

# Effects of Objective and Subjective Socioeconomic Status on Self-Rated Health, Depressive Symptoms, and Suicidal Ideation in Adolescents

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**Abstract** The purpose of this study was to identify relationships between three indicators of socioeconomic status (SES)—parental education, Family Affluence Scale (FAS), and subjective household economic status—and adolescent health (self-rated health, depressive symptoms, and suicidal ideation). Data from 69,196 students from 800 middle and high schools were analyzed. Relationships between the three SES indicators and adolescent health were examined using the *chi*-square test, and logistic regression analysis was then performed after adjusting for covariates. Female students whose parents had less education were more likely to report poor health than were those whose parents had a higher education. Low FAS scores were associated with higher odds ratios for poor self-rated health but not for depressive symptoms or suicidal ideation. In the logistic regression analysis, lower subjective household economic status significantly predicted poor self-rated health, higher levels of depressive symptoms, and more suicidal ideation. The findings suggest that subjective household economic status, rather than objective SES measures, is associated with adolescent health. Thus, future research about adolescent health should consider multiple dimensions of subjective social status of adolescents.

**Keywords** Adolescent · Socioeconomic status · Subjective household economic status · Self-rated health · Depressive symptoms · Suicidal ideation

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## 1 Introduction

Traditionally, socioeconomic status (SES) has been measured by educational attainment, occupational status, family income, and composite SES (Galobardes et al. 2006; Shrewsbury and Wardle 2008). These measures are well validated for assessing relationships between SES and health outcomes in adults, but the use of such measures to examine the association between the SES of adolescents and their health is controversial (West and Sweeting 2004). Because adolescents typically have no job and no income, either parental education or family income is often used as proxies for SES in studies of adolescents. However, several researchers have demonstrated that most adolescents perceive their SES according to where they stand relative to others in the social hierarchy (Adler et al. 2000; Currie et al. 1997). Furthermore, adolescents often have difficulty providing accurate information on parental income, education, and/or occupation and, thus, these variables may not be the best proxies for adolescents' SES (Currie et al. 1997; Lien et al. 2001; Molcho et al. 2007; Wardle et al. 2002). Given the problem of incomplete and missing data regarding parental education, occupation, and/or family income in research with adolescents (Currie et al. 1997; Lien et al. 2001; Molcho et al. 2007; Wardle et al. 2002), researchers have developed supplementary measures to assess the social status of adolescents, such as measures of subjective social status (Goodman et al. 2001; Piko and Fitzpatrick 2007) and the Family Affluence Scale (FAS; Currie et al. 2008).

Previous research has described health disparities according to SES in adults, whereas recent studies on health inequalities in adolescents have generated inconclusive evidence (Chen et al. 2006; Gwatkin et al. 2007). Some researchers have demonstrated a significant relationship between adolescents' SES and poor health outcomes (Braveman et al. 2010; Currie et al. 2004; Starfield et al. 2002), whereas others have reported little or no relationship between SES and health status in adolescents, including self-rated health and longstanding illness due to health equalization in adolescence (West and Sweeting 2004). Despite mixed findings with regard to differences in adolescent health related to socioeconomic status, SES is widely considered to be a key factor in health in that it influences the availability of resources for good health during the life course (Kuh and Ben-Schlomo 2004) and has been shown to be a mediating factor for depression and suicidal ideation (Gong et al. 2011). One possible explanation for such inconsistent findings could be the use of low-validity or low-sensitivity SES measures, perhaps because relationships between adolescent health and adolescent social status have been measured by parental education, parental occupation, and/or family income (Currie et al. 1997, 2008; Molcho et al. 2007; Wardle et al. 2002).

Different SES indicators may have different implications for health (Chen et al. 2006), and it appears that there is no single best indicator of SES that can be applied equally across all health outcomes and age groups (Iversen and Holsen 2008). Thus, research on health inequality related to SES should include several indicators of SES that are relevant to health outcomes and that are suitable for application to adolescents. Therefore, the purpose of this study was to examine relationships between various SES indicators (parental education, FAS, and subjective household economic status) and adolescent health (self-rated health, depressive symptoms, and suicidal ideation) in Korean adolescents using nationally representative data.

## 2 Methods

### 2.1 Design and Respondents

The data were taken from the 2009 Korea Youth Risk Behavior Web-based Survey (KYRBWS) conducted by the Korean Centers for Disease Control and Prevention (KCDC). The KYRBWS has been repeated every year since 2005 using a similar cross-sectional design to monitor the prevalence of high risk behaviors in Korean adolescents. For the 2009 KYRBWS, a nationally representative sample of middle and high school students in grades 7–12 was selected using a stratified three-stage clustering design based on geographic area, school size, and grade level using the Ministry of Education, Science and Technology database for Korea (KCDC, 2009). A sample of 400 middle schools and 400 high schools, including 76,937 students in grades 7–12, within in the primary sampling units (135 cities and districts) was selected. All students in selected classes within each sampled school were eligible for participation.

The KCDC conducted the survey following a sequence of three steps. 1) During the month of July, teachers were trained to assist participating students. 2) In August, each selected school was informed about the survey schedule and provided with written consent forms for students and parents/legal guardians, survey materials, and certificate numbers for each student. 3) During September and October, after voluntary participation was secured and confidentiality for all students was assured, the online survey was conducted. A recent study demonstrated that the self-reported risk-behavior indices in the KYRBWS questionnaire were reliable over time based on analysis of test–retest reliability (Bae et al. 2010).

A total of 75,066 students in grades 7–12 from 400 middle schools and 400 high schools completed the web-based survey with guidance from trained teachers, for a response rate of 97.6 %. In the present study, the analysis was limited to a population of 69,196 students (36,137 male and 33,059 female students in middle and high schools) aged 12–18 years after exclusion of students who did not respond to important questions (e.g., parental education, FAS, subjective household economic status, and three health indicators). The total number of subjects excluded was 5,870, about 7.8 %, which meets the criterion for acceptable exclusions (10 % of total subjects, Hair et al. 2006). Thus, we confirmed that the missing data could be considered completely random (Acuña and Rodriguez 2004).

### 2.2 Health Indicators

Three health indicators were used for this study: self-rated health, depressive symptoms, and suicidal ideation.

*Self-Rated Health* Self-rated health was measured with the question, “How would you rate your health in general?” Participants were given five response options: (1) very good, (2) good, (3) fair, (4) bad, and (5) very bad. Responses were divided into categories for binary logistic regression analysis; “poor” and “very poor” responses were combined to form the “poor health” category, and all other responses were combined to form the “good health” category.

*Depressive Symptoms* Depressive symptoms were assessed by a single item: “During the past year, have you ever felt depressed or sad for 2 weeks continuously?” Possible responses were yes and no.

*Suicidal Ideation* Suicidal ideation was assessed using a single question: “Have you ever had thoughts of attempting suicide during the past year?” Possible responses were yes and no. Suicidal ideation and behavior have been assessed by a group of four items taken from the US National Youth Risk Behavior Survey (YRBS), the Health Behaviours in School-aged Children (HBSC) study, and the KYRBWS of Korea. These measures identify four levels of severity on the continuum of suicidal ideation and behavior as measured by four questions: “Have you ever had thoughts of attempting suicide during the past year?”; “Have you made a plan to commit suicide?”; “Have you made a suicide attempt?”; and “Did you make a suicide attempt that required medical attention or treatment by a doctor or nurse?” In the present study, we focused on suicidal ideation only, and self-reported suicidal ideation in adolescents is generally assessed by a single item on the YRBS, HBSC, and KYRBWS: “Have you ever had thought of attempting suicide during the past year?” Suicidal ideation in adolescents has been shown to be associated with other indices of psychiatric problems, such as depressive disorders and specific phobias (Dhossche et al. 2002).

### 2.3 Socioeconomic Status Indicators

We employed three indices of socioeconomic status: parental education, FAS, and subjective household economic status.

*Parental Education* The educational level achieved by the parent with the most education was used to define “parental education” because this method has been used successfully in previous studies (Duarte-Salles et al. 2011; Khang et al. 2005). Parental education was categorized as (1) college graduation or higher, (2) high school graduation, (3) middle school graduation or less, and (4) do not know.

*Family Affluence Scale* The FAS was developed as a measure of family wealth for the Health Behavior in School-aged Children (HBSC) surveys. It includes questions about the following four items, which students are likely to be able to answer: family car ownership, bedroom occupancy, family holiday, and computer ownership (Currie et al. 2008). A composite FAS score was calculated for each participating student based on his or her responses to these four items. Following KCDC guidelines, FAS scores were categorized based on three ordinal scales: low affluence (score of 0–2), average affluence (3–5), and high affluence (6–9).

*Subjective Household Economic Status* Respondents were asked about their perception of their family’s economic status with the following question: “What do you perceive as your household’s economic status?” Five response options were given: (1) high, (2) high middle, (3) middle, (4) low middle, or (5) low.

## 2.4 Other Covariates

To assess the net effect of socioeconomic status according to sex, we considered the possible covariates of health indicators (self-rated health, depressive symptoms, and suicidal ideation) identified by the results of previous population-based research, including school grade, residency type, self-rated school achievement, and cohabitation with parents. Three response options were used in the assessment of residency type: (1) rural area, (2) medium- or small-sized city, and (3) large city. Self-rated school achievement was measured by the question “During the past year, how was your school achievement?” The response options were (1) high, (2) high average, (3) average, (4) low average, and (5) low. Cohabitation with parents was measured by asking students to indicate their cohabitation with father, step-father, mother, and step-mother by checking “living together” or “not living together” for each item.

## 2.5 Data Analyses

Frequencies and weighted proportions of sociodemographic characteristics by sex were calculated. After adjusting for the effect of age, multiple-classification analysis was employed to examine the effects of socioeconomic status on health outcomes (poor self-rated health, depressive symptoms, and suicidal ideation). We used *chi*-square and *t*-tests to assess proportional differences in the socioeconomic status of male and female students.

A multivariate logistic regression analysis was performed to examine the potential association between socioeconomic indices and health outcomes after adjusting for school grade, residency type, self-rated school achievement, and cohabitation with parents. The results are presented as odds ratios with 95 % confidence intervals. All analyses were performed separately for male and female students. The analyses of complex survey data originally provided by the 2009 KYRBWS were used to estimate the population parameters in both descriptive and multivariate analyses because the KYRBWS data have been collected via a survey using a complex sample design that includes stratification, clustering, and multiple stages of sample selection. All statistical analyses were performed with SPSS (version 18.0, SPSS, Chicago, IL, USA).

## 3 Results

Table 1 presents data on the general characteristics and socioeconomic status of Korean middle and high school students by sex. Female students accounted for 47.8 % of the total respondents ( $N=69,196$ ). Approximately 50.9 % of students were middle school students from grades 7–9, and the remaining students (49.1 %) were high school students from grades 10–12. More than half of the students (54.8 %) lived in large cities, and over a quarter (27.2 %) reported that their school achievement was average. Nearly 87 % of students reported that they lived with both parents. With regard to parental education, 54.2 % of students reported that either their father or their mother had achieved college graduation or higher. The mean FAS score was 4.65; 32.2 % of scores were categorized as high (scores of 6–9), and 11.5 % were

categorized as low (0–2). The majority of students rated their own socioeconomic status as middle (48.1 %); a small proportion rated their SES as low (5.3 %) or high (5.0 %).

Table 2 shows the percentage distribution of poor self-rated health, depressive symptoms, and suicidal ideation according to objective and subjective socioeconomic indicators by sex. The top line of Table 2 shows the prevalence of poor self-rated health, depressive symptoms, and suicidal ideation after controlling for age. Compared with male students, female students were more likely to report poor health (9.3 % of females vs. 6.5 % of males), depressive symptoms (43.0 % vs. 31.4 %, respectively), and suicidal ideation (23.1 % vs. 14.7 %, respectively). The three measures of SES were significantly associated with all health outcomes in both male and female students. Less parental education, low FAS scores, and low subjective household economic status were significantly related to a higher prevalence of poor self-rated health, depressive symptoms, and suicidal ideation.

Table 3 presents the results of the multivariate logistic regression analysis used to assess relationships between various SES indicators and health status after adjusting for other covariates, including school grade, residency type, self-rated school achievement, and cohabitation with parents. Female students who had parents with middle school education or less were more likely to rate their health as poor (OR: 1.26, 95 % CI: 1.03–1.54) than were those whose parents had higher education. Unexpectedly, male students who had parents with a high school education were significantly less likely to report depressive symptoms (OR: 0.81, 95 % CI: 0.76–0.86) and suicidal ideation (OR: 0.83, 95 % CI: 0.76–0.90) than were those in parents with college or higher education. The analysis of the relationship between FAS scores and health outcomes yielded inconsistent findings. A significant positive relationship was observed between low FAS scores and poor self-rated health, yet male students with low FAS scores had lower odds ratios for depressive symptoms and suicidal ideation than did those with high FAS scores. As expected, subjective household economic status clearly revealed the expected socioeconomic gradient for all health outcomes. Both male and female students with low subjective household economic status had higher odds ratios for poor self-rated health (males: OR: 2.25, 95 % CI: 1.73–2.93; females: OR: 2.18, 95 % CI: 1.62–2.94). Similarly, low subjective household economic status was significantly associated with a higher prevalence of depressive symptoms in male (OR=1.28, 95 % CI=1.10–1.50) and female (OR=1.27, 95 % CI=1.05–1.54) students and with suicidal ideation in male (OR=1.67, 95 % CI=1.45–1.92) and female (OR=1.61, 95 % CI=1.33–1.96) students.

#### 4 Discussion

Previous studies have suggested a variety of SES indicators for use in examining health inequalities among adolescents (Adler et al. 2000; Due et al. 2003; Iversen and Holsen 2008; Piko and Fitzpatrick 2007). Thus, the present study attempted to examine the influence of objective (parental education and FAS) and subjective SES indicators (subjective household economic status) on self-rated health and psychological health outcomes in Korean adolescents using nationally representative

**Table 1** General characteristics and socioeconomic status of Korean adolescents in middle and high schools ( $N=69,196$ )

	Male ( $n=36,137$ ) $n$ (%)	Female ( $n=33,059$ ) $n$ (%)	Total ( $n=69,196$ ) $n$ (%)
School grade			
7th (middle school)	5,983 (16.6)	5,551 (16.8)	11,534 (16.7)
8th (middle school)	6,179 (17.1)	5,666 (17.1)	11,845 (17.1)
9th (middle school)	6,208 (17.2)	5,616 (17.0)	11,824 (17.1)
10th (high school)	6,160 (17.0)	5,498 (16.6)	11,658 (16.8)
11th (high school)	5,952 (16.5)	5,482 (16.6)	11,434 (16.5)
12th (high school)	5,656 (15.7)	5,246 (15.9)	10,902 (15.8)
Residency type			
Rural area	1,862 (5.2)	1,684 (5.1)	3,546 (5.1)
Small- or medium-sized city	14,436 (39.9)	13,272 (40.1)	27,708 (40.0)
Large city	19,839 (54.9)	18,103 (54.8)	37,942 (54.8)
Self-rated school achievement *			
High	4,624 (12.8)	3,280 (9.9)	7,904 (11.3)
High average	8,764 (24.3)	8,050 (24.4)	16,814 (24.3)
Average	9,809 (27.1)	8,985 (27.2)	18,794 (27.2)
Low average	8,727 (24.1)	8,931 (27.0)	17,658 (25.5)
Low	4,213 (11.7)	3,812 (11.5)	8,025 (11.6)
Cohabitation with parents *			
Live with both parents	31,604 (87.5)	28,558 (86.4)	60,162 (86.9)
Live with either father or mother	3,149 (8.7)	3,238 (9.8)	6,387 (9.2)
Live with father & stepmother (or stepfather & mother)	671 (1.9)	620 (1.9)	1,291 (1.9)
Does not live with parents	711 (2.0)	644 (1.9)	1,355 (2.0)
Parental educational attainment <sup>a</sup> *			
College or higher	18,113 (55.4)	16,277 (53.0)	34,390 (54.2)
High school	13,395 (41.0)	13,298 (43.3)	26,693 (42.1)
Middle school or less	1,181 (3.6)	1,150 (3.7)	2,331 (3.7)
Do not know	3,448 (9.5)	2,334 (7.1)	5,782 (8.4)
Family Affluence Scale (score) *			
High (6–9)	11,919 (32.6)	10,512 (31.8)	22,431 (32.2)
Middle (3–5)	20,104 (55.6)	18,734 (56.7)	38,838 (56.3)
Low (0–2)	4,113 (11.8)	3,813 (11.5)	7,926 (11.5)
Mean $\pm$ SD	4.67 $\pm$ 1.84	4.64 $\pm$ 1.79	4.65 $\pm$ 1.82 <sup>†</sup>
Subjective household economic status *			
High	2,706 (7.5)	1,374 (4.2)	4,080 (5.0)
High middle	8,875 (24.6)	7,153 (21.6)	16,028 (23.1)
Middle	16,487 (45.6)	16,806 (50.8)	33,293 (48.1)
Low middle	6,063 (16.8)	6,039 (18.3)	12,102 (17.5)
Low	2,006 (5.5)	1,688 (5.1)	3,694 (5.3)

\*  $p < .01$  by *chi*-square test or *t*-test

**Table 2** Distribution of poor self-rated health, depressive symptom, and suicidal ideation for objective and subjective socioeconomic status by sex ( $N=69,196$ )

	Poor self-rated health			Depressive symptoms			Suicidal ideation		
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
Age-adjusted prevalence	6.5	9.3	7.8	31.4	43.0	36.9	14.8	23.2	18.7
Parental educational attainment <sup>a*</sup>									
College or higher	6.2	8.8	7.4	33.2	42.8	37.7	15.4	22.6	18.8
High school	6.9	9.8	8.4	30.3	43.5	36.9	13.7	23.7	18.7
Middle school or less	6.8	12.9	9.8	35.5	47.4	42.0	16.8	26.3	21.5
Family affluence scale (score) *									
High (6–9)	5.8	8.7	7.2	32.7	43.8	37.0	15.4	22.6	18.8
Middle (3–5)	6.7	9.2	7.9	30.8	42.0	36.6	14.1	22.6	18.2
Low (0–2)	7.4	11.2	9.2	30.7	45.2	38.2	15.2	26.9	20.8
Subjective household economic status *									
High	5.0	8.9	6.3	34.6	43.5	36.8	15.2	23.0	17.9
High middle	5.2	7.4	6.2	29.4	40.9	34.0	13.0	20.4	16.4
Middle	5.6	7.8	6.7	29.3	40.1	34.9	13.3	20.4	16.9
Low middle	9.8	12.8	11.3	34.3	48.9	42.2	17.4	29.3	23.3
Low	12.1	19.9	15.6	44.6	57.9	51.4	23.9	39.9	31.2

<sup>a</sup> Analysis limited to a population of 63,414 students (32,689 males and 30,725 females) after exclusion of respondents answering “do not know” for parental education level

\* $p < .01$  by *chi-square* test

data collected by the 2009 Korea Youth Risk Behaviors Web-based Survey. Female students whose parents had a middle school education or less were more likely to report poor health than were those whose parents had more education. Among the objective socioeconomic indicators, low FAS scores were significantly related to higher odds ratios for poor self-rated health but not to those for depressive symptoms and suicidal ideation. Of particular interest, low subjective household economic status significantly predicted all health outcomes, including self-rated health, depressive symptoms, and suicidal ideation in both male and female Korean students.

This study found that parental education, used as an objective indicator of SES, was significantly related only to self-rated health and not to depressive symptoms and suicidal ideation in female students. This finding is in concordance with those of previous studies of self-rated health (Braveman et al. 2010; Duarte-Salles et al. 2011; Pueyo et al. 2007; Starfield et al. 2002). A US study using nationally representative data to explore relationships between family income and parental education, on the one hand, and the self-rated health of adolescents, on the other, found that adolescents from poor families and those with the least-educated parents had the worst health and that adolescents whose families had intermediate levels of income and education were less healthy than were those from the wealthiest and most highly educated families (Braveman et al. 2010). Unexpectedly, the present study found inverse or no relationships between parental educational attainment and psychological health outcomes



**Table 3** Adjusted odds ratios<sup>a</sup> for poor self-rated health, depressive symptoms, and suicidal ideation among Korean adolescents (N=69,196)

	Poor self-rated health		Depressive symptoms		Suicidal ideation	
	Male OR (95 % CI)	Female OR (95 % CI)	Male OR (95 % CI)	Female OR (95 % CI)	Male OR (95 % CI)	Female OR (95 % CI)
<b>Parental educational attainment<sup>b</sup></b>						
College or higher	1	1	1	1	1	1
High school	1.04 (0.93–1.17)	1.02 (0.93–1.13)	0.81 (0.76–0.86)**	0.93 (0.87–1.00)	0.83 (0.76–0.90)**	0.99 (0.92–1.06)
Middle school or less	0.98 (0.74–1.28)	1.26 (1.03–1.54)*	0.97 (0.85–1.12)	1.06 (0.95–1.25)	1.02 (0.84–1.23)	1.11 (0.94–1.30)
<b>Family affluence scale (score)</b>						
High (6–9)	1	1	1	1	1	1
Middle (3–5)	1.15 (1.02–1.29)*	1.02 (0.93–1.13)	0.90 (0.84–0.95)**	0.88 (0.82–0.93)**	0.89 (0.82–0.96)**	0.94 (0.88–1.00)
Low (0–2)	1.20 (1.00–1.42)	1.16 (1.00–1.36)	0.85 (0.77–0.93)**	0.90 (0.82–0.99)*	0.92 (0.81–1.04)	1.06 (0.95–1.18)
<b>Subjective household economic status</b>						
High	1	1	1	1	1	1
High middle	1.02 (0.79–1.32)	0.80 (0.61–1.06)	0.75 (0.67–0.85)**	0.83 (0.73–0.96)**	0.85 (0.76–0.95)**	0.81 (0.68–0.96)*
Middle	1.06 (0.83–1.36)	0.83 (0.64–1.08)	0.71 (0.63–0.81)**	0.73 (0.64–0.84)**	0.84 (0.75–0.94)**	0.74 (0.63–0.86)**
Low middle	1.88 (1.44–2.44)**	1.37 (1.06–1.78)**	0.87 (0.76–1.00)*	0.98 (0.85–1.14)	1.20 (1.07–1.35)**	1.11 (0.94–1.31)
Low	2.25 (1.73–2.93)**	2.18 (1.62–2.94)**	1.28 (1.10–1.50)**	1.27 (1.05–1.54)**	1.67 (1.45–1.92)**	1.61 (1.33–1.96)**

<sup>a</sup> Multiple logistic regression analysis adjusted for other covariates (school grade, residency type, self-rated school achievement, and cohabitation with parents)

<sup>b</sup> Analysis limited to a population of 63,414 students (32,689 males and 30,725 females) after exclusion of respondents answering “do not know” for parental education level

\*  $p < .05$ ; \*\*  $p < .01$

among Korean middle and high school students. Previous studies examining whether less parental education was related to adolescents' psychological health have reported inconsistent findings; some studies have identified weak or no relationships between parental education or occupation and adolescent health (Piko and Fitzpatrick 2007; West and Sweeting 2004), whereas others have found that adolescents from families with lower SES reported more depressive symptoms (Due et al. 2003). One plausible reason for the lack of significant relationships between parental education and psychological health outcomes in adolescents is that the majority of Korean adolescents may experience a great deal of stress and depression due to parental expectations about their academic achievement regardless of their parents' socioeconomic status. In 2010, for example, 98 % of 25–34 year-old Koreans had attained a college or higher education, which was the highest proportion among OECD countries (OECD 2012). Generally, Korean parents want their adolescents to attend top-tier universities and to succeed academically. Korean parents sacrifice for their children's education because they believe educational success can provide upward social mobility (Sorensen 1994). In this competitive educational environment, adolescents experience intense pressure and high levels of stress, which may outweigh the effect of SES on their psychological health.

Based on previous studies of FAS scores and self-rated health (Cho and Khang 2010; Currie et al. 2004; Duarte-Salles et al. 2011; Iversen and Holsen 2008) or psychological health outcomes (Holstein et al. 2009; Veselska et al. 2009; West and Sweeting 2004), our hypothesis was that low FAS scores would be associated with higher odds ratios for poor self-rated health, depressive symptoms, and suicidal ideation. However, our study yielded mixed results, revealing a significant association between low FAS scores and poor self-rated health but not depressive symptoms and suicidal ideation in both male and female students. The finding that FAS scores predicted self-rated health is consistent with the results of previous studies (Cho and Khang 2010; Currie et al. 2004; Duarte-Salles et al. 2011) and was thus expected. However, findings showing that the effect of FAS scores on depressive symptoms and suicidal ideation went in the opposite direction were unexpected. Such inconsistent results may be explained by country-specific variations in the relative contribution of FAS items or by differences in the importance of individual items of the FAS. Indeed, the FAS may perform differently in each country, given, for example, that the prices of cars and housing vary significantly depending on a country's economic situation (Cho and Khang 2010; Holstein et al. 2009; Schnohr et al. 2008).

Studies conducted in Europe have suggested that the FAS II has acceptable validity and reliability for measuring adolescents' SES (Currie et al. 2008; von Rueden et al. 2006), and validation studies on the FAS II have also found that the FAS II is a reliable and valid SES measure for adolescents in China and Taiwan (Lin 2011; Liu et al. 2012). In Korea, several studies examining the reliability of the FAS II have found that it has high completion rates, appropriate cut-off points, moderate internal reliability, and moderate associations with other SES indicators (Bae et al. 2010; Cho and Khang 2010; Oh et al. 2009), but the validity of the FAS II has not been examined. The question of whether the FAS is a sufficiently sensitive measure of the SES of adolescents to assess relationships between the latter and the health of Korean adolescents should be considered. Boyce et al. (2006) suggested that country-specific items should be substituted for more general items on the FAS to improve

the validity of the index. For example, it may be more appropriate to ask about the availability of books instead of computer ownership in areas without internet access. Furthermore, given that the majority (97.1 %) of Korean adolescents in this study had computers, the computer-ownership item of the FAS may not be a sensitive measure of material wealth in Korean adolescents. Moreover, several studies conducted in Korea and other Asian countries have found weak correlations between the FAS II item about sharing a bedroom and the other FAS II items and composite FAS scores (Cho and Khang 2010; Lin 2011; Liu et al. 2012). These results reveal a need to choose the most sensitive items of the FAS II or to develop Korean-specific FAS items to adjust for differential contexts in future studies.

The key finding in this study was the significant inverse relationship between subjective household economic status and adolescent health, including poor self-rated health and psychological health. Although two objective SES indicators, parental education and FAS scores, were inconsistently related to adolescent health outcomes, these results suggest that subjective household economic status may play a consistently significant role in the health outcomes of Korean adolescents. In other words, students who perceived themselves as having lower household economic status demonstrated higher odds of poor self-rated health, depressive symptoms, and thoughts of suicide. This result fits with those of longitudinal studies (Goodman et al. 2007; Iversen and Holsen 2008) as well as with those of the Korean Youth Risk Behavior Web-based Online Survey (Cho and Khang 2010) and other studies with large samples (Karvonen and Rahkonen 2011; Piko and Fitzpatrick 2007). These significant findings confirm that subjective household economic status is a better predictor of adolescent health outcomes than are objective measures of SES. Low parental economic status may not affect the social status of adolescents because parental sacrifices can partly or totally compensate for actual poverty (Kochuyt 2004). Parents contribute greatly to adolescents' access to economic resources, but the social status of adolescents is not simply a reflection of the household economy of parents (Olsson 2007). Subjective socioeconomic status may correspond to adolescents' perceived social status within a particular context with respect to all SES indicators. Adolescents may not perceive family SES in terms of only family income; instead, their perceptions of socioeconomic status may be shaped by multiple factors including age, sex, and peer relationships (Adler et al. 2000; Goodman et al. 2007; Karvonen and Rahkonen 2011; Starfield et al. 2002; Wolff et al. 2010). Therefore, subjective social status is potentially more useful than are objective measures of parental SES as an index adolescents' socioeconomic status (Pueyo et al. 2007; Starfield et al. 2002). Given the importance of subjective measures of social status, Schnohr et al. (2008) suggested that the FAS II should contain items related to psychological well-being to assess adolescents' perception of family wealth.

Another explanation for the strong relationships between subjective household economic status and health outcomes may be that subjective household economic status is simply a more relevant measure for assessing psychological health outcomes than is objective SES (Adler et al. 2000; Karvonen and Rahkonen 2011; Operario et al. 2004; Singh-Manoux et al. 2005). It is possible that subjective household economic status and psychological health or self-rated health are related because these variables are both assessed by subjective measures (Garbarski 2010; Wolff et al.

2010). Thus, the relationship between subjective household economic status and psychological health or self-rated health may be robust, independent of adolescents' objective SES (Adler et al. 2000; Iversen and Holsen 2008; Karvonen and Rahkonen 2011; Goodman et al. 2001, 2007; Piko and Fitzpatrick 2001, 2007; Wolff et al. 2010).

One strength of this study was the use of a large representative sample of Korean middle and high school students. The second strength was the use of multiple socioeconomic indicators, which made it possible to understand the associations of various SES indicators with self-rated health, depressive symptoms, and suicidal ideation. However, several limitations should be considered when interpreting these findings. Although high participation rates (97.6 %) have been shown for the KYRBWS, our findings may be limited by selection bias, such as non-participation of students who are not attending school or of students in the lower SES group. Such bias may render our sample unrepresentative of all Korean adolescents because out-of-school youth were not included in sampling frame (KCDC 2009). Additionally, the number of adolescents from multicultural families has increased in Korea, and these students often fail to enroll or complete typical Korean school programs. Characterized by other cultural backgrounds, parents in multicultural families are more likely to have less education compared with native Korean parents and may also experience difficulty parenting their children (Korea Policy Institute of the Multicultural Family 2011). Such variation in parental education may decrease associations involving the variables of interest in the present study. Thus, the results of this study are generalizable only to Korean adolescents who attend middle and high schools. Second, the rate of "don't know" responses to the question about parental education was 8.4 % in our study. Previous studies have demonstrated that the proportion of adolescents who do not know or are not willing to respond to questions about parental education or occupation range from 18 % to 45 % (Cho and Khang 2010; Currie et al. 1997; Molcho et al. 2007; Wardle et al. 2002). Generally, missing data regarding parental education or occupation are frequently associated with students with lower SES (Lien et al. 2001). Although the rate of "don't know" responses in this study is slightly lower than those reported in previous studies, such systematic bias can nonetheless result in an underestimation of the association between SES and health outcomes.

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