한국심리학회지 : 발달
The Korean Journal of Developmental Psychology
2017, Vol. 30, No. 4, 49-69

The Effects of Parent Involvement on Kindergarten Children's Reading Achievement: A Multilevel Analysis

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Prior research on the relationship between parental involvement in schools and children's academic achievement has been inconclusive, finding some positive effects and some negative effects of parent involvement. This study investigated the effects of parental involvement on kindergarten children's reading achievement. Working from a conceptual basis in Bronfenbrenner's Ecological System Theory (1998), the present study distinguished between the effects of an individual child's parental involvement at home and at school and the collective effect of a school atmosphere in which parents are actively involved on kindergarten students and their parents. The study data (N=3,142) were drawn from the Early Childhood Longitudinal Study's Kindergarten Class-Kindergarten version. A Hierarchical Linear Modeling (HLM) technique was used to uncover both the effects of individual parent activities and collective parent activities. The major finding resulting from the HLM analyses was that while there is no significant effect of an individual child's parental involvement at school, a school atmosphere in which parents are actively and collectively involved mitigates the effect of children's prior achievement on their reading achievement at the end of the kindergarten year. That is, in educational environments characterized by high collective parent involvement, kindergarten children are more likely to end their school year with higher reading achievement compared to the start of the year.

Key words : collective parenting, Kindergarten, reading, community

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Mothers and fathers with school-age children are encouraged to engage in two kinds of parental activities in terms of where the activities are taken place: one at school and the other at home. Of them, the school activities often mean parents' collective engagement such as volunteering to run cooking classes and reading books to groups of students. At-home activities are normally understood as parents' individual activities with their own child within home environment or neighboring communities. Indeed, individualized school-activities can be held in schools as well as at home. For example, parents *go to schools* for their own child's individual consultation and supporting activities (Shin, 2011). *At home,* parents can guide children's after-school activities and support academic activities, such as completing homework. Families, schools, and communities share overlapping spheres that influence various aspects of children's development, such as academic achievement and social and moral development (Epstein, 2010). Especially for children's academic development, scholars suggest that parents' second order influences via setting academic environments and providing encouragement play important roles (Cline & Necochea, 2003; Zeece, 2005). The second order influences can take place through parent involvement both at school and at home.

The effect of parent involvement at school on children's academic achievement has been investigated in numerous studies, but the research is inconclusive. A number of studies have found a positive relation between parent involvement in schools and child's academic achievement (Fan & Chan, 2001; Galindo, & Sheldon, 2012; Jeynes, 2005; Lundeen, 2005). The children with highly involved parents tend to have greater motivation to do well in their school lives (Cheung & Pomerantz, 2012). There is some evidence that supports a parent involvement program may be effective in children's transitional adjustment to formal schooling (Skouteris, Watson, & Lum, 2012). Certain studies suggest that parent involvements at home and at school interactively contribute to shaping children's educational achievement (Epstein, 2010) and even to increasing mental stability (Kim, 2002). On the other hand, a considerable number of studies have found a negative or no significant relation (Kohl, Lengua, & McMahon, 2000; Okpala, Okpala, & Smith, 2001; Quiocho & Daoud, 2006) between parent participation in schools and child's academic achievement or behavior. The influence of parent involvement on child achievement seems to depend on the kinds of involvement activities. For instance, Froiland, Peterson, and Davison (2013) reported checking homework or grades negatively influenced achievement, but traditional home literacy activities positively influenced achievement.

Past studies also documented that poverty, using various indicators such as socio-economic status (Bracey, 2008; Huebner, 2000) and family

size (Marks, 2006), are important determinants in school readiness or achievement. One important way to limit this effect of poverty is to involve parents in school and class (Padgett, 2006). However, nationally supported parent involvement programs may be ineffective for low-income parents due to the inappropriate foci of the programs. Emphasis on such themes as empowerment, outreach, and indigenous resources for inner-city African American parents has been suggested (Abdul-Adil & Farmer, 2006). It is often observed that low-income parents are more likely to be involved in at-home activities than school activities because they often feel unwelcome at school (Fields-Smith, 2005; Pena, 2000; Quiocho & Daoud, 2006; Ramirez, 2003; Tinkler, 2002). Parents' limited understanding of school curricula sometimes diminishes their inclination toward school involvement (Smith, 2014). Thus, there is a need to analyze the role of parent-involvement in a large-scale context while accounting for socio-economic status. The current study examines the nature of parent involvement at schools for its ability to predict kindergarten children's reading achievement as an indicator for their school readiness over and above their socio-economic status (SES) and minority status.

Theoretical Framework and Research Questions

To examine the effects of parent involvement on children's school achievement, we adopted Bronfenbrenner's Ecological System Theory (1998, 2004). The theory offers a useful heuristic model for conceptualizing parent involvement both at home and at school. The child and his or her development are central to this model. The child, family, school, and culture are nested in layers. The theory organizes the various influences from different structures in separate layers according to the extent of their influence on the child's development. The first layer in this model, the microsystem, incorporates the structures that have direct influence on the child, such as parents and family. The second layer, the mesosystem, includes those broader structures that influence the child's microsystem, such as the school. The third layer, the exosystem, incorporates the larger social system, such as government and culture. The separation by the different layers indicates the strongest connection among the corresponding variables in each layer against another layer. For example, a family member may have stronger interactions with other family members in the same layer compared to the school members in the next layer.

Consistent with Bronfenbrenner's model, individual parental involvement can be conceptualized as having two major components: involvement at home and involvement at school. Involvement at home is focused more on the specific child, whereas involvement at school may be less direct involvement because it embraces a

broader community of children, educators, and parents. Because of the interaction across the home and school domains that takes place when parents are involved at school, a further distinction can be made between the effects of the involvement of an individual parent on the achievement of his/her own child and the effect of a school atmosphere in which many parents are involved. This conceptualization of parent involvement focuses on the microsystem and mesosytem levels of Bronfenbrenner's Ecological System Theory.

Building upon Bronfenbrenner's model, we expected that parents' involvement at school, a key connection between home and school, would influence the kindergarten students' reading achievement. In this study, parent involvement was observed both at school and at home. Parenting in both domains with similar activities encourages children's positive school adjustment. The focus of the present study was on the kindergarten year because children's academic skills and knowledge at kindergarten entry are significantly related to eventual reading achievement in later grades (Claessens & Engel, 2013; Le et al., 2006; Senechal & LeFevre, 2002). This study also included emphasis on parents' involvement in children's development outside of school through activities, such as taking the child to the library, as well as accounting for the hierarchical structure of the data. Of many academic areas, the current study focused on parent involvement related to reading achievement. Reading abilities are known to be a major predictor of general intelligence and successful academic adjustment in elementary school (Ritchie, Bates, & Plomin, 2015). The research questions for the present study are as follows.

1. Does the collective involvement of parents at events in a school affect children's end of kindergarten reading achievement?

2. Does individual parent engagement at home and at school influence the child's end of kindergarten reading achievement?

Methods

Data Sources

To address the research questions, we used data from the Early Childhood Longitudinal Study Kindergarten Class of 1998-1999 (ECLS-K), which is a multisource, multimethod, longitudinal, nationally representative study designed to explore the early educational experiences of children in the U.S. (Tourangeau, et al., 2005; West, 2000). Data were collected by the National Center for Education Statistics, the primary federal entity for collecting and analyzing data related to education in the U. S. Human subjects review and clearance was provided by the Office of Management and Budget prior to the start of data collection. Parental consent was obtained as required prior

to collecting data from each student. Human subjects approval for the second author to analyze existing data was provided by the Human Subjects Committee of Southern Illinois University Carbondale. The analysis used the base year data, which were collected from child assessments and parent interviews in the fall 1998 and spring 1999 of kindergarten. In the ECLS-K data collection design, a nationally representative sample of schools was selected first, followed by selection of children within the schools. Thus, the data by design are considered to have a hierarchical structure.

The sample for the current study was a reduced version of the full ECLS-K data including students who were measured in both the beginning and the end of their kindergarten year. Only schools with five or more students were included in the analysis so that there would be sufficient information available to statistically separate effects at the individual level from those at the school level. The reduced version of the full ECLS-K data included a total of 3,309 students in 200 schools, with an average of 16.68 students per school (minimum of 5 and maximum of 25). The current study used 3,142 students and their parents excluding missing data. Although the ECLS-K has been constructed quite long ago in the U.S. setting, this study is expected to contribute to the current Korean society. The changing situations of father engagement (i.e. fathers actively engaging in parenting) in South Korea seems to resemble that of the U. S. in past years. Indeed, U. S. father involvement for child caring was less than 10 minutes per day on average in 1990. However, the statistics rose to one hour per day in 2014 (Sevilla & Borra, 2014). Similar to 1990 in U. S., Fathers in Korea were reported to spend around 3 minutes per day in 2016 (Lee, Kim, & Lim, 2014). There seems to be more than 20 years gap between the U. S. fathers and Korean fathers child caring involvement times.

Student Variables

Academic achievement

Variables relevant to academic achievement include the child's reading IRT scale score at the beginning of kindergarten year (ZlnFAread) as well as the child's reading IRT scale score at the end of kindergarten (ZlnSPread). Both of these reading achievement scores were natural log transformed to have a distribution that more closely approximates a normal distribution and then were standardized to facilitate interpretation. An additional control variable time between testing (TIMEGAP) was included to control for differences in testing dates across children when considering the effect of beginning reading achievement. The time between testing is a necessary control variable because young children learn quickly and were tested individually.

Demographic characteristics

The demographic characteristics include three variables: child's gender, socio-economic status, and child's race. Child's gender (FEMALE; coded 1 for female, 0 for male) was expected to interact with one of the parent involvement variables, adult male time spent with the child, which may influence boys' and girls' achievement differently. Socio-economic status (SES) and race were also included in the analysis as controls for the individual background of the child in the multilevel analysis. It is necessary and desirable to include these control variables in multilevel analyses so as to increase the accuracy of estimation and power to detect the effects of other variables in the model (Raudenbush & Bryk, 2000). The SES scale is a composite score using five measures of socio economic status of each family generated by National Council of Education Statistics (NCES). The measures include each parent's education and occupational prestige score, along with household income. Each SES measure was standardized to have a mean of zero and a standard deviation of one. In this study, five points were added to all SES scores to make them greater than zero, and then the scores were natural log transformed so as to have a distribution that more closely approximates a normal distribution. This variable was also subsequently standardized to facilitate interpretation (ZlnSES5). A dichotomous variable MINORITY was used to indicate child's race. This variable was coded 1 for African Americans, Hispanics, and Native Americans and coded 0 for Whites and Asians. Asian American family was categorized into a majority group in this study based on existing research and our statistical analysis. Previous studies using the same dataset (i.e., ECLS-K) reported that Asian American parents' belief and expectation toward their child's academic achievement and its influence on long-term achievement outcomes are similar to those of White Americans (Sy & Schulenberg, 2005). The mean transformed reading achievement scores at the end of school year from the current study data were ranked in decreasing order as Asian American (M=0.71), White American (M=0.11), Hispanic (M=-0.21), and African American (M=-0.37). The Asian American students' scores were closer to White American students' scores on average than to the average scores of students in other race groups. Further, the parents' school involvement did not significantly differ between Asian and White American [t(83.740)=-1.406, p=.163, d=0.164; chi-square(n=2320)=0.492, p=.483, phi=.015].

Parental Involvement

Father's time with a child (ZDADTIME), whether family member takes the child to the library (LIBRARY), and whether the parent volunteered at the child's school (VOLUNTEER) were used as indicators of individual parent involvement. ZDADTIME is a standardized linear combination of three original ECLS-K

variables (father in household, week day time for adult male with child, and weekend time for adult male with child; first eigenvalue = 2.523) that reflects the influence that a father-figure has on the child in the home and thus may influence the child's reading achievement. LIBRARY is an additional measure of parent's involvement at home since children's experiences at libraries may affect their early reading achievement.

VOLUNTEER was chosen for the current study as an indicator of the parent's (either mother or father) direct involvement at the school. The item simply asked parents to answer the question "[Since the beginning of this school year, have you or the other adults in your household…] act as a volunteer at the school or served on a committee?" with response either "yes" or "no". Although there were six indicators of parental involvement at the child's school (such as attending school events or parent-teacher conferences), the umbrella question was chosen because it was most strongly correlated with the other parental involvement indicators as well as most strongly correlated with the kindergarten reading achievement at the end of school year.

School Variables

School variables were drawn from the school-level data, based on responses from school administrators regarding school characteristics and composition. First, a dummy variable (PRIVATE; coded 1 for private, 0 for public) was used to separate schools by sector: private school and public school. The private schools included Catholic and other private schools. Two additional control variables, high minority enrollment (HIGHMINO, coded 1 if greater than 40 percent minority, 0 otherwise) and average kindergarten beginning reading achievement (SCHACH), were used to control for the racial composition of the school and the achievement level of the kindergarteners at the school, respectively. Level of collective parent activity at school (COLLECTIV) was also included to investigate its direct and indirect influence on the kindergarteners' reading achievement. The school administrators were asked to report their observations whether "parents are actively involved in this school's programs" on a five-point likert type scale.

Missing Data

Eight schools (four percent) were missing data on COLLECTIV, the amount of parent involvement at the school level. However, an analysis of the schools with missing data demonstrated that they did not differ from the schools that have data in terms of sector, location, school size, or average socio-economic status. These eight schools and the individual child cases (N=132) associated with them were eliminated from the data file.

As for missing data on variables at the child level, five children did not have responses to

items regarding their race, ten children had nonresponses to the variable LIBRARY, and four children were missing data on VOLUNTEER. Twenty-nine students were missing on the item ZDADTIME. Because the amount of missing data on individual children was small (N=35; approximately one percent of the children), these individual cases were excluded from subsequent analysis. The final data used in the analysis consisted of cases from 3,142 children in 192 schools. Sampling weights were rescaled to account for the missing data.

Analysis

The data collection design for ECLS-K as well as the nested conceptual framework of the present study suggests a need for multilevel modeling. Student variables and parent variables were particularly embedded across different levels (e.g., home and school, see Table 1). In this case, one should consider interactions between the two levels as well as the different individual variables at each level. The multilevel analysis has the capacity to address the interactions across different levels and effects of the variables at their own levels. Since children and parents within a particular school will have a tendency to be more similar than children and parents across schools on many variables, it is necessary to take into account the implications of this clustering in order to draw accurate statistical inferences. To assess whether multilevel analysis is necessary for the given data set, a preliminary analysis was used to compute the intraclass correlation coefficient, a measure of the proportion of total variability in the dependent variable (end reading scores) that is attributable to variation between groups (schools). For the multilevel analysis the available data lend themselves best to a two level hierarchical linear model in which variation in individual children and parents within schools is modeled at the first level and variation across schools is modeled at the second level. Thus, we employed Higherchical Linear Modeling (HLM) technique, which produces accurate estimation of lower-level slopes as well as estimating higher-level outcomes (Hofmann, 1997). The following random intercepts and slopes model was used to model effects at the lower (or child/family) level (Equation 1) and the higher (or school) level (Equation 2) on final reading achievement. In these models, $ZlnSPread_{ij}$ is the reading IRT (item response theory) scale score at the end of kindergarten for student i from school j.

Child/Family level (level 1)

$$ZlnSPread_{ij} = \beta_{0j} + \beta_{1j}ZlnFAread_{ij} + \beta_{2j}TIMEGAP_{ij} + \beta_{3j}FEMALE_{ij} + \beta_{4j}ZlnSES5_{ij} + \beta_{5j}MINORITY_{ij} + \beta_{6j}LIBRARY_{ij} + \beta_{7j}ZDADTIME_{ij} + \beta_{8j}VOLUNTEER_{ij} + r_{ij}$$

School level (level 2)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}PRIVATE_j + \gamma_{02}HIGHMINO_j + \gamma_{03}COLLECTIV_j + \gamma_{04}SCHACH_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}COLLECTIV_j + u_{1j}$$

Note. the meanings of each variable are displayed in Tables 1 and 2.

In sum, we assumed that students final reading achievement would be predicted by various individual level variables (beginning reading achievement, time gap between the examination, SES, gender, whether they were a member of a minority group, whether they go to the library with their parents, fathers time with children, and parent school volunteering). Further, the students initial reading levels were assumed to be influenced by their school level variables (whether the school was private and included high proportion of minority, levels of parent involvement as a group, and the school reading achievement at the beginning as a whole. The parent involvement was also assumed to be predicted by levels of collective parent school involvement as a whole.

Results

Descriptive Statistics

Table 1 presents the weighted means and standard deviations of the variables. The four standardized variables, ZlnSPread, ZlnFAread, ZlnSES5, and ZDADTIME, were clearly identified as having means of zero and standard deviations of one for the sample. Final kindergarten testing took place an average of approximately six months (M=182.90 days) after testing at the beginning of the school year, as seen by the average for TIMEGAP. The mean for the variable LIBRARY (M=0.55) suggests that 55 percent of the families took their child to the library. About half of the children have a parent who volunteers at the child's school. Twenty percents of the schools in this sample are private, and 31 percents have high minority enrollments. The mean of parent's activity (M=3.90) on a 5-point Likert-type scale indicated that many school principals saw high levels of parent activity at the schools. However, responses were highly variant, deviating on average by about one point ($S.D.$= 1.02).

Preliminary analysis

A preliminary analysis of the variability in reading achievement at the end of school year confirmed that multilevel modeling is appropriate for this outcome and that there is sufficient between-group variability to be modeled at the school level. The value of the intraclass correlation coefficient was 0.290, suggesting that 29 percent of the variability in the spring reading achievement scores exists at the between-school level.

Multilevel analysis

Table 2 presents the results for the multilevel model. COLLECTIV was not significant in explaining variation in the average final reading achievement among schools, but it was significant in explaining the slope for the

Table 1. Means, and Standard Deviations of Child and School Variables

Variables	Mean	S.D.
Child-level Variables (N= 3, 142)		
Child's reading IRT scale score at the end of kindergarten year (ZlnSPread)	0.000	1.000
Child's reading IRT scale score at the beginning of kindergarten year (ZlnFAread)	0.000	1.000
Days between testings at the beginning and at the end, (TIMEGAP)	182.900	182.900
Natural log transformed Z score of SES + 5 (ZlnSES5)	0.000	1.000
Gender (FEMALE)	0.476	0.500
African Americans, Hispanics, and Native Americans (MINORITY)	0.298	0.458
Whether family member takes child to library (LIBRARY)	0.550	0.498
Z score of father's time spent with child (ZDADTIME)	0.000	1.000
Whether the parent volunteered at the child's school (VOLUNTEER)	0.530	0.499
School-level Variables (J= 200)		
Private school against public school (PRIVATE)	0.203	0.403
Greater than 40 percent minority enrollment (HIGHMINO)	0.318	0.467
Level of collective parent activity at the school (COLLECTIV)	3.901	1.021
Average kindergarten beginning reading achievement (SCHACH)	0.020	0.565

Note. N is the number of participants (child-parent), J is the number of participant schools, IRT means item response theory which is designed to represent the relation between an individual's item response and an underlying latent trait (van der Linden & Hambleton, 1997).

beginning reading achievement effect on final reading achievement. The school control variables SCHACH and HIGHMINO were statistically significant whereas PRIVATE was not. The effect of COLLECTIV and the school control variables did not explain all of the variability across schools, however. As can be seen in the random effects portion of Table 2, the variance components for the random effects for both the school mean effect and the slope for beginning reading achievement (ZlnFAread) were significant. Using these variance components as well as variance components from a model in which the school variables have been excluded (random coefficient model), the computed proportion of between-group variability in the intercept accounted for at the school level was 0.795. This suggests that 79.5 percent of the variance across schools in the random intercept has been explained by the school variables PRIVATE, HIGHMINO, SCHACH, and COLLECTIV.

The computed proportion of between-group variability in the prior achievement slope accounted for at the school level was 0.025.

This suggests that 2.5 percent of the variance across schools in the random slope was explained by the school variable COLLECTIV. Using variance components from this model as well as from a model in which all variables have been excluded (random ANOVA model), the calculated proportion of within-group variability explained by the model was .620. This suggests that 62.0 percent of the variability of children within schools has been explained by the child-level variables. The high proportion of child variation in the composition of the variance in schools was consistent with what was found in the previous studies using hierarchical linear modeling techniques for educational achievement (Stewart, 2008).

As can be seen in the coefficients for the statistically significant fixed effects in Table 2, high minority public schools have an average log-transformed reading achievement at the end of school year that is 0.11 of a standard deviation higher than schools that do not have a high minority enrollment, controlling for other explanatory variables affecting the within-schools intercept. This school-level effect serves to counteract the effect of individual student minority status, which decreases log-transformed reading achievement at the end of school year by 0.08 of a standard deviation. For every standard deviation increase in the school's average log-transformed beginning reading achievement, individual student log-transformed reading achievement at the end of school year increases by 0.87 standard deviation. This suggests a strong association between the achievement composition of the school and individual achievement during the kindergarten year. This also clearly shows how collective level achievement and individual level achievement function differently.

Mitigating effect of collective parent involvement

According to the findings, kindergarteners' reading achievement at the beginning of school year (i.e., fall) was predictive of kindergarteners' reading achievement at the end of school year (i.e., spring). However, parental collective involvement partially mitigates the relation between beginning achievement and final achievement. In other words, those who achieved lower reading scores at the beginning were more likely to improve their reading scores at the end of school year when mothers or fathers were involved in school events together with other parents.

Students who start kindergarten with higher reading achievement tend to end kindergarten with higher reading achievement, and students who start kindergarten with lower reading achievement tend to end kindergarten with lower reading achievement. For every standard deviation increase in individual log-transformed beginning reading achievement scores, on average log-transformed reading achievement scores at

Table 2. Effects of Parent Involvement on Reading Achievement at the End of Kindergarten School Year

Fixed effect	Coefficient	S.E.	DF	Description
Mean reading achievement at spring (ZlnSPread)				
BASE, r_{00}	-0.068*	0.030	187	The average (standardized log-transformed) spring reading achievement across schools when all independent variables have a value of zero
PRIVATE, r_{01}	-0.028	0.066	187	The average achievement difference for PRIVATE (uncentered)
HIGHMINO, r_{02}	0.107*	0.048	187	The average achievement difference for HIGHMINO (uncentered)
COLLECTIV,	-0.000	0.022	187	The average achievement difference for COLLECTIV (group-mean centered)
SCHACH, $r_{04}\, r_{03}$	0.867**	0.050	187	The average achievement difference for SCHACH (group-mean centered)
Entering kindergarten reading scores at the beginning (ZlnFAread)				
BASE, r_{10}	0.751**	0.020	190	The average effect of ZlnFAREAD (group-mean centered)
COLLECTIV *ZlnFAread, r_{11}	-0.035*	0.017	190	A cross-level interaction effect of COLLECTIV at the school level and ZlnFAread
Days bewteen testings at the beginning and at the end of school year (TIMEGAP)				
BASE, r_{20}	0.004**	0.001	3118	The average effect of TIMEGAP (grand-mean centered)
Child's gender (FEMALE)				
BASE, r_{30}	.070**	0.021	3118	The average effect of FEMALE (grand-mean centered)
Socio-economic status (ZlnSES5)				
BASE, r_{40}	0.029*	0.014	3118	The average effect of ZlnSES5 (grand-mean centered)
Child's race (MINORITY)				
BASE, r_{50}	-0.078*	0.037	3118	The average effect of MINORITY (grand-mean centered)
Family member taking child to library (LIBRARY)				
BASE, r_{60}	0.027	0.021	3118	The average effect of LIBRARY (grand-mean centered)
Father time spent with child (ZDADTIME)				
BASE, r_{70}	0.003	0.013	3118	The average effect of ZDADTIME (grand-mean centered)
Family volunteering at child's school (VOLUNTEER)				
BASE, r_{80}	0.033	0.023	3118	The average effect of VOLUNTEER (grand-mean centered)
Random effect	Variance component	χ^2	DF	
School mean effect, u_0	0.065**	830.754	187	The school effect on mean reading achievement at the end of school year
ZlnFAREAD u_1	0.022**	367.160	190	The school effect of ZlnFAREAD on reading achievement at the end of school year
Residual, r	0.284			a residual (individual differences not explained by the model)

Note: * p< .05, ** p< .01, S.E. means standard error, DF means degrees of freedom.

the end of school year increase by 0.75 of a standard deviation (see Table 2).

Parental involvement at the school has a negative effect on this slope, mitigating somewhat the relation that prior achievement has with subsequent achievement. Thus, for every one point increase in parental involvement at the school, the effect of beginning reading achievement on reading achievement at the end of school year decreases by -0.035 of a standard deviation.

While parents' *collective* involvement at school events (COLLECTIV) seemed to have an influence in mitigating the effect of prior reading achievement on subsequent reading achievement, the individual parent involvement as a volunteer at the school (VOLUNTEER) did not show a significant effect on reading achievement at the end of school year, after controlling for other child-based factors such as time gap between the beginning and the end of school year, child gender, socio-economic status, child's race, library-taking, and father time spent with child. For the outcome of kindergarten reading achievement, it seems to matter less that the individual child's parent volunteers at the school than that there is a general climate of parent involvement at the school.

Significant effects on mean reading achievement scores were shown in each of the child-level control variables in the model, such as the time gap between testings at the beinning and at the end of the year, child's gender, socio-economic status, and child's race, controlling for all other variables in the model. For every additional day between the beginning and the last testing dates, the children's log-transformed reading achievement at the end of school year increased by 0.004 of a standard deviation on average. On average, females scored 0.070 of a standard deviation higher on log-transformed spring reading achievement than males. A unit increase in the log-transformed socio-economic status resulted in an average increase in spring reading achievement of 0.029 points. Minority students scored an average of 0.078 points lower than reference group (White and Asian students). Additional child-level parent involvement variables, such as LIBRARY and DADTIME were not significantly associated with reading at the end of kindergarten year achievement.

Discussion

The current study provided insight into how differently parents' individual involvement at school and home and parents' collective involvement at school influences kindergarten children's reading achievement. The results suggest that parents' *collective* involvement at school has a modest but significant effect in mitigating the connection between entering reading achievement and reading achievement at the end of school year over and above

other variables known to be correlated with achievement, such as socio-economic status. That is, in educational environments characterized by high collective parent involvement, kindergarten children are less doomed to end the year with the same rank in reading achievement they had at the start of the year. The notion of collective parent involvement explored in the current study is poised between community involvement and individual parenting, which bridges the microsystem and mesosystem articulated by Bronfenbrenner (1998).

Before discussing the results as they relate to previous research and the implications for practitioners, some words of caution are in order. The present study found evidence that parents' collective involvement at school has a mitigating effect on the connection between entering reading achievement and reading achievement at the end of school year. However, parents' collective involvement did not have a statistically significant effect on the school's average reading achievement at the end of school year. While we have no particular reason to believe that a school environment of collective parental involvement would diminish the reading gains of high achieving students, additional research is necessary to understand the potentially different effects that such parental involvement has on low achieving students and high achieving students. If a school climate of parental involvement is helpful to low achieving students in attaining higher reading achievement by the end of kindergarten, what is happening to the high achieving students in these schools? It is plausible that the short duration of time, approximately six months, in the present study was insufficient to accumulate a sufficiently large effect on the school's average reading achievement at the end school year to reach statistical significance, but this should be empirically verified and not assumed.

In addition, it should be noted that when some additional explanatory variables, such as average school achievement, were entered into the Level 2 equation for the reading slope at the beginning, the result was that none of the school-level variables alone had a significant effect on the slope. This suppression phenomenon suggests that there may be a confounding of effects between a general climate of parental involvement at the school and other characteristics that reflect the composition of the school. There was not sufficient variability in these data to produce enough statistical power in this study to separate these effects. This does not suggest that the overall power in this study was necessarily low, only that separating out such highly intertwined effects requires greater heterogeneity in measures of parental involvement and perhaps very large amounts of data.

The findings of this study complement and extend other previous research on parent involvement. Parents have the utmost importance in kindergartener's achievement because they

spend the most time with the children and bridge the children's learning at school and at home. The effect of individual family involvement at school on the individual child's achievement was significant in Cabrera's study (2006) but non-significant in the present study. However, the direction of the estimate in the present study was similar in that children are likely to achieve better scores when parents are more actively involved in individual activities such as contacting the school, volunteering, attending parent-teacher conferences, and attending parent-teacher association meetings.

Previous literature has identified children, parents, and educators as three key players in school adjustment (Dockett & Perry, 2001). One can estimate children's school adjustment (Liew, 2012) and longer-term achievement by investigating the readiness shown in the kindergarten years (Sabol & Pianta, 2012). Reading achievement at the end of kindergarten year, as investigated in this study, may be seen as an indicator of readiness for formal schooling. Thus, the present study is consistent with prior research showing that parents' involvement is a core factor in predicting children's school readiness (Cheung & Pomerantz, 2012).

The mitigating influence of collective parental involvement related to kindergarten reading achievement in this study suggests that educational equity at the kindergarten level may be beneficially influenced when parents *collectively* participate in the school setting. This finding is consistent with previous studies highlighting parents' collaboration with community or educators to prepare children successfully for formal schooling, including academic achievement and adjustment (Skouteris, Watson, & Lum, 2012; Kim, Coutts, Homes, and Sheridan, 2012). This collective strategy may also result in a compensation for less skilled parents in teaching reading to their own children (Stoltz & Fischel, 2003).

The finding regarding the mitigating influence of collective parent involvement has important implications for early childhood professionals concerned with children's primary school readiness. First, parents, when working collectively, should be viewed as a community whose influence can be tapped by community institutions, such as schools. Much thought in early childhood literature focuses on parents' individual influences on their own children's development. The findings of the present study, if replicated, would suggest value in also considering the ability of parents as a group to collectively influence the development of a group of children.

Second, there may be potential in the school's role as a community institution to organize community resources, such as the individual efforts of parents, in a way that alters student achievement patterns. Further, the finding of this study suggests that school initiatives aimed at increasing parent involvement may not need to increase involvement of every child's parent in

order to have an effect on academic achievement. Simply having a culture of involvement may be sufficient to begin having an impact on achievement, particularly among young children, as this study demonstrates with kindergarteners, and in a short time, an average of about six months in this study.

Further, what might be the effects for younger children if there was a similar organizing structure for collective parental involvement in the pre-kindergarten years? In the U.S. more affluent families are known for scheduling play dates for their children, which not only allow for the socialization of young children, but also allow an informal structure for the collective involvement of parents. Closer examination of the ways in which parents of young children work collectively is warranted and could furnish suggestions for how to create alternative community structures that organize collective parental involvement in ways that produce similar benefits as school-based organizing structures.

In addition, the study findings have implications for parents' active participation in school events for low-income families and minority groups, which was skeptically viewed in previous research due to the misleading parenting programs at schools (Fields-Smith, 2005; Pena, 2000; Quiocho & Daoud, 2006; Ramirez, 2003; Tinkler, 2002). The findings of the present study suggest that collaborative parental involvement has recognized association with educational equity. Again, if these findings are replicated, parents should be encouraged to collaborate to increase equity in children's reading achievement.

While the size of the effect of collective parent involvement in this study may appear modest, it is possible that future longitudinal studies may demonstrate an accumulated effect over the elementary school years. What seems like a small effect size across six months in kindergarten could potentially amount to a sizable difference by the end of third grade when children typically transition from learning to read to reading to learn. Investigation of such an effect would require careful attention to the longitudinal measurement of parental involvement beyond the scope of the present study.

Further research is warranted. In addition to proper replication of this finding, future research should investigate what kinds of school programs and characteristics are associated with school principals' perceptions of the culture of parent involvement at the school. What is happening in schools that principals rank high that is not happening in schools that principals rank lower? Further, the results of the present study demonstrate that a future study further delineating the longitudinal effects of collective parental involvement would be merited. It would be interesting to see if the effect of collective parent involvement accumulates across the elementary school years. The current study did not include the parental behavior styles and

attitudes toward their children which have been known to significantly influence children's cognitive and affective development (e.g., Choi & Shin, 2014; Hong & Sung, 2012). Thus, researchers are called to consider parent attitudes as potential mitigators or moderators in studying effects of parent involvement on children's academic achievement.

Conclusion

In conclusion, parental involvement is complex and multifaceted in the ways in which it relates to child development. While it may be intuitively believed that parental involvement is a good influence on children's development, leveraging this good influence requires having an accurate understanding of how the relation works. This study has contributed to this understanding by showing that, above and beyond demographic characteristics correlated with early childhood achievement, an environment of collective parent involvement at school may help to mitigate the relation between kindergarten children's reading achievement at the beginning of the year and reading achievement at the end of the kindergarten year. This suggests greater educational equity in an environment of high parent involvement, where children do not necessarily end kindergarten with the same rank they may have had at the beginning of kindergarten. As kindergarten is crucial preparation for entry into formal schooling in the first grade, reading achievement at the end of kindergarten year may be seen as an indicator of readiness to enter formal schooling. Further, the demonstration of a modest relation over the course of approximately six months within a school year may bode well for the magnitude of a longitudinal relation when an environment of collective parent involvement is sustained over the course of multiple school years.

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1차원고접수 : 2017. 09. 20.
수정원고접수 : 2017. 11. 26.
최종게재결정 : 2017. 12. 05.

한국심리학회지 : 발달
The Korean Journal of Developmental Psychology
2017, Vol. 30, No. 4, 49-69

유치원생의 읽기 학업성취도에 미치는 부모영향에 대한 위계적 선형모형 분석

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부모의 학교 행사 참여와 자녀들의 학업성취도의 관련성에 대해 선행 연구에서는 긍정적인 결과와 부정적인 결과로 나뉘어 보고하고 있어 명확한 결론을 얻기 어렵다. 본 연구는 자녀의 읽기 학업 성취도에 부모의 활동 참여가 어떻게 영향을 미치는지 알아보기 위해 실시되었다. Bronfenbrenner의 생태 체계 이론(1998)을 근거로 하여 부모가 가정과 학교에서 자녀의 학업 활동에 개인적으로 참여하는 것과 단체 활동을 통해 자녀의 학업에 개입하는 것이 어떻게 다른지 유치원생의 읽기 활동을 중심으로 분석하였다. 본 연구에 활용된 자료는 미국 영유아 종단연구의 유치원버전(Early Childhood Longitudinal Study Kindergarten Class- Kindergarten)에서 추출한 3,142명의 아동과 그 부모이다. 연구자료가 개인과 학교의 두 개 수준으로 이루어져 있고 이 두 수준에서 부모의 학교 활동이 아동의 학업성취도에 미치는 영향을 알아보고자하였기 때문에 위계적선형모형(HLM: hierarchical linear modeling) 방법을 활용하였다. 연구결과, 부모가 학교에 개별적으로 참여하는 것은 통계적으로 유의한 결과를 낳지 않았지만 부모가 학교에서 하는 단체 활동은 자녀의 학업 성취, 특히 유치원 학년 말 읽기 학업성취에 영향을 미치는 것으로 나타났다. 다시 말해 부모의 단체 활동이 활발한 학교에 재학하는 학생들일수록 입학 초기의 읽기 성적에 비해 1년 후 읽기 성적의 오르내림의 폭이 덜 영향을 받을 가능성이 높은, 즉 평등하게 읽기학업성취를 이룰 가능성이 높은 것으로 나타났다.

주요어 : 학부모 단체 활동, 유치원, 읽기, 공동체