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### Title

Subjective Social Status and Health During High School and Young Adulthood

### Permalink

<https://escholarship.org/uc/item/8c7208wd>

### Journal

Developmental Psychology, 56(6)

### ISSN

0012-1649

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### Publication Date

2020-06-01

### DOI

10.1037/dev0000919

Peer reviewed



Published in final edited form as:

*Dev Psychol.* 2020 June ; 56(6): 1220–1232. doi:10.1037/dev0000919.

## Subjective Social Status and Health during High School and Young Adulthood

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### Abstract

Although many facets of social status (i.e., socioeconomic status, gender, race) are fairly stable, limited work has assessed how youths' identification with their status changes over time. Subjective social status (SSS) refers to one's perception of standing or rank relative to others, and for youth status is generally in the context of society or school. The current study assessed how adolescents' SSS in American society and in their school changes and predicts health and well-being during and after high school. A total of 336 adolescents (*Mean age* = 16.40 at Wave 1) reported their SSS at up to three time points, each two years apart, such that youth provided data between the 10<sup>th</sup> grade and three years following the transition from high school. Piecewise multilevel modeling was used, including discontinuities to assess the importance of the transition from high school. Society SSS decreased across the period, especially among youth with lower family income, youth whose parents reported lower SSS, and youth who did not attend college. School SSS was stable during high school, declined after 12<sup>th</sup> grade, and remained stable thereafter. Moderation analyses revealed that school SSS declines more consistently among females than males and Latinos relative to other ethnic groups. Lower society and school SSS were associated with more depressive symptoms and greater likelihood of obesity, highlighting the relevance of SSS for health during this important developmental transition. Results suggest declines in SSS are especially common among disadvantaged groups as they age, and that lower SSS may indicate risk for poorer health.

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## Keywords

adolescence; subjective social status; social status; college transition

Social status reflects access to social and material resources and one's overall rank relative to others (Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012). Social status is related to development, environment, and social interactions of children. Whereas much work has assessed the importance of objective markers of socioeconomic status (SES), such as family income and parental education, less work has assessed children's appraisal of subjective social status (SSS) as a potential developmental domain. SSS reflects a person's perceived rank relative to others in a social context. The importance of such relative ranking has been highlighted by relative deprivation theory, which posits that people's social comparisons can cause them to feel of relatively higher or lower status than others, with feelings of low status often corresponding to greater hostility and poorer well-being (Smith & Pettigrew, 2011). For children, SSS typically refers to their view of their family's standing relative to others in society and their own standing relative to others in their school. Ample work suggests that SSS can be as meaningful for health and adjustment as traditional SES among both adults (e.g., Adler, Epel, Castellazzo, & Ickovics, 2000; Cundiff & Matthews, 2017) and adolescents (e.g., (Destin, Richman, Varner, & Mandara, 2012; Huynh & Chiang, 2018; Quon & McGrath, 2014), and that changes in SSS can also influence health (Dombrowski, Aslinger, Wright, & Szanto, 2018). Few studies, however, have examined how perceptions of social status change over the course of adolescence and the implications of SSS for health during the transition from high school to young adulthood; even less is known about how these issues manifest in diverse ethnic groups.

## Developmental Change in Subjective Social Status

SSS likely undergoes significant development during the adolescent years. Adolescents experience changes in various aspects of their social identities as they become more aware of the nature and implications of social categories in their society (e.g., gender and ethnicity; Phinney, 1989; Ruble et al., 2004; Steensma, Kreukels, de Vries, & Cohen-Kettenis, 2013). Youth develop a broader sense of wealth in society that can ultimately shape their view of their own socioeconomic standing (Flanagan et al., 2014; Flanagan & Tucker, 1999). Developmental advances in social cognition may enable adolescents to better assess their socioeconomic standing relative to others (Kilford, Garrett, & Blakemore, 2016). At the more proximal level of schools, academic standing becomes more transparent through educational tracking and development of post-school plans, and social status concerns become increasingly salient with the onset of puberty (Dahl & Forbes, 2010; LaFontana & Cillessen, 2010). These advances in social knowledge and cognition are amplified as adolescents spend more time with peers and become especially attuned to peers' perceptions and social comparisons (Brown & Lohr, 1987).

The transition from high school to young adulthood presents a potentially significant inflection point in the development of SSS. Most youth pursue education, employment, or both, often placing them in new and different social contexts (Bureau of Labor Statistics,

2018). Youth may increasingly interact with peers from more diverse backgrounds relative to their home community (e.g., Bowman, 2012; Kim, Park, & Koo, 2015), further contextualizing and potentially adjusting their perception of their own social standing (Graham, Munniksma, & Juvonen, 2014). For those in college, newfound academic competition and unexpected changes in performance from high school can alter their school SSS (Abouserie, 1994). Financial concerns become more salient by shaping one's future educational trajectories, and youth develop greater autonomy over their own finances with age (Norvilitis et al., 2006). As young adults become more aware of the broader income distribution within society, they may value factors such as objective income and education more heavily when rating their overall society SSS.

## Demographic Differences in Subjective Social Status

There may be significant variability in the developmental changes in both school and society SSS during high school and young adulthood, particularly between members of social categories that differ in objective and perceived social status in the larger society. Generally, people who identify with more disadvantaged groups may develop a sense of their group's social status as they age and consequently report lower status over time. For instance, adolescents from African American backgrounds with lower income and parental education are more likely to show declines in society SSS as they age (Goodman, Maxwell, Malspeis, & Adler, 2015). Differences in status can become especially salient during the transition from high school to college, as students from underrepresented groups (i.e., ethnic minority, low SES, first generation college students) report lower SSS after one year of college (Loeb & Hurd, 2017).

The SSS of adolescents' parents may create additional variation in the developmental trajectories of youth SSS. Parents transmit messages about social class through parenting practices and may more openly discuss familial expenses more with children as they age, thereby shaping their adolescents' perception of status (Jones, Loiselle, & Highlander, 2018). Previous work has noted that adolescents' SSS is generally higher than that of parents, but declines with age such that it becomes more related to that of their parents across the teenage years. This finding suggests a divergence in SSS trajectories according to parents' own SSS (Goodman et al., 2001).

Finally, college enrollment after high school also may produce developmental changes in youth SSS. College education predicts higher levels of society SSS among adults (e.g., Adler et al., 2000), and similar associations have been found at initial enrollment in post-secondary schooling—even before students receive their degree—likely because they anticipate the higher status afforded to those with more education (Bozick & DeLuca, 2005). It is possible that these differences may be evident even during high school, as students anticipate their future college prospects based upon their achievement during secondary school.

## SSS and Health

Youths' SSS may predict aspects of their psychological and physical health over and above objective indicators of SES such as family income and parental education. Feeling as if one

is lower in a hierarchy can cause feelings of insecurity and thereby elicit differences in physiological stress (Sapolsky, 2004). Lower SSS has been linked with greater psychological and physiological stress (e.g., altered immune cell gene regulation; Murray, Haselton, Fales, & Cole, 2019), as well as engagement in maladaptive coping strategies, such as depressive thinking and rumination (Adler et al., 2000; Huynh & Chiang, 2018; Jackson, Richman, LaBelle, Lempereur, & Twenge, 2015; Schubert, Süßenbach, Schäfer, & Euteneuer, 2016). Sustained stress and ineffective coping among people of low SSS, therefore, may manifest in poorer physical and mental health outcomes over time. Associations between poor health and lower SSS are evident among adults (Cundiff & Matthews, 2017), and prospective analyses suggest that lower SSS precedes and contributes to aspects of poorer health, such as increases in depressive symptoms and BMI over time (Lemeshow et al., 2008; Singh-Manoux, Marmot, & Adler, 2005). Similar associations have been observed during adolescence (Quon & McGrath, 2014). SSS may be especially tied to obesity and depressive symptoms given that social stratification contributes to disparities in both, with lower status groups showing poorer health outcomes (e.g., Kearney, Draper, & Barón, 2005; Lorant et al., 2003; National Center for Health Statistics, 2017; Ogden, Carroll, Kit, & Flegal, 2014; Pickett & Wilkinson, 2015; Salk, Hyde, & Abramson, 2017). Indeed, lower school and society SSS were associated with depressive symptoms and overweight status among adolescents, over and above SES (Goodman et al., 2003, 2001). Yet, it is unclear how these associations may change with time. Given that there are normative changes in SSS throughout development, SSS may become more or less related to health outcomes during the transition from adolescence to young adulthood.

## Current Study

The purpose of the present study was to assess the developmental trajectory of SSS during adolescence and young adulthood. Employing an accelerated longitudinal design that allows for the estimation of developmental trajectories across a longer period of development (Willett, Singer, & Martin, 1998), we estimated trajectories in SSS across a five-year span from the 10<sup>th</sup> grade of high school through three years after the 12<sup>th</sup> grade. This enabled us to estimate complex models of developmental trajectories (e.g., non-linear change) that have not been examined in previous studies. This was done with a more broadly ethnically-diverse sample (i.e., those with Latino, Asian American, European American, and other ethnic backgrounds) than has been represented in previous studies. For example, of the three longitudinal investigations of adolescent SSS, two did not include Asian or Latino youth (Goodman et al., 2001, 2015), and the third only compared SSS at the start and end of the academic year among underrepresented students (Loeb & Hurd, 2017).

Given the significance of the transition from high school, this study examined linear and nonlinear changes in the trajectory of school and society SSS after high school. Additionally, SSS may develop differently for individuals of low SSS. Therefore, variations in the trajectory of SSS by gender, ethnicity, family income, parental education, parent's own SSS, and college attendance were also examined. Finally, given that previous work has consistently suggested that low SSS can contribute to more depressive thinking in an experimental context (Schubert et al., 2016) and prospectively predicts increases in BMI in female adolescents (Lemeshow et al., 2008), we leveraged the longitudinal design to assess

whether the strength of associations between societal and school SSS with health (i.e., depressive symptoms, BMI, obesity) varied with time.

Females and those from ethnic minority backgrounds and families with lower income and parental education were predicted to have lower school and society SSS and to show greater declines over time. We also predicted youth with lower parent's SSS would show greater declines with age. We expected college enrollment to predict higher and more stable society SSS. Their school SSS, however, was expected to decline as they moved from high school into the new school setting of college. Finally, lower school and society SSS were predicted to be associated with poorer health (i.e., more depressive symptoms, higher BMI, obesity status). These associations were expected to become stronger as concerns of social status strengthen throughout adolescence.

## Method

### Participants

This study used an accelerated longitudinal design with two age cohorts, each one year apart. Two cohorts of adolescents were followed from the 10<sup>th</sup> and 11<sup>th</sup> grades to two or three years post-high and completed annual surveys of school and society SSS every two years. Because waves of data collection occurred two years apart, most participants were in the 12<sup>th</sup> grade or 1-year post-high school during the second wave and two or three years post-high school during the third wave of data collection such that each year from 10<sup>th</sup> grade to three years post-high school were represented in the data.

**Descriptive Statistics.**—A total of 350 parent-adolescent dyads participated in a three-wave longitudinal study of health during high school and the transition to young adulthood. Participants had diverse ethnic and socioeconomic backgrounds. Adolescents predominately identified as being Latino ( $n = 141$ , 42.09%), European American ( $n = 101$ , 30.15%), and Asian American ( $n = 75$ , 22.39%), with fewer identifying as another ethnicity ( $n = 18$ , 5.37%). Caregivers reported family income at each wave, and families earned a median annual income of \$57,333 across all waves. European Americans had significantly higher median incomes than other groups (European American: \$107,917; Latino: \$50,000; Asian American: \$30,000; Other: \$62,281;  $F[3, 332] = 36.40$ ,  $p < .001$ ). Parental education was averaged across both parents in two-parent families when possible. Across the youths, 18.45% had parents who did not graduate from high school, 16.37% had parents who graduated high school and did not pursue higher education, 23.81% had parents who graduated from a trade or vocational school, 20.54% had parents who completed some other form of college, and 20.83% had parents who graduated from college or higher education. European Americans had higher parental education than Latinos and Asian Americans ( $F[3, 331] = 17.36$ ,  $p < .001$ ), and males also had slightly higher parental education than females ( $t[335] = 2.23$ ,  $p = .03$ ).

**Recruitment.**—In the first wave of data collection, 316 families were recruited, and 226 (73.14%) of these families continued to the second wave of data collection, two years later. Because of attrition, an additional 34 participants (26 12<sup>th</sup> graders and eight students who were one-year post-high school) were enrolled with their parents at the second wave.

Adolescents who enrolled at wave two did not differ from adolescents recruited at wave one with respect to ethnicity, college attendance, income, society SSS, school SSS, BMI, or depressive symptoms (all  $p$ 's > .2). Finally, 166 participants (64.3% of previous wave, 148 who began at the first wave and 18 who started at the second wave) completed a third wave of data collection two years later, approximately two or three years after participants completed high school.

**Attrition.**—Participants who enrolled in the first wave were eligible for three total waves of data collection, and participants enrolled in the second wave were eligible for two total waves. Percent of possible waves completed was slightly higher among female adolescents ( $t[334] = 2.04, p = .04$ ) and those with higher parental education ( $t[334] = .12, p = .02$ ). Asian American adolescents participated in significantly fewer possible waves of data collection ( $F[3, 342] = 6.40, p < .001$ ), and youth with higher annual incomes participated in more waves of data collection ( $t[340] = .17, p = .001$ ). College attendance did not predict participation ( $t[205] = 0.09, p = .94$ ). Although school SSS was not associated with degree of participation ( $B = -0.01, p = .99$ ), participants of higher society SSS participated in a higher percent of possible waves of data collection ( $B = 0.65, p = .01$ ). Among caregivers, gender was not related to participation ( $t[333] = 0.12, p = .12$ ), and Asian American caregivers participated in fewer possible waves of data collection ( $F[3, 331] = 5.89, p < .001$ ).

**Analytic Sample.**—Of the 350 total participating families, 347 reported either their societal or school SSS at least once during the study (society SSS  $n=341$ , school SSS  $n=337$ ). Five observations were removed if they were outliers on parent-reported income. For four observations, extreme values of family income were approximately ten times greater than the participants' reported income from another wave and only the inflated values were removed. One individual was excluded from the sample because they had only one report of family income, which was over four standard deviations greater than the mean income and more than double the next greatest income at that wave of participation. Ten individuals were missing data from other variables (i.e., parental education, gender, income) at all time-points and were therefore excluded. Hence, the final analytic sample comprised 335 adolescents in total (186 females, 55.52%).

## Procedure

During the first wave of data collection, 316 adolescents were recruited while in the 10<sup>th</sup> (45.45%) or 11<sup>th</sup> grades (48.09%) via in-class presentations, flyers, and mailings at four public high schools in the Los Angeles metropolitan area. Initial recruitment occurred from October 2011 to June 2012. Interested families were called to obtain verbal consent, and families provided written consent at the first study visit. The research team completed home-visits, during which adolescents completed surveys independently on laptops or tablets and parents completed interviews with the research staff. Participants and one primary caregiver completed a survey at each time-point of the study, and each earned \$50, \$75, and \$120 at each respective wave of data collection. All procedures were approved by the UCLA Institutional Review Board (Family Health [Wave 2], Protocol #14–000404).



## Measures

**Society Subjective Social Status.**—Adolescents and caregivers reported SSS at each wave by completing the Subjective Social Status Scale–Youth Version and the MacArthur Scale of Subjective Social Status, respectively (Adler et al., 2000; Goodman et al., 2001). Youth were presented with a 10-rung ladder and were asked to, “Imagine that this ladder pictures how American society is set up. At the top of the ladder are the people who are the best off—they have the most money, the highest amount of schooling, and the jobs that bring the most respect. At the bottom are people who are the worst off—they have the least money, little or no education, no job or jobs that no one wants or respects. Now think about your family. Please tell us where you think your family would be on this ladder. Fill in the circle that best represents where you would be on this ladder.” Caregivers viewed a similar prompt and rated where they viewed themselves (not the family, per se) in US society; the prompts were designed so that adolescent and adult responses can be compared with one another, despite slight differences in wording (Goodman et al., 2001). Scores range from 1 to 10, with higher scores representing higher SSS. This scale has been consistently linked with varied indices of health, corresponds to reports of status from mixed-methods research, and is a well-validated scale of SSS showing significant links with objective measures of socioeconomic status such as income and education (Goodman et al., 2001; Mistry, Brown, White, Chow, & Gillen-O’Neel, 2015; Quon & McGrath, 2014). All study scales are available in Supplementary Materials.

**School Subjective Social Status.**—Youth were presented with a 10-rung ladder and were asked to, “Now assume that the ladder is a way of picturing your school. At the top of the ladder are the people in your school with the most respect, the highest grades, and the highest standing. At the bottom are the people who no one respects, no one wants to hang around with, and have the worst grades. Where would you place yourself on this ladder? Fill in the circle that best represents where you would be on this ladder.” Scores range from 1 to 10, with higher scores representing higher SSS. This scale has been also consistently associated with varied indices of health (Quon & McGrath, 2014).

**College Enrollment.**—During the second and third waves of data collection, participants reported if they were currently enrolled in college. Among the 207 participants who had completed high school, 166 (80.19%) reported enrolling in college. An additional 38 participants from the second wave completed data collection either during high school or the summer following high school and did not report whether they were beginning college that year.

**Depressive Symptoms.**—Adolescents completed the 20-item Center for Epidemiologic Studies-Depression Scale (CES-D) at each wave of data collection (Radloff, 1977). Participants indicated how often they experienced cognitive, affective, and somatic symptoms of depression during the past week on a scale from 1 (*Rarely*) to 4 (*Most or all of the time*). This scale showed good reliability across all waves ( $\alpha = .90 - .91$ ).

**Body Mass Index.**—Trained staff measured height and weight at each study visit using a stadiometer and electronic scale. Body mass index (BMI) was weight in kilograms divided



by height in meters squared. Consistent with standard guidelines, adolescents under 20 were considered obese if they had a BMI above the 95<sup>th</sup> percentile of national benchmarks using data from the Centers for Disease Control and Prevention growth charts (Kuczmarski et al., 2002). Adolescents 20 and over were considered obese if they had a BMI above 30.

## Analytic Strategy

We used Stata 14.1 to estimate multilevel growth curve models of school and society SSS in which years during and after high school (Level 1) were nested within adolescents (Level 2). Models permitted for missing data such that participants were included in analyses regardless of the number of waves they had completed if they had at least one report of school or society SSS in the study. In total, data were collected from 138 10<sup>th</sup> graders, 159 11<sup>th</sup> graders, 132 12<sup>th</sup> graders, 101 participants one-year after high school, 90 participants two-years after high school, and 71 participants three-years after high school. There were an additional two 9<sup>th</sup> graders and four participants four-years after high school. These participants were included in analyses, although we only present models of SSS from 10<sup>th</sup> grade to three-years after high school. Reports of school SSS made by participants who reported not concurrently enrolled in either high school or college ( $N = 41$ ) were excluded from analyses.

First, time was modeled as years since high school graduation and centered at the 12<sup>th</sup> grade. Parallel analyses were conducted to assess the trajectory of school SSS and society SSS. Descriptions of variable coding are in Table S1. The base model included the linear effect of time as a random effect at Level 1. Gender (Male = 0, Female = 1), ethnicity (with European American as the reference group), and parental education were included as Level 2 predictors. Income was included as a Level 1 predictor, as parents reported household income at each wave. Next, adolescent college enrollment (0 = did not enroll in college after 12<sup>th</sup> grade, 1 = enrolled) was included as a Level 2 predictor and parent's SSS was included as a Level 1 predictor, over and above gender, ethnicity, income, and parental education. All continuous predictors were mean-centered.

Discontinuous piecewise (i.e., non-linear) models then assessed whether the transition from high school resulted in a change in the mean SSS (discontinuity) or a change in the rate of change (piecewise; e.g., Duncan & Duncan, 2004). The discontinuous change (i.e., an immediate increase or decrease) in society and school SSS was tested using a dummy-coded time-variable (0 = data were collected during high school; 1 = data collected afterward). The change in the effects of time on society and school SSS following the transition from high school was tested with a time variable in which years since the high school transition was included as a predictor, with all occasions in high school coded as 0.

Then, interactions of time with gender, ethnicity, income, parental education, college enrollment, and parent's SSS were tested in separate models to test whether these factors relate to trajectories of adolescents' SSS. Interactions were first assessed with only the linear factor of time. Subsequent models included interactions between each predictor and both linear and non-linear factors of time. Finally, associations between society and school SSS were assessed with depressive symptoms, obesity, and BMI. Obesity status was predicted

using logistic multilevel regression. These models included income, parental education, gender, and ethnicity. Time x SSS interactions were included to assess whether the strength of these relations varied throughout adolescence.

## Results

See Table 1 for descriptive statistics for all study variables by grade. See Tables S2–S4 for pairwise correlations between continuous study variables by wave.

### Changes in Subjective Social Status

Adolescents' perceptions of their social status in society and school both declined significantly, but in somewhat different ways (see Table 2). Society SSS declined in a linear fashion both during and after high school (Column 1), with no discontinuity or change in slope at the transition out of high school (Column 2). Although the initial model indicated a linear decline in school SSS (Column 3), the subsequent discontinuous piecewise model showed that this was due to a discrete drop after transition from high school, with no change in the years during or after high school (Column 4).

Overall, those from Asian American backgrounds reported lower society SSS than their European American peers and youth with higher family incomes reported higher society SSS than those with lower incomes. There were no group differences in school SSS.

### Variations in Change

**Gender, ethnicity, family income, and parental education.**—In addition, we examined interactions of gender, ethnicity, family income, and parental education with time in predicting SSS to assess whether changes in SSS over time varied as a function of these variables. The simple slopes for significant interactions are presented here in the text; the full models testing variations in change are available in Supplementary Materials, Tables S5–S10.

As shown in Figure 1a, change in society SSS after high school within the discontinuity model differed for males and females. The transition out of school produced a different rate of change for males, who reported declining SSS during high school ( $B = -0.31$ ,  $SE = 0.10$ ,  $[-0.49, -0.12]$ ) and an apparent increase afterward, although the rate of change after high school was not significant ( $B = 0.07$ ,  $SE = 0.14$ ,  $[-0.20, 0.35]$ ). Females did not demonstrate a difference in the rate of change during ( $B = -0.08$ ,  $SE = 0.09$ ,  $[-0.25, 0.10]$ ) and after ( $B = -0.14$ ,  $SE = 0.10$ ,  $[-0.34, 0.06]$ ) high school.

Figure 1b demonstrates the significant interaction from the linear model of change in school SSS. Females had declining school SSS during both high school and college ( $B = -0.17$ ,  $SE = 0.04$ ,  $[-0.25, -0.08]$ ). Males, in contrast, evidenced no change in school SSS ( $B = 0.03$ ,  $SE = 0.06$ ,  $[-0.09, 0.14]$ ).

In terms of ethnic differences in school SSS trajectories, Figure S1 shows that Latino youth reported a significantly steeper linear decline in school SSS across all years ( $B = -0.17$ ,  $SE = 0.05$ ,  $[-0.28, -0.07]$ ) as compared to the generally stable levels of school SSS among

European American youth ( $B = 0.00$ ,  $SE = 0.06$ ,  $[-0.12, 0.12]$ ). The linear changes in school SSS for Asian American and other youth did not significantly differ from that of European Americans. The only ethnic variation in the changes in society SSS to emerge involved those from other ethnic backgrounds, whose change during high school and difference in the rate change during and after high school differed significantly from those with European American backgrounds. The change and difference within this group, however, were not significant.

As shown in Figure 2, those with higher family incomes evidenced high and stable levels of society SSS ( $B = -0.02$ ,  $SE = 0.04$ ,  $[-0.10, 0.06]$ ), whereas those with average and low family incomes reported linear declines over time ( $B = -0.08$ ,  $SE = 0.03$ ,  $[-0.13, -0.02]$ ;  $B = -0.14$ ,  $SE = 0.04$ ,  $[-0.22, -0.06]$ , respectively). Parental education did not significantly moderate changes in SSS at any point.

**Parent's Society SSS and Youth's College Attendance.**—The roles of parent's own society SSS and the youth's attendance in college were examined by adding these factors as predictors and assessing interactions between these factors and the time variables. Separate models were examined for parent's SSS and college attendance given that college information was available for only those who participated in the study after high school. Parent's SSS was used to predict only youths' society SSS due to the correspondence between the measures. Because youth who were not attending college could not report school SSS, one model was used to assess school SSS among all youth during high school, and a separate model was used to assess changes in school SSS among students attending college.

Parent's society SSS interacted significantly with linear time to predict adolescents' society SSS. As shown in Figure S2, parents with high levels of society SSS had children who reported high and stable levels of society SSS across time ( $B = 0.00$ ,  $SE = 0.04$ ,  $[-0.08, 0.09]$ ). Parents with mean and low levels of SSS, in contrast, had children whose society SSS declined during and after high school ( $B = -0.06$ ,  $SE = 0.03$ ,  $[-0.12, -0.001]$ ;  $B = -0.12$ ,  $SE = 0.04$ ,  $[-0.20, -0.04]$ , respectively).

Linear changes in society SSS varied by college attendance. Figure 3a demonstrates how those who attended college exhibited stable society SSS both during and after high school ( $B = -0.04$ ,  $SE = 0.03$ ,  $[-0.11, 0.02]$ ), whereas those who did not attend college reported declining society SSS ( $B = -0.23$ ,  $SE = 0.07$ ,  $[-0.36, -0.09]$ ). In terms of school SSS, those who eventually attended college reported high and stable SSS during the high school years, followed by an abrupt decline at the transition out of high school ( $B = -0.68$ ,  $SE = 0.24$ ,  $[-1.14, -0.21]$ ; Figure 3b). Youth who did not attend college reported lower school SSS during high school ( $B = 1.03$ ,  $SE = 0.24$ ,  $[0.57, 1.50]$ ).

### Subjective Social Status, Depressive Symptoms, and Obesity

As shown in Table 3, youth with higher societal and school SSS evidenced lower depressive symptoms and lower odds of obesity. Follow-up analyses suggested that these associations did not significantly vary during and after high school. In contrast, neither societal nor school SSS significantly predicted continuous levels of BMI. A follow-up analysis indicated

that society SSS interacted with age such that higher levels of society SSS was linked with significantly lower BMI only among youths in the 10<sup>th</sup> grade ( $B = -0.27, SE = 0.13$ ).

## Discussion

Children show an understanding of SSS early in life and their SSS continues to change with age (Goodman et al., 2001, 2015). Although SSS has been robustly linked with health among adults, few previous studies have assessed developmental changes in SSS during adolescence, a key developmental period that could set the stage for adult SSS (Goodman et al., 2007, 2015 are notable exceptions). In this study, adolescents' reports of society SSS generally declined over time and school SSS declined at the transition from high school. For both forms of SSS, adolescents from groups of lower social status showed greater declines in SSS. Specifically, society SSS changes varied by gender, family income, parent's SSS, and college enrollment; school SSS changes were shaped by ethnicity and college enrollment. Finally, both lower society and school SSS were associated with greater depressive symptoms and higher odds of obesity, irrespective of age.

### Variations in Changes in Subjective Social Status

Substantial variation in the changes in youths' SSS were observed, with those from demographic groups with lower social standing and more disadvantage showing greater declines as they moved into young adulthood. Gender moderated both society and school SSS development. Whereas females exhibited a consistent decline in school SSS during and after high school, the only decline for males was in society SSS during the high school years. Females may show a decline in school SSS because their status may be more sensitive to the changing social environment and greater feedback regarding academic performance relative to males' status (Mayo, Kakarika, Pastor, & Brutus, 2012). Although girls outperform boys in school, they report lower self-efficacy and self-esteem in school, especially during adolescence (Diseth, Meland, & Breidablik, 2014; Kling, Hyde, Showers, & Buswell, 1999). Consequently, the increasing academic rigor of coursework may have more negative consequences for females' perceived status, whereas males' school SSS is relatively unaffected.

Ethnic differences were identified in society SSS, such that Asian Americans had significantly lower society SSS than European Americans, even after accounting for SES. Asian Americans may report lower society SSS because of experiences of microaggressions and discrimination (Huyhn, 2012; Ong, Burrow, Fuller-Rowell, Ja, & Sue, 2013). Moreover, Asian Americans may experience stressors unique to immigration status, such as acculturative stress, parent-child conflict, and language and socioeconomic barriers (Lim, Yeh, Liang, Lau, & McCabe, 2008; Qin, 2008).

In contrast, Latinos reported greater declines in school SSS over time, with lower school SSS than European Americans while in college. Latinos may show declines in school SSS because of lower academic performance and lower high school and college completion rates relative to White and Asian Americans (Gándara & Mordechay, 2017; Kelly, Schneider, & Carey, 2010). Latino students experience distinct challenges, such as cultural stereotyping,

lower academic self-efficacy, and feelings of unpreparedness for college which can contribute to lower school SSS in high school and college (Gándara & Mordechay, 2017).

Although both income and parental education are common indicators of SES, only family income was associated with adolescents' society SSS development. Youth with higher family income showed relative stability in society SSS, whereas youth of average and lower family income showed declines over time. Income, therefore, may become a more relevant criterion for SSS over time. Adolescents may become more aware of the financial concerns of their families and the financial status of others (Flanagan et al., 2014). In contrast, parental education did not relate to SSS development. As students transitioned from high school and potentially to higher education, their own educational attainment may be more salient to their status than that of their parents.

Although youth who ultimately enroll in college were predicted to show changes in SSS following the transition from high school, school and society SSS was relatively stable among this group. Awareness of financial concerns may begin in high school as youth plan their future (e.g., deciding their price limit for college, plan for work; Flanagan et al., 2014; Flanagan & Tucker, 1999). School SSS was lower in college, likely due to the increased academic rigor and higher achievement of peers during the transition to college. Interestingly, there was no mean-level change in school SSS throughout high school or college, suggesting that on average youths' status at each school environment remained relatively stable. In turn, adolescents who did not go to college showed declines in society SSS and had lower school SSS. Educational attainment is consistently related to SSS, and the decision not to enroll in college may prompt adolescents to view their families as having lower status (Andersson, 2018). These students also had lower school SSS. They may have had poorer academic performance or lower academic self-efficacy in high school, which could ultimately influence the decision to not enroll in college.

Youth with lower parent's SSS also reported declines in society SSS. Similar to income, parent's SSS is generally considered an accurate approximation of SES (Goodman et al., 2001). This may suggest youth develop a more accurate assessment of their society SSS over time. Alternatively, it may reflect how youth adopt similar attitudes to their parents as they age, which results in youths' SSS more strongly relating to parent's SSS over time (Goodman et al., 2001). Parents' low SSS may influence youths' SSS; conversations about financial matters may cause youth to weigh aspects of their status similarly to their parents. Low parent's SSS can influence adolescents' financial support and ultimate decisions regarding whether to work full-time, pursue college, or work while in college.

### **Subjective Social Status and Health**

In alignment with previous work, lower society and school SSS were associated with greater odds of obesity and more depressive symptoms. These results suggest that both the society and school are meaningful contexts for adolescent health and that lower SSS is related to both poorer physical and mental health as early as adolescence. Relative deprivation theory posits that relative differences can cause people to feel as though they have less than they need or deserve and consequently have poorer health and adjustment (Smith & Pettigrew, 2011). Higher society SSS was only related to higher BMI among 10<sup>th</sup> graders, suggesting

that SSS is not consistently related to graded differences in BMI. Adolescents gain more autonomy over their diet as they age, so the importance of family's standing in society for BMI may only be present earlier in adolescence. However, this finding is at odds with other work linking lower SSS to higher BMI throughout adolescence and young adulthood (Dhurandhar et al., 2018; Lemeshow et al., 2008). It is possible that BMI is a poorer measure of health relative to other biological indicators. Alternatively, lower SSS may be more strongly related to graded differences in mental health but not physical health. SSS tends to be more strongly related to mental than physical health in the literature, and a larger sample size may be needed to identify the relatively smaller association between SSS and BMI.

Although it is possible that youth who are obese and higher in depressive symptoms report lower SSS because of bullying or other mistreatment related to their poor health, the experience of having lower status can be stressful and thereby result in poorer health (Sapolsky, 2004). Indeed, previous work suggests that viewing oneself as being of low status can induce greater food-seeking behavior, especially with respect to high-calorie foods, and more depressive thinking (Cardel et al., 2016; Cheon & Hong, 2016; Schubert et al., 2016). Both the society and school may be meaningful contexts for health such that having low SSS in either can negatively impact health. These results were invariant of time, suggesting that the developmental changes in SSS may have important implications for the associations between SSS and health. For instance, youth show a decline in school SSS following college. Although normative in this sample, youth who report lower SSS across this transition likely also experience poorer health.

### Future Directions

Further work can address the specific events and experiences (e.g., financial stress, discriminatory experiences) that contribute to adolescents' conceptualization of their own status and precipitate declines in SSS (Singh-Manoux et al., 2005). Although our results suggest that more disadvantaged groups show greater declines in status over time, the pathways by which they learn about and identify with social status remain unclear, and few studies have aimed to identify the factors that inform adolescents' status in society and school.

Understanding the ways youth develop their SSS can promote interventions that target students' SSS within the school, community, or society, to reduce SSS differences in health and well-being (e.g., Destin et al., 2012; Quon & McGrath, 2014). Although low SSS may be influenced by factors such as low self-esteem and victimization which are also potent areas for intervention, experimental work has suggested that reframing of one's relative status can influence performance in a cognitive task (Johnson, Richeson, & Finkel, 2011). Low SSS may be an indicator of overall risk for poorer well-being and may be an ideal, easily measured marker to assess. Further, the unique dissociation between one's perception of status and one's objective status appears consistently relevant to health. Hence, further efforts regarding promoting a school climate that promotes inclusion and ensures representation of low- and high- status groups may be effective in curtailing declines in SSS and the negative consequences they confer.



## Limitations

Participants in our study completed a maximum of three SSS ratings, which precluded us from using trajectory analysis to identify subgroups of individuals who may be at heightened risk of declines in SSS or differentiating the effects of income differences within a participant from between participants. Also, society and school SSS were each reported using single-item measures. Future work should rigorously assess SSS with a multi-item scale to ensure high scale reliability and validity. An additional limitation to be considered is the greater attrition among males, Asian American families, and those with lower incomes and lower SES that may have biased the estimates of developmental trajectories for these groups. Providing financial incentive to participants is common, particularly in the context of a longitudinal study where compensation typically needs to be increased in subsequent waves in order to make it appropriate for participant age (e.g., 15 years of age vs. 21 years) and to maintain participation. We are not aware of research suggesting that financial compensation would have affected the findings of our study. Given the study design, it is not possible to identify mechanisms linking SSS with health. It is possible that people who are overweight experience more victimization and therefore report low SSS. However, bidirectional pathways have been theorized, and experimental and prospective work suggest that lower SSS can produce increased food intake and more depressive cognitions in adults (Cardel et al., 2016; Cheon & Hong, 2016; Lemeshow et al., 2008; Schubert et al., 2016). Further work is needed to interrogate the strength of these mechanisms in adolescence specifically.

Ethnicity and income were confounded in this study, as it is in many others, with the differences sometimes being quite large (e.g. European American vs. Asian American). Although this did not preclude findings for the independent associations of both ethnicity and income with SSS, our results should be validated among less socioeconomically disparate groups. Further, interactions between demographic variables and time were included in separate models due to concerns of multi-collinearity. Several moderators were tested that suggested a similar pattern of results, with groups of lower-status showing greater declines in SSS. However, these moderation findings will need to be replicated among other large samples. Finally, by accounting for the unique variance in SSS after accounting for measures of socioeconomic status, we are specifically testing how demographic factors account for the unique *perception* of status. However, we lacked objective measures of status in school besides socioeconomic status —such as academic performance or peer popularity—to more thoroughly assess the effects of low school SSS. Future work can endeavor to identify the unique effects of school SSS on health after accounting for these factors, as well as the mechanisms underlying the observed associations between SSS and health.

## Conclusions

Taken together, groups of lower status (i.e., low-income youth, women, ethnic minorities) seem positioned for lower and declining SSS. These declines in society SSS generally emerge during high school, and the transition from high school corresponds with a decrease in school SSS. People chronically overrate their SSS; roughly one fourth of people report viewing themselves as having below average status in society by using the bottom half of the



ladder (Andersson, 2018). Early adolescents may all rate themselves similarly high when they are young. As they age, they appear to experience or better understand the consequences of having lower status relative to peers and reevaluate their SSS. This finding is consistent with a work from animal models, as organisms need to identify their status to promote survival (Sapolsky, 2004). However, feeling of low social status may harm humans' health and capacity for gaining status, as this low status may make them feel less competent and inform their career choices as they age. SSS appears consistently linked with health, and previous literature has linked it with other factors that can shape youths' capacity for gaining status such as their academic competencies and future career choices (e.g., Mistry, Benner, Tan, & Kim, 2009; Weinger, 1998). Therefore, understanding whether groups differ in SSS and identifying trajectories of SSS may help to reduce disparities among disadvantaged groups.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

Funding: This research was supported by NIH National Center for Advancing Translational Science (NCATS) UCLA CTSI (UL1TR001881) and funding from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R01-HD062547), the UCLA California Center for Population Research (P2C-HD041022), the UCLA Older Americans Independence Center (P30-AG028748), and the USC/UCLA Center for Biodemography and Population Health (P30-AG017265).

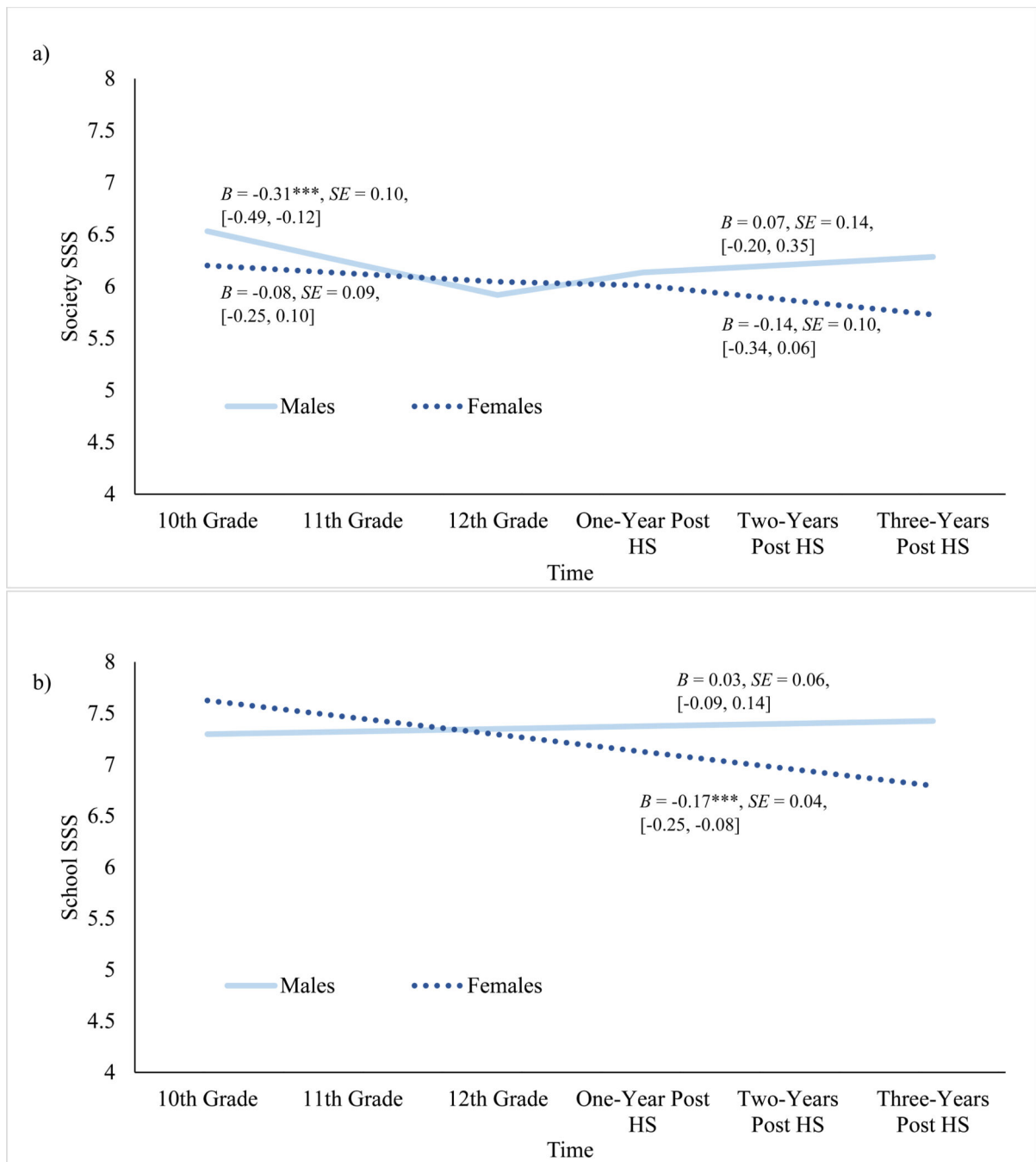
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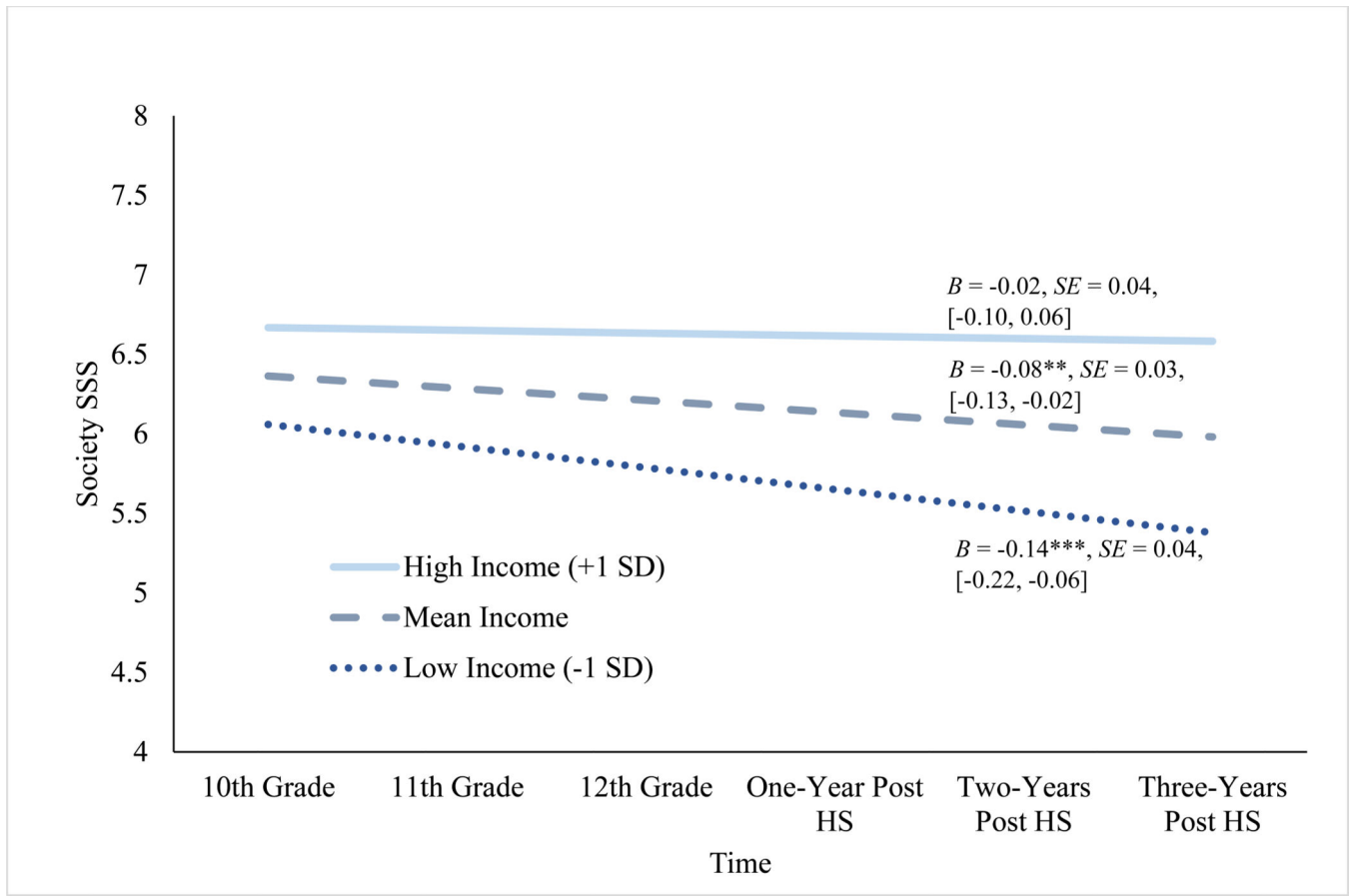
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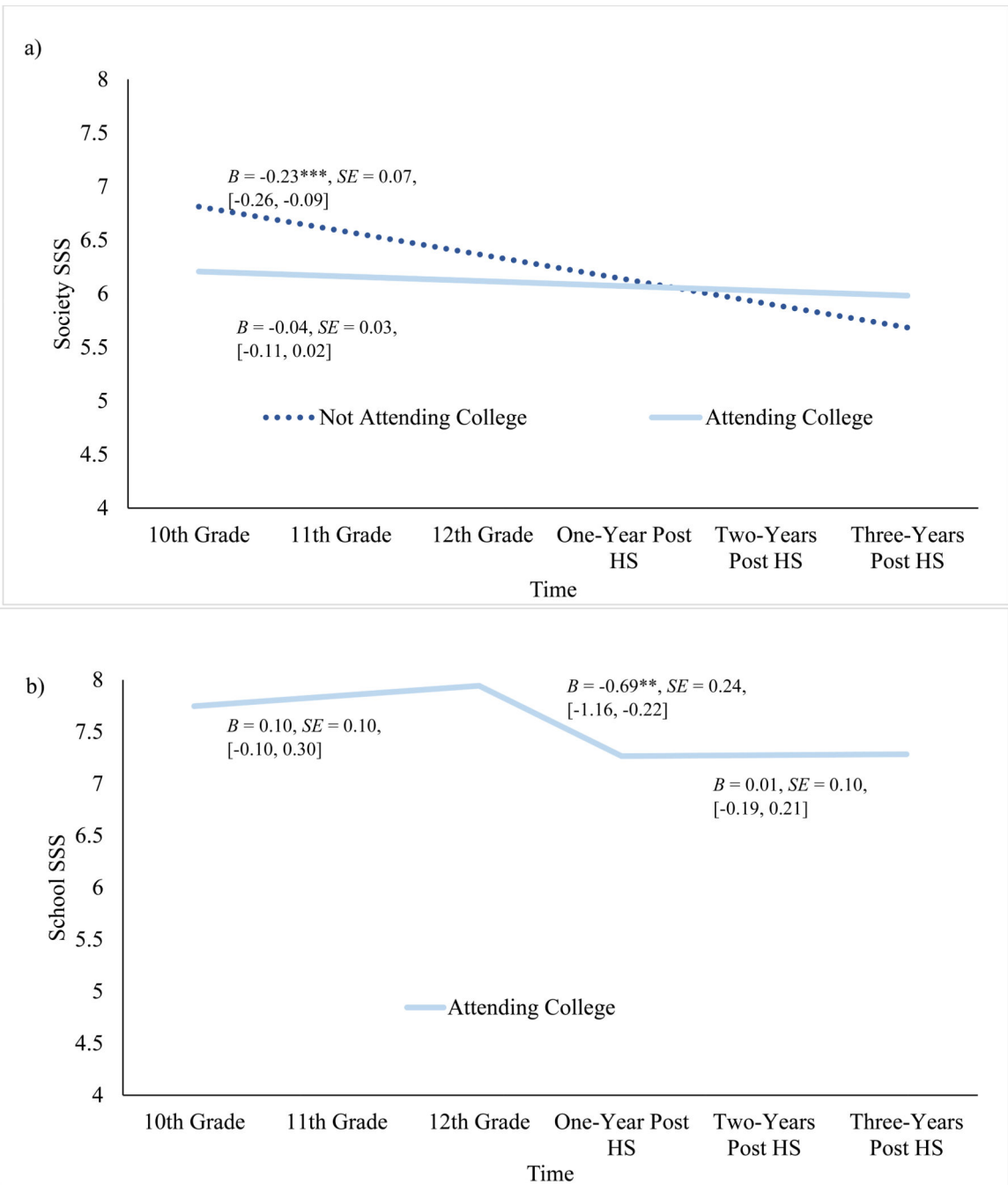
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**Figure 1.** Discontinuous change in society SSS (a) and linear change in school SSS (b) as a function of gender. *Note.* HS=high school,  $***p < .001$ .



**Figure 2.**  
 Linear changes in society SSS as a function of concurrent family income.  
*Note.* HS=high school, \*\* $p < .01$ ; \*\*\* $p < .001$ .



**Figure 3.** Linear changes in society SSS (a) and discontinuous changes in school SSS (b) as a function of whether adolescents ultimately attending college. *Note.* HS=high school, \*\* $p < .01$ ; \*\*\* $p < .001$ .



**Table 1.**

Descriptive statistics for study variables.

	10th grade		11th grade		12th grade		1-year post		2-years post		3-years post		
	<i>N</i>	range	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>N</i> range	121–137		137–158		111–132		90–105		84–99		77–89		
Age	14.5–22.17	15.86	0.55	16.87	0.52	17.84	0.63	18.89	0.51	19.83	0.66	20.79	0.40
Income (\$10,000)	0–35	7.13	4.97	6.15	4.89	8.96	6.06	7.73	6.70	8.80	5.79	7.87	6.66
Parental Education	1.5–11	7.50	1.66	7.02	1.81	7.52	1.86	7.14	1.86	7.39	1.84	7.27	1.95
Adolescent	1–10	6.10	1.30	5.66	1.51	5.88	1.43	5.65	1.68	6.07	1.71	5.57	1.71
Society SSS													
Adolescent	1–10	7.20	1.39	7.21	1.49	7.40	1.71	6.60	1.70	6.76	1.80	7.21	1.55
School SSS													
Parental	1–10	5.63	1.67	5.36	1.88	5.77	1.59	5.35	1.71	5.43	1.64	5.69	1.70
Society SSS													
BMI	15.02–53.10	22.52	4.87	23.62	5.00	23.61	4.83	24.29	5.71	24.10	5.05	24.39	5.23
Depressive Symptoms	1–3.5	1.77	0.51	1.83	0.56	1.79	0.48	1.74	0.51	1.75	0.48	1.71	0.53

Note: SSS= subjective social status; income was divided by \$10,000; BMI=Body Mass Index. *N*= number of observations for each year. The accelerated longitudinal design and two-year data collection intervals resulted in not all participants providing data for each year.

**Table 2.**

SSS as a function of Time.

Variable	Society SSS				School SSS			
	Linear Model		Discontinuous Piecewise Model		Linear Model		Discontinuous Piecewise Model	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Constant	6.20 <sup>***</sup>	0.15	6.07 <sup>***</sup>	0.16	7.28 <sup>***</sup>	0.17	7.47 <sup>***</sup>	0.19
Time	-0.08 <sup>**</sup>	0.03	-0.19 <sup>**</sup>	0.07	-0.10 <sup>**</sup>	0.04	0.07	0.08
Post-High School Discontinuity	--	--	0.16	0.19	--	--	-0.52 <sup>*</sup>	0.24
Post-High School Change in Time	--	--	0.12	0.10	--	--	-0.08	0.13
Income	0.08 <sup>***</sup>	0.01	0.08 <sup>***</sup>	0.01	0.02	0.01	0.02	0.01
Parental Education	0.08	0.04	0.07	0.04	-0.02	0.05	-0.02	0.05
Gender	-0.16	0.13	-0.16	0.13	0.03	0.15	0.04	0.15
Latino	-0.29	0.16	-0.30	0.16	-0.23	0.19	-0.20	0.19
Asian American	-0.68 <sup>**</sup>	0.20	-0.69 <sup>***</sup>	0.20	-0.27	0.23	-0.25	0.23
Other Ethnicity	-0.41	0.31	-0.41	0.31	-0.01	0.34	0.01	0.34

*Note.*\*  
*p* < .05;\*\*  
*p* < .01;\*\*\*  
*p* < .001;

SSS=subjective social status; income was divided by \$10,000.

**Table 3.**

Depressive Symptoms, log odds of obesity, and BMI as a function of SSS.

	Depressive Symptoms						Obesity						BMI					
	Societal SSS		School SSS		Societal SSS		School SSS		Societal SSS		School SSS		Societal SSS		School SSS			
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>		
Constant	1.66 <sup>***</sup>	0.05	1.66 <sup>***</sup>	0.06	-4.63 <sup>*</sup>	2.01	-5.37 <sup>**</sup>	1.83	24.06 <sup>***</sup>	0.59	23.85 <sup>***</sup>	0.59	23.85 <sup>***</sup>	0.59	23.85 <sup>***</sup>	0.59	23.85 <sup>***</sup>	
SSS	-0.03 <sup>*</sup>	0.01	-0.05 <sup>***</sup>	0.01	-0.43 <sup>*</sup>	0.22	-0.62 <sup>*</sup>	0.29	-0.09	0.09	-0.05	0.08	-0.05	0.08	-0.05	0.08	-0.05	
Time	-0.02	0.01	-0.02 <sup>*</sup>	0.01	-1.11	1.28	-0.53	0.86	0.42 <sup>***</sup>	0.06	0.44 <sup>***</sup>	0.07	0.44 <sup>***</sup>	0.07	0.44 <sup>***</sup>	0.07	0.44 <sup>***</sup>	
Income	-0.01 <sup>*</sup>	0.00	-0.01 <sup>**</sup>	0.00	-0.18 <sup>*</sup>	0.09	-0.21	0.12	-0.05	0.03	-0.05	0.04	-0.05	0.04	-0.05	0.04	-0.05	
Parental Education	0.02	0.02	0.02	0.02	-0.03	0.24	-0.03	0.27	-0.19	0.16	-0.22	0.16	-0.22	0.16	-0.22	0.16	-0.22	
Gender	0.13 <sup>**</sup>	0.05	0.11 <sup>*</sup>	0.05	-2.23 <sup>**</sup>	0.81	-2.15	1.13	-0.61	0.53	-0.47	0.53	-0.47	0.53	-0.47	0.53	-0.47	
Latinos	0.04	0.07	0.04	0.06	-0.10	0.98	0.72	1.22	1.02	0.66	1.20	0.67	1.20	0.67	1.20	0.67	1.20	
Asian Americans	0.03	0.06	0.05	0.08	-2.86 <sup>*</sup>	1.27	-2.51	1.57	-1.88 <sup>*</sup>	0.78	-1.52	0.78	-1.52	0.78	-1.52	0.78	-1.52	
Other	0.15	0.11	0.18	0.11	-0.18	1.65	0.03	1.87	-0.78	1.23	-0.87	1.19	-0.87	1.19	-0.87	1.19	-0.87	
SSS × Time									0.09 <sup>*</sup>	0.04	0.03	0.05	0.09 <sup>*</sup>	0.04	0.03	0.05	0.09 <sup>*</sup>	

Note.

\*  $p < .05$ ;

\*\*  $p < .01$ ;

\*\*\*  $p < .001$ ;

SSS= subjective social status; income was divided by \$10,000; BMI=Body Mass Index.