Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

HHS Public Access

Author manuscript

Dev Psychol. Author manuscript; available in PMC 2020 March 01.

Published in final edited form as:

Dev Psychol. 2019 March ; 55(3): 574–585. doi:10.1037/dev0000551.

Perceived social status and mental health among young adolescents: Evidence from census data to cellphones

Joshua G. Rivenbark[1,2], **William E. Copeland**[3], **Erin K. Davisson**[4], **Anna Gassman-Pines**[1,5], **Rick H. Hoyle**[5], **Joy R. Piontak**[1], **Michael A. Russell**[6], **Ann T. Skinner**[4], and **Candice L. Odgers**[1,7]

[1]Sanford School of Public Policy, Duke University

[2]Duke University School of Medicine

[3]Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine

[4]Center for Child and Family Policy, Duke University

[5]Department of Psychology & Neuroscience, Duke University

[6]The Pennsylvania State University

[7]Department of Psychology & Social Behavior, University of California, Irvine

Abstract

Adolescents in the United States live amidst high levels of concentrated poverty and increasing income inequality. Poverty is robustly linked to adolescents' mental health problems; however, less is known about how perceptions of their social status and exposure to local area income inequality relate to mental health.

Participants comprised a population representative sample of over 2,100 young adolescents (aged 10–16), 395 of whom completed a 14-day ecological momentary assessment (EMA) study. Participants' subjective social status (SSS) was assessed using a ladder measure at the start of the EMA, and mental health symptoms were measured both at baseline for the entire sample and daily in the EMA sample.

Adolescents' SSS tracked family, school and neighborhood economic indicators ($|r|$ ranging from 0.12 to 0.30), and associations did not differ by age, race, or gender. SSS was independently associated with mental health, with stronger associations among older (aged 14 to 16) versus younger (aged 10 to 13) adolescents. Adolescents with lower SSS reported higher psychological distress and inattention problems, as well as more conduct problems in daily life. Those living in areas with higher income inequality reported significantly lower subjective social status, but this association was explained by family and neighborhood income. Findings illustrate that adolescents' SSS is correlated with both internalizing and internalizing mental health problems, and by age 14 becomes a unique predictor of mental health problems.

Address correspondence to: Candice L. Odgers, Department of Psychology and Social Behavior, University of California, Irvine, Irvine CA 92617. codgers@uci.edu.

Financial disclosure: None

Conflict of interest: None

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Keywords

subjective social status; adolescence; mental health; poverty; income inequality

With each step up the socioeconomic ladder, the mental health of young people improves. Differences in income, education, and resources available to families account for much of the socioeconomic gradient in adolescent's mental health outcomes (Bradley & Corwyn, 2002). However, adolescents' *perceptions* of their family's resources and ranking in larger society, often referred to as their *subjective social status*, have also been uniquely associated with mental health across multiple studies (Goodman et al., 2001; Quon & McGrath, 2014). Such findings suggest that how adolescents perceive their place in the social hierarchy may be a key, and potentially malleable, determinant of their mental health and wellbeing.

Unfortunately, less is known about adolescents' perceptions of their social status during early adolescence, a time that is marked by heightened social awareness (Steinberg & Morris, 2001) and the maturation of cognitive capacities, which may facilitate a more nuanced perception of one's own social position (Goodman, Maxwell, Malspeis, & Adler, 2015). Early adolescence is also a period of heightened vulnerability for the onset and exacerbation of mental health problems (Belfer, 2008; Schwarz, 2009), and recent evidence suggests that SSS may already correspond with indicators of family socieconomic status by 10 to 12 years of age (Mistry, Brown, White, Chow, & Gillen-O'Neel, 2015). As such, the transition to adolescence comprises a potentially important, period for understanding the interplay between perceptions of social status and mental health problems. More specifically, it is not known: (a) how young adolescents' subjective social status (SSS) is influenced by the socioeconomic composition of the families, schools, and neighborhoods that they grow up in, including levels of income inequality, (b) whether perceptions of social status are more strongly related to mental health outcomes for certain subgroups of adolescents (e.g., gender, race/ethnicity, and socioeconomic status), and, (c) at what age subjective perceptions of social status first begin to signal poor mental health.

Study Description

Assessments of adolescents' subjective social status were gathered as part of the Research on Adaptive Interests, Skills, and Environments (RAISE) Study, which included a large representative sample of North Carolina (NC) public school children (N = 2,104) assessed using diverse data sources and methods including geo-coded census-level economic information and administrative record data from public schools. A subsample (n = 395) of adolescents completed in-home assessments and a 14-day ecological momentary assessment (EMA). The EMA captured adolescents' daily experiences and mental health symptoms multiple times per day using mobile phones and wearable devices. EMA allows for the measurement of experiences, emotions, and behaviors in near real-time and in adolescents' naturalistic settings, helping to reduce recall bias and enhance ecological validity (Shiffman, Stone, & Hufford, 2008).

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Research Questions

Using data from this diverse and representative sample of adolescents, which spanned from daily symptom assessments via mobile devices to geo-coded contextual indicators of income inequality, the following three sets of questions were addressed:

(1) How closely do young adolescents' perceptions of social status track with family, school and neighborhood economic indicators? Do those perceptions become more accurately calibrated with age and/or vary across racial or gender subgroups?

Among adults, SSS tracks measures of economic resources and social class well enough that it has been suggested to represent a "cognitive average" of the multitude of factors comprising one's objective SES (Singh-Manoux, Adler, & Marmot, 2003). Unfortunately, relatively little is known about the contextual factors that shape SSS among adolescents. In this study, we bring together independent assessments of adolescents' SES (objectively verified family income, census tract neighborhood income measures, and school-level compositional factors) to identify correlates of SSS during the early adolescent period – a time when perceptions of SSS are hypothesized to first calibrate with objective income and correlate with mental health (Odgers, 2015). We also examine potential differences in the SES-SSS relationship across age, sex, and racial groups.

The evolution of status-related perceptions over childhood and adolescence is poorly understood, although there is some evidence that adolescents' reports of SSS may become more 'accurately calibrated' as they age. Goodman and colleagues (2001) report a trend of youth's perceptions of their families' standing on the ladder becoming more strongly correlated with their mother's ratings by late adolescence, though the difference in correlation between those younger than 15 versus those 15 years and older was not statistically significant. At the same time, adolescents' reference groups for making evaluations of their SSS may be influenced by the socioeconomic characteristics of the neighborhoods and schools that they spend their days in. Increasing levels of segregation by both race and income in the United States (Reardon & Bischoff, 2011) raises questions as to how SSS is "calibrated" across different racial and ethnic groups. For example, Black adults report both higher SSS than Whites, despite well documented differences in objective indicators of economic resources favoring Whites, and show weaker links between SSS and objective measures of social status (Wolff, Acevedo-Garcia, Subramanian, Weber, & Kawachi, 2010). Thus, the relative weight given to "non-economic" inputs when appraising social status may differ by race. But again, much less is known about how socioeconomic status interacts with racial and ethnic identity among adolescent to influence status perceptions. In one longitudinal study of non-Hispanic black and white adolescents transitioning to adulthood, black youth with low SES where more likely to belong to a "downward SSS trajectory group", characterized by high initial SSS ratings, but sharp declines over time. The authors concluded that this distinct subgroup of low-SES youth may begin with "rose-colored glasses" early in life, followed by calibration with age to more accurately reflect objective, external measures of SES (Goodman et al., 2015). These types of insights are critical to consider in light of recent evidence suggesting that even among Black youth who begin their lives at the highest rungs of the income ladder, their chances of

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

remaining at the "top" are less than those of their White peers (Chetty, 2018). Finally, Prior research has found stronger evidence for neighborhood poverty effects on boys versus girls' behavior (Leventhal & Brooks-Gunn, 2000), suggesting that boys may be more likely to experience negative effects of growing up in poor environments. However, to date, there is not strong evidence to suggest that subjective perceptions of social status are more predictive for boys versus girls (Quon & McGrath, 2013).

(2) Are adolescents' perceptions of social status uniquely associated with mental health outcomes, both globally and in daily life? When do these associations first emerge?

Adolescent's SSS is uniquely associated with mental health even after controlling for objective SES, with a recent meta-analysis demonstrating robust associations for a number of mental health outcomes (Quon & McGrath, 2014). However, the majority of previous research has combined older and younger adolescents, making it difficult to discern when young people first become aware of their position on the SES ladder and, in turn, when these evaluations begin to matter for health outcomes. In addition, when compared to adults, relationships between SSS and mental health among adolescents appear weaker and less consistent (Chen & Paterson, 2006; Ghaed & Gallo, 2007; Goodman et al., 2015). This may be because adolescents' sense of social status is still developing as their identity becomes more self- versus family-defined and, as a result, shows increasing associations with their own health outcomes with age (Goodman, Huang, Schafer-Kalkhoff, & Adler, 2007; Goodman et al., 2015). Nonetheless, the finding that adolescents' views of their social status is uniquely associated with their mental health suggests that viewing oneself as lower ranked, in addition to having fewer resources, may play a key role in the creation of health disparities (McLaughlin, Costello, Leblanc, Sampson, & Kessler, 2012).

In the current study, we examine associations between adolescents' SSS and mental health in two ways. First, we test whether adolescents' views of their SSS are uniquely correlated with global assessment of mental health (reported in a cross-sectional adolescent survey) and with symptoms captured in daily life (reported multiple times each day and averaged across the 14-day EMA). This approach extends prior research by controlling for economic indicators of family and school disadvantage, *as well as* neighborhood income and local area inequality. Second, age-variation in the sample is leveraged to test when the association between perceived status and mental health symptoms first emerges, with the expectation that SSS would be more strongly associated with mental health among older versus younger participants in our sample.

(3) Does local area income inequality influence adolescents' mental health and subjective social status?

It has been argued that income inequality is bad for everyone. Indeed, high levels of income inequality at the country and state level are reliably associated with worse outcomes for children (Pickett & Wilkinson, 2007) and this is especially true for the children from the poorest families (Elgar et al., 2015). However, evidence is mixed as to how income inequality within smaller units of analyses, such as the neighborhood or school level, influences children (Pickett & Wilkinson, 2007). Understanding the influence of economic inequality – and the level at which inequality may matter – for children is important, as

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

economic inequality in the United States has risen an estimated 40% to 50% since the 1970s (Duncan & Murnane, 2014). Among children, trends in inequality are amplified as economic inequality has increased even more among families with versus without children (Owens, 2016). At the same time, an estimated 43% of children live in “low-income” households, with family income less than 200% of the federal poverty line, and poverty is more widespread among children from ethnic minority families (Jiang, Granja, & Koball, 2017).

Children are growing up in a society characterized by increasing economic and racial stratification and segregation (Reardon & Bischoff, 2011). Yet, relatively little is known about how young people perceive, and may be influenced by, local area socioeconomic status (SES), exposure to difference reference groups, and rising levels of income inequality. Moreover, we are just beginning to understand how these perceptions interact with race and ethnicity to create identities around status more generally (Destin, Rheinschmidt-Same, & Richeson, 2017), and among young people more specifically (Mistry et al., 2015).

In the present study, we test whether local area inequality – defined at the census tract-level (tracts are predefined geographical spaces with populations generally ranging from 1,200 to 8,000) – is associated with adolescents’ perceptions of social status and mental health. We also test whether these associations are stronger among adolescents from low-income families (persistently disadvantaged) or among those who identify as an ethnic minority, as the risks associated with growing up in high-inequality settings may be greater for these children (C. L. Odgers & Adler, 2017). For low income children, growing up high inequality settings may lead to greater exposure to higher-income peers and, in turn, to what Sir Michael Marmot has termed the “status syndrome” (Marmot, 2004), which refers to the phenomenon of “feeling poor” in relation to others, and the negative comparisons, self-evaluations, and health outcomes linked to this appraisal. That is, high income inequality settings may cause adolescents to more acutely “feel the hierarchy” (Destin, Richman, Varner, & Mandara, 2012) and perceive themselves as having low social status.

Social status identity, or the tendency for individuals to distinguish themselves along class lines, tends to be stronger in high-inequality settings (Buttrick & Oishi, 2017), which may, in turn, evoke stereotype threat for low-income adolescents and increase the risk of conforming to negative stereotypes about the socio-economic group that they identify with. Stereotype threat has been primarily studied in relation to racial and gender identity. However, socio-economic based stereotype threat has been shown to influence students’ test performance and self-confidence within experimental paradigms (Spencer & Castano, 2007). Thus, lowered status-related perceptions and stronger class-based affiliations among low-income children in high-inequality settings would be expected to lead to a host of emotional and mental health problems associated with being positioned lower on social dominance hierarchies. Throughout each set of analyses, we test for interactions between poverty status, sex, age, and race with local area inequality and economic indicators to better understand the ways in which these factors may both intersect and be shaped by the broader social and economic context.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Methods

Participants

Participants were drawn from the population of children enrolled in grades 3–6 in North Carolina Public Schools during the 2011–2012 school year (N = 2,104) as determined by administrative data from the North Carolina Department of Public Instruction (NCDPI). At the time of the Adolescent Survey, participants were enrolled in grades 5–8 and ranged in age from 9 to 15 (M_{age} = 12.36, SD = 1.12). At the time of the EMA, participants ranged in age from 10 to 16. The sample was representative of the state population of public school children with respect to economic disadvantage, gender, and ethnicity (see Supplemental Table 1), and, as shown in Supplement Figure 1, participants were spread geographically across the state of North Carolina and were living in both rural and urban areas, as well as areas with varying levels of poverty and income inequality.

Procedure

The Adolescent Survey was conducted from April to August of 2015. Participants and their parents were contacted and consented by phone. Adolescents were surveyed by phone and reported on demographics, mental health, and problem behaviors. The majority of parents provided consent to link survey data to administrative data from the NCDPI (n = 2,048, 97.3%) and gave permission to contact their child for future studies (n = 1,867, 88.7%). Table 1 details the survey sample's demographic and economic characteristics by race and ethnicity.

Of those who agreed to be contacted, 395 adolescents were recruited to participate in a Home Visit and a 14-day EMA between April 2016 and February 2017. Adolescents were selected based on their: 1) proximity to two geographically distinct locations (central, urban NC, and western, rural NC) from which staff could make in-person home visits, and 2) representation to the statewide public school population in terms of economic disadvantage, gender, race, and ethnicity. All procedures, protocols, and measures were approved by the Duke University Institutional Review Board for the RAISE study (approval #D0396).

The Home Visit was conducted by two interviewers and included tests of the adolescents' executive functioning, self-reported information about perceived social status, and interviewer assessments of the participant's personality, home, and neighborhood. Interviewers also installed MetricWire (MetricWire Inc., 2016), a phone-based survey application, to deliver the EMA on the participant's own mobile phone or a study-administered phone (49.9% of adolescents used their own phone). Participants received three daily surveys for the next 14 days, one each in the morning, afternoon, and evening. Survey questions assessed participants' daily experiences, behaviors, perceptions, and mood. Eighty percent of survey prompts were answered, resulting in 13,017 total observations.

Measures

Perceived status and social standing—*Subjective social status (SSS)* was measured once at the Home Visit, with an adapted version of the MacArthur SES measure (Goodman et al., 2001). Adolescents were shown an image of a ladder with 5 rungs and told that "*this*

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

ladder represents how things are in the United States. At the top of the ladder are all the people who have the best jobs, lots of money, live in nice places, and go to the best schools. At the bottom of the ladder are those people who don't have enough money, don't live in a nice place, and might not have a job. Now think about your family - where would they be on the ladder?" Adolescents were instructed to indicate which rung best represents their family's position with the lowest rung (1) representing "poor" and the highest rung (5) representing "rich" ($M = 3.25$, $SD = 0.60$; see Figure 1 for distributions by age, race, and family economic disadvantage). An abbreviated version of the SSS scale using five versus ten rungs, and adding the labels "rich" and "poor" was adopted based on pilot data collection with 10-year-old children in Britain who reported that the five-rung scale was simpler to complete and that the anchors "rich" and "poor" most clearly conveyed the "top" and "bottom" of the scale respectively.

Adolescent mental health—Adolescents ($N = 2{,}104$) reported on their levels of psychological distress, conduct problems, and substance use in the Adolescent Survey.

Psychological distress was assessed with six items from the Kessler (K6) Psychological Distress scale, a widely accepted scale (Furukawa, Kessler, Slade, & Andrews, 2003), with demonstrated validity for assessing emotional disturbance among adolescents (Green, Gruber, Sampson, Zaslavsky, & Kessler, 2010). Levels of depression ("*During the past 30 days, about how often did you feel hopeless?*") and anxiety ("*About how often during the past 30 days did you feel nervous?*") were scored on a 0 to 4 scale, and summed to create a psychological distress score for each individual ($\alpha = 0.66$). Based on recommended guidelines using a cutoff point of 13 or greater on the scale to classify as at risk for serious emotional disturbance (Kessler et al., 2003), our sample (4.8% at or above the cutoff) was roughly in line with the estimated national prevalence of 5.7% among 13 to 16 year old adolescents (Li, Green, Kessler, & Zaslavsky, 2010).

Conduct problems were assessed using a 25 item Problem Behavior Frequency Scale (Miller-Johnson, Sullivan, & Simon, 2004). For each item, responses capture the frequency of a behavior over the last 30 days, ranging from 0 (*never*) to 5 (*20 or more times*). Six items assessed physical aggression, seven assessed relational aggression, five assessed other aggression, and seven assessed deviant behavior. Adolescents' responses were averaged across items and domains to create a scaled score ($M = 0.14$, $SD = 0.23$).

Early substance use was assessed using four items that captured alcohol, drug, tobacco, and unauthorized prescription drug use (i.e., "*Have you ever had any alcoholic beverage to drink – more than just a few sips?*"), adopted from the Monitoring the Future study (Johnston, Bachman, O'Malley, & Schulenberg, 2010). Adolescents who responded affirmatively to any of the four items assigned were assigned value of 1 (9.7%) on this dichotomous indicator.

A mental health problem index was created with scores ranging from zero to three, with one point each possible for (a) scoring in the top quartile of the sample on the psychological distress scale, (b) scoring in the top quartile of the sample on the conduct problem scale, and (c) reporting any early substance use ($M = 0.38$, $SD = 0.63$). A majority of the sample had a

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

score of zero on the index (*N* = 1,454, 69.2%), while 494 participants (23.5%) had a score of one, 142 (6.8%) had a score of two, and 10 (0.5%) had a score of three.

Daily symptoms—In the EMA, adolescents (*n* = 395) reported each day in the morning, afternoon, and evening on symptoms related to depression, anxiety, inattention/hyperactivity, and conduct problems (afternoon and evening only). Symptoms were summarized across the day to create a daily score and person-means were computed by averaging all daily measures from the EMA.

Depressive symptoms were measured by asking adolescents to use a slider scale to indicate whether they felt "sad", "tired", and "lonely," on a scale ranging from *not at all* (1) to *very* (100) (person mean: *M* = 21.30, *SD* = 12.39; *iSD* = 9.1; α = 0.50).

Anxiety used the same slider scale (*not at all* (1) to *very* (100)), asking adolescents to indicate whether they were "worried about something" (person mean: *M* = 18.36, *SD* = 17.21; *iSD* = 13.3).

Inattention and hyperactivity were assessed with three questions based on EMA-adapted items from studies of attention-deficit hyperactivity in children (Whalen, Odgers, Reed, & Henker, 2011), assessing the presence of attention difficulties ("*Since this morning, I'm having a hard time concentrating or focusing*") or hyperactivity ("*So far today, I've felt restless or like I was always 'on the go'*"), summed in a 3-point scale (person mean: *M* = 0.40, *SD* = 0.52; *iSD* = 0.33; α = 0.49).

Conduct and substance use problems were assessed with seven (yes/no) questions about whether adolescents engaged in aggressive and deviant behavior (i.e., "*I took or stole something that didn't belong to me*"), and in the evening whether they had used alcohol or marijuana that day (i.e., "*At any time today, have you had any alcohol, more than a few sips?*") (person mean: *M* = 0.13, *SD* = 0.36; *iSD* = 0.19).

Socioeconomic status and local area income inequality—*Demographic information,* including age, gender, race, Hispanic ethnicity, and urbanicity, were reported by adolescents in the Adolescent Survey. Race and ethnicity (Hispanic/Latino/Spanish) were assessed in separate questions and combined into categories of non-Hispanic White, non-Hispanic Black, Hispanic, and Other Race for analyses. Descriptive information for all demographic and SES measures are reported in Table 1.

Family economic disadvantage was assessed based on the child's history of eligibility for the receipt of free and/or reduced lunch, using school administrative records beginning in the third grade. Schools use verified household income to determine eligibility; cutoffs vary with household size and are on the order of 175% the federal poverty level. On average, information on participants' family economic disadvantage was available for 91.4% of possible observation years. These longitudinal assessments were used to create a variable with three levels: never eligible, intermittently eligible (>0% and <100%), and always eligible.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Neighborhood income was measured as the estimated median household income within participants' neighborhood, which we defined as the census block-group (block-groups generally range in size from 600 to 3,000 people), mean-centered and standardized across the sample. Data was geocoded from the American Community Survey (ACS) 5-year estimates for 2010–2014.

School-level economic disadvantage was measured as the percentage of children in the school who were eligible for free and/or reduced lunch. These publicly available data were gathered from the National Center for Education Statistics for the 2014–15 school year.

Local area income inequality was measured with the ratio of the 80th percentile to the 20th percentile household income (the "80/20 ratio") in a given census tract, a predefined geographical spaces with populations generally ranging from 1,200 to 8,000, geocoded from the ACS 5-year estimates for 2010–2014. Household income ratios are commonly used measures of inequality (e.g., Kearney & Levine, 2016). In this sample, the 80/20 ratio ranged from 2.13 to 26.10 (M = 4.31, SD = 1.29), and was mean-centered and standardized for analyses. We also measured local area inequality with the tract-level GINI coefficient. The GINI coefficient is a widely used measure that takes on a value of 0 in a situation of perfect equality (i.e., all households with equal incomes) and a value of 1 in a situation of maximal inequality (i.e., all wealth concentrated in a single household). In this sample, the GINI coefficient ranged from 0.25 to 0.73 (M = 0.42, SD = 0.06), and was mean-centered and standardized for analyses. In any analyses that included local area inequality as a covariate, only the 80/20 ratio was included to avoid multicollinearity.

Analyses

Analyses proceeded in three steps, mapping onto the aforementioned research questions. First, means and bivariate correlations were computed to describe adolescents' SSS and associations with economic indicators. Regression models were used to test for differences in mean levels of SSS across age, sex and ethnicity, and interaction terms were added to the models to test whether the associations between SSS and economic indicators became stronger at older ages or among subgroups.

Second, multiple regression models were used to test whether SSS was associated with adolescents' reports of mental health and if these associations were stronger among older versus younger participants.

Third, in the full sample, multiple regression models were used to test whether local area economic inequality measures were associated with adolescents' SSS and mental health, above and beyond economic and demographic factors. In the EMA subsample, we tested if adolescents' SSS was associated with local area economic inequality, and whether that relationship varied over race, age, gender, and SES groups.

Analyses were conducted with version 14 of StataSE. Robust standard errors were used in all regression analyses.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Results

(1) How closely does adolescents' SSS track with family, school and neighborhood economic indicators? Does SSS become more accurately calibrated with age and/or vary across racial or gender subgroups?

First, as shown in Table 2 (Model A), adolescents from the most economically disadvantaged families (r =−0.26, p <0.001), higher poverty schools (r = −0.12, p = 0.028), and lower income neighborhoods (r = 0.29, p < 0.001) reported lower subjective social status (SSS). The majority of adolescents placed themselves on the middle rung of the ladder (66.7%; M = 3.25, SD = 0.60), with adolescents from persistently disadvantaged families, on average, placing themselves significantly lower (M = 3.03, SD = 0.49) than their peers from families who were never disadvantaged (M = 3.44, SD = 0.61). In multiple regression models (see Table 2, Model B)**,** persistent family disadvantage (b = −0.28, β =−0.21, p < 0.001) and neighborhood SES (b = 0.0039, β = 0.22, p < 0.001) were independently associated with adolescents' SSS. However, no differences in levels of SSS were observed across age, sex, or race.

Second, we tested whether adolescents' subjective social status became more 'accurately calibrated' with objective measures of family disadvantage, school poverty levels, or neighborhood income with age. We found no evidence of a stronger correlation between SSS and socioeconomic status measures with increasing age (see Supplemental Table 2 for comparisons between youth under 14 years of age versus those 14 years of age or older); interaction terms testing for age by family, school, and neighborhood economic indicators were all non-significant (see Supplemental Table 3).

(2) Is adolescents' subjective social status uniquely associated with mental health outcomes, both globally and in daily life? When do these associations first emerge?

We tested the association between SSS and mental health in three ways. First, adolescents self-reported their mental health symptoms over the last 30 days (or lifetime, for substance use) during the Adolescent Survey. Adolescents' SSS was negatively associated with psychological distress (β = −0.14, p = 0.006), conduct problems (β = −0.11, p = 0.025), and early substance use (OR = 0.41, p <0.001), as well as overall mental health problems measured with a combined mental health index (IRR = 0.63, p <0.001). The association between SSS and the mental health problem index remained statistically significant (IRR = 0.65, p = 0.001) after controlling for economic and demographic characteristics (Table 3). Further, the association between adolescents' SSS and mental health was stronger among older versus younger participants (SSS by age 14+ interaction term: IRR = 0.63, p = 0.037). This strengthening relation across age is illustrated in Figure 2, which also shows that the association between SSS and mental health was robust to controls for family and neighborhood SES, although only among older adolescents (age 14 and above).

Second, adolescents reported their mental health symptoms and perceptions of social standing each day via mobile devices during the EMA. Adolescents' subjective social status was significantly associated with daily reports of conduct problems (b = −0.05, B= −0.08, p = 0.030), but not internalizing or attentional symptoms across the EMA period (Table 4).

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

(3) Are levels of local area income inequality uniquely associated with adolescents' mentalhealth and subjective social status?

Consistent with prior research, adolescents in economically disadvantaged families were more likely to report mental health problems. Analyses among the full cohort of adolescents (N =2,104, n=1,927 with complete data for analyses), showed that those from the most persistently economically disadvantaged families scored, on average, 1.33 points higher on psychological distress (0.36 *SD*), 0.06 points higher on conduct problems (.24 *SD*), and had a 1.57 times higher prevalence of early substance use compared to their peers who were never observed as economically disadvantaged, based on models controlling for other economic and demographic characteristics. As shown in Figure 3(A & B), as family or neighborhood economic disadvantage increases, so too do average scores on a mental health problem index. This trend was consistent across age, sex, and racial groups.

Adolescents' mental health outcomes were also regressed on local inequality as well as a range of sociodemographic and economic covariates. Results illustrate two main findings (Table 5). First, in bivariate models, the local 80/20 ratio was significantly associated with psychological distress, but not with conduct problems or early substance use. A one-*SD* increase in the 80/20 ratio was associated with a score 0.15 points higher on the K6 scale (B= 0.04, p =0.036). This association was not moderated by age, gender, race, or family SES. Second, the relationship between inequality and psychological distress did not remain statistically significant when covariates for family, neighborhood, and school economic status and individual demographic characteristics were added. No interactions between family poverty and local area inequality were observed. Measures of local area inequality and poverty were not associated with daily reports of mental health within the EMA.

Adolescents' subjective social status was significantly associated with local area inequality, as captured by the 80/20 ratio ($r = -0.07$, $p = 0.034$), but not the GINI index ($r = -0.06$, $p = 0.254$). As illustrated in Supplemental Figure 2, the association between local area inequality, as measured by the 80/20 ratio, and SSS was statistically significant among older ($\beta = -0.17$, $p = 0.036$) but not among younger ($\beta = -0.06$, $p = 0.226$) participants, although the interaction term was not significant at the $p < .05$ level ($p = 0.093$). There was no evidence that income inequality and status-related perceptions were more strongly associated among males versus females, or among white versus ethnic minority adolescents. However, the association between local area inequality and SSS varied by economic disadvantage (80/20 ratio X Always ED interaction term: $b = 0.08$, $p = 0.017$), such that for persistently disadvantage youth, there was no significant association between local area inequality and SSS ($\beta = 0.07$, $p = 0.227$), while for the "never disadvantaged" group, there was a negative association between inequality and SSS ($\beta = -0.09$, $p = 0.011$).

Discussion

This study examined how young adolescents perceive their social status by asking them to rank their families on a ladder representing American society, with those at the top of the ladder having the most money and best living conditions and those at the bottom not having enough money and living in worse conditions. Adolescents' views of their subjective social status (SSS) were modestly ($|r|$ ranging from 0.12 to 0.30), but not perfectly, correlated with

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

levels of family disadvantage, school poverty levels, and neighborhood income. There was no evidence to suggest that the association between SSS and objective economic measures was stronger among older versus younger participants – that is, we found no "calibration" effect with age, suggesting that either SSS has already been calibrated among young adolescents, as the strength of the association is similar to those documented in studies with older adolescents and even adults (Goodman et al., 2001; Shaked, Williams, Evans, & Zonderman, 2016) or that the association between SSS and economic indicators will increase as the sample ages.

Adolescents' views of their SSS were correlated with their overall mental health symptoms, with robust associations found among older (14 to 16-year-old) participants. Overall, those who placed themselves higher on the ladder reported fewer mental health problems the prior year in the Adolescent Survey. The association between SSS and mental health problems was found across all mental health outcomes (psychological distress, inattention, and conduct problems), became stronger with age, and was robust at older ages to controls for multiple objective measures of SES. Although these findings cannot speak to directionality, they advance prior research by documenting a substantial and robust negative association ($\beta = -0.28$, $p < .001$) between SSS and mental health problems among adolescents age 14 and older only.

Adolescents' SSS ratings were also associated with conduct problems in daily life captured across the EMA period ($\beta = -0.08$, $p = 0.030$), but not with daily internalizing or inattention symptoms, even among the older adolescents in our sample. The lack of an association with daily symptoms of internalizing symptoms and inattention was surprising, given associations between SSS and more traditional measures of mental health detailed above. It is possible that the association between SSS and daily symptoms emerges later in adolescence, or that more comprehensive daily symptom assessments of internalizing problems are required to capture these associations.

Our findings advance understanding of adolescents' social status perceptions and suggests interesting avenues for future research in the following ways. First, with respect to developmental patterns, SSS tracks family, school, and neighborhood level economic indicators, even among very young adolescents (ages 10–13), and that by ages 14 to 16, adolescents' SSS uniquely correlates with a wide range of mental health symptoms, including global measures of psychological distress, inattention, and conduct problems, as well as daily reports of conduct problem symptoms. SSS was associated with multiple types of mental health problems reported over the lifetime or last 30 days, as well as conduct problems in daily life. While directionally cannot be assumed from these observational findings, it is interesting to note the common pattern of stronger associations or coupling among older versus younger adolescents and that these associations held when controlling for key confounders such as socioeconomic status, sex, race, and urbanicity.

Second, SSS was not correlated with local area inequality. Adolescents' SSS was associated with the 80/20 ratio in bivariate models. However, these associations disappeared once family income and other economic indicators were considered. There was also no evidence to suggest that SSS or mental health outcomes of adolescents from low-income or racial/

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

ethnic minority families were more strongly associated with local area inequality. Moreover, the socioeconomic gradient in mental health (illustrated in Figure 3) did not vary as a function of local area inequality or racial/ethnic identity of the adolescent.

The absence of associations between levels of local area inequality and adolescents' outcomes is in contrast with comparisons between countries showing worse health as income inequality rises (Elgar et al., 2015), but align with conclusions from a meta-analysis of 168 associations between income inequality and health, which showed that results and estimated effect sizes are less consistent as the size of the unit of analysis decreases (Wilkinson & Pickett, 2006). Hence, local area inequality measured at the census tract-level may be too small a geographical unit to capture a meaningful index of income inequality for health; instead, explanations for the robust associations between income inequality and child health across larger units of analysis (countries and states) may be driven by associated policies, programs, and/or societal views toward equality and resource allocation, rather than by children's perceptions of their social status and environments. To that point, a recent analysis of data from OECD countries showed that both national measures of the GINI and the percent of GDP spent on education were associated with inequalities in adolescent developmental outcomes (Keating, Siddiqi, & Nguyen, 2013). Future research using alternative measures of perceived status, local area income inequality and public spending are required to fully explore potential linkages between local area inequality and child outcomes.

Finally, while prior research and theory suggest that associations between SSS and mental health may be more pronounced among adolescents occupying disadvantaged status groups, e.g., among children from low-SES families or identifying as a racial/ethnic minority, we did not find evidence to support these patterns. In a related study, we measured perceived daily discrimination among these adolescents each day and found that race, as opposed to economic status, is associated with day-to-day experiences of discrimination, and that perceived daily discrimination is in turn strongly coupled with mental health symptoms in daily life (manuscript in preparation). Perhaps what is needed is higher resolution data that captures how variation in day-to-day experiences across racial and ethnic groups shape adolescents' perceptions, evolving and intersecting identities, and health outcomes (Destin et al., 2017).

This study had a number of limitations. First, adolescents' mental health was assessed via self-report measures only, and independent assessments of mental health should be integrated into future studies. Second, findings reported throughout the paper are correlational, which prevents conclusions regarding directionality and the causal nature of associations between status-related perceptions, mental health, and economic correlates. Third, the EMA assessment covered only a two-week period, which may have limited the ability to capture incidents of mental health problems which are typically captured in adolescents' retrospective reports. Fourth, while measures of children's family, school and contexts were integrated into this study, future research is required to better understand how perceptions of status may be shaped by the rapidly changing landscapes of adolescents' digital lives, whereby exposure to inequality and wealth is transmitted through experiences in both offline and online contexts (Odgers, 2018). Finally, our sample was representative of

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

the population of public school students in NC, the ninth most populous state, with a demographically diverse population, substantial numbers of people living in urban and rural areas, and a sociodemographic profile that closely mirrors that of the US in terms of age, education, marital status, and employment. However, the sample was also limited to one state and generalizability of the findings to other contexts should be tested and not assumed.

With these limitations in mind, the implications of this study for advancing science and practice related to adolescents' perceptions of their social standing can be considered. First, consistent with theories about the "developmental evolution" of subjective social status (Goodman et al., 2001), we find that SSS is increasingly related to adolescents' mental health as they age. Stronger and robust associations between SSS and mental health were observed beginning at age 14, suggesting a time when parents, educators, and clinicians may want to focus more closely on the interplay between status-related perceptions and mental health. In addition, SSS was consistently associated with objective measures of SES, even among the youngest adolescents in our sample, suggesting that the calibration of adolescents' perceptions and their economic reality have already begun to converge. Future research with younger children is required to better understand when children first begin to make sense of, and "feel", socioeconomic hierarchies. Finally, it is time for the measurement of social status to expand beyond a static ladder to more dynamic and multi-dimensional measures of children's social status. Such measures should capture not only how a child ranks themselves, but also who their reference group is and, where possible, how their perceptions evolve over time. Mobile devices were used here as a tool to capture mental health symptoms, but it is also possible to record daily exposure to wealth, inequality and poverty as children move through their offline and online lives. Increasing segregation of children by race and socioeconomic status, rapidly growing income inequality, and new exposures to wealth and inequality in the online word, require that we adapt our theories, models and measures of subjective social status to better reflect contemporary adolescents, growing up in an increasingly unequal and digital age.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This study was supported with funding from the National Institute on Drug Abuse Center for the Study on Adolescent Risk and Resilience (C-StARR) (P30DA023026). We thank the C-StARR study team, study participants and their families. JGR received funding from T32 GM007171 as part of the Medical Scientist Training Program. CLO is a Jacobs Foundation Advanced Fellow and a Fellow of the Canadian Institute of Advanced Research.

References

Belfer ML. 2008; Child and adolescent mental disorders: The magnitude of the problem across the globe. Journal of Child Psychology and Psychiatry and Allied Disciplines. 49(3):226–236. DOI: 10.1111/j.1469-7610.2007.01855.x

Bradley RH, Corwyn RF. 2002; Socioeconomic status and child development. Annual Review of Psychology. 53(1):371–399. DOI: 10.1146/annurev.psych.53.100901.135233

Buttrick NR, Oishi S. 2017; The psychological consequences of income inequality. Social and Personality Psychology Compass. 11(3):e12304.doi: 10.1111/spc3.12304

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Chen E, Paterson LQ. 2006; Neighborhood, family, and subjective socioeconomic status: How do they relate to adolescent health? Health Psychology. 25(6):704–714. DOI: 10.1037/0278-6133.25.6.704 [PubMed: 17100499]

Chetty, R; Hendren, N; Jones, MR; Porter, SR. [Accessed online March 18, 2018] Race and economic opportunity in the United States: An intergenerational perspective. 2018. http://www.equality-of-opportunity.org/assets/documents/race_paper.pdf

Destin M, Rheinschmidt-Same M, Richeson JA. 2017; Status-based identity: A conceptual approach integrating the social psychological study of socioeconomic status and identity. Perspectives on Psychological Science. 12(2):270–289. DOI: 10.1177/1745691616664424 [PubMed: 28346114]

Destin M, Richman S, Varner F, Mandara J. 2012; "Feeling" hierarchy: The pathway from subjective social status to achievement. Journal of Adolescence. 35(6):1571–1579. DOI: 10.1016/j.adolescence.2012.06.006 [PubMed: 22796063]

Duncan GJ, Murnane RT. 2014; Growing income inequality threatens American education. The Phi Delta Kappan. 95(6):8–14. DOI: 10.1177/003172171409500603

Elgar FJ, Pförtner TK, Moor I, De Clercq B, Stevens GWJM, Currie C. 2015; Socioeconomic inequalities in adolescent health 2002–2010: A time-series analysis of 34 countries participating in the Health Behaviour in School-aged Children study. The Lancet. 385(9982):2088–2095. DOI: 10.1016/S0140-6736(14)61460-4

Furukawa TA, Kessler RC, Slade T, Andrews G. 2003; The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. Psychological Medicine. 33(2):357–362. DOI: 10.1017/S0033291702006700 [PubMed: 12622315]

Ghaed SG, Gallo LC. 2007; Subjective social status, objective socioeconomic status, and cardiovascular risk in women. Health Psychology. 26(6):668–674. DOI: 10.1037/0278-6133.26.6.668 [PubMed: 18020837]

Goodman E, Adler NE, Kawachi I, Frazier AL, Huang B, Colditz GA. 2001; Adolescents' perceptions of social status: Development and evaluation of a new indicator. Pediatrics. 108(2):1–8. DOI: 10.1542/peds.108.2.e31 [PubMed: 11433046]

Goodman E, Huang B, Schafer-Kalkhoff T, Adler NE. 2007; Perceived socioeconomic status: A new type of identity that influences adolescents' self-rated health. Journal of Adolescent Health. 41(5): 479–487. DOI: 10.1016/j.jadohealth.2007.05.020 [PubMed: 17950168]

Goodman E, Maxwell S, Malspeis S, Adler N. 2015; Developmental trajectories of subjective social status. Pediatrics. 136(3):e633–e640. DOI: 10.1542/peds.2015-1300 [PubMed: 26324868]

Green JG, Gruber MJ, Sampson NA, Zaslavsky AM, Kessler RC. 2010; Improving the K6 short scale to predict serious emotional disturbance in adolescents in the USA. International Journal of Methods in Psychiatric Research. 19(S1):23–35. DOI: 10.1002/mpr.314 [PubMed: 20527003]

Jiang, Y, Granja, MR, Koball, H. Basic facts about low-income children: Children under 18 years, 2015. New York, NY: 2017.

Johnston, LD, Bachman, JG, O'Malley, PM, Schulenberg, JE. Monitoring the future: A continuing study of american youth (8th-and 10th-grade surveys), 2005. Ann Arbor, MI: 2010.

Kearney, MS; Levine, PB. Income inequality, social mobility, and the decision to drop out of high school; Brookings Papers on Economic Activity. 2016. 333–367.

Keating, DP, Siddiqi, A, Nguyen, Q. Social resilience in the Neoliberal Era: National differences in population health and development. In: Hall, PA, Lamont, M, editors. Social Resilience in the Neoliberal Era. New York: Cambridge University Press; 2013. 239–263.

Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, … Zaslavsky AM. 2003; Screening for serious mental illness in the general population. Archives of General Psychiatry. 60(2):184–189. DOI: 10.1001/archpsyc.60.2.184 [PubMed: 12578436]

Li F, Green JG, Kessler RC, Zaslavsky AM. 2010; Estimating prevalence of serious emotional disturbance in schools using a brief screening scale. International Journal of Methods in Psychiatric Research. 19(S1):88–98. DOI: 10.1002/mpr.315

Marmot, M. Status syndrome: How social standing affects our health and longevity. New York, NY: Owl Books; 2004.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

McLaughlin KA, Costello EJ, Leblanc W, Sampson NA, Kessler RC. 2012; Socioeconomic status and adolescent mental disorders. American Journal of Public Health. 102(9):1742–1750. DOI: 10.2105/AJPH.2011.300477 [PubMed: 22873479]

MetricWire Inc. 2016MetricWire.

Miller-Johnson S, Sullivan TN, Simon TR. 2004; Evaluating the impact of interventions in the Multisite Violence Prevention Study: Samples, procedures, and measures. American Journal of Preventive Medicine. 26(1S):48–61. DOI: 10.1016/j.amepre.2003.09.015 [PubMed: 14732187]

Mistry RS, Brown CS, White ES, Chow KA, Gillen-O'Neel C. 2015; Elementary school children's reasoning about social class: A mixed-methods study. Child Development. 86(5):1653–1671. DOI: 10.1111/cdev.12407 [PubMed: 26300338]

Odgers C. 2018; Smartphones are bad for some teens, not all. Nature. 554(7693):432–434. DOI: 10.1038/d41586-018-02109-8 [PubMed: 29469108]

Odgers CL. 2015; Income inequality and the developing child: Is it all relative? American Psychologist. 70(8):722–731. DOI: 10.1037/a0039836 [PubMed: 26618957]

Odgers CL, Adler NE. 2017; Challenges for low-income children in an era of increasing income inequality. Child Development Perspectives. 0(0):1–6. DOI: 10.1111/cdep.12273

Owens A. 2016; Inequality in children's contexts: The economic segregation of households with and without children. American Sociological Review. 81(3):1–26. DOI: 10.1177/0003122416642430

Pickett KE, Wilkinson RG. 2007; Child wellbeing and income inequality in rich countries: Ecological cross sectional study. BMJ. 335(7629):1080.doi: 10.1136/bmj.39377.580162.55 [PubMed: 18024483]

Quon EC, McGrath JJ. 2014; Subjective socioeconomic status and adolescent health: A meta-analysis. Health Psychology. 33(5):433–447. DOI: 10.1037/a0033716 [PubMed: 24245837]

Reardon SF, Bischoff K. 2011; Income inequality and income segregation. American Journal of Sociology. 116(4):1092–1153. DOI: 10.1086/657114

Schwarz SW. 2009Adolescent mental health in the United States: Facts for policymakers.

Shaked D, Williams M, Evans MK, Zonderman AB. 2016; Indicators of subjective social status: Differential associations across race and sex. SSM - Population Health. 2:700–707. DOI: 10.1016/j.ssmph.2016.09.009 [PubMed: 29349181]

Shiffman S, Stone AA, Hufford MR. 2008; Ecological Momentary Assessment. Annual Review of Clinical Psychology. 4(1):1–32. DOI: 10.1146/annurev.clinpsy.3.022806.091415

Singh-Manoux A, Adler NE, Marmot MG. 2003; Subjective social status: Its determinants and its association with measures of ill-health in the Whitehall II study. Social Science and Medicine. 56(6):1321–1333. DOI: 10.1016/S0277-9536(02)00131-4 [PubMed: 12600368]

Spencer B, Castano E. 2007; Social class is dead. Long live social class! Stereotype threat among low socioeconomic status individuals. Social Justice Research. 20(4):418–432. DOI: 10.1007/s11211-007-0047-7

Steinberg L, Morris AS. 2001; Adolescent development. Annual Review of Psychology. 52(1):83–110. DOI: 10.1146/annurev.psych.52.1.83

Whalen CK, Odgers CL, Reed PL, Henker B. 2011; Dissecting daily distress in mothers of children with ADHD: An electronic diary study. Journal of Family Psychology. 25(3):402–411. DOI: 10.1037/a0023473 [PubMed: 21517172]

Wilkinson RG, Pickett KE. 2006; Income inequality and population health: A review and explanation of the evidence. Social Science and Medicine. 62(7):1768–1784. DOI: 10.1016/j.socscimed.2005.08.036 [PubMed: 16226363]

Wolff LS, Acevedo-Garcia D, Subramanian SV, Weber D, Kawachi I. 2010; Subjective Social Status, a New Measure in Health Disparities Research: Do Race/Ethnicity and Choice of Referent Group Matter? Journal of Health Psychology. 15(4):560–574. DOI: 10.1177/1359105309354345 [PubMed: 20460413]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

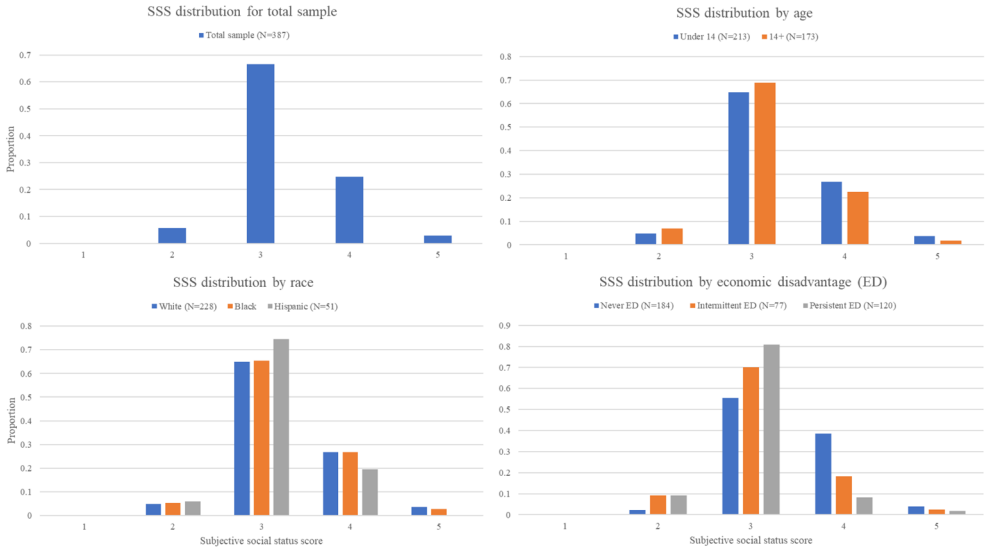

Figure 1.

Distribution of subjective social status rankings in the total EMA sample, and split by age, race/ethnicity, and economic disadvantage.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

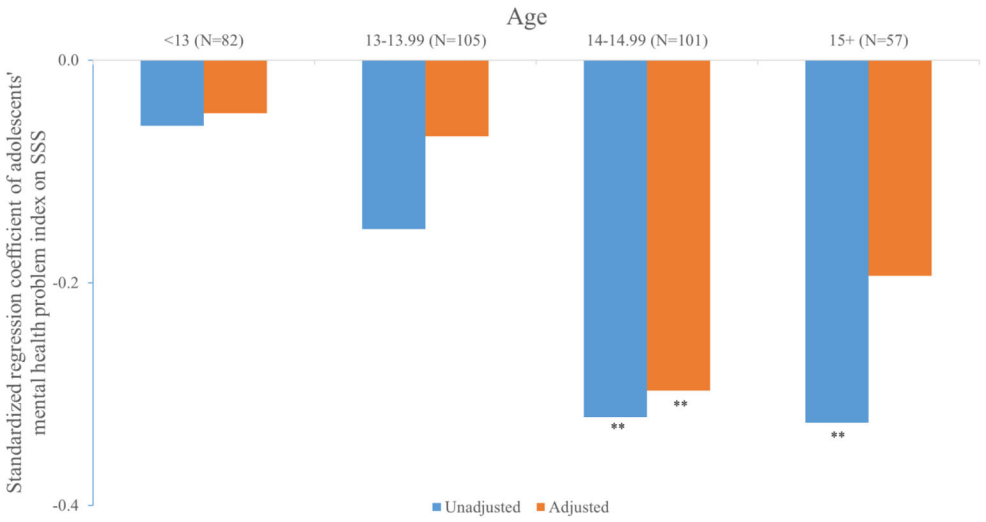

Figure 2.

Association between adolescents' subjective social status (SSS) and mental health problems, by age. Age is calculated at the time of the Home Visit. Standardized coefficients are estimated with OLS models. Unadjusted model is a bivariate regression of mental health problem index on SSS; adjusted model includes family, neighborhood, and school economic measures, as well as demographic characteristics, as covariates. Significance levels: *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

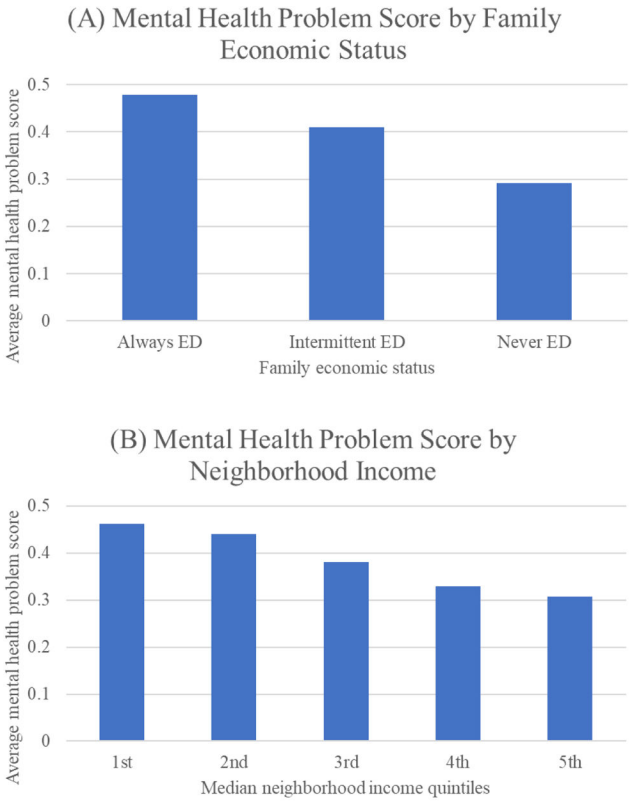

Figure 3.

Adolescents' average mental health problem index score by (A) family economic status, (N=2,042) and (B) neighborhood median income (N=2,099).

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 1

Demographic and economic characteristics of study sample, by race/ethnicity

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Other	Total
N[1]	1,011	442	280	194	1,927
Female	51.0%	55.2%	51.1%	54.1%	52.3%
Age[2]					
<11	2.8%	2.5%	1.4%	3.1%	2.6%
11	23.3%	22.2%	23.6%	22.2%	23.0%
12	29.2%	26.0%	29.6%	33.5%	29.0%
13	28.1%	31.2%	28.2%	29.4%	29.0%
14	14.7%	14.7%	16.4%	11.3%	14.6%
15	1.9%	3.4%	0.7%	0.5%	1.9%
Family economic disadvantage (ED)					
Never ED	61.1%	15.2%	15.0%	40.2%	41.8%
Intermittent ED	18.5%	26.9%	25.7%	26.3%	22.3%
Persistent ED	20.4%	57.9%	59.3%	33.5%	36.0%
Median neighborhood HH income[3]					
Quartile 1 (<34.4)	15.7%	43.2%	31.4%	22.7%	25.0%
Quartile 2 (34.6 – 46.8)	25.7%	20.6%	28.6%	25.8%	25.0%
Quartile 3 (46.8 – 65.0)	27.8%	24.4%	21.4%	20.1%	25.3%
Quartile 4 (>65.0)	30.8%	11.8%	18.6%	31.4%	24.7%
Local area inequality (80/20 ratio)[3]					
Quartile 1 (<3.5)	26.8%	22.6%	26.1%	22.7%	25.3%
Quartile 2 (3.5 – 4.1)	23.9%	23.3%	26.4%	31.4%	24.9%
Quartile 3 (4.1 – 4.8)	27.3%	24.7%	22.1%	18.6%	25.1%
Quartile 4 (>4.8)	22.0%	29.4%	25.4%	27.3%	24.7%
School % ED[3]					
Quartile 1 (<0.36)	26.1%	25.8%	23.2%	21.7%	25.2%
Quartile 2 (0.36 – 0.56)	24.8%	22.9%	26.8%	27.8%	25.0%
Quartile 3 (0.56 – 0.72)	24.1%	23.8%	27.1%	25.8%	24.7%

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Other	Total
Quartile 4 (>0.72)	24.9%	27.6%	22.9%	24.7%	25.2%

Descriptive statistics for adolescents in the study sample.

[1] Sample size in this table includes all observations for which the tabulated measures were available (92% of total $N = 2,104$).

[2] Age at the time of the Adolescent Survey.

[3] Quartiles are calculated in order to best fit the full sample.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 2

Correlates of adolescents' subjective social status (SSS)

	SSS	
	(A) Bivariate Correlation	**(B) Multiple Regression**
Variable	***r***	***b (SE)***
Never ED	0.30***	-
		-
Intermittent ED	−0.09	−0.163
		(0.0884)
Always ED	−0.26***	−0.277***
		(0.0754)
Neighborhood income	0.29***	0.00389***
		(0.000919)
School % ED	−0.12*	−0.185
		(0.138)
80/20 ratio	−0.07*	−0.0179
		(0.0307)
Age 14+	−0.09	−0.0539
		(0.0609)
Female	−0.01	−0.0174
		(0.0620)
White	0.08	-
		-
Black	0.02	0.148
		(0.0870)
Hispanic	−0.08	0.00369
		(0.0873)
Urban	0.10	−0.00671
		(0.0728)

Bivariate associations (A) and multiple regression (B) of pre- and early adolescents' subjective social status (SSS) with family, neighborhood, and school economic measures, and demographic characteristics. Coefficients are correlations in (A) and regression coefficients in (B); "Never ED" and "White" were reference variables in (B). Standard errors are robust. Significance levels:

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3

Association between pre- and early adolescents' mental health problems and subjective social status (SSS)

	Mental Health Problem Index	
	(1) ***IRR [CI]***	***(2)*** ***IRR [CI]***
SSS	0.650***	0.804
	[0.507, 0.835]	[0.594, 1.090]
Age 14+	1.186	4.842*
	[0.876, 1.606]	[1.228, 19.10]
Age 14+ X SSS		0.633*
		[0.413, 0.973]
N	345	345
Pseudo R^2	.038	.042

Regression analyses of pre- and early adolescents' mental health problems and subjective social status (SSS), with tests of SSS X age interactions. Model (1) estimates the association between SSS and mental health outcomes while controlling for family economic disadvantage, neighborhood income, school economic disadvantage, local inequality, age, gender, race, and urbanicity (covariates not tabulated here). Model (2) adds an interaction term between age and SSS. Poisson regressions were used to account for the count distribution of mental health problems. Coefficients are exponentiated to create incident rate ratios (IRR); all models estimated with robust standard errors. Significance levels:

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 4

Associations between adolescents' daily mental health symptoms and subjective social status

		Daily reports of mental health problems			
		Depression	Anxiety	Inattention/hyperactivity	Conduct/substance
Independent variables	***N***	***b (se)***	***b (se)***	***b (se)***	***b (se)***
Subjective social status	336	1.307	0.619	−0.0284	−0.0490 *
		(1.371)	(1.582)	(0.0477)	(0.0225)

Adolescent's average daily mental health problems regressed on subjective social status. All regression models are adjusted and include covariates for family economic disadvantage, neighborhood income, school economic disadvantage, local inequality, age, gender, race, and urbanicity. All models were estimated with robust standard errors. Significance levels:

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 5

Associations between adolescents' mental health and economic and demographic characteristics

	Psychological Distress		Conduct Problems		Substance Use	
	(1) b (se)	*(2) b (se)*	*(1) b (se)*	*(2) b (se)*	*(1) OR (CI)*	*(2) OR (CI)*
80/20 ratio	0.154*	0.0689	0.0120	0.00772	0.943	0.842
	(0.0735)	(0.0764)	(0.00690)	(0.00633)	(0.813,1.094)	(0.691,1.026)
No ED (ref)		−0.0473		0.0113		1.178
		(0.189)		(0.0122)		(0.831,1.668)
Some ED		-		-		-
		-		-		-
Always ED		1.326***		0.0555***		1.639*
		(0.236)		(0.0159)		(1.046,2.569)
Neighborhood income		−0.00222		−0.0000413		0.991*
		(0.00323)		(0.000192)		(0.982,0.999)
School % ED		0.399		−0.00890		0.896
		(0.348)		(0.0226)		(0.496,1.620)
Female		0.541**		−0.0384***		0.972
		(0.166)		(0.0110)		(0.716,1.321)
Age		0.0871		0.0209***		1.450***
		(0.0757)		(0.00550)		(1.265,1.661)
White (ref)		-		-		-
		-		-		-
Black		0.0315		0.0437*		0.631*
		(0.239)		(0.0173)		(0.399,0.998)
Hispanic		−0.0330		−0.0302		0.888
		(0.272)		(0.0165)		(0.542,1.456)
Urban		0.350		0.0116		1.497
		(0.291)		(0.0179)		0.925, 2.424)
N	1877	1877	1878	1878	1878	1878

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

	Psychological Distress		Conduct Problems		Substance Use	
	(1) *b (se)*	*(2)* *b (se)*	*(1)* *b (se)*	*(2)* *b (se)*	*(1)* *OR (CI)*	*(2)* *OR (CI)*
R^2/*pseudo-*R^2	.002	.042	.003	.042	<.001	.028

Regression analyses of adolescents' health measures on economic and demographic characteristics in the full sample. Model (1) is the bivariate association between a given health outcome and the 80/20 ratio, and Model (2) controls for family economic disadvantage, neighborhood income, school economic disadvantage, local inequality, age, gender, race, and urbanicity. Coefficients are not standardized; standard errors are robust. Significance levels:

* $p < .05$;

** $p < .01$;

*** $p < .001$.