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**Perceived Social Status and
Adolescent Health and Risk Behaviors:
A Systematic Review**

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Although the inverse graded relationship between social class and infant, child, and adult health is well established, this gradient is inconsistent and understudied among adolescents. The empirical inquiry into health inequalities among adolescents is of particular significance because health in adulthood is strongly influenced by early life circumstances. Current research suggests that social stratification as reflected by subjective social status may be an important determinant of adolescents' health independent of traditional objective social class indicators. The following article is a systematic review of the subjective social class-adolescent behavior and health relationship. It highlights the known dimensions of subjective social position and health, and the large gaps in the scientific understanding of the determinants of adolescent health. Suggested future research directions are discussed.

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Introduction

Social environments are important determinants of ill health. Differential exposure to known risk factors in social environments results in an unequal distribution of health outcomes. All major known risk factors—including malnutrition, poor water supply, air pollution, tobacco, alcohol, hypertension, physical inactivity, illicit drugs, unsafe sex, and occupation—account for only 40 percent of the global burden of disease (Marmot and Wilkinson 1999). There is an emerging body of research that relates disease patterns to the organization of society and the way society distributes power among its members (Wilkinson 2005). Researchers are beginning to find that these social determinants of health represent the other 60 percent of the global disease burden and are determinants of some of the known risk factors as well (Marmot and Wilkinson 1999). Social determinants of health have had their greatest burden in the developed world; however, these social risk factors are becoming increasingly problematic in the developing world as these countries go through the demographic transition.

The role of the social environment in producing health disparities merits renewed attention in the context of the current concerns addressed by social epidemiology. Social epidemiology is the branch of epidemiology that studies the social distribution and social determinants of states of health (Berkman and Kawachi 2000). The second overarching goal of Healthy People 2010 is to eliminate health disparities among different population segments, including differences related to socioeconomic status (SES). Similarly, the American Academy of Pediatrics has pointed out the need for additional research on the impact of social class across the life course (2000). Social status is a key factor underlying health disparities. Investigating

social class—defined as an individual’s composition and accumulation of social exposures—from a life course perspective provides a lens with which to view the effects of the accumulation of differential exposures to risk factors in our various social environments and provides a framework for understanding how societal structure produces social inequalities in health.

Rationale and Structure of Paper

This systematic review summarizes what is known about the subjective social status (SSS)-adolescent health and risk behavior relationship. First, an introduction to the concept of social class in the field of epidemiology will be presented. This section focuses on the various ways of measuring social class, the association between social class and health, particularly adolescent health, and the strengths and limitations of social class measures. Second, the research objectives and methods are explained. The third section of the paper provides a comprehensive summary of the articles that met the inclusion criteria for review. A discussion of the following topics is included: 1) What is known and not known about the SSS-adolescent health and behavior relationship? Are the relationships between SSS and the targeted health outcomes and risk behaviors significant? Are they inversely associated? 2) What targeted health outcomes and risk behaviors have been studied in association with SSS and which have not? 3) Which adolescent population segments have been studied in the context of SSS research and which have not? 4) Which study designs have been employed to understand the SSS-health/behavior relationship among adolescents? Is there any evidence of causality or are all of the studies cross-sectional? 5) What are the known mediators and effect modifiers of the SSS-health/behavior relationship? The final two sections discuss gaps in the empirical literature and future research directions.

Background

Measuring Social Class: Domains and Indicators

Measurements of social class standing attempt to locate individuals within social hierarchies based on their compilation of social exposures. Social exposures can be broken down into various distinct domains. These domains include, but are not limited to: a) economic and social policies, b) institutions, c) neighborhoods, communities, and living conditions, and d) social relationships (Smedley, Syme et al. 2000) (See Table One). The measurement of all of these domains is not feasible; therefore indicators of social class are used to capture these social exposures.

Table One: Social Exposure Domains*

Social Exposure Domain	Description of Domain
Economic and social policies	Policies that influence the social class-health relationship include governmental policies related to taxation, cash and non-cash transfers, and employment, as well as social policies related to access of health insurance and medical care, and the nature of transportation, housing, schools, and neighborhood structures.
Institutions	Institutions such as those related to education, work, medical care, housing, and the criminal justice system impact the health of individuals who operate within these institutions. In the case of adolescents, school environments are known to contribute to patterns of diet, physical activity, reproductive behavior, drug, alcohol and tobacco use, gang formation, bullying, and violence.
Neighborhoods, communities, and living conditions	Indicators of exposure to area difference include measurements of ambient air quality, types of local advertising, availability of affordable and nutritious food, access to preventive and curative services, access to parks and safe recreational areas, and resident social cohesion and trust.
Social relationships	Social relationship exposures are determined by the quantity, quality, and scope of social support and social network participation

*Table organizes findings from Cohen and Syme (1985).

There are two main ways to conceptualize and assess social status at an individual level. Social class can be measured objectively or subjectively. Social status is usually assessed by objective social class indicators, also known as socioeconomic status (SES) indicators, which are used in most research studies to capture the individual's accumulation of social exposures. The

most commonly used objective social class indicators for adults are educational attainment level, income and occupational grade. Parental education, income and occupation are most commonly used as proxies for the social class of infants, children and adolescents. These indicators have been used for many decades and there are a range of methods for measuring them. As will be discussed in detail in this review, an alternative approach is to assess subjective social status. Indicators of subjective social class are less clear. The most commonly used scale, the MacArthur Scale of Subjective Social Status, asks the individual to locate him/herself within a social hierarchy. The MacArthur Scale consists of two separate 10-point anchoring scales: 1) the society scale and 2) the community scale (Adler 2007). The Society-SSS ladder captures the intersection of the three objective SES indicators mentioned above: education, income and occupation. Additionally, the Community-SSS ladder captures other indicators of social standing, such as social group membership. A modified version of the MacArthur Scale exists for adolescents and will be discussed later in this review.

Before turning to this emerging approach, a brief review of key findings regarding objective social status is discussed.

Objective Social Class and Health: Findings and Limitations

There is a vast literature on the effect of objective individual social class indicators (income, education, occupation) on health. The literature consistently shows that educational attainment level, income and occupational grade all predict a similar inverse graded relationship for a variety of disease states and risk factors among infants, children, and adults. The greater the objective social status, the lower the risk of all-cause mortality and of cardiovascular, respiratory, rheumatoid and psychiatric diseases among adults and infants (Sapolsky 2005). The literature on the social class-adolescent health relationship is sparse (Goodman, Slap et al. 2003)

and inconsistent. West and colleagues found little evidence of an SES-health gradient among adolescents. They found that the social gradient persisted only for height and severe chronic conditions (West 1997). Starfield and colleagues conducted a systematic review of the literature on the SES-health relationship among adolescents and found an adolescent social gradient for injury, fighting, smoking, drunkenness, unhealthy diet, psychosocial difficulties, depression, obesity, suicide attempts, and self-reported health. There was no gradient for asthma or sexually transmitted infections (Starfield, Riley et al. 2002). The inconsistencies in findings and the absence of social class gradients in some areas of health and strong presence in others may be explained by methodological problems. Methodological problems may include: 1) Health effects during adolescence (e.g. from smoking and drinking) take a long time to manifest into chronic illness and mortality. Therefore, there may be an inverse graded relationship that is undetected at a clinical level and that would be captured by studies that measure subclinical states of disease. 2) Adolescents are often grouped into samples of “adults” or “children.” It is therefore difficult to make claims about the association between social class and disease distribution among adolescents. 3) Few social status indicators are youth-specific. Therefore the social status of youth is mainly characterized by the social class of the parent. Objective parental social class may not be an appropriate proxy for adolescent social class. 4) Social class indicators and health outcomes may be measured differently in different studies, and therefore may be measuring different aspects of the social class-health relationship.

While useful, objective social class indicators are limited among adults. First, objective social class indicators do not capture social exposures across all domains (Singh-Manoux, Adler et al. 2003; Singh-Manoux, Marmot et al. 2005). Second, objective social status indicators do not capture social meaning across diverse cultural, racial, ethnic, religious and community

contexts (Krieger, Rowley et al. 1993; Kaufman, Cooper et al. 1997). A college education, an annual income of \$50,000, or a managerial job position may have very different social meaning or economic value depending on one's race/ethnic group, gender, locale or other factors. For example, compared with whites at equivalent levels of income, blacks and Latinos have substantially less economic security and are therefore less likely to have the financial assets or reserves needed to cushion a shortfall of income (Williams 1996). Objective indicators of SES do not have the precision to detect these subtle, yet critically important social class distinctions. Third, parental SES indicators may not be an accurate assessment of adolescent social and economic resources. Most research on social class and adolescent health has used parental social standing and economic resources to measure adolescent social class. Adolescence is a time of transition into a state of greater social and economic independence. The appropriateness of using objective parental social class to measure adolescent social class has not been adequately investigated. Fourth, objective social class indicators do not predict divergent outcomes among individuals of similar social class status. These objective indicators over-determine our targeted outcomes; they do not have the sensitivity to predict a given behavior or health outcome among individuals living in the same social class. Objective social status does not explain why some people join gangs while others do not; why some people become perpetrators of violence while others do not. A social class indicator is needed that can both predict health outcomes and risk behaviors and transcend the barriers of objective social status indicators. Subjective social status may fill this need.

Subjective Social Status and Health

There is a small but growing body of literature about people's perceptions of their placement in the social hierarchy, SSS, and how these perceptions relate to health and behaviors.

People become prone to depression, drug use, anxiety, hostility, and other physical health outcomes due to being poor, unemployed, socially excluded; feeling undervalued, unappreciated, and not useful; and having a low degree of control over meaningful life processes. SSS provides a framework for understanding the association between material and physical disadvantage and its social meanings.

There is evidence that the SSS-adult health relationship follows the same inverse gradient found using the objective social status indicators. Among a cohort of 10,000 male and female British civil servants, ages 35-55, followed prospectively, SSS predicted decline in physical, psychological and social functioning after controlling for occupational grade, an objective indicator of SES (Singh-Manoux, Marmot et al. 2005). In another longitudinal study among British civil servants, SSS predicted age-adjusted angina, diabetes, perceived general health and depression for men and women; and respiratory illness for men, after controlling for SES (Singh-Manoux, Adler et al. 2003). In both longitudinal studies, these associations persist after controlling for objective social class indicators. This suggests that SSS may capture unique aspects of social class standing and may be a more powerful determinant of certain health outcomes than traditional measures of social class among adults. The three predominant hypotheses regarding why SSS may be a better predictor of certain health outcomes are: 1) SSS is better equipped to capture hierarchical rank and relative standing compared to objective SES indicators, which best capture absolute social position. 2) SSS reflects individual sociocultural circumstances more fully than any of the other objective measures of social class. 3) SSS is a more precise measure of the combined past and current social standing and future prospects of an individual (Singh-Manoux, Marmot et al. 2005).

The MacArthur Scale of SSS is the only validated instrument used to measure perceived social status among adults and adolescents. Both the adult and youth versions consist of two 10-point anchoring ladder scales: a community and a society ladder. In the adult version, they are asked to locate themselves in both the context of their community (which is left ambiguous so that they may define community for themselves) and the society (e.g. US society). Participants are given a drawing of the ladder with the following description: “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, least education, and the worst jobs or no job” (Singh-Manoux, Adler et al. 2003, p.1323). The MacArthur Scale of SSS-Youth Version is modified from the original adult version. It is one of the only youth indicators for social status and was designed to capture the unique social exposures of adolescence—including adolescent transition into adulthood, a state of greater social and economic independence—that parental objective social status indicators may not measure. Adolescents are asked to locate themselves in the context of their school community. “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” (Goodman, Adler et al. 2001, p.3). There is evidence suggesting that status among peer groups may be just as important if not more important to the social class-adolescent health relationship as parental social status (Goodman, Adler et al. 2001). The second ladder is similar to the adult version. The only modification is that adolescents are asked to locate their families rather than themselves on the ladder.

There are benefits to using the MacArthur Scale of SSS in conjunction with objective social class indicators. First, SSS attempts to capture the compilation of socioeconomic

exposures across economic, geographic, institutional, and social environments. Second, the MacArthur Scale is the only social class measure for adolescents that does not divide social class into pre-defined categories and therefore attempts to capture the underlying difference in social meaning and economic value of social exposures due to race/ethnicity, gender and age, without biasing participant response. Third, SSS provides a means to assess adolescent social status directly, without using parental social class as a proxy. Several studies suggest that adolescents' perceptions of their relative social standing differ from those of their parents and are more consistently related to their health than is the social class of their parents (Glendinning, Love et al. 1992; Goodman, Amick et al. 2000). Fourth, SSS attempts to predict targeted outcomes among individuals of the same social status. Individuals of the same social class may have varying health outcomes and risk behaviors. Fifth, SSS captures relative social standing, rather than absolute social standing. Sixth, SSS measures perceived past and current social standing as well as predicted future prospects.

Subjective Social Status and Adolescent Health and Risk Behaviors

Little is known about the social class gradient in health among adolescents. Three major reasons for this include a lack of: 1) understanding of the mechanisms underlying the social class-health/behavior relationship in general, 2) knowledge about social determinants of adolescent health and risk behaviors, and 3) youth-specific indicators of social status. SSS is beginning to fill the gaps in the social class-adolescent health/behavior literature.

SSS may provide a greater understanding of how adolescent behavior and physiology is shaped by the social environment. First, perceptions and belief systems influence individuals' health behaviors. This may explain why two adolescents from the same low-income community and same racial/ethnic background, raised in similar conditions, engage in differing behaviors

and have different health outcomes. Second, adolescence is a critical period in one's life: one develops social and intellectual skills and reaches physical and sexual maturity. It is also a time of transition into a state of greater economic and social independence. These biological, cognitive, and psychosocial changes—that will shape future career options, quality of life, and health—are strongly determined by the broader sociocultural and economic context. Third, physical and mental health status, health behaviors, and educational attainment level during adolescence may have profound consequences for health later in life. According to the additive accumulation model, one of the four predominant life course theories, the longer people live in stressful economic and social circumstances, the greater the physiological and psychological wear and tear they suffer and the increased chances of having poor mental and physical health, adopting risk behaviors and facing premature death (Wilkinson, Marmot et al. 2003). Therefore understanding the social status-adolescent health/behavior relationship from a life course perspective may have important policy implications. Fourth, adolescents contribute disproportionately to morbidity, mortality and social problems associated with social class standing, including unwanted pregnancies, HIV and other sexually transmitted infections (STIs), depression, obesity, diabetes, crime, violence, drug use, alcohol abuse, and commercial sex (Gruber 2001). This information could aid in the formulation of social policy, public health measures and clinical strategies to improve health outcomes and risk behaviors.

Objectives

This systematic review of the literature on subjective social status and adolescent health and risk behaviors is intended to summarize the empirical literature on the subjective social class-adolescent health/behavior relationship. The gaps in the empirical literature and future research directions will be discussed.

Methods

Sample of Studies

An extensive search of the subjective social class-adolescent health literature was undertaken. Relevant studies were identified through computerized database searches of PubMed and PsychINFO for publications between 1980 and 2006. Key words entered were subjective social status, socioeconomic status, social position, social hierarchy, social stratification, and perceived social status. A range of key words was used to reflect the changing terminology in the empirical literature over the course of the three decades covered here. The reference sections of articles selected for study inclusion were analyzed to identify any additional relevant studies. Papers and websites on social position were also reviewed to ensure coverage. Studies that were included for review are those in which quantitative methods were used to examine the association between subjective social position and a health-related outcome in adolescents. Criteria for selection of papers included: peer-reviewed experimental or observational studies with a minimum of N=25; published in English; and with at least one outcome assessing mental or physical health or risk behaviors. This review did not include single case studies or doctoral dissertations, reasoning that those dissertations whose findings would be relevant would have had a high probability of being published.

Coding of Studies

Using the above criteria, the search identified 4473 published papers for preliminary review. Studies that did not fit the review's conceptualization of adolescent subjective social status were not included. Out of the 4473 identified studies, only nine examined subjective social status among adolescents. Of these nine, six used the MacArthur Scale of Subjective Social Status. All eligible studies were reviewed and coded for the date of publication, country

of origin, size and demographics of study sample (i.e., age, race/ethnicity, and gender), method and measure for assessing perceived social status, and a measure for the relationship between specific correlates and social class. Table Two presents findings regarding the association between adolescent subjective social status and health and behavioral outcomes. Quantitative summarization of the study findings is problematic due to varied study populations, social class measures and outcomes evaluated, and designs utilized. Moreover, a tally approach to summarizing across studies based on statistical significance can be misleading due to the different strengths, weaknesses, power and biases of each study (Rothman and Greenland 1998). Summaries therefore consist primarily of qualitative information on the types and directions of associations observed and the findings reported by authors. Although I avoid focusing on statistical significance, in most studies the authors' decision to declare a significant finding was tied to a null-hypothesis significance test using a p-value of < 0.05 .

Summary of Empirical Research

Nine studies tested the association between adolescent subjective social status and either a mental or physical health outcome or risk behavior and were included in the review (see Table Two). All nine of the studies were conducted between 2001 and 2006.

Table Two: Empirical Evidence for Association between Subjective Social Status and Health and Behavioral Outcomes among Adolescents

Author/Date of Publication/ Country	Study Population	Type of Design	Type of subjective social status measure	Covariates (objective social class variables are highlighted)	Health and behavioral outcomes of interest	Hypothesized direction of the association between subjective social status and the outcome of interest	Observed direction of the association between subjective social status and the outcome of interest
Chen and Paterson. 2006. USA	N=315 Ages: 14-19 Race: white, African-American Family SES: middle class	Cross-sectional	MacArthur Scale of Subjective Social Status (society ladder)	N/A	Positive psychological traits (optimism, control, self-esteem)	Hypothesized: Positive	Observed: Positive ←SSS → ↑ Optimism, control, self-esteem Observed: Negative
Piko and Fitzpatrick. 2001. Hungary.	N=1039 Ages: 12-18 Race: white Family SES: heterogeneous*	Cross-sectional	Subjective appraisal of family SES (lower, middle, upper-middle, and upper class)	Parental occupation and education , age, gender, type of school	Psychosocial health: self-perceived health, psychological wellbeing, psychosomatic symptoms (sleep disorders, back pain, tension, headaches, and chronic fatigue)	Hypothesized: Negative	↑ SSS → ↓ Psychosomatic Symptoms, poor perceived health, poor psychological wellbeing
Goodman et al. 2001. USA.	N=10,843 Ages: 13-16 Race: non-Hispanic white Family SES: high-SES	Cross-sectional	MacArthur Scale of Subjective Social Status (society and school community ladders)	Parental education , age, gender, number of parents in home, self-esteem, popularity	Psychological health (depressive symptoms); Physical health (overweight and obesity)	Hypothesized: Negative	Observed: Negative ←SSS → ↓ Depressive Symptoms and Overweight/Obesity
Goodman et al. 2003. USA.	N=1491 Ages: 13-17 Race: non-Hispanic black and white Family SES: heterogeneous*	Cross-sectional	MacArthur Scale of Subjective Social Status (society and school community ladders)	Highest level of parental education, total household income , household size, age, type of school, gender, race/ethnicity	Overweight	Hypothesized: Negative	Observed: Negative ←SSS → ↓ Overweight

Author/Date of Publication/ Country	Study Population	Type of Design	Type of subjective social status measure	Covariates (objective social class variables are highlighted)	Health and behavioral outcomes of interest	Hypothesized direction of the association between subjective social status and the outcome of interest	Observed direction of the association between subjective social status and the outcome of interest
Goodman et al. 2005. USA.	N=1209 Ages: 12-19 Race: non-Hispanic black and white Family SES: heterogeneous*	Cross-sectional	MacArthur Scale of Subjective Social Status (society ladder)	Highest level of parental education, total household income, household size, family structure (single vs. 2-parent home), race/ethnicity, age, gender	Perceived stress	Hypothesized: Negative	Observed: Negative ←SSS → Perceived stress
Gruenewald, et al. 2006. USA.	N=81 Ages: 17-22 Race: Asian-American, non-Hispanic white, black, Latino, Filipino, Other Adolescent SES: high educational achievement (college students)	Randomized control trial	MacArthur Scale of Subjective Social Status modified (dormitory ladder)	Gender, BMI, time of session appointment, age	Psychological health (anxiety, self-esteem, depressed mood); physiological health (heart rate, systolic blood pressure, diastolic blood pressure, salivary cortisol)	Hypothesized: Negative	Observed: Negative and Positive ←SSS → Poor psychological Health ←SSS →
Finkelstein et al. 2006. USA.	N=1021 Ages: 12-19 Race: non-Hispanic black and white Family SES: heterogeneous*	Longitudinal and Cross-sectional	MacArthur Scale of Subjective Social Status (society and school community ladders)	Parental education, age, gender, type of school, race/ethnicity	Cigarette Smoking	Hypothesized: Negative	Physiological Health Observed: Negative ←SSS → Cigarette smoking

Author/Date of Publication/ Country	Study Population	Type of Design	Type of subjective social status measure	Covariates (objective social class variables are highlighted)	Health and behavioral outcomes of interest	Hypothesized direction of the association between subjective social status and the outcome of interest	Observed direction of the association between subjective social status and the outcome of interest
Janssen et al. 2006 Canada	N=6684 Ages: 11-15 Race: white Family SES: heterogeneous*	Cross-sectional	Perceived Family Wealth	Parental education and income , age, sex	Obesity, unhealthy eating, physical inactivity	Hypothesized: Negative	Observed: Negative ↑ SSS → ↓ Obesity and physical activity
Simpson et al. 2005 Canada	N=7235 Ages: 11-16 Race: white Family SES: heterogeneous*	Cross-sectional	Perceived Family Wealth	Parental education and income , age, sex	Injury (hospitalized/fighting)	Hypothesized: Negative	Observed: Negative ↑ SSS → ↓ Fighting injury and injury hospitalization

*Defined as lower to upper middle class.

Study Populations

Eight of the nine studies were conducted in North America (United States and Canada). The other study was conducted in Europe (Hungary). Five of the nine studies looked only at white adolescents. Four studies looked at black and white junior high and high school students. One study looked at primarily Asian-American and white college students. Furthermore, seven of the studies looked at adolescents from middle class families, one from advantageous socioeconomic positions, and one study did not report SES.

Study Designs

All nine studies employed cross-sectional study designs. One study followed a subset of the cohort longitudinally for one year (Finkelstein, Kubzansky et al. 2006).

Subjective Social Status Measure

Six of the nine studies that were included in this review used the MacArthur Scale of Subjective Social Status-Youth Version as their measure of perceived social status. Three of these six studies used both the society-SSS and school community-SSS ladders (Goodman, Adler et al. 2001; Goodman, Adler et al. 2003; Finkelstein, Kubzansky et al. 2006). One study used a modified version of the school community-SSS ladder, by replacing school community with dormitory community (Gruenewald, Kemeny et al. 2006). The other two studies only used the society-SSS ladder (Goodman, McEwen et al. 2005; Chen and Paterson 2006). Of the three studies that did not use the MacArthur scales, one asked adolescents “How would you rate your family’s socioeconomic status?” The five answer categories included: lower, lower-middle, middle, upper-middle, and upper class (Piko and Fitzpatrick 2001). The other two used the same measure of perceived family wealth. This variable was based on the question “How well off do you think your family is?” The response categories were: very well off, quite well off,

average, not very well off, not at all well off (Simpson, Janssen et al. 2005; Janssen, Boyce et al. 2006).

Health and Behavioral Outcomes of Interest

Self-evaluated general health and psychosocial health were examined in five studies (Goodman, Adler et al. 2001; Piko and Fitzpatrick 2001; Goodman, McEwen et al. 2005; Chen and Paterson 2006; Gruenewald, Kemeny et al. 2006). These five studies looked specifically at stress, sleep disorders, back pain, tension, headaches, chronic fatigue, anxiety, self-esteem, perceived control, optimism and depression. Overweight and obesity were the only physical health outcomes that were studied (Goodman, Adler et al. 2001; Goodman, Adler et al. 2003). Two studies examined adolescent risk behaviors, specifically cigarette smoking and physical inactivity (Finkelstein, Kubzansky et al. 2006; Janssen, Boyce et al. 2006). One study investigated various injury types (Simpson, Janssen et al. 2005). Physiological health was examined in one study. The measured outcomes included heart rate, systolic blood pressure, diastolic blood pressure, and salivary cortisol (Gruenewald, Kemeny et al. 2006). This is the only study that has looked at the possible biological mechanisms which may mediate SSS and health outcomes.

Graded Relationship

All nine studies found significant inverse association between subjective social status and the health/behavior outcome of interest. All associations remained significant after adjustment for objective social status indicators, except one study which did not adjust for objective social status (Gruenewald, Kemeny et al. 2006). The directions of the associations were consistent across studies. All studies, with the exception of Gruenewald et al (2006), found SSS to have a

significant inverse graded relationship with the outcome of interest; as subjective social status increases, the risk of poor mental and physical health outcomes and risk behaviors decreases.

Goodman et al (2001), studying a cohort of 10,000 white, middle and upper middle class adolescents, found an inverse graded relationship between SSS and depressive symptoms and obesity after controlling for age, gender, nonwhite race, number of parents in home, father's education, self-esteem and popularity. A one unit increase in SSS was associated with a 12% decrease in depressive symptoms (odds ratio_{society}=0.89, p-value<0.001; odds ratio_{community}=0.89, p-value<0.001), after adjusting for covariates. A one unit increase in SSS was associated with a 10-12% decrease in obesity (odds ratio_{society}=0.89, 95% confidence interval=0.83, 0.95; odds ratio_{community}=0.91, 95% confidence interval=0.87, 0.97), after controlling for potential confounders (Goodman, Adler et al. 2001). In a cohort of primarily middle class black and white adolescents, Goodman et al (2003) again demonstrated a graded inverse relationship between SSS and overweight. A decreasing school community SSS was associated with a 16% increase in the risk of being overweight (odds ratio_{community}=1.16, 95% confidence interval=1.06, 1.27), after controlling for parental education, household income, age, school site, race and gender (Goodman, Adler et al. 2003). Goodman et al (2001; 2003) show that SSS can predict mental and physical health outcomes. Other studies have shown this inverse graded relationship with risk of behaviors and injuries. Finkelstein et al found that for a one unit increase in SSS, there was a 37% decrease in risk of smoking (odds ratio_{community}=0.73, 95% confidence interval=0.62, 0.87) after controlling for gender, grade, parental education, perceived stress, and type of school (Finkelstein, Kubzansky et al. 2006). Simpson et al (2005) found that lower perceived family wealth was associated with a higher likelihood of injury from fighting (p<0.01 for trend), after controlling for age, gender, and objective parental SES indicators.

Others have shown that subjective social status is inversely related to subjective health assessment, and self-reported physical and psychological wellbeing. In a study of Hungarian adolescents, Piko and Fitzpatrick found that subjective appraisal of family SES was associated with self-perceived health (odds ratio=1.17, p-value<0.01), psychological well being (odds ratio=1.19, p-value<0.01), and psychosomatic symptomatology (odds ratio=0.92, p-value<0.05), after adjusting for parental occupation and education, gender, age and type of school (Piko and Fitzpatrick 2001). Again, the relationship was inverse and graded. Those with higher subjective family social status had higher values for perceived mental and physical wellbeing and lower levels of psychosomatic symptomatology. Similarly, Gruenewald et al found higher SSS to be significantly correlated with higher self-esteem ($r=0.37$, p-value<0.001) and less depressed mood ($r=-0.30$, p<0.001) and marginally correlated with less anxiety ($r=-0.19$, p-value=0.09). However, contrary to the study hypothesis, individuals with high SSS had higher post-stress cortisol levels than low SSS individuals (Gruenewald, Kemeny et al. 2006). Goodman et al (2005) also found an inverse graded relationship between SSS and perceived stress level among junior high and high school students. Stress levels were higher among those with lower perceived SES, after adjusting for age, gender, family structure, race, parent education, and household income and size (odds ratio_{society}=0.64, p-value<0.01) (Goodman, McEwen et al. 2005). Chen and Paterson (2006) found that higher perception of family status was correlated with higher levels of adolescent optimism ($r=0.33$, p<0.001), self-esteem ($r=0.22$, p<0.05), and perceived control ($r=0.19$, p<0.05).

Determinants of adolescent subjective social status

The criteria that adolescents use to locate themselves in the social hierarchy have not been investigated. There is evidence that parental objective social status may be a determinant of

adolescent subjective social status. Goodman et al (2005), studying a middle class cohort of black and white adolescents, found that those who had at least one college-educated parent had a higher mean placement on the society ladder when compared with those whose parents had no college education ($p\text{-value}<0.001$) (Goodman, McEwen et al. 2005). Similarly, Piko and Fitzpatrick, studying a sample of southern Hungarian adolescents, found that subjective SES had a significant positive correlation with maternal and paternal education and occupation (Piko and Fitzpatrick 2001).

Modifiers of the SSS-health/behavior relationship: race, gender, age

Among a middle class group of black and white adolescents, the mean society ladder rank was 6.6 ± 1.4 , and the mean school community ladder rank was 7.3 ± 1.6 . Significant race by gender group differences were found in SSS. Black girls had a significantly lower societal SSS ($p\text{-value}<0.05$) compared to all other groups among high school students, but not among junior high school students. Among the subgroup of junior high school students, white adolescents had lower societal SSS than black boys ($p\text{-value}=0.024$) and black girls had lower school community SSS than white girls ($p\text{-value}=0.046$). In this study, the association of school SSS with overweight was strongest among white girls, moderate for white and black boys, and absent for black girls (Goodman, Adler et al. 2003). In another study of black and white adolescents, with the same mean age (15 years), there were no reported significant differences in society SSS by race despite the fact that black subjects came from lower SES families ($p\text{-value}=0.001$) compared to white subjects (Goodman, McEwen et al. 2005). This study found that self-reported stress was higher among those who were female, older, black, those with no parent who had graduated from college and those with lower society SSS rankings.

Among a middle and upper middle class cohort of white adolescents, gender was associated with SSS. There were no significant gender differences in the society ladder rank, however girls had a higher mean placement on the school community ladder compared to boys ($\text{Mean}_{\text{girls}}=7.7\pm 1.6$ vs $\text{Mean}_{\text{boys}}=7.5\pm 1.8$, $p\text{-value}<0.001$) (Goodman, Adler et al. 2001). In this study adolescents under 15 years old categorized themselves into higher subjective social class positions than those of their parents and those 15 years and older categorized themselves similarly to that of their parents (Goodman, Adler et al. 2001). Among the sample of southern Hungarian adolescents, SSS had a similar significant negative correlation with age of the adolescent ($r=-0.11$, $p\text{-value}<0.01$) (Piko and Fitzpatrick 2001).

Discussion

Study Population

There is a paucity of research on SSS among adolescents by nationality, race, immigrant status, age, gender and socioeconomic status. Eight of the studies were conducted in the United States and Canada. The other one was conducted in Hungary. No studies on the SSS-adolescent health/behavior relationship have been conducted outside of North America and Europe. Four of the studies had racially heterogeneous adolescent cohorts. Three examined non-Hispanic black and white adolescents and one examined Asian American and white students. Research on the SSS-health relationship has only been conducted on black, white and Asian American youth and on white Hungarian youth. No other racial/ethnic adolescent groups have been studied. No study has examined SSS among adolescent immigrants. All of the studies looked at adolescents from middle, upper-middle, and upper class backgrounds. No study has looked at adolescents living in poverty.

Study Designs

The role of SSS has never been studied from a life course perspective. One study looked at SSS longitudinally but only followed adolescents for one year. The other studies employed cross-sectional designs. Cross-sectional studies are useful in detecting the association between SSS and other risk factors; however mechanisms that might explain these associations cannot be explored. Health and health behaviors established in adolescence may mediate the development of morbidity and mortality in adulthood. It is important to conceptualize the social class-adolescent health and behavior relationship in terms of long term influences and exposures to different social and material contexts (Starfield, Riley et al. 2002).

Subjective Social Status Measures

The best known tool for measuring adolescent SSS, the MacArthur Scale, has been used in six published studies. Much more research on adolescents should be done using this instrument. Perceived social status measures that use class identification as a proxy for social status are problematic, as the full spectrum of socioeconomic stratification is not adequately captured by the categorical identification of social class. Furthermore, these class categories may connote socially charged meanings that influence an adolescent's choice (Goodman, Adler et al. 2001).

Health and Behavioral Outcomes

The association between SSS and leading causes of adolescent morbidity and mortality—including homicides, HIV/AIDS, sexually transmitted infections, and suicide—has not been studied. Few mental and physical health outcomes, biological mechanisms, and risk behaviors have been examined in relation to SSS.

Determinants of SSS

No study has been conducted looking at the criteria that adolescents use to locate themselves within the social milieu. There is evidence that employment grade, household income, education, satisfaction with standard of living and feeling of financial security are predictors of SSS among adults (Singh-Manoux, Adler et al. 2003). The extent to which family SES is associated with adolescent SSS may depend on how salient family SES is in how adolescents place themselves within society or their school community. Determinants of adolescent SSS may vary by region, race, ethnicity, culture and age.

Modifiers

These studies suggest the importance of race, gender, age and other unidentified demographic factors in understanding the SSS-adolescent health and behavior relationship. For example, there is a tendency for younger adolescents to categorize themselves into higher social class positions compared to their objective social standing (Goodman, Amick et al. 2000; Goodman, McEwen et al. 2005). Younger adolescents may see the world through rose-colored lenses and as they age they may become aware of the constraints and economic pressures of the socioeconomic hierarchy in which they are located. Additional research is needed to understand how these factors and their interactions with each other impact the SSS-health/behavior relationship.

Theoretical Pathways

The mechanisms through which SSS influences adolescent health have not been determined. One study tested to see if self-reported stress mediated the SSS-smoking relationship. This study found that stress did not explain the relationship between low SSS and smoking (Finkelstein, Kubzansky et al. 2006). Further research is needed to investigate other

possible mediators. Mediators of the SSS-health relationship may include: 1) appraisal of life stressors and coping skills and resources, 2) psychological and mental distress, 3) physiological response to chronic stress, 4) material deprivation, and 5) health habits, learned behaviors, and sociocultural factors.

Conclusion

This review suggests that social stratification as reflected by subjective social status is associated with adolescents' mental and physical health and risk behaviors. Longitudinal studies that begin during early adolescence and continue into adulthood will be needed to better understand the effects of adolescent SSS on adult health outcomes. A reliable and valid research tool, the MacArthur Scale of Subjective Social Status-Youth Version, has been tested and shows promise in helping us understand the relationship between adolescent SSS and health. This analytic tool may be able to explain variation in adverse outcomes among adolescents sharing the same socioeconomic environments. It may be a means to distinguish among youth of similar socioeconomic status environments who have different health outcomes and risk behaviors. The MacArthur Scale has not been used widely. It remains for future research to determine the utility of this scale among adolescents from regions other than Europe or the United States and for specific population groups such as immigrants and adolescents living in poverty. Furthermore, while there is evidence in support of low SSS being associated with obesity, smoking, injuries, physical inactivity and perceived poor physical and psychological health, little is presently known about the relationship between adolescent SSS and a wide range of other health outcomes and risk factors that are leading causes of morbidity and mortality in this age group. It is likely that actions that have an impact on the social position of adolescents can potentially reduce the public health burden associated with these leading causes.

Much more needs to be done in the area of subjective social status if we are to understand how the social environment affects health outcomes, risk behaviors and perceived well being. It is imperative to know why some youth from the same socioeconomic status have different health outcomes and risk behaviors. We need to make an explicit commitment to using indicators of social status that are not solely based upon objective measures of class when studying youth. By deepening our understanding of the factors that determine and are associated with SSS, we may be better equipped to increase adolescent SSS, which could conceivably promote the inhibition of violence and its sequelae, such as firearm-related mortality. Future research in this area may prove critical to designing effective interventions, including violence prevention programs.

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