Mental Health and Extracurricular Education in Korean First Graders: A School-Based Cross-Sectional Study

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Objective: This study explores the results of mental health screening in Korean first graders in association with the amount of time the children spent in extracurricular education.

Method: The study included a community sample of 761 boys and girls, with a mean age of 6.6 years, collected from 5 elementary schools in Gunpo-si, South Korea, in July 2007. Primary caregivers completed a questionnaire that included information on demographic characteristics, the amount of time the children spent in extracurricular education and other activities, and an adapted form of the Behavior Assessment System for Children, Second Edition (BASC-2) to screen for mental health problems.

Results: These first graders spent a mean of a little over 2 hours each day in extracurricular education. Extracurricular education demonstrated positive correlations with 4 BASC-2 domains, including hyperactivity ($r = 0.092$, $P < .05$), aggression ($r = 0.073$, $P < .05$), conduct problems ($r = 0.073$, $P < .05$) and depression ($r = 0.137$, $P < .01$). A positive linear relationship between depression and extracurricular education was also evident in regression analyses ($F = 2.25$, $R^2 = 0.022$, $P = .001$). The relationship held true even when controlling for time spent with parents, time spent with friends, and time spent asleep. Post hoc analyses revealed that children receiving more than 4 hours of extracurricular education per day showed a sharp increase in depressive symptoms as well as a decrease in the amount of time spent with caregivers.

Conclusions: Results of this study demonstrate that excessive amounts of time spent in extracurricular education (greater than 4 hours per day) may be associated with depression in school-aged children. These findings have relevance for mental health screening and educational policy.

J Clin Psychiatry 2011;72(6):861–868

Submitted: *December 12, 2009; accepted June 14, 2010.*
Online ahead of print: *February 8, 2011 (doi:10.4088/JCP.09m05907gry).*
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Worldwide, academic activities prove to be a major source of stress[1–6] for even the youngest of school-aged children. In the United States, the No Child Left Behind Act of 2001 placed a premium on achievement in reading and math, resulting in an increase in the amount of academic drilling and testing in elementary school programming.[3] Reports from the United Kingdom suggest that parents and schools have a tendency to place academic pressure on children to the extent that some youngsters come to describe their experience with formal education mainly as painful.[2] Children across East Asia attend school in a fiercely competitive system in which educational promotion is based on class rank, and stress related to academic achievement has been reported from as early as the elementary school period.[4]

The effect of academic stress on mental health has been studied cross-nationally. In a Swiss study, the degree of school pressure self-reported by children on a symptom checklist demonstrated a positive linear association with the severity of depression.[7] In other surveys, Asian students were found to be very likely to report anxiety, depressive symptoms, and a sense of being overburdened by the pressure to achieve academic excellence.[8,9] Stressful life events are key risk factors in the development of major depressive disorder in children,[10–13] and these and other studies suggest that academic stress might qualify in some circumstances as a risk factor for psychopathology from the youngest of school-aged children.

South Korea in particular is known for the rigor of its primary and secondary education programs. More than 80% of high school graduates go on to college,[14] and academic success has been linked to improvement in the social and economic status of Koreans in general.[15] In the last decade, extracurricular education meant to supplement school curricula for the purpose of boosting academic success has become commonplace and is considered by many families to be an essential part of their children's education.[16–18] In 2006, private spending on extracurricular education totaled 2.9% of South Korea's gross domestic product and made Korea the highest payer for extracurricular education among the 31 member countries of the France-based Organization for Economic Cooperation and Development.[19]

There are several forms of extracurricular education in South Korea, including the *hagwon*, which denotes a for-profit program specializing in intensive test preparation (a "cram school"). Extracurricular education is also conducted through private tutoring, extended-day schools, and

on-line programs. Henceforward, tutoring is understood to refer to all these forms of extracurricular education in this article. Tutoring often begins in or even before elementary school, and it is not unusual for children to attend more than 1 *hagwon* at a time.[5] Topics frequently reviewed include English language fluency, math, writing skills, and the sciences. Few programs focus on the development of musical, artistic, or athletic ability, as these activities are considered to be recreational rather than academic.[6,20]

On the whole, Korean families believe that tutoring is advantageous not only for their children's academic achievement but also for increasing the likelihood that their children will obtain entrance to prestigious colleges, paving the way for high-status employment in adulthood.[16] A study in Asian American youth suggested that a strong sense of obligation to the family is associated with a belief in the importance of education, and this belief appears to account for the tendency of Asian American adolescents to report a high level of academic motivation.[21]

At the same time, however, there is also growing concern that the emphasis on educational activities has become excessive and that too much time spent in tutoring may be related to an increased risk of mental health problems. One survey reported that the perception of an excessive educational load was cited by Korean elementary students as their most severe source of stress.[5] Korean child and adolescent psychiatrists have reported cases in which children's depression was attributed to excessive amounts of tutoring.[5,6] More alarming are reports indicating that a quarter of Korean school children endorse suicidal ideation in the context of overwhelming educational stress.[5]

Among the various educational activities in which children participate, tutoring in particular has the potential to reduce time spent in activities known to support children's mental and physical health. One such activity is spending quality time with primary caregivers, the importance of which for the development and maintenance of children's mental health has been borne out in repeated demonstrations.[22–24] Individual and social free play is another activity essential to the achievement of fundamental developmental milestones.[25] An excessive educational burden might lead to loss of sleep; and sleep deprivation in youth has been associated with hyperactivity as well as hypertension, and obesity.[26–28] Moreover, a study of Hong Kong students has associated excessive sleepiness with a counterproductive reduction in academic performance.[29]

Despite growing concerns about potential adverse effects of intensive tutoring, empirical evidence concerning the relationship between tutoring and mental health is lacking. This study explores the relationship between the amount of time spent in tutoring and the results of mental health screening in Korean first graders. We focused on first graders for several reasons. First, we were able to access resources from a larger research program studying mental health–related issues in a community sample of Korean first graders. Second, we felt that any adverse effects might be magnified in children who had recently commenced contact with the educational system. Finally, we felt that starting with children of a young age might provide the opportunity to study the efficacy of mental health interventions, if needed, and to document longitudinal outcomes.

Our a priori hypothesis asserted that increasing time spent in tutoring would directly relate to mental health problems. Given our interest in the relationship between tutoring and children's psychosocial support mechanisms, we further examined whether any association between tutoring and mental health problems was able to survive an analysis that controlled for alterations in time spent in putative protective factors due to tutoring.

METHOD

Recruitment and Survey Protocol

Our study utilized existing resources from the 2007 School Mental Health Project of Gunpo-si.[30] Gunpo-si is a midsized city (population 280,000; middle socioeconomic level) in the populous Gyeonggido Province of South Korea, and it is considered to be part of the Seoul National Capital Area. The larger School Mental Health Project was designed to study mental health–related issues in a community sample of first graders. Gunpo-si has 22 public elementary schools and no private elementary schools. The 5 elementary schools in which data were collected for this study were randomly selected among the 22 existing schools.

Our survey was conducted in July 2007, 4 months after the school year began. After gaining permission from the Gunpo-si Board of Education, we mailed information regarding the aims and procedures of the study to the principals and teachers of the 5 elementary schools. Once approved by school personnel, each child was given a packet to take to his or her primary caregiver(s), with a letter explaining the aims and procedures of the study, a consent form, and the study survey. For families choosing to participate, the consent form and survey were filled out, and the child returned the completed packet to the school. The Institutional Review Board of the Hallym University Sacred Heart Hospital (Anyang-si, Gyeonggido, South Korea) approved the study. Of the 1,117 children who received information about the study, 786 (70.37%) obtained consent from caregivers, and 761 (68.12%) returned a fully completed survey.

Demographic Characteristics

The survey instrument was designed to obtain demographic information as well as information about tutoring and mental health problems. We obtained data on sex, age, family structure, caregiver education, caregiver employment, and sources of income. Next, we asked caregivers to estimate the average amount of time (minutes per weekday from Monday to Friday) that their children spent in tutoring, asleep, and with caregivers or friends. As tutoring is rarely conducted on weekends, we limited the measurement

Table 1. Comparison of Mean Time Spent by Korean First Graders (N = 761) in Extracurricular Education by Demographic Characteristic

Demographic Characteristic	n (%)	Time in Extracurricular Education, Mean (SD), min	*t, F(df)*	*P*
Sex				
Male	366 (48.10)	145.79 (70.45)	$t = -0.381$ (752)	.741
Female	387 (50.85)	147.81 (75.03)	$t = -0.381$ (752)	.741
Data missing	8 (1.05)	131.25 (98.77)	NA	
Family structure				
Living with both parents	681 (89.49)	145.87 (71.46)	$F = 5.045$ (2)	.007
Living with single parent	14 (1.84)	208.57 (123.15)	$F = 5.045$ (2)	.007
Living with others	14 (1.84)	152.14 (99.47)	$F = 5.045$ (2)	.007
Data missing	52 (6.83)	139.04 (98.77)	NA	
Education level of parents				
Both parents college-educated	457 (60.05)	146.15 (67.69))	$F = 1.492$ (2)	.226
One parent college-educated	135 (17.74)	137.67 (67.78	$F = 1.492$ (2)	.226
Neither parent college-educated	155 (20.37)	152.32 (87.44)	$F = 1.492$ (2)	.226
Data missing	14 (1.84)	146.67 (73.1)	NA	
Job status of father				
Regular job	710 (93.30)	145.36 (71.21)	$t = -1.781$ (732)	.075
Temporary or no job	24 (3.15)	172.08 (100.17)	$t = -1.781$ (732)	.075
Data missing	27 (3.55)	146.77 (73.05)	NA	
Source of family income				
Dual income	224 (29.43)	157.24 (82.86)	$t = 2.921$ (711)	.004
Single income	489 (64.26)	141.21 (66.88)	$t = 2.921$ (711)	.004
Data missing	48 (6.31)	146.67 (73.05)	NA	

Abbreviation: NA = not applicable.

of time to weekdays. Time spent with caregivers is subsequently referred to as *family time* in this article, and it was calculated as the number of hours the child and a caregiver were at home together, plus the amount of time in which there was significant interaction between caregiver and child outside the home. Family time excluded the time in which the child was asleep. Likewise, time spent with friends in noncurricular activities is referred to as *play time*. Tutoring included participation in *hagwon*, private tutoring, after-school programs, on-line education, and any other before- or after-school activity designed to supplement school curricula.

Mental Health Screening

We screened for mental health problems using the Behavior Assessment System for Children, Second Edition (BASC-2),[31] Parent Rating Scales-Child. Caregivers respond to 160 items regarding their children's behavior, marking their responses on a 4-point scale. The BASC-2 is a widely-used child mental health assessment instrument with good internal consistency and test-retest reliability[31–33] that assesses behavioral problems over 9 separate clinical domains. The Korean language version of the BASC-2 is undergoing standardization by coauthor Y. S. Kim. For this study, we transformed raw data to linear *t* scores (mean = 50, SD = 10) based on norms derived from a community sample of Koreans (N = 5,000) that was tested using the Korean language version. Internal consistency for this sample was calculated at a Cronbach α of 0.97. The internal consistency for each of the 9 clinical domains was as follows: hyperactivity, 0.76; aggression, 0.75; conduct problems, 0.78; anxiety, 0.80; depression, 0.79; somatization, 0.77; atypicality (psychosis), 0.79; withdrawal, 0.40; and attentional problems, 0.26. These preliminary data suggest that the Korean language version of the BASC-2 is consistent with the English language version for the majority of the domains.[31]

Statistical Analyses

We used SPSS version 15 (SPSS Inc, Chicago, Illinois) for statistical analysis of the data. Demographic variables were compared to mean tutoring time using independent *t* tests or analysis of variance. Pearson correlation analyses were performed to characterize the relationship between tutoring time and family time, play time, or sleep time. Correlation analysis was also used to compare tutoring time with scores for each of the 9 clinical subscales of the BASC-2.

Next, we used the *T* scores for each of the BASC-2 domains showing significant Pearson correlations (hyperactivity, aggression, conduct problems, and depression) as outcome variables in a regression analysis. The purpose of the regression analysis was to determine whether a significant association between tutoring time and domain scores survived when controlling for putative protective factors including time with family and friends and time spent asleep. In addition, the regression models controlled for 5 demographic variables as categorized in Table 1. For each clinical subscale, we used both an unadjusted model and models adjusted for family time, play time, or sleep time. Adjusted models were performed stepwise such that we added 1 putative protective factor at a time as a continuous variable into the model. The significance level of these analyses was set at $P = .05$ (2-tailed).

Finally, categorical BASC-2 scoring was used to form a subgroup of children with evidence of depressive symptoms. Our clinically relevant subgroup consisted of children with T scores of 60 or higher on the BASC-2 depression subscale. Standardized scores in this range are considered to reflect children at risk of or currently demonstrating clinically significant psychopathology.[31] Based on the distribution of time the children spent in this activity, tutoring was stratified into 5 time intervals including the following: ≤ 1 hour, >1–2 hours, > 2–3 hours, > 3–4 hours, and > 4 hours of tutoring per day. Chi-square analysis was used to compare the proportion of children showing clinically relevant scores in each time interval. Because family structure showed a significant relationship with tutoring time, and because single-caregiver households were relatively rare in this sample, we repeated the categorical analysis excluding data derived from single-caregiver households. The amount of time spent with family, with friends, and time asleep was also calculated based on hourly intervals.

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Table 2. Pearson Correlation Analyses Between Time Spent by Korean First Graders in Extracurricular Education and Time Spent in Putative Protective Factors and the Scores of BASC-2 Clinical Scales

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Extracurricular education time	1												
2. Play time	−0.139**	1											
3. Family time	−0.204**	0.073	1										
4. Sleep time	−0.119**	0.016	−0.005	1									
5. BASC-2 Hyperactivity score	0.092*	0.051	−0.050	−0.023	1								
6. BASC-2 Aggression score	0.073*	0.056	−0.068	−0.022	0.680**	1							
7. BASC-2 Conduct problem score	0.073*	0.123**	−0.088*	−0.056	0.643**	0.602**	1						
8. BASC-2 Anxiety score	0.064	−0.087*	−0.014	−0.052	0.214**	0.327**	0.164**	1					
9. BASC-2 Depression score	0.137**	−0.012	−0.052	−0.039	0.482**	0.585**	0.452**	0.536**	1				
10. BASC-2 Somatization score	0.027	−0.067	−0.018	−0.043	0.300**	0.387**	0.309**	0.467**	0.573**	1			
11. BASC-2 Atypicality score	0.040	−0.019	−0.009	−0.016	0.576**	0.530**	0.526**	0.433**	0.605**	0.511**	1		
12. BASC-2 Withdrawal score	0.003	0.023	0.009	−0.018	0.201**	0.256**	0.235**	0.431**	0.441**	0.341**	0.364**	1	
13. BASC-2 Attentional problem score	−0.002	−0.061	0.010	0.011	0.001	0.016	−0.051	0.157**	0.075*	0.058	−0.027	0.254**	1

*Correlation is significant at the .05 level (2-tailed).
**Correlation is significant at the .01 level (2-tailed).
Abbreviation: BASC-2 = Behavior Assessment System for Children, Second Edition.

RESULTS

Data were collected from 761 Korean first graders (mean ± SD age was 6.55 ± 0.51 years; Table 1). Boys (48.1%; n = 366) and girls (50.9%; n = 387) were represented in equal proportions ($\chi^2 = 0.001$, $P = .975$). The majority of children lived in 2-parent households with a stable income. Three-quarters of the households contained at least one college-educated adult. The mean amount of time the children attended tutoring each weekday was just over 2 hours (mean = 146.7 minutes, SD = 73.0 minutes), with the maximum amount of time logged at 420 minutes per weekday. Only 6 children (0.08%) did not attend tutoring.

Table 3. Multiple Regression Analyses Associating Scores on the BASC-2 Clinical Scales With Time Spent in Extracurricular Education by Korean First Graders

	Regression Model									
	Unadjusted					Adjusted for Family Time, Play Time, and Time Asleep				
BASC-2 Clinical Scale Score	*F*	*df*	R^2 [a]	β	*P*	*F*	*df*	R^2 [a]	β	*P*
Hyperactivity	3.362*	7	0.029	0.089	.035	2.543*	10	0.027	0.083	.056
Aggression	2.051*	7	0.013	0.070	.100	1.669	10	0.009	0.068	.118
Conduct problem	2.331*	7	0.016	0.086	.053	2.962*	10	0.034	0.089	.038
Depression	2.494*	7	0.026	0.149	< .001	2.250*	10	0.022	0.144	.001

[a]Adjusted R^2. Variables in this model include sex, family structure, parental education, employment status, and sources of income (single or dual).
*$P < .05$.
Abbreviation: BASC-2 = Behavior Assessment System for Children, Second Edition.

Several demographic characteristics were significantly associated with tutoring (Table 1). Children living in single-parent families spent more time in tutoring than children in 2-parent households (208.6 minutes vs 145.9 minutes, $\chi^2 = 5.045$, $P = .007$). At the same time, children in dual-income families spent more time in tutoring than children in families with a single income (157.2 minutes vs 141.2 minutes, $\chi^2 = 2.91$, $P = .004$).

Correlational Analyses

Time spent in tutoring showed a modest inverse correlation with play time ($r = -0.139$, $P = .000$), family time ($r = -0.204$, $P = .000$), and sleep time ($r = -0.119$, $P = .001$; Table 2). Tutoring demonstrated positive correlations with 4 BASC-2 domains including hyperactivity ($r = 0.092$, $P < .05$), aggression ($r = 0.073$, $P < .05$), conduct problems ($r = 0.073$, $P < .05$) and depression ($r = 0.137$, $P < .01$).

Regression Analyses

We conducted multiple regression analyses in the 4 BASC-2 domains (hyperactivity, aggression, conduct problems, and depression) that showed significant correlations with tutoring (Table 3). This analysis was performed in order to assess the relationship between domain scores and tutoring time while controlling for the amount of time the children spent in activities thought to be protective toward developing mental health problems. In the case of the depression domain, unadjusted regression analyses indicated that the amount of time spent in tutoring showed a small but statistically significant positive linear association with depressive symptoms ($F_7 = 2.50$, $R^2 = 0.026$, β = .149, $P = .000$). This relationship held true in regression models controlling for the amount of family time, play time, and sleep time (full model: $F_{10} = 2.250$, $R^2 = 0.022$, β = .144, $P = .001$; Table 3), demonstrating that alterations in time spent in putative protective factors did not influence the relationship observed between depression scores and tutoring.

The hyperactivity subscale score reached statistical significance in our unadjusted model ($F_7 = 3.36$, $R^2 = 0.029$, β = .089, $P = .043$), and in the models adjusted for play time ($F_8 = 2.94$, $R^2 = 0.027$, β = .09, $P = .035$) and family time ($F_9 = 2.64$, $R^2 = 0.026$, β = .087, $P = .042$). Statistical significance did not survive adjustment with the addition of sleep time (full model: $F_{10} = 2.54$, $R^2 = 0.027$, β = .083, $P = .056$). The conduct problems subscale score did not reach statistical

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Figure 1. Percentage of Korean First Graders With Depressive Symptoms by Time Spent in Extracurricular Education

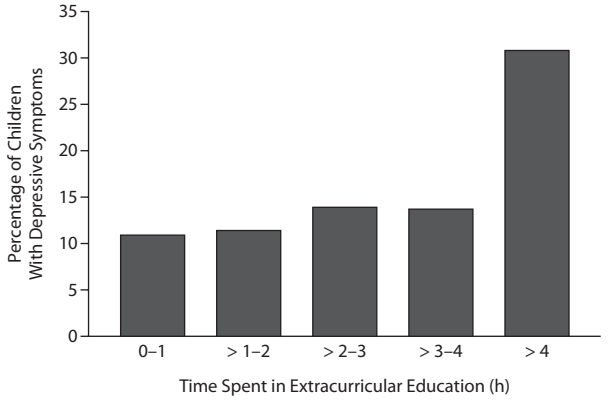
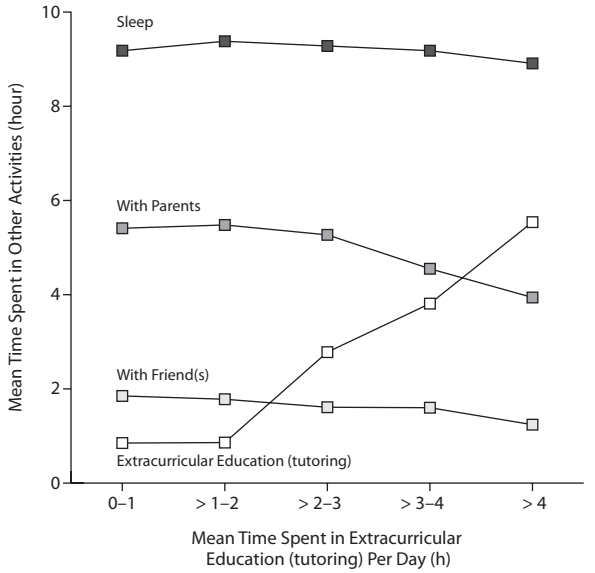


Figure 2.The Relationship Between Time Spent in Extracurricular Education, Time Spent With Parents, Time Spent With Friends, and Time Asleep in Korean First Graders



significance in the unadjusted model ($F_7 = 2.33$, $R^2 = 0.016$, $\beta = .86$, $P = .053$), but was significant in the stepwise models with play time ($F_8 = 2.95$, $R^2 = 0.027$, $\beta = .10$, $P = .017$), family time ($F_9 = 2.73$, $R^2 = 0.027$, $\beta = .097$, $P = .024$) and sleep time (full model: $F_{10} = 2.96$, $R^2 = 0.034$, $\beta = .089$, $P = .038$). Aggression subscale scores did not show statistically significant associations with tutoring in any of the regression models (Table 3).

Sex was a significant factor in two analyses. Female sex was a significant predictor of depressive symptoms (fully adjusted model: $\beta = .092$, $P = .029$). Male sex, on the other hand, was found to be a significant predictor of hyperactivity (fully adjusted model: $\beta = -0.111$, $P = .009$) and conduct problems (fully adjusted model: $\beta = -0.110$, $P = .009$). Detailed data from the stepwise regression analyses are available in the supplementary materials (eTables 1, 2, 3, and 4).

Categorical Analyses

In order to better appreciate the relationship between tutoring and depressive symptoms, we compared the proportion of children with clinically relevant depression subscale scores relative to tutoring in hourly intervals. Chi-square analysis indicated significant differences between time intervals of tutoring and the proportion of children with clinically significant depressive symptoms ($\chi^2 = 14.83$, $P = .005$). In particular, a sharp increase in the proportion of children with clinically relevant depressive symptoms was evident among the group that spent more than 4 hours per day in tutoring (Figure 1). Specifically, 30% (16 of 53 children) exhibited clinically relevant depressive symptoms compared with about 10% of children who showed clinically relevant symptoms in groups receiving less than 4 hours of tutoring per day. Thus, we saw a 3-fold increase in the risk of clinically relevant depression subscale scores in children spending more than 4 hours per day in tutoring. It is noteworthy that, in children who received more than 4 hours of tutoring a day, there was a reversal in the proportion of tutoring and family time such that the mean time spent in tutoring was greater than the mean time that they spent with their family (Figure 2).

In a categorical analysis excluding children living with a single caregiver, 30.6% (15 of 49 children) exhibited clinically relevant scores on the BASC-2 depression subscale when participating in more than 4 hours of tutoring per day ($\chi^2 = 13.23$, $P = .01$). The proportion of children with clinically relevant depression subscales scores was similar among the subgroup excluding children in single-parent families and the sample as a whole, and it was consistent with the notion that family structure was unlikely to be confounding the interpretation of our results.

DISCUSSION

To our knowledge, this is the first study to empirically demonstrate a relationship between time spent in tutoring and mental health in school-aged children. The main finding of the study, conducted in a large community sample of middle-class Korean first graders, was a positive correlation between depressive symptoms and tutoring. Categorical analysis indicated that clinically relevant scores on the BASC-2 depression subscale were sharply increased in children who spent more than 4 hours per day in tutoring. Children in this category were 3 times more likely to manifest depressive symptoms than their classmates who spent less than 4 hours per day in tutoring. The association between tutoring and depressive symptoms remained strong even through regression analyses controlling for putative protective factors, including the amount of time the children spent with family and friends and the amount of time spent sleeping. Stressful life events are key risk factors in the development of major

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depressive disorder in children,[10–13] and major depressive disorder in school-aged children is known as a serious clinical condition characterized by high levels of recurrence over the life course.[34,35] Our study suggests that extensive time spent in tutoring may be one of these risk factors.

Academic impairment is known to be a risk factor for childhood mental health problems,[36–38] and low academic achievement[38–40] and decreased sense of academic competence[41] have consistently been found to be associated with depression. Moreover, well-organized after-school programs have been associated with better academic outcomes, including superior grades, work habits, peer relations, and conduct and emotional adjustment at school.[42,43] Nevertheless, our data reveal that 30% of children who spend more than 4 hours per day in tutoring demonstrate clinically relevant symptoms of depression consistent with the notion that excessive amounts of time spent in tutoring may be a risk factor for psychopathology. In particular, the *hagwon*, the most prevalent form of extracurricular education,[16,18,20,44] is known to use intense and inflexible curricula that discourage spontaneous interaction between children and mutual communication between children and adults.[17,18,20] Spending long periods of time in this type of environment might be conducive to the development of mental health problems, including depressive symptoms in young children.

In our community sample, Korean first graders spent a mean of 2 hours a day in tutoring. Our report of a mean of 10+ hours per week of tutoring is higher than the 8.9 hours per week obtained in a 2007 nationwide survey[16] but is similar to a recent survey showing that 90% of school children in Seoul attend a mean of 2.5 hours of tutoring per day.[5,17] Between tutoring and a 6-hour school day, these studies demonstrate that elementary school children in Korea routinely spend 8 hours each day in educational activities, exclusive of time spent completing homework.

One of our study goals was to determine whether tutoring reduced time spent in other activities known to protect children from expressing depressive symptoms. Good sleep hygiene, play time with friends, and quality time spent with caregivers have all been shown to be important for the healthy development and mental well-being of children.[11–17] Our results suggest that time spent in these activities does not appear to be adversely affected in Korean children who attend the mean amount (2 hours per day) of tutoring. Our data suggest, however, that when children spend 4 or more hours per day in tutoring, time spent with caregivers decreases such that these children spend more time during the day in tutoring than they do with family. Thus, more than 4 hours per day of tutoring may create a situation of additive risk for the manifestation of depression in children.

There were several differences in tutoring patterns based on family structure and source of income. For example, our data revealed that children from dual-income families spent more time in tutoring than did children from single-income families. This finding is consistent with the idea, highlighted by the popular press,[45] that mothers who choose to return to work outside the home may do so at least in part to help cover their children's educational expenses. This rationale, however, is not consistent with our finding that children living in single-parent families spent more time in tutoring than did children in 2-parent families.

An alternative hypothesis may be that single-parent and dual-income families enroll their children in tutoring as much to cope with child care responsibilities as to further their children's education. Data regarding children from single-parent families should be interpreted with caution due to the limited number included in the study (N = 14, 0.02%). Nevertheless, in our clinical experience, we have noted a considerable number of working parents who rotate their children through several *hagwons* on a daily basis so as to avoid the children's being home alone after school. Emergence of further data regarding a relationship between supervision and tutoring may indicate a need on the part of young Korean families to have access to alternative sources of quality child care.

Hyperactivity, aggression, and conduct problems showed modest correlations with tutoring time. The hyperactivity subscale score reached statistical significance in our unadjusted regression model and models adjusted for family time and play time but did not remain significant in the full model. This finding could result either from lack of statistical power or, potentially from an association between sleep duration and hyperactivity/impulsivity.[46] The conduct problems subscale score was significant in adjusted models but did not reach statistical significance in the unadjusted model, suggesting that factors in addition to tutoring play a role in the manifestation of conduct disorder. Future research may be able to define more specifically the association of these factors with conduct problems and hyperactivity. In sum, our regression models analyzing tutoring time suggested that the association with these subscales was not as robust as that seen with depression.

Implications

The results of this study have several implications. The presence of a direct association between tutoring and depressive symptoms should encourage clinicians to utilize questions about tutoring as part of routine mental health screening. Clinicians should be vigilant for the existence of mental health issues or family problems in children who report attending more than 4 hours of tutoring per day. Screening for depression would be especially relevant in children with a family history of depression and in those who spend long hours in tutoring. From a public health perspective, policy that limits tutoring for young children to less than 4 hours per day could prove valuable in preventing early incidence of mental illness. This type of policy, however, could aggravate problems associated with the situation, if it existed, in which single-parent and dual-income families were using tutoring programs as a mechanism for after-school supervision. This outcome would reinforce the idea of a widespread need for ready access to alternative forms of child care.

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Limitations

Although our sample was chosen to be representative of first graders in the city of Gunpo-si, it is not necessarily representative of first graders across Korea or abroad. Furthermore, our data are cross-sectional and cannot determine a causal relationship between tutoring and children's mental health. A larger, longitudinal study is necessary to further define the trajectories of risk and protective factors, and it would be of value in documenting the outcome of any intervention instituted for young children manifesting psychopathology.

We assessed children's depressive symptoms using the BASC-2 subscale. The BASC-2 assesses parental report of children's symptoms included in diagnostic criteria from the *DSM-IV-TR*.[31] Although we did not confirm diagnoses with direct observation, clinical interviews, or other diagnostic testing, and despite the risk for recall bias, the BASC-2 has proven to be a reliable and valid screening instrument across multiple research settings.[31,47] Additionally, a family history of depression[48] as well as low academic achievement have been associated with juvenile depression,[38–40] but these factors were not assessed in this study.

We used normative data newly collected from the Korean language version of the BASC-2 to standardize subscale scores. Using a Korean community sample has the benefit of providing a good fit between the population used to standardize the instrument and the sample being studied. Although this version of the instrument has not been used extensively, we determined the internal consistency to be greater than 90%, suggesting that further testing of the Korean language version of the BASC-2 will find it to be a valid and reliable instrument for many of its domains.

We did not ascertain information about the nature of the children's tutoring. Thus our study does not provide data on qualitative aspects of extracurricular education that might be associated with depressive symptoms. Future studies using daily diaries filled out by children or caregivers or direct observation in vivo or through videotaping would counteract the effect of recall bias and allow for qualitative assessment of the activities.

CONCLUSION

This study is the first to empirically demonstrate the relationship between extracurricular education and depressive symptoms in Korean school children. Our analysis indicated that first graders who spent more than 4 hours per day in tutoring were 3 times more likely to demonstrate depressive symptoms than classmates who underwent less than 4 hours of tutoring per day. Our results suggest that excessive amounts of time (4+ hours per day) spent in extracurricular education are directly associated with psychopathology in early school-aged children, and further research is imperative in order to determine whether excessive time devoted to educational activities is a risk factor for childhood depression.

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Potential conflicts of interest: **Dr Greenhill** has received research support from Johnson and Johnson and Otsuka. **Drs H. J. Hong**, **Kim**, **Jon**, **Soek**, **N. Hong**, **Harkavy-Friedman**, and **Miller** report no financial or other relationship relevant to the subject of this article.
Funding/support: This study was supported by the 2007 School Mental Health Project of Gunpo-si, Korea.
Previous presentation: Data from this study were presented in poster form at the 56th Annual Meeting of the American Academy of Child and Adolescent Psychiatry, October 27–November 1, 2009, Honolulu, Hawaii.
Acknowledgment: The authors are thankful to Gyu-Tae Kim, MD, MPH, of Gunpo-si Public Health Center, Gunpo-si, Republic of Korea, for administrative support; to Eun-Suk Park, BA, Hyen Jin Kim, BA, Yeo Ju Choen, RN, Sang Tae Kim, BA, and Yong Sik Hwang, MD, of Gunpo-si Mental Health Center, Gunpo-si, Republic of Korea, for harmonious communication with schools; and to Yu-Kyung Soh, MA, of the Department of Clinical Psychology, Hallym University Sacred Heart Hospital, Anyang-si, Republic of Korea, for data management and quality control of assessment. Finally, the authors are thankful to the children and their parents who participated in the study. The acknowledged persons report no financial or other relationship relevant to the subject of this article.
Supplementary material: eTables 1, 2, 3, and 4 are available at PSYCHIATRIST.COM

REFERENCES

1. World Health Organization. *Health Behavior in School-Aged Children: A WHO Cross-National Study (HBSC). International Report* (Health Policy for Children and Adolescents [HEPCA] Series No 1). Copenhagen, Denmark: World Health Organization Regional Office for Europe; 2000. http://www.hbsc.org/downloads/Int_Report_00.pdf. Accessed December 1, 2010.
2. Powers S. *Education in the Middle Class*. Buckingham, England: Open University Press; 2003.
3. Ginsburg KR. American Academy of Pediatrics Committee on Communications; American Academy of Pediatrics Committee on Psychosocial Aspects of Child and Family Health. The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*. 2007;119(1):182–191.
4. Berning S. Stress among school children leads to health problems. *Deutsche Welle*. February 25, 2010. http://www.dw-world.de/dw/article/0,5274129,00.html. Accessed December 15, 2010.
5. Korean elementary schoolers: crushed with private education [in Korean]. November 5, 2007; http://weekly.hankooki.com/lpage/nation/200711/wk2007110515004837070.htm. Accessed December 23, 2008.
6. Korean education: an unhealthy obsession. *AM*. http://www.abc.net.au/am/content/2005/s1333165.htm. Accessed December 29, 2008.
7. Steinhausen H-C, Metzke CW. Adolescent self-rated depressive symptoms in a Swiss Epidemiological Study. *J Youth Adolesc*. 2000;29(4):427–440.
8. Holman RL. Exam hell linked to depression. *Wall Street Journal*. December 21, 1991: 4.
9. Watanabe T. A lesson for Japan's kids: Play! *Los Angeles Times*. September 14, 1992.
10. Kendler KS. Major depression and generalised anxiety disorder: same genes, (partly) different environments—revisited. *Br J Psychiatry Suppl*. 1996;(30):68–75.
11. Kendler KS, Gardner CO. Monozygotic twins discordant for major depression: a preliminary exploration of the role of environmental experiences in the aetiology and course of illness. *Psychol Med*. 2001;31(3):411–423.
12. Silberg J, Rutter M, Neale M, et al. Genetic moderation of environmental risk for depression and anxiety in adolescent girls. *Br J Psychiatry*. 2001;179(2):116–121.
13. Jaffee SR, Moffitt TE, Caspi A, et al. Differences in early childhood risk factors for juvenile-onset and adult-onset depression. *Arch Gen Psychiatry*. 2002;59(3):215–222.
14. Park S. On College-Entrance Exam Day, All of South Korea Is Put to

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the Test: Noisy Flights Can't Land; Offices Open Late To Avoid Traffic; Mothers Pray a lot. *Wall Street Journal*. November 12, 2008. http://online.wsj.com/article/SB122644964013219173.html. Accessed December 22, 2008.
15. Lee MH. The "public" and the "private" in Korean higher education: one private dominating system. *J Asian Public Policy.* 2008;1(2):199–210.
16. Statistics Korea. *The Survey of Private Education Expenditures in 2009*. Private Education Expenditures and Participation Rate. Daejeon, Republic of Korea: Statistics Korea; 2009. http://kostat.go.kr/portal/english/news/1/8/index.board?bmode=read&bSeq=&aSeq=69874&pageNo=1&rowNum=10&navCount=10&currPg=&sTarget=title&sTxt. Accessed December 15, 2010.
17. Kim S. *An Analytic Study on the Private Education of Elementary School Students in Ulsan. Ulsan: Educational Administration* [in Korean]. Ulsan, South Korea: University of Ulsan; 2004.
18. Jung J-m. *A Study on Elementary School Students' Actual Condition Using Private Education—Centering on Pyeong Chang Province* [in Korean]. Seoul, Korea: Education Administration, Yonsei University; 2006.
19. Kang S-w. Korea Tops OECD in Private-Sector Public Education Spending. *The Korea Times*. September 9, 2008.
20. Je M. *A Study on Preference to Private Education* [in Korean]. Seoul, Korea: Sociology of Education, Hong-Ik University; 2003.
21. Fuligni AJ. Family obligation and the academic motivation of adolescents from Asian, Latin American, and European backgrounds. *New Dir Child Adolesc Dev*. 2001;2001(94):61–75.
22. Rutter M. Epidemiological approaches to developmental psychopathology. *Arch Gen Psychiatry*. 1988;45(5):486–495.
23. Wyman PA, Cowen EL, Work WC, et al. Developmental and family milieu correlates of resilience in urban children who have experienced major life stress. *Am J Community Psychol*. 1991;19(3):405–426.
24. Wyman PA, Cowen EL, Work WC, et al. Interviews with children who experienced major life stress: family and child attributes that predict resilient outcomes. *J Am Acad Child Adolesc Psychiatry*. 1992;31(5):904–910.
25. Levendosky AA, Huth-Bocks A, Semel MA. Adolescent peer relationships and mental health functioning in families with domestic violence. *J Clin Child Adolesc Psychol*. 2002;31(2):206–218.
26. Javaheri S, Storfer-Isser A, Rosen CL, et al. Sleep quality and elevated blood pressure in adolescents. *Circulation*. 2008;118(10):1034–1040.
27. Van Cauter E, Knutson KL. Sleep and the epidemic of obesity in children and adults. *Eur J Endocrinol*. 2008;159(suppl 1):S59–S66.
28. Calamaro CJ, Mason TB, Ratcliffe SJ. Adolescents living the 24/7 lifestyle: effects of caffeine and technology on sleep duration and daytime functioning. *Pediatrics*. 2009;123(6):e1005–e1010.
29. Ng EP, Ng DK, Chan CH. Sleep duration, wake/sleep symptoms, and academic performance in Hong Kong Secondary School Children. *Sleep Breath*. 2009;13(4):357–367.
30. Hong HJ. *The 2007 Gunpo-si School Mental Health Project Report* [in Korean]. Gunpo-si: Gunpo-si Mental Health Center; 2007.
31. Reynolds CR, Kamphaus RW. *BASC-2 Behavior Assessment System for Children. Second Edition*. Circle Pines, MN: AGS Publishing; 2004.
32. Doyle A, Ostrander R, Skare S, et al. Convergent and criterion-related validity of the Behavior Assessment System for Children-Parent Rating Scale. *J Clin Child Psychol*. 1997;26(3):276–284.
33. Allison Bender H, Auciello D, Morrison CE, et al. Comparing the convergent validity and clinical utility of the Behavior Assessment System for Children-Parent Rating Scales and Child Behavior Checklist in children with epilepsy. *Epilepsy Behav*. 2008;13(1):237–242.
34. Birmaher B, Ryan ND, Williamson DE, et al. Childhood and adolescent depression: a review of the past 10 years, Part 2. *J Am Acad Child Adolesc Psychiatry*. 1996;35(12):1575–1583.
35. Rutter M, Kim-Cohen J, Maughan B. Continuities and discontinuities in psychopathology between childhood and adult life. *J Child Psychol Psychiatry*. 2006;47(3–4):276–295.
36. Ladd GW, Burgess KB. Do relational risks and protective factors moderate the linkages between childhood aggression and early psychological and school adjustment? *Child Dev*. 2001;72(5);1579–1601.
37. Samroff AJ, Lewis M, Miller SM. *Handbook of Developmental Psychopathology*. 2nd ed. New York, NY: Kluwer Academic/Plenum Publishers; 2000.
38. Chen X, Rubin KH, Li BS. Depressed mood in Chinese children: relations with school performance and family environment. *J Consult Clin Psychol*. 1995;63(6):938–947.
39. Hilsman R, Garber J. A test of the cognitive diathesis-stress model of depression in children: academic stressors, attributional style, perceived competence, and control. *J Pers Soc Psychol*. 1995;69(2):370–380.
40. Kaslow NJ, Rehm LP, Siegel AW. Social-cognitive and cognitive correlates of depression in children. *J Abnorm Child Psychol*. 1984;12(4):605–620.
41. Cole DA, Martin JM, Powers B, et al. Modeling causal relations between academic and social competence and depression: a multitrait-multimethod longitudinal study of children. *J Abnorm Psychol*. 1996;105(2):258–270.
42. Posner JK, Vandell DL. Low-income children's after-school care: are there beneficial effects of after-school programs? *Child Dev*. 1994;65(2 Spec No):440–456.
43. Posner JK, Vandell DL. After-school activities and the development of low-income urban children: a longitudinal study. *Dev Psychol*. 1999;35(3):868–879.
44. Kim S. Elementary schooler's low grade class [in Korean]. *Hankyoreh*. June 9, 2008.
45. Kang H-S, Im J-S. Mothers choose to work [in Korean]. *Nocutnews*. April 4, 2007.
46. Paavonen EJ, Räikkönen K, Lahti J, et al. Short sleep duration and behavioral symptoms of attention-deficit/hyperactivity disorder in healthy 7- to 8-year-old children. *Pediatrics*. 2009;123(5):e857–e864.
47. Cameron FJ, Smidts D, Hesketh K, et al. Early detection of emotional and behavioural problems in children with diabetes: the validity of the Child Health Questionnaire as a screening instrument. *Diabet Med*. 2003;20(8):646–650.
48. Luby JL, Si X, Belden AC, et al. Preschool depression: homotypic continuity and course over 24 months. *Arch Gen Psychiatry*. 2009;66(8):897–905.

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THE JOURNAL OF CLINICAL PSYCHIATRY

Supplementary Material

Article Title: Mental Health and Extracurricular Education in Korean First Graders: A School-Based Cross-Sectional Study

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DOI Number: 10.4088/JCP.09m05907gry

List of Supplementary Material for the article

1. **eTable 1** Multiple regression analyses associating scores on the BASC-2 hyperactivity subscale with tutoring and putative protective factors
2. **eTable 2** Multiple regression analyses associating scores on the BASC-2 aggression subscale with tutoring and putative protective factors
3. **eTable 3** Multiple regression analyses associating scores on the BASC-2 conduct problem subscale with tutoring and putative protective factors
4. **eTable 4** Multiple regression analyses associating scores on the BASC-2 depression subscale with tutoring and putative protective factors

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eTable 1. Multiple regression analyses associating scores on the BASC-2 hyperactivity subscale with tutoring and putative protective factors

Variables	Unadjusted			Adjusted for family time			Adjusted for play time and family time			Adjusted for play time, family time, and time asleep		
	R^2	beta	p	R^2	beta	p	R^2	beta	p	R^2	beta	p
	0.029			0.027			0.026			0.027		
Sex												
Female		-0.109	0.009		-0.109	0.010		-0.108	0.010		-0.111	0.009
Family structure												
[a]Single or other		-0.085	0.045		-0.085	0.045		-0.085	0.046		-0.088	0.039
Educational level of parents												
[b]One parent		-0.019	0.655		-0.019	0.658		-0.021	0.632		-0.022	0.611
[c]Neither		-0.046	0.299		-0.046	0.301		-0.048	0.279		-0.052	0.237
Job status of father												
[d]Temporary or unemployed		0.021	0.631		0.020	0.636		0.019	0.650		0.019	0.656
Dual income		-0.105	0.013		-0.104	0.014		-0.114	0.015		-0.120	0.011
Time in tutoring		0.089	0.035		0.090	0.035		0.087	0.042		0.083	0.056
Play time					0.008	0.845		0.009	0.835		0.007	0.871
Family time								-0.024	0.613		-0.029	0.544
Time asleep											-0.054	0.201

[a] Single or other; living with single parents and others [b]One parent; one parent college-educated [c]Neither; neither parent college-educated [d]Temporary or no; temporary or no job, Time in tutoring; time spent in extracurricular education per day (minutes), Play time: time spent with friend per day(minutes); Family time: time spent with parents per day (minutes), Time asleep per day(minutes)

eTable 2. Multiple regression analyses associating scores on the BASC-2 aggression subscale with tutoring and putative protective factors

Variables	Unadjusted			Adjusted for family time			Adjusted for play time and family time			Adjusted for play time, family time, and time asleep		
	R^2	beta	p	R^2	beta	p	R^2	beta	p	R^2	beta	p
	0.013			0.012			0.011			0.009		
Sex												
Female		-0.081	0.055		-0.079	0.061		-0.079	0.063		-0.080	0.063
Family structure												
[a]Single or other		-0.039	0.358		-0.039	0.354		-0.039	0.360		-0.040	0.350
Educational level of parents												
[b]One parent		-0.065	0.136		-0.086	0.053		-0.067	0.127		-0.040	0.350
[c]Neither		-0.086	0.052		-0.086	0.053		-0.089	0.046		-0.090	0.044
Job status of father												
[d]Temporary or unemployed		0.009	0.843		0.008	0.856		0.007	0.875		0.007	0.877
Dual income		-0.061	0.150		-0.059	0.168		-0.072	0.126		-0.074	0.120
Time in tutoring		0.070	0.100		0.073	0.089		0.069	0.109		0.068	0.118
Play time					0.022	0.613		0.022	0.602		0.022	0.611
Family time								-0.032	0.507		-0.033	0.490
Time asleep											-0.017	0.693

[a] Single or other; living with single parents and others [b]One parent; one parent college-educated [c]Neither; neither parent college-educated [d]Temporary or no; temporary or no job, Time in tutoring; time spent in extracurricular education per day (minutes), Play time: time spent with friend per day(minutes); Family time: time spent with parents per day (minutes), Time asleep per day(minutes)

eTable 3. Multiple regression analyses associating scores on the BASC-2 conduct problem subscale with tutoring and putative protective factors

Variables	Unadjusted			Adjusted for family time			Adjusted for play time and family time			Adjusted for play time, family time, and time asleep		
	R^2	beta	p	R^2	beta	p	R^2	beta	p	R^2	beta	p
	0.016			0.027			0.027			0.034		
Sex												
Female		-0.115	0.007		-0.106	0.012		-0.105	0.013		-0.110	0.009
Family structure												
[a]Single or other		-0.052	0.218		-0.055	0.196		-0.054	0.203		-0.059	0.162
Educational level of parents												
[b]One parent		0.038	0.380		0.040	0.349		0.037	0.390		0.035	0.419
[c]Neither		0.061	0.171		0.062	0.157		0.069	0.194		0.050	0.262
Job status of father												
[d]Temporary or unemployed		-0.030	0.491		-0.033	0.437		-0.035	0.416		-0.036	0.405
Dual income		-0.037	0.379		-0.025	0.552		-0.045	0.334		-0.056	0.237
Time in tutoring		0.086	0.053		0.102	0.017		0.097	0.024		0.089	0.038
Play time					0.114	0.008		0.115	0.007		0.111	0.009
Family time								-0.047	0.322		-0.055	0.243
Time asleep											-0.093	0.028

[a] Single or other; living with single parents and others [b]One parent; one parent college-educated [c]Neither; neither parent college-educated [d]Temporary or no; temporary or no job, Time in tutoring; time spent in extracurricular education per day (minutes), Play time: time spent with friend per day(minutes); Family time: time spent with parents per day (minutes), Time asleep per day(minutes)

eTable 4. Multiple regression analyses associating scores on the BASC-2 depression subscale with tutoring and putative protective factors

Variables	Unadjusted			Adjusted for family time			Adjusted for play time and family time			Adjusted for play time, family time, and time asleep		
	R^2	beta	p	R^2	beta	p	R^2	beta	p	R^2	beta	p
	0.026			0.025			0.023			0.022		
Sex												
Female		0.094	0.025		0.093	0.027		0.093	0.027		0.092	0.029
Family structure												
[a]Single or other		-0.070	0.099		-0.069	0.101		-0.069	0.101		-0.070	0.098
Educational level of parents												
[b]One parent		-0.004	0.922		-0.005	0.915		-0.006	0.893		-0.006	0.887
[c]Neither		0.008	0.864		0.007	0.869		0.006	0.901		0.004	0.923
Job status of father												
[d]Temporary or unemployed		0.027	0.521		0.028	0.513		0.027	0.522		0.027	0.524
Dual income		-0.053	0.206		-0.063	0.183		-0.063	0.183		-0.064	0.524
Time in tutoring		0.149	0.000		0.147	0.001		0.145	0.001		0.144	0.001
Play time					-0.018	0.673		-0.018	0.710		-0.018	0.671
Family time								-0.018	0.710		-0.019	0.690
Time asleep											-0.015	0.729

[a] Single or other; living with single parents and others [b]One parent; one parent college-educated [c]Neither; neither parent college-educated [d]Temporary or no; temporary or no job, Time in tutoring; time spent in extracurricular education per day (minutes), Play time: time spent with friend per day(minutes); Family time: time spent with parents per day (minutes), Time asleep per day(minutes)