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The role of parental involvement in academic achievement trajectories of elementary school children with Southeast Asian and Taiwanese mothers

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ABSTRACT

Drawing upon Coleman's concepts of social capital, which emphasized the potential roles of resources inside and outside the family in affecting children's academic performance, this study explores the parental involvement gap between children of Southeast Asian mothers and children of Taiwanese mothers, and analyzes to what extent parental involvement is associated with trajectories of achievement in elementary school. The sample comprised 8810 fourth to sixth graders.

Results: showed that new immigrant children experienced less parental involvement than did native children. The hierarchical linear model revealed that four of the five parental involvement factors related to initial achievement, the only exception being intergenerational closure. The immigrant-native gap in initial achievement can be partially explained by parental involvement, while discrepancies in the growth rates of academic achievement were not observed between the two groups. Furthermore, a negative and long-lasting effect of parental expectation on achievement was found in Confucian culture, which is characterized by an emphasis on the importance of education and the higher academic standards set by Chinese parents.

1. Introduction

Academic achievement gaps between immigrant and native children have been an issue of concern among educational researchers and policymakers (Levin & Shohamy, 2008; Kao, 1995; Kao & Rutherford, 2007; Kieffer, 2011). Most studies conducted within Western countries have indicated that both family backgrounds and parental involvement can partly explain academic gaps in reading or in math scores among children from immigrant and non-immigrant families (Kao & Rutherford, 2007; Yan & Lin,2005), but that the effect of parental involvement on the growth rate of reading and math among immigrants is insignificant (Jeong & Acock, 2014). The growing independence of respondents in middle and late adolescence from their parents may explain the non-significant result. Given that children are more influenced by their parents at the elementary school stage, the association of parental involvement with initial performance and academic growth rate may be manifested in elementary school. Parental involvement is treated as a form of social capital by which parents can affect their children's educational outcomes (Dufur et al.,2013; Jeong & Acock, 2014; Lee & Bowen, 2006), but little is known about how parental involvement factors influence the trajectories of achievement differences between immigrant and native children during early adolescence.

A local study finds that native students outperform new immigrant students (atypical second-generation students with mothers

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from Southeast Asia and native fathers are different from typical native-born students with both parents born abroad) in test scores at fourth and sixth grade, particularly in Chinese and in math subjects, and hypothesizes that academic gaps may be attributed to the lower levels of involvement of immigrant parents (Lin & Liu, 2014). Although research shows that the low levels of education and limited language abilities of immigrant parents hinder them from being involved in their children's schooling (Fleischmann & Haas, 2016; Turney & Kao, 2009), Lin and Lu (2014) did not utilize the panel data to test this hypothesis empirically. It remains unknown whether differences in parental involvement between atypically immigrant and native students occur and are linked to academic gaps. Understanding the effects of particular dimensions of parental involvement may contribute to the reduction of the immigrant-native gap in terms of academic achievement.

Taiwan, a country that practices Confucianism, presents an interesting profile for analyzing the issue on educational inequality. Firstly, marriage-based migration is not uncommon in Taiwan. For most of the lower socioeconomic status males in Taiwan, seeking for brides overseas can simultaneously conquer problems of domestic marriage squeeze and caring for elders (Bélanger, Lee, & Wang, 2010). Many foreign spouses from Southeast Asian countries live in Pingtung County which has a large proportion of male employees in the agricultural sector. Agriculture provides employment opportunities for foreign spouses with low levels of education. Next, the proportion of new immigrant children in elementary school has expanded by 10% in 10 years and was above 12% in 2013. Approximately 61% of these children originate from Southeast Asian families and 36% of them from mainland China (MOE, 2014). Research reveals that the Chinese and math scores of children whose mothers are from mainland China are similar to those of native children (Lin & Lu, 2014; Wang & Tsai,2008). Thus, this study does not include non-disadvantaged children with mothers from mainland China, but instead analyzes the local-born children of the largest marriage-based immigrant groups.

Additionally, new immigrant children can be viewed as second-generation children because of their foreign-born mother, (e.g., Cohen & Haberfeld, 2003; Lin & Liu, 2014). They differ from typical second-generation immigrant children in that their fathers are native-born Taiwanese. However, the poor academic performance of these atypical second-generation children is similar to that of typical second-generation children (Muenier, 2011). Current research relating to atypical second-generation children is rare. Finally, the impact of parental involvement on the levels and rate of growth of achievement may be different in Confucian contexts, due to the context-dependent traits of social capital (Fasang, Mangino, & Bruckner, 2014). The stress that Chinese culture places on the importance of academic achievement and collectivism apparently differs from Western culture (Chen, 1988). More importantly, social capital sometimes has positive effects but sometimes also has negative impacts (Portes, 1998). For example, social capital as a source of social control has positive impacts by promoting compliance, whereas higher levels of social control may reduce individuals' autonomy and push them to escape from the extant environment, as described by Portes (1998). The mixed effects of parental involvement relates to achievement trajectories outside the context of extant Western research, after considering family backgrounds.

1.1. Theoretical background

Social capital is a theoretically multidimensional concept. This study adopts Coleman's concepts of social capital because his individual-oriented approaches have been frequently utilized in the field of education and his research interests lie in the role that social capital plays in academic performance (Coleman, 1988). He proposes two dimensions of social capital: social capital in the family and outside the family, and indicates that the two types of social capital reduce the dropout rate in high schools by virtue of obligations, expectations, flow of information and informal sanctions embedded in relationships among the actors. The lack of social capital reduces the possibility that parents transmit their human capital and skills to their children.

Subsequent scholars define social capital according to Coleman's theoretical roots and focus on parental involvement such as home-based and school-based involvement, because parental involvement signifies purposeful investment in children. After reviewing the literature relating to social capital, it is clear that home-based involvement usually includes parent-child discussion (Jeong & Acock, 2014; Kao, 1995; Lee & Bowen, 2006; Yan & Lin, 2005), parental expectation (Jeong & Acock, 2014; Lee & Bowen, 2006; Yan & Lin, 2005) and family rules (Kao, 1995; Yan & Lin, 2005). Two common components are presented when researchers conceptualize school-based involvement, i.e., intergenerational closure and participation in school-based activities (Kao & Rutherford, 2007; Yan & Lin, 2005). As compared with home-based involvement, school-based involvement focusses on parents' relations with school as well as with the parents of their children's friends. Intergenerational closure, originating from Coleman's concepts, refers to a type of social network where parents have contact with the parents of their children's friends. Parents can gather information and set expectations and norms for their children through the parents of their children's friends, even when their children are not willing to disclose academic scores to their parents. Once this network of closure is established, it provides information and norms which are available to each parent in educating their children. Simply put, parents in this social network will monitor academic performance not only for their own children but also for the children of others (Coleman, 1988). Participation in school-based activities includes attending open house or school events, which increases interactions between parents and teachers (Kao & Rutherford, 2007; Turney & Kao, 2009). The five dimensions of parental involvement can transmit necessary information, expectations and norms to children, which may facilitate educational outcomes, but they are rarely explored simultaneously in the extant literature.

1.2. Immigrant differences in parental involvement

The extent of parental involvement varies across different immigrant groups. In the Netherlands, immigrant parents are as much involved in parent-child discussion as the average Dutch family (Cabus & Ariës, 2017). Mexican immigrant parents have lower

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educational expectations for their children's academic achievement than do their East Asian counterparts, whereas the discrepancies in other dimensions of parental involvement such as intergenerational closure and parent-child discussion are not apparent between these immigrant groups (Jeong & Acock, 2014). Compared with white native-born parents, Asian foreign-born parents report less involvement (Turney & Kao, 2009). However, Villiger, Wandeler, and Niggli, 2014 indicate that parents of immigrant children have higher expectations of their children than native parents. Cultural differences may make it difficult to draw a firm conclusion regarding the parental involvement of immigrants.

Previous research reveals that language ability is positively associated with levels of parental involvement among immigrant and ethnic minority parents (Fleischmann & Haas, 2016; Turney & Kao, 2009). Compared with the Dutch majority, Turkish and Moroccan immigrants are less involved in their children's education because of their lower levels of language skills (Fleischmann & Haas, 2016). Nevertheless, the above-mentioned studies concern parental involvement in the case of immigrant children with foreign-born parents, and too little attention has been paid to children with foreign-born mothers and local fathers. In Taiwan, the parents of new immigrant children in 2013 mainly originated from Vietnam (43.1%), followed by Indonesia (10.5%), Cambodia (2.5%), and the Philippines (2.0%) (MOE, 2014), and over 45% of these parents exhibited language abilities insufficient for daily communication (Wang & Tsai, 2008). It is anticipated that the limited language proficiency of these immigrant mothers may prevent them from being involved in the education of their children.

Furthermore, a specific gender role within Confucian contexts may reinforce the result that there is less parental involvement among immigrant parents, because mothers usually bear the main part of the burden of educating children in Chinese society. The extant sexual division of labor in Confucian society stresses values associated with mothers having greater responsibility than fathers for taking care of and educating children (Jiang, 2009). The cultural value that men are breadwinners and women are homemakers may reduce the willingness of Taiwanese fathers to be involved in new immigrant children's education. As the responsibility for educating children mainly devolves on foreign spouses with limited language proficiency, we expect that new immigrant children experience less parental involvement than do native children.

1.3. Effects of parental involvement on academic achievement

Abundant evidence has shown that the effects of various dimensions of social capital vary according to ethnicity. Of the parental involvement dimensions, it has been recognized that parental expectation has a strongly predictive power for achievement (Jeong & Acock, 2014; Yan & Lin,2005), while the effects of parent-child discussion and family rules appear less consistent than the effect of parental expectation. For example, parent-child discussion has a positive and direct influence on White students' initial achievement status, whereas it does not affect the achievements of Asian American students (Hong & Ho, 2005; Yan & Lin,2005). A previous study found family rules, (e.g., limitations on TV time and the amount of time spent on learning) to be positively associated with reading achievement (Ho & Willms, 1996); however, other studies have not confirmed this effect (Lee & Bowen, 2006) and have observed that family rules do not account for differences in reading between ethnic groups. As for the impacts of intergenerational closure and participation in school-based activities, mixed results occur, with differences based on ethnicity and cultural environment, (e.g., Kao & Rutherford, 2007; Yan & Lin,2005). Though disparities in achievement between immigrant and native children can largely be attributed to aspects of family background such as the language used at home, family structure and socioeconomic status (SES) (Kao & Rutherford, 2007; Kao, 1995), little is known about whether different levels of home-based or school-based involvement reduce academic gaps between immigrant and native children after controlling for family backgrounds. As the average reading trajectory of immigrant learners starting at a lower reading level can catch up with that of native learners in about the sixth grade after holding SES constant (Kieffer, 2011), immigrant children in Taiwan may keep pace with native children at higher grades.

The long-term effect of parental involvement also varies with cultural contexts. With regard to longitudinal studies on types of social capital and academic achievement, findings from three notable studies have shed light on the effects of social capital on reading and math achievement. Fan (2001) used a latent growth model to analyze the effects of parental involvement dimensions on the academic growth rate of high school students, and indicated that the growth rate of reading was positively associated with educational aspiration but negatively associated with participation in school activities. However, the long-lasting impact of educational aspiration was reflected among Hispanic and White groups rather than among Asian American groups.

Hong and Ho (2005) implemented the same model and found that for Asian American adolescents, parent-child discussion did not influence initial academic performance but affected subsequent academic growth, whereas parental expectation was beneficial for short-term achievement but was not long-lasting. Additionally, participation in school-based activities showed direct effects for initial achievement status, as well as for the rate of achievement growth. Subsequently, Jeong and Acock (2014) used the same database (NELS:88) to analyze how family capital and other factors influence the academic achievement trajectories of adolescents from immigrant families. Their results show that no type of parental involvement is associated with the growth rates of reading and math scores.

It is notable that, on the one hand, Coleman holds a positive view of the function of social capital, but is of the belief that the effects of home-based and school-based involvement on immigrant achievement during early adolescence is limited, because peer groups seem to be more influential than the adolescent's parents (Kao & Rutherford, 2007; Yan & Lin,2005). Results from elementary school studies indicate that both family social capital and social capital from outside the family exert apparent influences on children's achievements across ethnic groups at the elementary stage (Lee & Bowen, 2006).

On the other hand, the effect of social capital is not necessarily positive but may be negative according to the extent of social control, (i.e., strong and effective norms) and collective sanction. If the demands of established social control are stronger than those of individual freedom, the strong family tie sometimes does not benefit children's achievement (Portes, 1998). Researchers have

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endeavored to identify potential negative impacts of home-based involvement or school-based involvement on educational outcomes (Byun, Meece, Irvin, & Hutchins, 2012; Fasang et al., 2014; Murayama, Pekrun, Suzuki, Marsh, & Lichtenfeld, 2016). Recent research points out that parental overaspiration is negatively associated with children's math achievement among early and middle adolescents (Murayama et al., 2016). As Chinese students are more willing to accept parents' advice and to fulfill their expectations than American students (Chen & Lan, 1998), the negative associations of some dimensions of parental involvement may be found in the present study. Guided by social capital theory, we expected that many dimensions of social capital would reduce the more substantial gaps in elementary school children's initial academic performances and positively affect yearly academic achievement gains in Chinese culture; however, a few parental involvement factors may have adverse effects.

1.4. The current study

To date, scholars have observed the phenomenon of academic gaps but not yet explored the role social capital plays in reducing these academic gaps between new immigrant and native children, (e.g., Chung, Wang, & Chen, 2006; Lin & Lu, 2014; Wang & Tsai, 2008; Wu & Tsai, 2014). Since there are few longitudinal studies focussing on immigrant populations within an Asian context, this research aims to understand the immigrant-native gap in terms of parental involvement among elementary school children from Southeast Asian immigrant and Taiwanese families, and to contribute to understanding the association of parental involvement with the trajectories of reading and math achievement within the context of Confucian culture.

Two research questions are addressed by utilizing the independent samples *t*-test and the hierarchical linear model: (1) whether there are differences in the five dimensions of parental involvement between the new immigrant and native children and (2) whether the five dimensions of parental involvement relate to academic achievement such as initial achievement status and growth rates, and whether they explain the differences between researchts' educat samples after controlling for family backgrounds and individual characteristics (marital status, parenion, means-tested assistance, language at home and gender).

2. Methods

2.1. Data and participants

The data are drawn from the released files of the Pingtung Education Longitudinal Survey (PELS, Chen & Chen, 2011). The PELS, consisting of longitudinal census data, was designed to collect data on parental involvement and academic achievement of children, and the socioeconomic background and the school-based involvement of their parents from 2010 to 2012 in Pingtung County. Children completed a self-administered questionnaire and a test regarding reading and math with over 95% response rates across three waves.

The present study uses all three waves of data from fourth grade to sixth grade (within the age range 10 to 12), which represents nearly all elementary school fourth graders in Pingtung County. The base-year sample consists of 9868 fourth graders from 167 elementary schools. The first follow-up and second follow-up sample contain 9811 and 9795 students, respectively. After excluding missing values pertaining to mothers' nationality and samples of children whose mothers were not from Southeast Asian countries, a total of 582 new immigrant children and 8228 native children was included in the present study.

2.2. Multiple imputation

In the PELS, the missing rates for items measuring family background factors and parental involvement range from 2% (parental education at the first wave) to 12% (intergenerational closure at the third wave), and the total missing value of academic achievement is about 3%. Statistical comparisons of children with incomplete responses in the explanatory variables or covariates and children with complete responses reveal that the former tend to be disadvantaged in both reading and math achievement. Therefore, excluding respondents with missing values in explanatory variables, covariates and dependent variables may bias the research results by over-representing children with higher parental involvement in the samples. To address this obstacle, multiple imputation strategies using SPSS 17.0 (SPSS, Chicago, IL) were implemented to impute the missing values for all variables used in the analytical model. Multiple imputation produces multiple sets of plausible values and takes into account the uncertainly of the missing data by repeated imputation, which assumes a posterior predictive distribution for the missing information under a special Bayesian model. Five complete data sets were created for adequate estimation (for more details see Rubin, 1996) and then imported to HLM 6.08 (Hierarchical Linear Model, SSI, Lincolnwood, IL). The merit of this imputation method lies in obtaining more accurate estimates than would be yielded if only a subset of the data was imputed (Little & Rubin, 2002). The results presented in the tables represent average parameter estimates with robust standard errors that were computed via an HLM standard procedure (Raudenbush, Bryk, Cheong, Congdon, & Toit, 2011).

2.3. Measure

2.3.1. Dependent variables: reading and math achievement

In this study, academic achievements such as reading and math were measured across grades using item response theory (IRT) scores which assess the score a student might have if the student had been taught all the items, so that achievement can be comparable across time. The Chinese language test including vocabulary, sentence structure, and reading comprehension, and the math

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test including number, algebra, and geometry were designed according to the grade 1–9 curriculum. These written tests were completed in class within a week and then information was returned to National Pingtung University, which was responsible for data collection and administration.

2.3.2. Parental involvement

Three variables regarding home-based involvement, i.e., parent-child discussion, parental expectation, and family rules were obtained from the children's questionnaire, while two school-based involvement variables were derived from the parent-oriented questionnaire. The detailed operational definitions of the five dimensions of parental involvement are shown in the Appendix. Parent-child discussion questions consisted of four items about homework, test scores, what was studied, and what happened in school, (e.g., "How often do your parents or guardians talk about your homework or test scores?"). The reliability coefficients for these items were 0.77, 0.80 and 0.80 (Cronbach's alpha) for the three waves, respectively. Response options ranged from 0 'never' to 3 'often'.

Parental expectation questions were composed of two items that had higher reliability coefficients, beyond 0.88 at each wave. Answer options on an eight-point scale ranged from 0 'do not have particular expectations' to 7 'a PhD degree'. The above variables at each wave form an index by totaling the answers to the questions. The index of family rules was obtained by summing six items and was used primarily to assess the extent to which parents limited the amount of time children spent on non-study activities. A measure of intergenerational closure focussed on the frequency of parents' interaction with the parents of their children's friends, and its response items adopted a four-point Likert scale. Participation in school-based activities included two items, which also had higher Cronbach's alpha coefficients, beyond 0.8 at each wave, and were measured in the same way as parent-child discussion. The abovementioned time-varying predictors were further transformed to average levels of parental involvement by subtracting the average of the predictor for all children across three time points, from the average of the predictor for a child across all time points, as indicated in Maldonado-Carreno and Votruba-Drzal (2011). Higher values indicated a child whose parents had higher average levels of homebased and school-based involvement.

The Pearson correlation coefficient between the five factors at each wave ranged from 0.04 to 0.36, implying that the measure captured different dimensions of social capital. Exploratory factor analysis (EFA) revealed that three distinct factors accounted for more than 61% of the variance in parental involvement factors at each wave (see Appendix A for details). Due to the low load factor of family rules and intergenerational closure, confirmatory factor analysis (CFA) in AMOS 22.0 was used to test the construct validity. The results of CFA showed that the five-factor model of parental involvement fitted the data better than the three-factor model which is presented in EFA ($\chi 2 = 575.21$, df = 27, RMSEA = 0.05, CFI = 0.98, $\chi 2$ difference (df = 5) = 107.25, p < 0.01). Therefore, the validity of the five dimensions of parental involvement model, including parent-child discussion, parental expectation, family rules, intergenerational closure and school-based participation, was confirmed.

2.3.3. Control variables

Family backgrounds included immigrant offspring, marital status, parents' education, the means-tested program (the measurement of poverty) and language at home. Except for immigrant offspring, parent education and language at home were derived from the parent-focused questionnaire in wave 1; other family background factors were derived from the children's questionnaire in wave 1. Immigrant offspring was a dummy variable (1 = new immigrant children; 0 = native children). Marital status, the means-tested assistance and language at home were also dummy variables, respectively, and denoted whether parents were married and lived together, were eligible for government assistance and if they spoke the same language at home as the language of the test. The highest levels of parents' education was an ordinal variable that had nine categories (i.e., 0 = illiteracy to 8 = a PhD degree). Additionally, gender was viewed as a control variable and recoded as 1 for boys and 0 for girls.

2.4. Data analysis

An independent *t*-test was used to address the first question, exploring whether there were differences in the five dimensions of parental involvement between the two groups. With regard to the question of whether the five dimensions of parental involvement related to academic achievement in terms of initial achievement status and growth rates (the second question), this study utilized a linear model rather than a growth curve model in HLM because there were only three time points. In model 1, children's initial academic scores and the growth rate of academic achievement was captured. At level 1, Y_{ti} indicated academic achievement at time t for child i. Time was coded as 0 (in 2010), 1 (in 2011) and 2 (in 2012); π_{0i} represented the fourth-grade achievement for child i, while π_{1i} represented the mean growth rate per year for child i. The errors ε_{ti} were assumed to be independent and normally distributed. At level 2, each of these parameters (π_{0i} and π_{1i}) served as a dependent variable in a separate equation, where β_{00} and β_{10} denoted the intercepts and r_{0i} and r_{1i} denoted random errors. In model 2, the conditional specification modeled the achievement gaps between Southeast Asian immigrant children and Taiwanese children, but did not contain predictors. In model 3, control variables including family backgrounds and gender were added to the analytical model. In the final model, five parental involvement factors such as parent-child discussion (PCD), parental expectation (PE), family rules (FR), intergenerational closure (IC) and school-based participation (SBP) were added to address the second research question.

These models were specified as follows: Model 1: unconditional model: Level-1 Model Y $_{ti} = \pi_{0i} + \pi_{1i}$ (Time) + ϵ_{ti} Level-2 Model

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$$\begin{split} \pi_{0i} &= \beta_{00} + r_{0i} \\ \pi_{1i} &= \beta_{10} + r_{1i} \\ \text{Model 2: conditional model with immigrant backgrounds:} \\ \text{Level-2 Model} \\ \pi_{0i} &= \beta_{00} + \beta_{01} (\text{immigrant offspring}) + r_{0i} \\ \pi_{1i} &= \beta_{10} + \beta_{11} (\text{immigrant offspring}) + r_{1i} \\ \text{Model 3: conditional model with family backgrounds and gender:} \\ \text{Level-2 Model} \\ \pi_{0i} &= \beta_{00} + \beta_{01} (\text{immigrant offspring}) + \beta_{02} (\text{family backgrounds and gender}) + r_{0i} \\ \pi_{1i} &= \beta_{10} + \beta_{11} (\text{immigrant offspring}) + \beta_{12} (\text{family backgrounds and gender}) + r_{1i} \\ \text{Model 4: conditional model with parental involvement:} \\ \text{Level-2 Model} \\ \pi_{0i} &= \beta_{00} + \beta_{01} (\text{immigrant offspring}) + \beta_{02} (\text{family backgrounds and gender}) + \beta_{03} (\text{PCD}) + \beta_{04} (\text{PE}) + \beta_{05} (\text{FR}) + \beta_{06} (\text{IC}) \\ \end{split}$$

+ β_{07} (SBP) + r_{0i} $\pi_{1i} = \beta_{10} + \beta_{11}$ (immigrant offspring) + β_{12} (family backgrounds and gender) + β_{13} (PCD) + β_{14} (PE) + β_{15} (FR) + β_{16} (IC) + β_{17} (SBP) + r_{1i}

3. Results

3.1. Descriptive statistics

The average IRT scores for all respondents for reading and math between 2010 and 2012 changed from 0.02 to 0.04 and from 0.04 to 0.07 respectively (see Table 1). With regard to social capital, the average levels of parental expectation and family rules increased with age, while other dimensions of social capital did not demonstrate this increasing trend. New immigrant children constituted about 7% of the sample in 2012, which is comparable to census data where 7.5% of elementary school children were found to be from Southeast Asian families in 2013 (MOE, 2014).

3.2. Differences between new immigrant and native children

Table 2 presents the differences in parental involvement and academic achievement between new immigrant and native children.

Table 1

Overview of the used variables (n = 8810).

Variable	Wave 1		Wave 2		Wave 3	
Academic achievement						
IRT reading (M, SD)	0.02	0.91	0.05	0.90	0.04	0.92
IRT math (M, SD)	0.04	0.91	0.06	0.92	0.07	0.90
Social capital						
Parent-child discussion (M, SD)	7.58	3.36	7.83	3.35	7.41	3.33
Parental expectation (M, SD)	6.27	5.10	6.38	4.77	6.53	4.42
Family rules (M, SD)	3.04	1.47	3.18	1.42	3.19	1.48
Intergenerational closure (M, SD)	0.92	0.86	0.92	0.85	0.89	0.83
School-based participation (M, SD)	1.64	1.67	1.64	1.60	1.59	1.61
Family backgrounds Immigrant offspring (N, %)						
Native children	8228	93.39				
Immigrant children	582	6.61				
Marital status (N, %)						
Others	1924	21.84				
Married	6886	78.16				
Parents' education (M, SD)	3.65	1.52				
The means-tested program (N, %)						
Nonparticipant	7727	87.71				
Participant	1083	12.29				
Language at home (N, %)						
Others' language	4144	47.04				
Chinese language	4666	52.96				
Individual characteristics						
Gender (<i>N</i> , %)						
Girls	4338	49.24				
Boys	4472	50.76				

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Table 2

Discrepancies in parent involvement and achievement between research samples (n = 8810).

	New immigrant children Mean (SD) $(n = 582)$	Native children Mean (SD) (n = 8228)	Independ -ent test	Effect size: Cohen's d
Parent-child discussion at fourth grade	5.97(3.33)	7.69(3.34)	-12.01*	-0.52
Parent-child discussion at fifth grade	6.10(3.41)	7.96(3.31)	-13.03*	-0.55
Parent-child discussion at sixth grade	5.84(3.22)	7.52(3.31)	-11.88*	-0.51
Parental expectation at fourth grade	5.64(4.98)	6.31(5.10)	- 3.07*	-0.13
Parental expectation at fifth grade	5.35(4.63)	6.46(4.77)	- 5.44*	-0.24
Parental expectation at sixth grade	5.99(4.53)	6.57(4.41)	- 3.09*	-0.13
Family rules at fourth grade	2.92(1.44)	3.05(1.47)	-2.07*	-0.09
Family rules at fifth grade	3.01(1.40)	3.19(1.42)	- 2.95*	-0.13
Family rules at sixth grade	2.94(1.42)	3.21(1.48)	- 4.45*	-0.19
Intergenerational closure at fourth grade	0.84(0.86)	0.92(0.86)	-2.24*	-0.09
Intergenerational closure at fifth grade	0.82(0.83)	0.92(0.85)	-2.64*	-0.12
Intergenerational closure at sixth grade	0.78(0.81)	0.90(0.83)	- 3.43*	-0.15
School-based participation at fourth	1.38(1.56)	1.66(1.68)	-4.25*	-0.17
grade				
School-based participation at fifth grade	1.39(1.53)	1.66(1.61)	- 3.90*	-0.17
School-based participation at sixth grade	1.38(1.51)	1.61(1.61)	-3.52*	-0.15
IRT reading scores at fourth grade	-0.17(0.89)	0.03(0.91)	-5.18*	-0.22
IRT reading scores at fifth grade	-0.09(0.86)	0.06(0.90)	- 3.87*	-0.17
IRT reading scores at sixth grade	-0.11(0.89)	0.04(0.93)	- 3.85*	-0.16
IRT math scores at fourth grade	-0.17(0.87)	0.05(0.91)	-5.81*	-0.25
IRT math scores at fifth grade	-0.15(0.86)	0.08(0.92)	- 5.95*	-0.26
IRT math scores at sixth grade	-0.14(0.84)	0.08(0.90)	-6.10*	-0.25

Note: *(p < 0.05) denotes significant difference between research samples. The results on parental involvement from four other imputed datasets are similar to those in Table 2 and are available upon request.

Results revealed that parents of new immigrant children were less involved in the five educational dimensions of parent-child discussion, parental expectation, family rules, intergenerational closure and school-based participation. In terms of parent-child discussion at fourth grade, parents of new immigrant children showed lower levels of involvement at M = 5.97 than native children's parents (t = -12.01, p < 0.001). Similarly, the average educational expectation of new immigrant children's parents was significantly lower (M = -0.74) in the study interval, compared to parents of native children (M = 0.05). Parental involvement gaps continued from the fourth grade to the sixth grade. Generally, children whose mothers were from Southeast Asian countries possessed less social capital than did their counterparts.

As shown in Table 2, native children outperformed new immigrant children in reading and math achievement. For new immigrant fourth graders, the average reading and math scores were lower than those of native children (t = -5.18, p < 0.01; t = -5.81, p < 0.01). The gap in math scores between the two groups seemed to increase with grade. On the other hand, results showed that the discrepancy in reading scores reduced as elementary school students progressed through the grades.

3.3. The linear growth model

As presented in Table 3 and Table 4, model 2 reveals that the coefficients of initial achievement in reading and math are significant. This means that there are significant academic differences in reading and math between new immigrant children and native children in the fourth grade and these differences may be explained by differences in parental involvement. In model 2, at the first measured time point (fourth grade) immigrant children were already lagging behind native children academically, as measured without controlling for any covariates; however, they had a faster annual growth rate of 0.029 points for reading achievement, compared with math achievement. When keeping family background and gender constant in model 3, no significant academic differences – including initial achievement (B = 0.037 for reading and B = 0.008 for math, p > 0.05) and growth rate (B = 0.022 for reading, p > 0.05) – emerged in reading and math achievement between the two groups. This suggests that differences in family backgrounds account for the academic gaps between immigrant and native children, especially differences in the levels of parental education (data not shown). Inclusion of family background factors and gender helped to account for about 20% and 18% of the variance between children in initial reading and math achievement respectively, and for about 5% of the variance between children in the growth rate of math achievement.

Once parental involvement variables were added in model 4, surprisingly, new immigrant children scored 0.104 (SE = 0.036) and 0.063 (SE = 0.036) points above their native counterparts in reading and math achievement in the fourth grade. Effect sizes for the main effect of immigrant status on initial reading and math achievement were 0.46 and 0.25, respectively. Effect sizes were calculated using the formula dGMA-raw = γ (time)/SDraw, where γ denotes the fixed effects slope coefficient relating to immigrant status, and SD represents the pooled standard deviation (Feingold 2009). New immigrant children are academically advantaged at the fourth grade when their family backgrounds and the level of their parents' involvement are similar to those of native children. Four dimensions of parental involvement were significantly associated with both reading (B = 0.052 for parent-child discussion, B = 0.036 for parental expectation, B = 0.045 for family rules, and B = -0.027 for school-based participation, p < 0.01) and math

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Table 3

Outcomes of the linear growth model for reading IRT raw scores.

Fixed Effects	Model 1		Model 2		Model 3 ^a		Model 4 ^b	
	В	SE	В	S	B SE		В	SE
Initial achievement								
Intercept,β ₀₀	0.024*	0.010	0.037**	0.010	-0.690**	0.032	-0.461**	0.032
Immigrant offspring,β01			-0.194**	0.038	0.037	0.037	0.104**	0.036
Parent-child discussion, B03							0.052**	0.004
Parental expectation, β_{04}							0.036**	0.003
Family rules,β ₀₅							0.045**	0.009
Intergenerational closure, β_{06}							-0.019	0.016
School-based participation,β ₀₇							-0.027**	0.007
Growth rate								
Intercept, β_{10}	0.010**	0.004	0.008*	0.014	0.053**	0.014	0.036*	0.015
Immigrant offspring, β_{11}			0.029†	0.016	0.022	0.016	0.019	0.016
Parent-child discussion, β_{13}							-0.002	0.002
Parental expectation, β_{14}							-0.004**	0.001
Family rules,β ₁₅							-0.005	0.004
Intergenerational closure, β_{16}							-0.004	0.007
School-based participation,β ₁₇							0.008*	0.003
Random Effects: variance components								
Initial achievement,r _{0i}	0.641**		0.639**		0.509**		0.461**	
Growth rate,r _{1i}	0.022**		0.022**		0.022**		0.021**	
Residual, e _{ti}	0.197		0.197		0.197		0.197	
Explained variance								
Initial achievement			0.003		0.206		0.281	
Growth rate			0		0		0.045	

 $p^{**}p < 0.01; p^{*} < 0.05; p^{*} < 0.10.$

^a Model 3 includes family background factors.

^b Model 4 includes parent-child discussion, parental expectation, family rules, intergenerational closure and school-based participation.

Table 4

Outcomes of the linear growth model for math IRT raw scores.

Fixed Effects	Model 1 B	SE	Model 2 B	SE	Model 3 ^a B	SE	Model 4 ^b B	SE
Initial achievement								
Intercept,β ₀₀	0.041*	0.041*	0.056**	0.010	-0.738**	0.032	-0.551**	0.032
Immigrant offspring, β_{01}			-0.225 * *	0.037	0.008	0.037	0.063†	0.036
Parent-child discussion, β_{03}							0.042**	0.004
Parental expectation, β_{04}							0.029**	0.003
Family rules, β_{05}							0.042**	0.010
Intergenerational closure,β ₀₆							-0.025	0.016
School-based participation, β_{07}							-0.021**	0.008
Growth rate								
Intercept,β ₁₀	0.013**	0.013**	0.013**	0.004	0.060**	0.013	0.052**	0.014
Immigrant offspring,β ₁₁			0.009	0.016	-0.002	0.016	-0.001	0.016
Parent-child discussion, β_{13}							-0.012	0.002
Parental expectation, β_{14}							-0.004**	0.001
Family rules,β ₁₅							-0.006	0.004
Intergenerational closure, \beta_{16}							0.010	0.006
School-based participation, β_{17}							0.008*	0.003
Random Effects: variance components								
Initial achievement, r _{0i}	0.654**		0.650**		0.538**		0.505**	
Growth rate,r _{1i}	0.021**	0.021**	0.021**		0.020**		0.019**	
Residual, eti	0.199		0.199		0.199		0.199	
Initial achievement			0.006		0.177		0.228	
Growth rate			0		0.048		0.095	

 $p^{**}p < 0.01; p^{*}p < 0.05; p^{*} < 0.10.$

^aModel 3 includes family background factors.

^bModel 4 includes parent-child discussion, parental expectation, family rules, intergenerational closure and school-based participation.

scores (B = 0.042 for parent-child discussion, B = 0.029 for parental expectation, B = 0.042 for family rules, and B = -0.021 for school-based participation, p < 0.01) at the fourth grade, though the fifth dimension of intergenerational closure showed no such association.

Accordingly, the initial academic gap between the two groups is attributable to the differences in four of the dimensions of parental involvement. Parental expectation had a direct influence on initial achievement and growth rate, but its long-term effect was

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detrimental (B = -0.004, p < 0.01). School-based participation was associated negatively with initial performance in reading and math achievement but positively affected children's growth in these achievements (B = 0.008, p < 0.05). To examine the robustness of our findings, parental expectation was recoded according to the years of the corresponding education level, (e.g., junior high school = 9, high school = 12). The negative relationship between expectation and the growth rate of children's academic achievement remained significant (data not shown).

4. Discussion

4.1. Discussion of the results

In view of the fact that parental involvement and the academic gap between immigrant and native elementary school students has rarely been explored, this study – based on social capital theory – used PELS longitudinal data to analyze the parental involvement gap between children with mothers from Southeast Asian countries and native children, and explored to what extent parental involvement is associated with the trajectories of reading and math achievement.

The findings confirmed the untested hypothesis from local research (Lin & Liu, 2014) and found that new immigrant parents are less likely to be involved in home-based and school-based activities as compared to families where both parents are Taiwanese. The result extended the scope of previous findings regarding typical second-generation children to atypical second-generation children. Language barriers reduced the probability of involvement among the immigrant mothers, as indicated by previous literature (Turney & Kao, 2009). The burden of educating children falls primarily on mothers rather than fathers in Taiwan, and this may further explain why new immigrant children experience less parental involvement. Gendered expectations that a man should be a breadwinner, but not a caretaker, exist in Confucian culture. As such, it is unlikely that the low level of educational involvement of the new immigrant families can be expected to improve through the involvement of Taiwanese fathers. Future work should understand the norms and barriers relating to parental involvement among the atypical second-generation children in other Confucian contexts, in order to reduce the parental involvement gap.

Results indicated that native children significantly outperformed new immigrant children in both the academic subjects considered, without controlling for any covariates. After taking family backgrounds and gender into account, the academic differences in initial achievement between these two groups was insignificant, in contrast to local cross-sectional research (Lin & Lu, 2014; Wang & Tsai,2008). One possible reason for this is that Wang and Tsai (2008) utilized convenience sampling; as such, their findings pertaining to falling behind in reading and math achievement cannot be representative of the mean academic achievement of Southeast Asian elementary school children. Another possible reason lies in the intervention effect of the Guidance Plan introduced for children with immigrant parents in 2004, which tends to enhance the learning ability of new immigrant students (Sung, Tseng, Kuo, Chang, & Chiou, 2014). This program provides not only parenting courses that enrich parents' knowledge about educating children, but also multicultural courses and textbooks for children. Schools also provide new immigrant children who lag far behind their counterparts in Chinese language with remedial teaching. This plan may allow the vulnerable to catch up quickly with their counterparts before the fourth grade. Therefore, previous research using data from 2005 to 2007 still found that the immigrant-native gap in academic achievement remained unchanged, even after taking family background into consideration (Lin & Lu, 2014).

What was unanticipated was that an immigrant child would outperform his/her native counterparts in initial reading and math achievement when the former parents had higher SES, had higher expectations of him/her, discussed things at home and school with the child more often, asked their child to spend a significant amount of time learning and when the child attended school-based activities less often. This infers that parental involvement disparities contribute to academic differences between new immigrant children and native children. Lower levels of parental involvement were reflected in immigrant parents, as noted by Turney and Kao (2009).

Except for intergenerational closure, four dimensions of parental involvement exerted short-term and long-term influences on academic achievement. Recently, Fasang et al. (2014) revised the functional argument of intergenerational closure and stressed closure as a multiplier of network content, rather than as network content directly linked to positive academic outcomes. Simply speaking, the effect of closure will vary across different social structures and cultural environments. In this study sample, the ethnicity of Taiwanese children's parents was diverse and included Minnan, Hakka, Mainlander and other aboriginal groups. Even though inter-ethnic friendship between children's parents and other parents had been established, this does not mean that these parents had common values regarding academic achievement.

Findings pertaining to the beneficial effect of parental expectation on initial achievement were consistent with earlier research (Jeong & Acock, 2014; Lee & Bowen, 2006; Yan & Lin,2005). With regard to the long-term impact of parental expectation, a longitudinal study (Jeong & Acock, 2014) focussing on academic achievement trajectories during the adolescent period argued that the insignificant relationship between parental expectations and the growth rate of achievement was due to adolescents being less influenced by their parents. Another panel research study (Mistry, White, Benner, & Huynh, 2009) that partially included elementary school children found that mothers' expectations did not have long-lasting effects on GPA, but exerted a negative influence in this direction. It is likely that when parents have a greater impact on their elementary school children and when their expectations are set unrealistically high, children who are unable meet these expectations may feel powerless and give up easily over time. In fact, in a Confucian environment like Taiwan, a combination of Chinese parents who are less satisfied with their children's achievement and Chinese students who are more willing to meet their parents' expectations (Chen & Lan, 1998; Chen, 1988) could explain the negative and long-lasting effect on academic achievement. This may be the result of parents' unrealistically high expectations as found by Murayama et al. (2016). However, parental expectation cannot account for the immigrant-native gap in the growth rate of reading

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and math achievement because this aspect was similar in the two groups.

Our results demonstrate that both parent-child discussion and family rules are strongly related to the initial achievement of elementary school children in comparison to Western research on adolescent achievement (Ho & Willms, 1996; Yan & Lin,2005). In addition, the long-term effects of discussing homework with children and setting strict family rules on academic achievement were found to be insignificant, and furthermore these effects showed a reverse trend. A possible explanation for this lies in the fact that increased frequency of discussion and increased emphasis on family norms may be a result of stagnant progress in achievement; thus, parents endeavor to draw their children's attention to academic performance through constant discussions and the setting of specific norms. This can potentially lead to a respondent who performs less well than previously with regard to these variables, resulting in a negative trend.

Consistent with previous research (Yan & Lin, 2005), attending an open house or school event was negatively associated with initial achievement. This finding may be explained by the common notion that parents tend to contact teachers or educational professionals when their children are academically at risk. Furthermore, though small in magnitude, school-based participation had a subsequent effect on both reading and math achievement. In a Confucian cultural environment, parents value teachers' opinions more highly than do American parents (Chen, 1988). Given that parents establish stable and long-term relationships with schools, and consequently follow teachers' suggestions for instructing their children in cases of academic difficulty, these children should exhibit more progress than other children. Hong and Ho (2005) have indicated that, compared with three other ethnicities, school-based participation appears to positively influence the growth rate of Asian American adolescents, and the current study further confirms the benefit of long-term school-based participation on the growth rate of elementary school children's achievement.

On the whole, the positive effects of parental involvement on academic achievement are greater than the negative effects. The results echo the viewpoint of positive functions argued by Coleman (1988). The results add to the research (Portes, 1998) suggesting that over-expectation and excessive control are linked to detrimental outcomes. However, it is worth noting that the long-term and negative association of parental expectation with achievement might not be found outside Confucian culture. To understand the context-dependent effects of social capital, future work should compare the impacts of parental involvement in Eastern Asian countries with those in Western countries.

With regard to the trend of the immigrant-native academic gap, new immigrant children gradually catch up with native children in reading at a higher grade, as indicated by Kieffer (2011). However, the trend of the disparity in math achievement between the two groups is persistent (see Table 2). This implies that current educational strategies do not effectively alleviate the immigrant-native gap in terms of math. As a result, suitable math programs which target the issue of new immigrant children falling behind in math, should be designed. Furthermore, the insignificant long-term effects of parent-child discussion and family rules may partly attributable to respondents' growing independence. When children age, they may begin to pursue their autonomy and hence are less influenced by their parents in the early adolescence.

4.2. Limitations of the current study

Despite some of the findings of this study, it nonetheless had certain limitations. First, although the proportion of new immigrant children in the present sample was close to that of census data in 2014, the sample did not fully represent all elementary school children from other counties in Taiwan. However, the findings may be generalized to other regions with a high number of foreign immigrants in Taiwan.

Second, this study did not include other dimensions of parental involvement such as participation in parent-teacher organizations (PTO) or having knowledge of children's homework, which can benefit academic development (Ho & Willms, 1996; Yan & Lin,2005). Further research should include other dimensions of parental involvement in order to advance an understanding of whether these dimensions of parental involvement have the same effects in Asian countries as in Western countries.

Third, this study does not analyze the short-term and long-term effects of parental involvement on other areas of academic achievement such as science and social studies, because reading and math are the most important subjects that elementary school children study. A *meta*-analysis study indicates that the relationship between parental involvement and academic achievement can be generalized across many types of measurements for academic achievement, including tests and GPA scores, but cannot be generalized across different areas of academic achievement (Fan & Chen, 2001).

Finally, a self-reported survey on parental involvement is likely to be subject to social desirability bias, especially in terms of the parent-focused survey. When parents are more likely than their children or school teachers to overestimate their involvement (Deplanty, Kern, & Duchane, 2007), measurement error in predictors will downwardly bias the estimated coefficient, which may result in the underestimated effect of school-based involvement variables as noted by the parent survey.

4.3. Conclusions and implications

This study finds that apparent differences in parental involvement occur between new immigrant children and native children. In order to encourage parents of new immigrants to participate in home-based and school-based activities, schools should provide them with more resources, such as parenting education programs. Results reveal that once immigrant children have similar resources and similar levels of parental involvement to those of their native counterparts, they outperform native children at the fourth grade. Almost all parental involvement factors, i.e., parent-child discussion, parental expectation, family rules and school-based participation are significantly associated with children's initial achievement. The only exception is intergenerational closure. In addition, both parental expectation and school-based participation are related to children's academic growth rates. The immigrant-native gap

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in initial academic achievement can be partially explained by differences in parental involvement. In a Confucian context, parental expectation may be a double-edged sword. Parents in Confucian cultures should carefully set high academic expectations without pushing children beyond their capabilities. This finding contributes to the theoretical development of the social capital concept in a specific culture from the standpoint of its negative effects.

Appendix. Measurement of parental involvement and its results of principal component analysis

Items	Factor in 2010			Factor in 2011			Factor in 2012		
	1	2	3	1	2	3	1	2	3
Parent-child discussion: 4 items (i)How often do your parents or guardians teach you to do	0.76	0.10	0.10	0.79	-0.02	-0.08	0.78	-0.01	-0.07
(ii)How often do your parents or guardians talk about your homework or test scores?	0.79	0.07	0.12	0.84	-0.05	-0.07	0.82	-0.01	-0.07
(iii)How often do your parents or guardians talk about what is studied in school?	0.81	0.10	0.20	0.84	-0.01	-0.02	0.84	-0.02	-0.01
(iv)How often do your parents or guardians discuss school events with you?	0.69	0.16	0.26	0.70	0.06	0.05	0.73	0.04	0.02
Response options $(0 - payor 1 - payor 2 - option)$									
Parental expectation: 2 items									
(i)What educational level does your father want you to complete?	0.23	0.08	0.95	0.02	-0.01	0.95	0.01	-0.01	0.94
(ii)What educational level does your mother want you to complete?	0.26	0.09	0.95	0.01	-0.01	0.94	0.01	-0.01	0.94
Response options									
 (0 = do not have particular expectations, 1 = junior high school, 2=vocational high school, 3=senior high school, 4=junior college or technology college, 5=university, 6=graduate school, 7=PhD degree) 									
Family rules: 6 items	0.39	0.08	0.24	0.32	0.03	0.16	0.40	0.01	0.13
(i)Do your parents or guardians set wake-up time for you?(ii)Do your parents or guardians set a time when you arrive home from school?									
(iii)Do your parents or guardians set a fixed bedtime?(iv)Do your parents or guardians limit the amount of time you spend on learning?									
(v)Do your parents or guardians limit the amount of time you entertaining yourself?									
(vi)Do your parents or guardians limit the amount of time for making friends?									
Response options									
(0 = no, 1 = yes)									
Intergenerational closure	0.12	0.62	0.09	0.03	0.60	0.01	0.05	0.61	0.04
How often do you or your spouse contact the parents of your children's friends?									
Response options									
(0 = never, 1 = rarely, 2 = sometimes, 3 = often)									
School-based participation:									
2 items									
(i) How often do you or your spouse attend an open house?(ii) How often do you or your spouse attend school events?	0.12 0.09	0.87 0.87	0.06 0.05	-0.01 -0.04	0.87 0.88	-0.02 -0.02	-0.01 -0.05	0.88 0.90	0.08 0.06
Response options ($0 = $ never, $1 = $ rarely, $2 = $ sometimes, $3 = $ often)									

Note: Results of factor analysis of parental involvement in four other imputed datasets are similar to those in Appendix.

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