0.186	-0.352	-0.235	0.0495	0.281
	(0.496)	(0.263)								(0.243)	(0.233)	(0.236)	(0.249)	(0.245)	(0.249)	(0.353)
Father: contractual employment	-0.0577	0.0413								-0.251	-0.194	-0.133	-0.143	-0.196	0.0500	0.739*
	(0.572)	(0.308)								(0.285)	(0.274)	(0.278)	(0.293)	(0.288)	(0.293)	(0.415)
Father: directors	0.585	0.339								-0.201	-0.129	-0.243	-0.328	-0.303	0.282	0.603
	(0.571)	(0.307)								(0.284)	(0.273)	(0.276)	(0.292)	(0.287)	(0.292)	(0.413)
Father: other	0.113	-0.0945								-0.272	-0.0711	-0.00635	-0.206	-0.127	0.182	0.174
	(0.529)	(0.282)								(0.259)	(0.249)	(0.252)	(0.266)	(0.262)	(0.266)	(0.377)
Household income	-8.23e-06	2.65e-05	0.000220***	7.77e-05	-6.73e-06	0.000149*	0.000257***	0.000172*	0.000760***	0.000126	0.000122	6.38e-05	-1.11e-07	0.000141	8.39e-05	0.000676***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Father listens to adolescent and gives advice	-0.170	-0.120														
	(0.167)	(0.095)														
Mother listens to adolescent and gives advice	0.515***	0.117														
	(0.179)	(0.099)														
Relationships of parents	0.0809	0.00369														
	(0.065)	(0.036)														
Number of siblings	-0.251***	0.0317														
	(0.084)	(0.046)														
Type of school (ref. public school)																
Private school	-0.138	0.161														
	(0.231)	(0.124)														
National school	-0.146	0.127														
	(0.447)	(0.269)														
Cram school	-0.00549															
	(0.160)															
Private teacher	-0.544*															
	(0.316)															
Distance learning	0.651***															
	(0.194)															
Lessons related with academic subjects	0.314															
	(0.249)															

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A. 7 Results of GSEM for Females (Continuous Part from Table A.6)

	Model 2b															
Variables	Grade	Aspiration	M1	M2	M3	M4	M5	M6	MA	F1	F2	F3	F4	F5	F6	FA
Hours of study during weekdays	0.0898															
	(0.067)															
Hours of study during weekends	0.0605*															
	(0.036)															
Size of city	-0.00140	0.000161														
	(0.001)	(0.001)														
Constant		3.845***	3.392***	2.730***	2.950***	3.312***	2.481***	2.609***	11.29***	2.563***	2.014***	2.115***	2.494***	1.954***	2.106***	10.03***
		(0.537)	(0.207)	(0.222)	(0.234)	(0.251)	(0.273)	(0.292)	(0.402)	(0.319)	(0.307)	(0.311)	(0.328)	(0.323)	(0.328)	(0.465)
Observations	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861	861

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: AIC for Model 2b = 38457.

Table A. 8 Results of Robustness Checks for Males

Model 1c (N = 221): Result of estimation after dropping observations of paternal aspiration of 16 and 18 school years
Model 1d (N = 212): Result of estuation after dropping observations of maternal aspiration of 16 and 18 school years

	Model 1c		Model 1d	
Variables	Grade	Aspiration	Grade	Aspiration
Adolescents' educational aspiration	0.280***		0.260***	
	(0.089)		(0.091)	
Discussion				
Mother: episodes from school	-0.00853	-0.0878	0.151	-0.292**
	(0.200)	(0.133)	(0.225)	(0.140)
Mother: about study and grades				
Mother: future and life course after graduation	0.309		0.144	
	(0.200)		(0.203)	
Mother: about friends	-0.224		-0.382**	
	(0.187)		(0.193)	
Mother: about society and news				
Mother: about hobby and extracurricular activities				
Father: about episode from school				
Father: about study and grades	0.350*		0.226	
	(0.191)		(0.198)	
Father: future and life course after graduation	-0.172	-0.0467	-0.0223	0.174
	(0.217)	(0.132)	(0.228)	(0.127)
Father: about friends		-0.119		-0.00521
		(0.131)		(0.125)
Father: about society and news	0.271*		0.421**	
	(0.161)		(0.178)	
Father: about hobby and extracurricular activities	-0.233	0.273**	-0.290*	0.201
	(0.170)	(0.127)	(0.176)	(0.123)
Maternal aspiration	0.198**	0.322***	0.230	0.459***
	(0.097)	(0.071)	(0.160)	(0.116)
Paternal aspiration	0.0867	0.343***	0.0777	0.225***
	(0.152)	(0.125)	(0.092)	(0.073)
Years of education completed by mother	0.00419		-0.00682	
	(0.096)		(0.095)	
Years of education completed by father		-0.0482		-0.0265
		(0.059)		(0.058)
Employment status (ref. non-employed)				
Mother: regular employment				
Mother: contractual employment				
Mother: other				
Father: regular employment				
Father: contractual employment		-0.572		-0.644
		(0.493)		(0.460)
Father: directors				
Father: other				

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A. 9 Results of Robustness Checks for Males (Continuous Part from Table A.8)

	Model 1b		Model 1c	
	Grade	Aspiration	Grade	Aspiration
Variables				
Household income		0.000324		0.000244
		(0.000)		(0.000)
Father listens to adolescent and gives advice				
Mother listens to adolescent and gives advice				
Relationships of parents	0.214		0.186	
	(0.133)		(0.137)	
Number of siblings	0.291*	-0.184	0.394**	-0.188
	(0.161)	(0.124)	(0.173)	(0.128)
Type of school (ref. public school)				
Private school				
National school				
Cram school		0.271		-0.179
		(0.217)		(0.215)
Private teacher	-0.879		-1.703***	
	(0.641)		(0.637)	
Distance learning	0.441		0.699	
	(0.439)		(0.471)	
Lessons related with academic subjects	-12.90		-0.354	
	(523.000)		(1.389)	
Hours of study during weekdays				
Hours of study during weekends	0.335***		0.420***	
	(0.069)		(0.075)	
Size of city	-0.00430	0.000223	-0.00256	0.000219
	(0.003)	(0.002)	(0.003)	(0.002)
Constant		5.090***		4.845***
		(1.587)		(1.518)
Observations	221	221	212	212

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A. 10 Results of Robustness Checks for Females: Parental Aspiration

Model 2c (N = 342): Result of estimation after dropping observations of paternal aspiration of 16 and 18 school years
Model 2d (N = 328): Result of estuation after dropping observations of maternal aspiration of 16 and 18 school years
Model 2e (N = 861): Result of estimation that dropped the variable of paternal aspiration

	Model 2c		Model 2d		Model 2e	
Variables	Grade	Aspiration	Grade	Aspiration	Grade	Aspiration
Adolescents' educational aspiration	0.347***		0.206**		0.409***	
	(0.082)		(0.086)		(0.060)	
Discussion						
Mother: episodes from school						
Mother: about study and grades	0.213		0.184		0.326***	
	(0.159)		(0.165)		(0.103)	
Mother: future and life course after graduation						
Mother: about friends						
Mother: about society and news						
Mother: about hobby and extracurricular activities						
Father: about episode from school	-0.143		-0.0180		-0.147*	
	(0.138)		(0.140)		(0.089)	
Father: about study and grades	0.427**		0.498***		0.388***	
	(0.170)		(0.180)		(0.108)	
Father: future and life course after graduation	-0.279*		-0.412**		-0.260**	
	(0.167)		(0.170)		(0.103)	
Father: about friends		-0.0965		-0.0810		-0.0845**
		(0.074)		(0.076)		(0.040)
Father: about society and news	0.00381	0.200**	0.0107	0.172**	0.140*	0.179***
	(0.129)	(0.079)	(0.129)	(0.081)	(0.078)	(0.041)
Father: about hobby and extracurricular activities	0.0206		-0.0530		-0.166**	
	(0.130)		(0.135)		(0.080)	
Maternal aspiration	0.109	0.435***	-0.0943	0.255***	0.248***	0.592***
	(0.089)	(0.056)	(0.129)	(0.085)	(0.058)	(0.027)
Paternal aspiration	-0.0375	0.176**	0.184**	0.274***		
	(0.115)	(0.077)	(0.094)	(0.062)		
Years of education completed by mother						0.0964***
						(0.018)
Years of education completed by father		0.0110		0.0404		
		(0.037)		(0.036)		
Employment status (ref. non-employed)						
Mother: regular employment	0.445*		0.621**		0.263*	
	(0.268)		(0.285)		(0.159)	
Mother: contractual employment		0.0863		0.0140		0.160**
		(0.142)		(0.144)		(0.074)
Mother: other						
Father: regular employment	0.359		0.450*		0.303*	
	(0.250)		(0.266)		(0.171)	
Father: contractual employment						
Father: directors	0.000379	0.429	0.864	0.639*	0.556*	0.315*
	(0.620)	(0.415)	(0.584)	(0.351)	(0.325)	(0.167)
Father: other						

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A. 11 Results of Robustness Checks for Females: Parental Aspiration (Continuous Part from Table A.10)

	Model 2b		Model 2c		Model 2d	
	Grade	Aspiration	Grade	Aspiration	Grade	Aspiration
Variables						
Household income						
Father listens to adolescent and gives advice						
Mother listens to adolescent and gives advice	0.741***		0.663***		0.458***	
	(0.248)		(0.249)		(0.155)	
Relationships of parents						
Number of siblings	-0.231*		-0.0745		-0.233***	
	(0.127)		(0.133)		(0.083)	
Type of school (ref. public school)						
Private school						
National school						
Cram school						
Private teacher	0.0555		-0.0270		-0.521*	
	(0.455)		(0.405)		(0.302)	
Distance learning	0.444		0.353		0.646***	
	(0.301)		(0.334)		(0.180)	
Lessons related with academic subjects						
Hours of study during weekdays	0.0320		0.0935		0.107*	
	(0.105)		(0.109)		(0.063)	
Hours of study during weekends	0.0835		0.109*		0.0570	
	(0.061)		(0.064)		(0.035)	
Size of city						
Constant		5.261***		6.001***		4.455***
		(1.030)		(1.046)		(0.397)
Observations	342	342	328	328	861	861

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A. 12 Results of Robustness Checks for Females: Discussion about Study and Grade

Model 2c (N = 686): Result of estimation after dropping observations of discussing study and grade with fathers often (coded as 4)
Model 2d (N = 431): Result of estimation after dropping observations of discussing study and grade with mothers often (coded as 4)

	Model 2f		Model 2g	
Variables	Grade	Aspiration	Grade	Aspiration
Adolescents' educational aspiration	0.335***		0.358***	
	(0.068)		(0.084)	
Discussion				
Mother: episodes from school				
Mother: about study and grades	0.308***		0.0901	
	(0.108)		(0.185)	
Mother: future and life course after graduation				
Mother: about friends				
Mother: about society and news				
Mother: about hobby and extracurricular activities				
Father: about episode from school	-0.127		-0.158	
	(0.101)		(0.131)	
Father: about study and grades	0.500***		0.523***	
	(0.137)		(0.161)	
Father: future and life course after graduation	-0.336***		-0.246	
	(0.119)		(0.151)	
Father: about friends		-0.0835*		-0.0715
		(0.046)		(0.059)
Father: about society and news	0.124	0.165***	0.0288	0.149**
	(0.088)	(0.046)	(0.115)	(0.063)
Father: about hobby and extracurricular activities	-0.216**		-0.0664	
	(0.092)		(0.121)	
Maternal aspiration	0.174**	0.432***	0.212**	0.336***
	(0.076)	(0.040)	(0.093)	(0.054)
Paternal aspiration	0.171**	0.207***	0.0350	0.267***
	(0.069)	(0.038)	(0.090)	(0.052)
Years of education completed by mother				
Years of education completed by father		0.0642***		0.0963***
		(0.020)		(0.027)
Employment status (ref. non-employed)				
Mother: regular employment	0.185		0.426*	
	(0.176)		(0.219)	
Mother: contractual employment		0.138*		0.146
		(0.083)		(0.109)
Mother: other				
Father: regular employment	0.359*		0.445*	
	(0.192)		(0.241)	
Father: contractual employment				
Father: directors	0.513	0.290	0.427	0.274
	(0.369)	(0.193)	(0.437)	(0.237)
Father: other				

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A. 13 Results of Robustness Checks for Females: Discussion about Study and Grade (Continuous Part from Table A.12)

	Model 2e		Model 2f	
	Grade	Aspiration	Grade	Aspiration
Variables				
Household income				
Father listens to adolescent and gives advice				
Mother listens to adolescent and gives advice	0.471***		0.363*	
	(0.169)		(0.193)	
Relationships of parents				
Number of siblings	-0.129		-0.183*	
	(0.092)		(0.109)	
Type of school (ref. public school)				
Private school				
National school				
Cram school				
Private teacher	-0.330		-0.0802	
	(0.332)		(0.386)	
Distance learning	0.699***		0.532**	
	(0.206)		(0.264)	
Lessons related with academic subjects				
Hours of study during weekdays	0.0876		0.114	
	(0.070)		(0.089)	
Hours of study during weekends	0.0501		0.0599	
	(0.039)		(0.051)	
Size of city				
Constant		4.265***		4.346***
		(0.439)		(0.558)
Observations	686	686	431	431

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Bibliography

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*(3), 317-332.

Amato, P. R. (1994). Father-child relations, mother-child relations, and offspring psychological well-being in early adulthood. *Journal of Marriage and the Family*, 1031-1042.

Barnett, R. C., Marshall, N. L., & Pleck, J. H. (1992). Adult son-parent relationships and their associations with sons' psychological distress. *Journal of Family Issues*, *13*(4), 505-525.

Berzin, S. C. (2010). Educational Aspirations among Low-income Youths: Examining Multiple Conceptual Models. *Children & Schools*, *32*(2), 112-124.

Biddle, B. J. (1986). Recent development in role theory. *Annual Review of Sociology*, 67-92.

Blazer, C. (2009). The Effect of Poverty on Student Achievement. Information Capsule. Volume 0901. *Research Services, Miami-Dade County Public Schools*.

Bryan, A., Schmiege, S. J., & Broaddus, M. R. (2007). Mediational analysis in HIV/AIDS research: Estimating multivariate path analytic models in a structural equation modeling framework. *AIDS and Behavior*, *11*(3), 365-383.

Cabinet Office Director General for Policies on Cohesive Society (2015). Heisei 26 nendo kekkon・kazokukeisei ni kansuru isiki chosa houkokusyo (Report of a survey on attitude of marriage and family). Retrieved June 9, 2017, from Cabinet Office, Government of Japan Website: http://www8.cao.go.jp/shoushi/shoushika/research/h26/zentai-pdf/

Castro, M., Expósito-Casas, E., López-Martín, E., Lizasoain, L., Navarro-Asencio, E., & Gaviria, J. L. (2015). Parental involvement on student academic achievement: A meta-analysis. Educational Research Review, 14, 33-46.

Connell, R. W. (1987). *Gender and power: Society, the person and sexual politics*. Cambridge, UK: Polity Press.

Crouter, A. C., Manke, B. A., & McHale, S. M. (1995). The family context of gender intensification in early adolescence. *Child Development*, 317-329.

Dumka, L. E., Gonzales, N. A., Bonds, D. D., & Millsap, R. E. (2009). Academic success of Mexican origin adolescent boys and girls: The role of mothers' and fathers' parenting and cultural orientation. *Sex Roles*, *60*(7-8), 588-599.

Englund, M. M., Luckner, A. E., Whaley, G. J., & Egeland, B. (2004). Children's achievement in early elementary school: Longitudinal effects of parental involvement, expectations, and quality of assistance. *Journal of Educational Psychology*, *96*(4), 723.

Fan, X. (2001). Parental involvement and students' academic achievement: A growth modeling analysis. *The Journal of Experimental Education*, 70(1), 27-61.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, *13*(1), 1-22.

Fantuzzo, J., McWayne, C., Perry, M. A., & Childs, S. (2004). Multiple dimensions of family involvement and their relations to behavioral and learning competencies for urban, low-income children. *School Psychology Review,*33(4), 467.

Flouri, E., & Buchanan, A. (2004). Early father's and mother's involvement and child's later educational outcomes. *British Journal of Educational Psychology*, *74*(2), 141-153.

Frostick, C., Phillips, G., Renton, A., & Moore, D. (2016). The Educational and Employment Aspirations of Adolescents from Areas of High Deprivation in London. *Journal of Youth and Adolescence*, *45*(6), 1126-1140.

Galindo, C., & Sheldon, S. B. (2012). School and home connections and children's kindergarten achievement gains: The mediating role of family involvement. *Early Childhood Research Quarterly*, 27(1), 90-103.

Garamszegi, L. Z., & Mundry, R. (2014). Multimodel-inference in comparative analyses. In *Modern phylogenetic comparative methods and their application in evolutionary biology* (pp. 305-331). Springer Berlin Heidelberg.

Geckova, A. M., Tavel, P., van Dijk, J. P., Abel, T., & Reijneveld, S. A. (2010). Factors associated with educational aspirations among adolescents: cues to counteract socioeconomic

differences?. *BMC Public Health*, *10*(1), 154.

Grossmann, K., Grossmann, K. E., Fremmer-Bombik, E., Kindler, H., & Scheuerer-Englisch, H. (2002). The uniqueness of the child–father attachment relationship: Fathers' sensitive and challenging play as a pivotal variable in a 16-year longitudinal study. *Social Development*, *11*(3), 301-337.

Gunzler, D., Chen, T., Wu, P., & Zhang, H. (2013). Introduction to mediation analysis with structural equation modeling. *Shanghai archives of psychiatry*, *25*(6), 390.

Harris, K. M., Furstenberg, F. F., & Marmer, J. K. (1998). Paternal involvement with adolescents in intact families: The influence of fathers over the life course. *Demography*, *35*(2), 201-216.

Hill, N. E., Castellino, D. R., Lansford, J. E., Nowlin, P., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2004). Parent academic involvement as related to school behavior, achievement, and aspirations: Demographic variations across adolescence. *Child Development*, *75*(5), 1491-1509.

Hill, N. E., & Taylor, L. C. (2004).Parental school involvement and children's academic achievement pragmatics and issues. *Current Directions in Psychological Science*, 13(4), 161-164.

Hill, N. E., & Wang, M. T. (2015). From middle school to college: Developing aspirations, promoting engagement, and indirect pathways from parenting to post high school enrollment. *Developmental Psychology*, *51*(2), 224.

Hoover-Dempsey, K., & Sandler, H. (1995). Parental involvement in children's education: Why does it make a difference?. *The Teachers College Record*,*97*(2), 310-331.

Hoover-Dempsey, K. V., & Sandler, H. M. (1997). Why do parents become involved in their children's education?. *Review of Educational Research*, *67*(1), 3-42.

Hoover-Dempsey, K. V., Walker, J. M., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., &Closson, K. (2005). Why do parents become involved? Research findings and

implications. *The Elementary School Journal*, *106*(2), 105-130.

Hsu, H. Y., Zhang, D., Kwok, O. M., Li, Y., & Ju, S. (2010). Distinguishing the influences of father's and mother's involvement on adolescent academic achievement: Analyses of Taiwan Education Panel Survey data. *The Journal of Early Adolescence*.

International Labour Office (2015) *Women in Business and Management: Gaining Momentum.* Geneva: ILO.

Kim, S. U., & Hill, N. E. (2015). Including fathers in the picture: A meta-analysis of parental involvement and students' academic achievement. *Journal of Educational Psychology.* 107(4), pp. 919-934.

Lam, C. B., McHale, S. M., & Crouter, A. C. (2012). Parent–child shared time from middle childhood to late adolescence: Developmental course and adjustment correlates. *Child Development*, *83*(6), 2089-2103.

Jassey, I. A. (1998). Gender in elementary school texts. *Japan Quarterly*, *45*(1), 87.

Jung, E., & Zhang, Y. (2016). Parental involvement, children's aspirations, and achievement in new immigrant families. *The Journal of Educational Research*,*109*(4), 333-350.

Lamb, M. E. (1975). Fathers: Forgotten contributors to child development. *Human Development*, *18*(4), 245-266.

Lazarides, R., Viljaranta, J., Aunola, K., Pesu, L., & Nurmi, J. E. (2016). The role of parental expectations and students' motivational profiles for educational aspirations. *Learning and Individual Differences*, *51*, 29-36.

Lee, J. F. (2014). A hidden curriculum in Japanese EFL textbooks: Gender representation. *Linguistics and Education*, *27*, 39-53.

Lee, S. M., Kushner, J., & Cho, S. H. (2007). Effects of parent's gender, child's gender, and parental involvement on the academic achievement of adolescents in single parent families. *Sex Roles*, *56*(3-4), 149-157.

Leung, C. H., Chen, S. X., & Lam, B. C. (2010). Where there's a will, there's a way: The

mediating effect of academic aspiration between beliefs and academic outcomes. *Journal of Psychology in Chinese Societies*, *11*(1), 53.

Lewis, C., & Lamb, M. E. (2003). Fathers' influences on children's development: The evidence from two-parent families. *European Journal of Psychology of Education*, *18*(2), 211-228.

Maurer, T. W., & Pleck, J. H. (2006). Fathers' caregiving and breadwinning: A gender congruence analysis. *Psychology of Men & Masculinity*, *7*(2), 101.

Maurer, T. W., Pleck, J. H., & Rane, T. R. (2001). Parental identity and reflected-appraisals: Measurement and gender dynamics. *Journal of Marriage and Family*, *63*(2), 309-321.

McBride, B. A., Schoppe-Sullivan, S. J., & Ho, M. H. (2005). The mediating role of fathers' school involvement on student achievement. *Journal of Applied Developmental Psychology*, *26*(2), 201-216.

Marjoribanks, K. (1998). Family capital, children's individual attributes, and adolescents' aspirations: A follow-up analysis. *The Journal of Psychology*,*132*(3), 328-336.

McNeal Jr, R. B. (2015). Parent involvement and student performance: the influence of school context. *Educational Research for Policy and Practice*,*14*(2), 153-167.

Mears, D. P., Ploeger, M., & Warr, M. (1998). Explaining the gender gap in delinquency: Peer influence and moral evaluations of behavior. *Journal of Research in Crime and Delinquency*, *35*(3), 251-266.

Paquette, D. (2004). Theorizing the father-child relationship: Mechanisms and developmental outcomes. *Human Development*, *47*(4), 193-219.

Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039-1101.

Plunkett, S. W., Henry, C. S., Houltberg, B. J., Sands, T., & Abarca-Mortensen, S. (2008). Academic support by significant others and educational resilience in Mexican-origin ninth grade students from intact families. *The Journal of Early Adolescence*, *28*(3), 333-355.

Pong, S. L. (1997). Family structure, school context, and eighth-grade math and reading

achievement. *Journal of Marriage and the Family*, 734-746.

Rogers, M. A., Theule, J., Ryan, B. A., Adams, G. R., & Keating, L. (2009). Parental involvement and children's school achievement: Evidence for mediating processes. *Canadian Journal of School Psychology*.

Sakai, A., Sugawara, M., Maeshiro, K., Sugawara, K., Kitamura, T. (2002) Chugakusei no oya oyobi shinyu tono shinraikankei to gakkoutekiou (Parent-Child Relations of Mutual Trust, Trust in One's Best Friend, and School Adjustment: Junior High School Students). *Kyoiku Shinrigaku Kenkyu*, 50(1), 12-22.

Sarkadi, A., Kristiansson, R., Oberklaid, F., & Bremberg, S. (2008). Fathers' involvement and children's developmental outcomes: a systematic review of longitudinal studies. *Acta Paediatrica*, *97*(2), 153-158.

Sauerbrei, W., Royston, P., & Binder, H. (2007). Selection of important variables and determination of functional form for continuous predictors in multivariable model building. *Statistics in medicine*, *26*(30), 5512-5528.

Schumacker, R. E., & Lomax, R. G. (2010). *A beginner's guide to structural equation modeling* (3rd ed.). Psychology Press.

Shumow, L., Lyutykh, E., & Schmidt, J. A. (2011). Predictors and outcomes of parental involvement with high school students in science. *School Community Journal,* 21(2), 81.

Singh, K., Bickley, P. G., Trivette, P., & Keith, T. Z. (1995). The effects of four components of parental involvement on eighth-grade student achievement: Structural analysis of NELS-88 data. *School Psychology Review*.

Starrels, M. E. (1994). Gender differences in parent-child relations. *Journal of Family Issues*, *15*(1), 148-165.

Sui-Chu, E. H., & Willms, J. D. (1996). Effects of parental involvement on eighth-grade achievement. *Sociology of Education*, 126-141.

Tan, E. T., & Goldberg, W. A. (2009). Parental school involvement in relation to children's

grades and adaptation to school. *Journal of Applied Developmental Psychology*, *30*(4), 442-453.

Ueno, A., & Suzuki, T. (1994). Chuugakusei no Oyako no Komyunikeeshon no Jittai to Haikei (Facts and Background Factors of Communication between Junior High School Students and Their Parents). Yokohamakokuritsudaigaku Kyouikukiyou, 34, 95-106.

Véronneau, M. H., & Dishion, T. J. (2011). Middle school friendships and academic achievement in early adolescence: A longitudinal analysis. *The Journal of Early Adolescence*, *31*(1), 99-124.

West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & Society*, *1*(2), 125-151.

Yamaguchi, K., (2013) *Howaitokaraseishain no Kanrishyoku no Wariai no Danjyokakusa no Ketteiyouin – Jyoseidearukotono Futona Shyakaitekifurieki to, sono Kaisyoushisaku nitsuite.(Determination factor of gender gap in a ratio of white collar managers).* RIETI Discussion Paper, 13-J-069. Retrieved June 9, 2017, from http://www.rieti.go.jp/jp/publications/dp/13j069.pdf.

Youm, Y., & Yamaguchi, K. (2016). *Gender Gaps in Japan and Korea: A Comparative Study on the Rates of Promotions to Managing Positions*. RIETI Discussion Paper Series, 16-E-011. Retrieved June 9, 2017, from http://www.rieti.go.jp/jp/publications/dp/16e011.pdf