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Social Hierarchy and Health among Adolescents:  
The Role of Perceived Class Identity

By

Miranda Lucia Ritterman

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Epidemiology

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Leonard Syme, Chair

Professor Lia Fernald

Professor Emily Ozer

Professor Sylvia Guendelman

Professor Alan Hubbard

Spring 2010

## Abstract

## Social Hierarchy and Health among Adolescents: The Role of Perceived Class Identity

by

Miranda Lucia Ritterman

Doctor of Philosophy in Epidemiology

University of California, Berkeley

Professor S. Leonard Syme, Chair

There is a well-established inverse graded relationship between social class and infant, child, and adult health but 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 adolescent perceived class identity, may be an important determinant of adolescent health independent of traditional objective social class indicators.

This dissertation research was conducted using data Mexican adolescents living in poverty with the following objectives: 1) to examine the associations between adolescent risk behaviors and adolescent perceived class identity, using two subjective social status (SSS) scales and introducing a new indicator: “*anticipated social mobility*”; 2) to examine whether or not these associations persist after controlling for traditional indicators of socioeconomic position; and 3) to investigate demographic, psychosocial and socioeconomic correlates of adolescent class identity within a new national context and among a socioeconomically homogenous cohort. Adolescents were from households that qualified for the Mexican government’s poverty alleviation program, “Oportunidades”. Individual, household and neighborhood data were collected on urban households in seven states in Mexico in 2004 as part of the evaluation of this welfare program. The adolescent module was completed by approximately 7900 adolescents aged twelve to twenty-two. This dissertation highlights the known and unknown dimensions of adolescent class identity and health, filling in gaps in the scientific understanding of the social gradient in health during adolescence.

Chapter 1 provides an overview of the dissertation. Chapter 2 reports on the shape of social class gradients for substance use among Mexican adolescents. Multiple logistic regressions are used to estimate the associations of objective indicators of socioeconomic status (SES) and SSS—at both community and societal levels—with smoking, alcohol and drug use. Chapter 3 examines multiple dimensions of social position in relation to obesity-related behaviors. Multiple objective and subjective measures of social position are used including parental education, household

expenditures, community and society SSS, and school dropout status. Ordinal logistic regressions are used to estimate the associations between parental, household and adolescent indicators of social position and obesity risk. The first objective of Chapter 4 is to examine the association between adolescent risk behaviors and a new indicator of adolescent relative social position, adolescent *anticipated social mobility*. *Anticipated social mobility* was calculated for each subject by taking the difference between their rankings on two 10-rung ladder scales that measured (1) projected future social status and (2) current SSS within Mexican society. This chapter then investigates potential underlying demographic, socioeconomic and psychosocial determinants of this indicator. Multiple logistic regression analyzes are used to estimate the strength of associations in this chapter. Chapter 5 provides a summary of the findings from Chapters 2, 3 and 4. In addition, suggested future research directions and policy implications are discussed.

This dissertation has contributed to the literature on health inequities by providing data on cross-sectional associations between objective and subjective indicators of social class and multiple risk behaviors in a vulnerable urban adolescent population. Findings provide evidence that there is a social gradient in health during adolescence. Adolescents who have dropped out of school and perceive themselves as having little control over their destinies are more likely to perceive themselves as having low social status and being downwardly mobile. Subjective measures of adolescent class identity, including subjective social status and *anticipated social mobility*, may be more effective than conventional indicators of social class in explaining the association between social position and health during this transitional period. The conclusion from this work suggests the usefulness of subjective indicators of adolescent class identity for further studies of adolescent populations, particularly those with a restricted range of socioeconomic statuses.

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### Author's Contributions

I contributed to all work that went into the writing of this manuscript, including its conception and design; the acquisition, analysis and interpretation of data; and the drafting and revising of its content.

This dissertation is dedicated to my loving parents,  
Jeffrey B. Ritterman, Michele K. Ritterman, and Vivien Feyer,  
to my devoted and adoring fiancée,  
Jeremy L. Weintraub,  
and to my longest-standing mentor,  
Leonard Syme.  
Their support and guidance was felt and appreciated  
in the writing of every page of this text.

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## ACKNOWLEDGMENTS

This dissertation and my tenure as a doctoral student have been benefitted by the support of numerous people. First, I would like to thank my mentor, Leonard Syme, whose faith in my ability to advance the field of social epidemiology preceded my own. Len's undying support, friendship, encouragement, criticism, and guidance over the last seven years bring the definition of mentoring to a new level. It has been a great honor and privilege to call Len my mentor. I can only hope to repay him by my continued commitment to policy- and intervention-relevant research and by one day becoming an equally passionate and committed mentor to my university students. I am grateful to Lia Fernald, my co-advisor, who provided me with an academic home in her research lab, the dataset I used for my dissertation, and years of brilliant feedback. Emily Ozer, who provided me with my first Graduate Student Research position and placed me in a leadership role from the very beginning, has been one of my longest-standing supports. She has opened up numerous academic doors for me that have expanded my future career options. I am forever grateful. There is so much to write about Nancy Adler, who has informally advised me since the initial months of my PhD program. Nancy's own research has had one of the most profound influences on the direction of my research. Furthermore, Nancy's belief in my work has inspired me to remain committed to research that can improve population health and reduce health inequities. Sylvia Guendelman has not only mentored me, expanded the scope of my research, and raised the bar for the quality of my work, but has also provided me with the encouragement and support one gets from a loving parent. I would also like to thank Elizabeth Goodman, who helped pave the way for research on adolescent social position and provided me with comments that were extremely helpful in revising Chapter 2 of this manuscript. I have also benefitted from the teaching and mentoring of numerous Public Health professors. In particular, I would like to thank Alan Hubbard, who provided me with the statistical consulting needed to write this dissertation, and to both Bill Satariano and Art Reingold, for providing me with the opportunity to be a Graduate Student Instructor for their fantastic courses. It was a joy working for them both. I would also like to thank my colleagues and dear friends, Farren Briggs, Aubree Gordon, Sara Tartof, and Lisa Goldman Rosas, whose support and humor carried me through the difficult times of doctoral student life. They too were outstanding mentors and will certainly go on to make important contributions to our field. I thank David Minkus, Christine Trost and Deborah Lustig of the Institute for the Study of Social Change at UC Berkeley for their support of this work and continued encouragement. I have also been inspired by the work of Paula Braveman, Nancy Kreiger, Michael Marmot, Richard Wilkinson, Kate Pickett, Ichiro Kawachi, Lisa Berkman, Ana Diez-Roux, George Kaplan, Bruce Link, Jo Phelan, Ezra Susser, Robert Sapolsky, and Bruce McEwen, to mention a few. Their work has paved the way for researchers committed to understanding the social determinants of health. Most importantly, I would like to thank my parents, Jeff and Michele Ritterman and Vivien Feyer, my beloved life partner, Jeremy Louis Weintraub, my brother, Judah Ritterman, my grandmother, Ann Ritterman, my closest friend, Laurie Jagoda, and all of my aunts, uncles, cousins, and friends, for which the list is too long to write out in full. It is their love, enthusiasm, and support that have always allowed me to follow my dreams and even, at times, actualize them.



## CHAPTER 1

### INTRODUCTION: SOCIAL CLASS AND HEALTH DURING ADOLESCENCE

#### Background

There is substantial evidence that relative deprivation, not merely absolute deprivation, impacts health (1). There is evidence for this in countries at all levels of development, from lower- to upper-income countries (2). This social gradient in health is consistently observed in infants, children and adults (3-6). For adolescents however, findings have been inconsistent (7-9). This is of particular concern. Adolescence is a critical period in the life course: one develops social and intellectual skills and reaches physical and sexual maturity during this time. It is also a period 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. Furthermore, adolescents contribute disproportionately to morbidity, mortality and social problems associated with social class standing, including unwanted pregnancies, HIV and other sexually transmitted infections, depression, obesity, diabetes, crime, violence, drug use, alcohol abuse, and commercial sex (10). Since social class is a key factor underlying health and health inequities among infants, children and adults, special attention needs to be paid to research regarding social class among adolescents.

There are several plausible explanations for why traditional objective indicators of SES—occupational grade, educational attainment level and income—do not consistently predict health-related outcomes among adolescents. Among them are the following: First, objective SES indicators in adolescence do not capture the multidimensional nature of social position including social, economic, political and cultural characteristics. Second, adolescent social class may be less influenced by income, occupation and education, and be more influenced by national educational systems and related policies, peer structures, and cultural norms and values. Adler and Newman have shown adolescent class identity involves not only access to material resources but also social resources as well (11). Third, objective SES indicators do not have the sensitivity to detect subtle, yet critically important social class distinctions, such as the underlying meaning and social value of education and income. For example, the life options may be significantly different for two adolescents, both with fathers classified as having a college education, but who graduated from different tiered universities. Another example involves the complex social meaning or economic value of income. Consider two adolescents with parents with the same total annual salaries. The implications of one set of parents losing their jobs could be severely different from the other set of parents losing their jobs if they do not have the same financial assets or reserves needed to cushion a shortfall of income. These two examples illustrate how social class categories, as determined by objective indicators of SES, fail to capture important nuanced social class distinctions between individuals. Additionally, objective SES indicators may be unable to capture social class when it is a moving target. This may be particularly problematic during adolescence, a period defined by economic and social transition. Also, while household and parental SES are useful for younger children, they may be less applicable for adolescents since they may not adequately assess adolescent social class standing and social and

economic resources, including the dynamic nature of adolescents' educational attainment, the economic status of adolescents who are employed outside of the home or adolescents' sense of relative social standing among their peers. Finally, indicators of SES reflect past and current social status, whereas adolescent social class may involve projections of one's socioeconomic trajectory as well.

The inclusion of subjective measures of social position is of particular importance for research among both adolescents and relatively homogenous socioeconomic cohorts. Most studies of the social gradient in adolescent health have used objective indicators of socioeconomic status—parental occupational grade, educational attainment level, and income. There is a new body of research which suggests that social stratification, as reflected by adolescent perceived class identity, may be an important determinant of adolescent health independent of traditional objective social class indicators (13) and may be useful in conjunction with objective SES indicators for studying this period in the life course (13). Perceived social position measures are distinct from objective measures, as they do not divide social class into pre-defined categories and they are therefore able to capture underlying differences in social meaning and economic value without biasing participant response. They are thus able to detect a social gradient in health among individuals classified into the same class category. Perceived social class measures also provide 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 are consistently related to their health, unlike the social class of their parents (14, 15). There is also 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 (17). Additionally, perceived social class indicators can capture future prospects as well as past and current social standing (16).

The studies in this dissertation enable the exploration of relative deprivation among a cohort of adolescents using multiple indicators of objective and subjective social position. The objective social position indicators include parental education, total monthly household expenditures per capital, and school dropout status. Three indicators of perceived social position were also included: two scales of subjective social status (SSS), and a new indicator, *anticipated social mobility*. The SSS scales consist of two 10-point anchoring ladders: a community and a society ladder. Adolescents are first asked to locate themselves in the context of their group of friends. "At the top of the ladder are those who are the most cool. At the bottom are those who are the least cool". The second ladder asks adolescents to locate their families compared to other families in Mexican society, where at the top are the richest and at the bottom are the poorest. Anticipated social mobility involves taking the difference in score between the society SSS ladder and a third 10-rung ladder scale, that of future orientation in society. This third ladder asks adolescents where they anticipate their future family (future partner and children) will be located in the social hierarchy compared to other families in Mexican society. The difference between the society SSS scale and the society future orientation scale captures the adolescent's expected shift in social status: anticipated upward mobility, downward mobility, or no change.

The inclusion of multiple indicators of social position is critical to research on social hierarchies and health, as social position is multidimensional in nature. Humans belong to multiple social hierarchies, may rank differently in each and may attribute different levels of

importance to each. Different measures of social position within given hierarchies may be more adequate than others depending on the context and population under study. 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 four distinct domains: a) economic and social policies, b) institutions, c) neighborhoods, communities, and living conditions, and d) social relationships (12, 18). The measurement of this complex constellation of social exposures is not feasible; however the use of multiple indicators of social position help to capture multiple aspects of these domains linked to social position.

## Structure of Dissertation

This dissertation summarizes findings on the cross-sectional association between three indicators of adolescent perceived class identity and health-related outcomes among Mexican adolescents living in poverty. Data for the three studies described in this dissertation come from a 2004 evaluation of the Mexican government's cash transfer program, "Oportunidades", and was collected in 157 urban (50,000-1 million inhabitants) regions in seven states in Mexico (Guerrero, Hidalgo, Michoacan, Puebla, Queretero, San Luis, VeraCruz). Households that qualified for the program were in the bottom twentieth percentile of wealth in the country. These households are considered to be living in extreme poverty. Although Mexico is generally classified as a middle-income country, its high level of inequality implies that a large fraction of the population (approximately 20%) lives in extreme poverty, defined as having insufficient income to cover basic food needs (SEDESOL, 2002). Data were collected at the individual, household and neighborhood levels. Adolescents, ages 12 to 22, completed an audio-computer assisted self-interview. Legal guardians and parents completed household questionnaires and evaluators completed a neighborhood survey.

In Chapter 2, the associations between SSS and substance use behaviors are examined. Utilizing two SSS scales for adolescents previously used only in the US, this chapter examines the association between objective and subjective dimensions of social position and alcohol, tobacco and drug use among this large sample of Mexican adolescents. Chapter 3 further examines the associations between SSS and adolescent risk behaviors among Mexican adolescents living in poverty, by adding the examination of obesity-related behaviors. Chapter 4 introduces a new measure of adolescent perceived class identity, *anticipated social mobility*, and examines its association with multiple risk behaviors. A secondary analysis is conducted examining the demographic, socioeconomic and psychosocial correlates of *anticipated social mobility*. The central goals of Chapters 2-4 are to explore the utility of multiple indicators of social position among adolescents for epidemiologic research and to extend inquiry regarding the social gradient in adolescent health to a wider economic and cultural context. Chapter 5 provides a comprehensive summary of chapters 2-4. A discussion of the remaining gaps in the empirical literature, future research directions, and policy implications is included.

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## CHAPTER 2

## OBJECTIVE AND SUBJECTIVE SOCIAL CLASS GRADIENTS FOR SUBSTANCE USE AMONG MEXICAN ADOLESCENTS

Published: *Social Science and Medicine*, 2009 April (68): 1843-1861

### Abstract

This study examines the shape of social class gradients for substance use among Mexican adolescents. Substance use and objective and subjective indicators of social class were assessed in house-to-house surveys conducted with 7,614 Mexican adolescents in 2004. The sample was designed to be representative of the poorest urban communities in seven Mexican states. The prevalence of current smoking was 16.8%, alcohol consumption was 30.2%, and drug use was 4.6%. Multiple logistic regressions are used to estimate the associations of objective indicators of socioeconomic status (SES) and subjective social status (SSS)—at both community and societal levels—and smoking, alcohol and drug use. Adolescents who perceived themselves as higher in social status in reference to their local community reported *more* smoking and drinking. Our findings were similar when we used objective measures of SES, such as maternal education and total monthly household expenditures per person. In contrast, adolescents who perceived that they had high social standing in reference to Mexican society *as a whole* were *less* likely to report being current smokers and drinkers. We found no significant association between social status and drug use. Research into how adolescents perceive themselves in reference to their peer communities may help strengthen programs and policies aimed at promoting health in vulnerable adolescent populations.

### Introduction

### *Socioeconomic status and health in adolescents*

As with adults, low socioeconomic status has been consistently associated with poor health outcomes among children, particularly those living in poverty during early childhood (1-3). A similar social class “gradient” has been found in many studies of adults in a range of health domains (4-6). In contrast, no consistent pattern has been shown between socioeconomic status (SES) and health-outcomes during adolescence across key domains such as respiratory health, smoking, obesity, mental health, and asthma (7-10).

There are several possible explanations for divergent findings regarding the SES-health relationship among adolescents. First, different indicators of SES (e.g. family income, parental education, parental occupational grade) may exert varying effects on the same outcome; research with adults has shown different associations of components of SES and health outcomes (11). Second, few studies on adolescents have included *youth-specific* indicators of social class. While family and parental SES are useful for younger children, they may be less applicable for adolescents since they do not fully capture the dynamic nature of adolescents’ educational attainment, the economic status of adolescents who are employed outside of the home or adolescents’ sense of relative social standing among their peers. These subjective dimensions of class have been shown to help explain health-related outcomes beyond the effects of simple objective indicators of SES in both adults and adolescents (12-15). However, research has primarily been done in high-income countries, and findings may not be entirely generalizable to adolescents from less developed countries, like Mexico. As Brown et al. found, adolescents from different socio-cultural contexts may use different criteria when ranking their social position (16). The extent to which there are similarities in findings between Mexico and from high-income countries like the U.S. will shed light on the cultural specificity of these processes.

The central goal of the present study is to extend inquiry regarding the social gradient in adolescent health to a wider economic and cultural context. Utilizing two subjective social status (SSS) scales for adolescents previously used only in the U.S., our study examines the association between objective and subjective dimensions of SES and substance use among a large sample of Mexican adolescents living in very low-income urban communities. Below we review the recent empirical research on SSS and its relationship to health in high-income countries; the small but growing literature on substance use among Mexican youth, and, finally; the potential relevance of SSS for explaining patterns of substance use in an urban Mexican context.

### *Subjective Social Status*

Social class is a reflection of social, economic, political and cultural status within a given social hierarchy. Its association with health outcomes involves not only differential access to material resources but also social processes associated with social position (17). The social gradient in adolescent health has largely been explored using objective indicators of the socioeconomic components of parents’ social class, such as income, education, or occupation, which serve as proxy measures of access to goods and services. Several recent studies have also investigated adolescents’ perceptions of their relative subjective social status (SSS)—using scales modeled after those used in adults—and found the ladders to be valuable in explaining adolescents’ health status even after taking into account objective indicators of parental social class (14, 18, 19).

Similar to the measurements for SSS in adults, the youth-specific indicators involve two “ladders:” one representing broader society, and the other representing one’s immediate community; adolescents are asked to rank themselves on these ladders. Thus, this assessment process invites them to tap into their emerging self-concept of social stratification within the context of two reference populations (14, 16, 20).

Considered as a whole, the existing literature on adolescent social class and health suggests that SSS captures unique aspects of social standing and appears useful in predicting health-related outcomes beyond objective indicators of social class; several patterns emerge in the literature (see Table 1 for a review of the literature on adolescent SSS). First, adolescent SSS—both community and societal—is significantly associated with psychological, physical, behavioral and physiological indicators of health. Second, each SSS scale, defined by a given reference population (e.g. society, peer community), represents a unique social hierarchy. While both SSS ladders have been found to be associated with health-related outcomes independent of objective indicators of SES, community SSS is more strongly related to health-related outcomes than is society SSS. Third, important group differences, in terms of age, race/ethnicity, SES and sex, exist in the SSS-health relationship among this age group. For example, in the U.S., Native American youth ranked themselves higher than did their White American peers on a society SSS ladder, even though their poverty level was higher. This suggests that they simultaneously considered their local social comparison with others from their reservations and territories while ranking themselves in reference to the general society.

### *Adolescent Substance Use*

Adolescence is a life stage marked by increased risk of tobacco smoking, excessive alcohol consumption, and illicit drug use (21, 22). These three risk behaviors during adolescence are associated with immediate health hazards, including depression, interpersonal violence, motor vehicle accidents, drowning, risky sexual behaviors, suicidal behavior and more frequent use of health services (21, 23). Continuous and long-term use of these substances can result in morbidity and early mortality in adulthood (24, 25).

*Relationship of SES to adolescent substance use.* A sizable body of research conducted in the U.S. and Western Europe has investigated the association between “objective,” parent-reported SES and substance use among adolescents, with mixed results. The preponderance of studies have found that higher SES, measured objectively, is associated with *lower* rates of substance use in adolescents (10, 26-33). Other studies, however, have not confirmed these associations (34). One U.S. study found that low SES adolescents, as measured by parental income, reported more cigarette use compared to adolescents of high SES (31). In contrast, another U.S. study found that high SES adolescents, defined as those with greater financial resources and family social status, reported more cigarette, alcohol and drug use compared to low SES adolescents (27).

Only two studies to our knowledge have examined the relationship between adolescents’ own ratings of their social status and their use of substances. In a U.S.-based study, higher community SSS (defined as within school) was associated with a *lower* prevalence of smoking among adolescents, in both cross-sectional and longitudinal analyses, even after controlling for objective SES (35). A study of Hungarian adolescents found that those who ranked their families

as having higher SES had *higher* rates of substance use, after adjustment for their parents' report of objective SES indicators (36).

*Adolescent substance use in Mexico.* In Mexico, as in many other Latin American countries, adolescent cigarette smoking, alcohol consumption, and illicit substance use are all on the rise (23, 37-43). According to a 2002 national survey, 15.7% of poor urban Mexican adolescents ages 12 to 21 had ever smoked cigarettes and 8.6% currently consumed alcohol (44). The latest national estimate of illicit drug use of young people living in urban Mexico, from the same 2002 survey, reported that 5.4% of males and 1.5% of females, ages 12 to 34, reported using illicit drugs (45). Although reported drug use among adolescents remains low in Mexico, drug use is increasing with the rise in drug trafficking, particularly in the northern states which border the U.S. and lie on major drug trafficking routes (46).

*Association of SES to adolescent substance use in Mexico.* Several recent studies on SES and substance use among Mexican youth suggest that SES may be an important risk factor for adolescent substance use (39, 47, 48). The complex associations between SES and adolescent substance use found in the US and Western Europe are also found in Mexico. Two studies found that higher SES, measured objectively, is associated with *lower* rates of substance use among adolescents in Mexico (39, 49). Another recent study from Mexico, among low SES Mexican teens from disadvantaged urban areas, reported that higher SES was associated with *higher* rates of drinking and sexual activity (50). While substance use among Mexican adolescents is a growing health concern, the risk factors associated with substance use are still poorly understood (23).

### *Present Study*

The purpose of our present study is to extend the current literature on the association between SSS and reported adolescent substance use in several key ways. First, results from this study will fill a critical research gap by examining how two different SSS gradients (community and society) relate to multiple substance use behaviors in a large sample of adolescents. Second, our findings will test whether adolescent SSS relates to health risks in a broader context, outside of the U.S. The findings may provide insights into influences in health of recently immigrated Mexican-American adolescents, as they have characteristics in common with our sample in Mexico. Finally, this study focuses on adolescents within an extremely restricted range of SES in Mexico allowing us to examine SSS across what could be considered to be a socioeconomically homogenous population. In this way, the study will also contribute to a better understanding of the impact of relative (rather than absolute) deprivation on the social gradient in adolescent health. Based on the small existing literature, we hypothesize that adolescents who perceive themselves to be higher in SSS (society and community) would be less likely to report substance use.

## **Methods**

### *Procedure (study design and sampling)*



The cross sectional analyses reported in this paper use data gathered in 2004 for the evaluation of a poverty alleviation program in Mexico. All data were collected using an audio-computer assisted self-interview system, supplemented with a socioeconomic household questionnaire<sup>1</sup>. The survey included 157 urban (defined as having 50,000 to 1 million inhabitants) towns in seven states in Mexico. Households were selected first, using census data for all census tracts. The number of eligible households was identified and used by the program to define areas with 500 or more eligible households. Second, a sample of the areas with the highest density of eligible households was selected and then matched to comparison areas for evaluation purposes. Following this process, a random selection of census tracts was identified within the areas with probability proportional to size. From this sample of 204 urban areas, a sub-set of 157 areas was selected for the adolescent risk behavior component. Up to three visits were made to each household to collect data on household SES as well as data on adolescent risk behavior. A total of 7900 adolescents, aged 12-22 years of age, were identified in this way. Of this group, 7,614 (96%) completed the questionnaire.

We used data from the general household survey on household SES as well as data from the adolescent survey, including SSS, school attendance, and self-reported substance use. Excluded from the final sample were adolescents missing data on SSS (n=1,315), risk behaviors (n=79), total monthly household expenditures per person (n=151), school attendance (n=138), parental alcohol use (n=235), or outside of the age range (n=1) of 12 to 22 years. Our final sample for this analysis included 5,695 adolescents (75% of the original sample). We compared the adolescents with and without missing data and there were no differences in terms of prevalence of smoking, drinking or drug use.

The study was approved by the Research Committee at the National Institute of Public Health in Mexico, and by the Committee on the Protection of Human Subjects at the University of California at Berkeley. Participants were invited to participate after receiving a detailed explanation of the survey procedures. They were then asked to sign an informed consent declaration. If the adolescent was under the legal age of consent (16 years of age), the parents were asked to provide consent and the adolescent was asked to provide assent.

### *Measures*

#### *Objective socioeconomic status (from parents' survey)*

*Maternal education.* Maternal education was represented by the following four categories: 'no education', 'some elementary', 'some secondary', and 'some university.'

*Total monthly household expenditure.* Total monthly household expenditure was estimated adding 'household reported weekly expenditure on food items', 'monthly expenditure on services and short term goods,' and 'other expenditures', and was divided into tertiles to classify households into low, middle and high consumption.

#### *Subjective social status (adolescent self-report)*

A modified version of the Subjective Social Status Scale-Youth Version was completed (14). The first question asked adolescents to make a relative comparison of themselves with

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<sup>1</sup> The evaluation surveys are available at <https://evaluacion.oportunidades.gob.mx>

“their peers,” and therefore may serve as a proxy measure for relative social position within the community. The second question asked adolescents to make a comparison with “all families in Mexico,” a group about which the participants may not have had as much information.

*Demographic covariates (adolescent self-report)*

Adolescents provided data regarding age, gender, and whether they had dropped out before completing high school.

*Parental characteristics (adolescent self-report)*

Adolescents were asked about parental alcohol abuse and also reported on whether their father resided at their place of residence.

*Adolescent risk behaviors (adolescent self-report)*

Adolescents were asked to respond yes/no to three questions: 1) “Do you currently smoke?” 2) “Do you currently drink alcohol, even if just occasionally?” and 3) “At some time have you consumed a drug (such as marijuana, hashish, mushrooms, amphetamines, etc...) even if just occasionally or at parties?”

*Statistical analysis*

Statistical analyses were conducted using STATA 10.0 (STATA Corporation, College Station, TX). After conducting bivariate analyses examining the associations of the outcome measures (smoking, drinking or drug use) and the independent variables (maternal education, monthly household expenditure, society SSS or community SSS), we used logistic regression models to investigate associations between the outcome measures and independent variables while controlling for covariates (gender, age, school drop-out, father’s presence, and parental alcohol consumption). All models controlled for the clustering at the neighborhood level.

**Results**

The prevalence of current smoking in the sample was 16.8%, alcohol consumption was 30.2%, and drug use was 4.6%. Males were more likely than females to smoke, drink or take drugs, as were older adolescents, those who dropped out of school or those whose parents had an alcohol problem (Table 2). Tobacco and alcohol use were both positively correlated with community SSS and household expenditures and negatively correlated with society SSS. Drug use was not significantly correlated with any measure of SES or SSS (Table 3). The prevalence of drug use was so small that further analyses were not conducted.

*Smoking.* Current smokers perceived themselves lower on the society SSS ladder ( $F=7.58$ ,  $p=0.006$ ) and higher on the community SSS ladder ( $F=6.31$ ,  $p=0.012$ ) when compared with non-smokers (Table 4). After adjustment for maternal education, household expenditures, gender, age, school dropout status, father’s presence and parental alcohol abuse, current smoking was still significantly associated with lower society SSS ( $OR=0.96$ ,  $p=0.027$ ) and higher

community SSS (OR=1.04, p=0.041) (Table 5). Current adolescent smoking was also associated with having a mother with more education, being in the highest tertile of monthly household expenditures in comparison with the lowest, being male, older, having dropped out of school, and having a parent who abused alcohol.

*Drinking.* Current drinkers had lower society SSS scores (F=7.37, p=0.007) and higher community SSS scores (F=4.11, p=0.043) than non-drinkers (Table 4). In an adjusted analysis, current drinking remained significantly associated with lower society SSS (OR=0.97, p=0.015) and higher community SSS (OR=1.03, p=0.036) (Table 5). Additional risk factors for current drinking were being in the middle or highest tertile of household expenditures compared with being in the lowest, being male and older, having dropped out of school, and having a parent who abused alcohol.

## Discussion

In our study of low SES Mexican adolescents, we found that the SSS ladders for community and society were differentially related to adolescents' use of substances. Adolescents who perceived themselves as higher in social status in reference to their peers (community SSS) reported *more* smoking and drinking. These findings are consistent with what we found using objective SES measures. In contrast, adolescents who perceived their families as higher in social status in reference to others in Mexican society (society SSS) reported *less* smoking and drinking. Analyses examining the associations between SSS and drug use are not presented, as only a small sub-sample of the cohort reported having ever used drugs.

There are several plausible interpretations for our pattern of results. It is well established that humans belong to multiple hierarchies and may rank differently in each (51). Hierarchical ranking is associated with many factors, including the given reference population, the scale and proximity of the hierarchy, the stability of the hierarchy, the language used to describe the hierarchy (e.g. "best off" or "most respected" or "highest standing"), and the object being ranked (e.g. one's self, one's family) (6, 14).

The first interpretation of our findings is based on the given community reference population. Most studies that have examined adolescent community SSS have specified the school community as the referent population (15, 35, 52). Because of the high prevalence of youth in our sample that do not attend school, adolescents were asked to compare themselves to a close group of friends. The criteria that adolescents use to compare themselves to others in a school community may not be the same as those used for this comparison. Factors—such as grades and involvement in extracurricular activities—may play a critical role in determining community ranking in the context of the school yet may be less significant in the context of a group of friends where popularity and social integration are more important. This interpretation is consistent with research conducted in the U.S. that suggests that adolescent peer status is largely determined by social integration and friendship networks (53). This prior U.S. literature indicates that adolescents with extensive social networks are more likely to be substance users (53, 54) and that more "popular" adolescents may have more opportunities for substance use in social situations (55). It is possible that the same social processes may be occurring in our very different urban Mexican context and may help explain the significant positive association found between community SSS and substance use in this study. Further research that directly examines

the social contexts in which substance use occurs among very poor Mexican youth would be needed to address this question.

The second explanation for our findings involves the difference in scale between the society and community SSS ladders. The two ladders were correlated with each other, but the association was modest ( $r=.25$ ). The determinants that adolescents use to rank themselves within societal and peer hierarchies differ (16). Society SSS captures a larger slice of the social hierarchy than community SSS by asking the adolescents to compare their families' social position in the social hierarchy to that of every other family in Mexico. Low community SSS may reflect an adolescent having fewer friends, which could in turn make illicit substances less accessible. Low society SSS may reflect the lack of academic and extracurricular opportunities associated with coming from a disadvantaged family, which in turn could make substance use a more appealing option. The negative association between family social class and substance use is consistent with findings from research conducted in developed countries (10).

The third explanation involves the relative stability of the given hierarchies. Among nonhuman primates in stable hierarchies, those lower in the social hierarchy experience more stress. In *unstable* hierarchies, however, higher-ranking primates experience more stress (6). Adolescence is itself a time of transition, affecting the stability of peer networks. While Mexico itself is undergoing social change, altering the societal context, this change is slower. The adolescents in our sample located themselves within the social milieu of their groups of friends and their families. The adolescent peer community ladder represents a more proximate, local and possibly less stable hierarchy than the society SSS ladder (14, 56). Higher status in each domain brings different kinds of resources and social processes. Higher status in relation to society appears to be protective, while higher status in relation to one's immediate peers appears to enhance risk. The community SSS ladder may assess a less stable hierarchy than does the society SSS ladder, conferring an increased risk in stress-related behaviors for those higher in the hierarchy. In addition to differential opportunity and access to substances associated with higher peer status, this may also account for the pattern of associations of substance use and ranking on the community versus society ladders.

### *Social class, covariates and substance use*

This study provides evidence for a social gradient in health in adolescence for some social class indicators, but not for others. Adolescents' community and society SSS remained significant in both regression models after mutually adjusting for each other and adjusting for mother's education, household expenditures, gender, age, school dropout, fathers' presence, and parental alcohol abuse. In contrast, our measures of objective SES – maternal education and total monthly household expenditure – were inconsistently related to the outcome measures. These findings are consistent with the literature, which has shown that adolescent *self*-assessment of social class may be a better predictor of adolescent health than parental indicators of social class (56). Furthermore, the complexities of the social gradient in health found in this study are consistent with other studies that have considered multiple indicators of social class (57).

Findings from this study regarding the association among covariates—gender, age, school dropout, presence of father and parental alcohol abuse—and adolescent risk behaviors were all consistent with other studies conducted on youth in Mexico and other middle- and low-income countries (22, 23, 58, 59).

### *Limitations*

Several limitations of the present study should be noted. First, the assessment of risk behaviors was broad, e.g. “non-current users” of tobacco and alcohol included both those who had *never* used these substances, and those who *no longer* used them and “current users” included all adolescents who have ever tried a drug without distinguishing between regular, occasional and experimental use. This artificial dichotomization of a behavior that occurs on a continuum likely served to attenuate the strength of the associations found here, suggesting that the current study represents a conservative test of our study hypotheses; an even stronger pattern of findings may be found in future research that assesses substance use with measures that are more sensitive to variation. Second, the cross-sectional nature of our study precludes our ability to make causal inferences regarding the social class-health relationship. Although prior research suggests that assessment of social position is a predictor rather than a consequence of health status (13), it is possible that using tobacco is a way for some adolescents to gain in social status or rank. Third, although a person’s social status is inextricably linked to both that person’s perception of both their own location in the social milieu and the location of others, we do not have access to sociometric information. This study only captured self-perceived status, not actual placement in social groups. Fourth, our findings with Mexican adolescents living in poverty cannot necessarily be generalized to all adolescents living in other countries. Finally, adolescents’ reports of their use of substances are potentially subject to social desirability bias, given the potentially covert nature of adolescents’ use of substances.

### *Conclusions*

This study provided us with the opportunity to examine the associations between social class and substance use among an extremely poor sample of adolescents from Mexico, a middle-income country undergoing an epidemiologic transition in which chronic illnesses are replacing infectious diseases as the primary causes of morbidity and mortality. Consistent with studies conducted in high-income countries, this study found that adolescents with higher perceived social status of their family within Mexican society are at lower risk of substance use. This study also provides evidence that very low-income adolescents who have higher perceived social status within their peer group are at greater risk of substance use than those lower in perceived social position. One plausible explanation for this relationship is that higher social status may be in part determined by social norms and placement within peer social networks. Adolescents living in poverty who are more deeply embedded in peer social networks—due to issues involving peer pressure, popularity, and lack of access to other social outlets—may be more likely to use tobacco, alcohol, and illicit drugs to gain or maintain social status. Such substance use may be used to help adolescents cope with stresses associated with maintaining status in unstable hierarchies. Further research into how adolescents perceive themselves in their peer communities, the criteria they use to rank themselves and the nature of their social networks can inform programs and policies aimed at health promotion of vulnerable adolescent populations. Programs to prevent early onset of substance use should not be restricted to adolescents in school, as those who have dropped out of school show the same patterns of association with SSS and appear to be at greater risk.

Our findings make a unique contribution to the literature on health inequalities by providing data on the role that different social class indicators play in relation to health behavior in an extremely vulnerable adolescent population. This study suggests that subjective measures of social class may operate differently in different national contexts. They may be more effective than objective indicators of social class at exploring the adolescent social gradient in health among populations with a restricted range of SES. Our findings suggest that future research on the social gradient in health among adolescents, including those who have dropped out of school, could benefit from the inclusion of the peer community SSS ladder used in this study. In order to best inform intervention efforts, further research should also examine the criteria that youth use to rank themselves in different social hierarchies as well as wider national contexts.

Table 1 Empirical Evidence for Association between Subjective Social Status and Health and Behavioral Outcomes among Adolescents

<b>Study/ Country</b>	<b>Type of Design</b>	<b>Age Group</b>	<b>Racial/Ethnic Group</b>	<b>SSS Measure</b>	<b>Health-related Indicators (Direction of Association)</b>
Goodman et al. (2001) USA	Cross-sectional	12-18 (n=10,843)	White Non-white	Society Community (school)	<u>Psychological health:</u> Depressive Symptoms (-)  <u>Physical health:</u> Overweight and Obesity (-)
Goodman et al. (2003) USA	Cross-sectional	7-12 <sup>th</sup> graders (n=1491)	White (non-Hispanic) Black (non-Hispanic)	Society Community (school)	<u>Physical health:</u> Overweight (society: 0; community: -)
Goodman et al. (2005) USA	Cross-sectional	12-19 (n=1209)	White (non-Hispanic) Black (non-Hispanic)	Society	<u>Psychological health:</u> Perceived stress (-)
Chen and Paterson. (2006) USA	Cross-sectional	14-19 (n=315)	Caucasian African-American Native American Asian	Society	<u>Physiological health:</u> BMI (0) Salivary Cortisol (0) Systolic Blood Pressure (0) Diastolic Blood Pressure (0) Heart Rate (0)

					<u>Psychological health:</u> Hostility (0) Discrimination (0) Threat Perception (0) Optimism (+) Control (+) Self-esteem (+)
Gruenewald, et al. (2006) USA	Randomized Control Trial	17-22 (n=81)	Asian-American Caucasian Black/African American Latino and Chicano Filipino Other	Community (school dormitory)	<u>Psychological health:</u> Anxiety (-) Self-esteem (+) Depressed mood (-)
					<u>Physiological health:</u> Heart rate (0) Systolic Blood Pressure (0) Diastolic Blood Pressure (+) Salivary Cortisol (+)
Finkelstein et al. (2006) USA	Longitudinal Cross-sectional	12-19 (n=1021)	White (non-Hispanic) Black (non-Hispanic)	Society Community (school)	<u>Risk Behavior:</u> Baseline Cigarette Smoking (society: 0; community: -) Follow-up Cigarette Smoking (society:-; community: -)



Goodman et al. (2007) USA	Longitudinal	7-12 <sup>th</sup> graders (n=1179)	White (non-Hispanic) Black (non-Hispanic)	Society	<u>Physical and Psychological health:</u> Self-rated Health (+)
Reitzel et al. (2007) USA	Cross-sectional	18-24 (n=123)	White (non-Hispanic) Black (non-Hispanic) Hispanic Other	Society	<u>Risk Behavior variables:</u> Time to first cigarette (0) Years smoked (0) Average cigarette/day (0) Likelihood of smoking (-) Confidence (+) Temptations (-)
Lemeshow, et al. (2008) USA	Longitudinal	12-18 (n=4446)	White Non-white	Community (school)	<u>Physical health:</u> BMI (-)
Brown et al. (2008) USA	Cross-sectional	19-24 (n=344)	Cherokee White	Society Community	N/A

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0=no significant association between SSS and health-related indicator; +=high SSS associated with higher probability of health-related outcome; -=low SSS associated with lower probability of health-related outcome.

Table 2 Smoking status, alcohol consumption, and drug use by sociodemographic characteristics and risk behaviors (n=5,695)<sup>a, b</sup>

	Total		Current Smoker <sup>c</sup>		p Value	Current Drinker <sup>c</sup>		p Value	Ever Used Drugs <sup>c</sup>		p Value
	n	%	% No	% Yes		% No	% Yes		% No	% Yes	
Total	5,695	100	83.3	16.8		69.9	30.2		95.4	4.6	
Gender					<0.0001			<0.0001			<0.0001
Male	2,658	46.7	72.7	27.4		60.1	39.9		91.6	8.4	
Female	3,037	53.3	92.5	7.5		78.4	21.6		98.7	1.3	
Age					<0.0001			<0.0001			<0.0001
13 or less	26	0.4	84.6	15.4		88.5	11.5		96.2	3.9	
14	275	4.0	92.7	7.3		87.6	12.4		98.2	1.8	
15	1,231	21.6	90.8	9.2		80.9	19.1		97.7	2.3	
16	1,026	18.0	85.0	15.0		74.9	25.2		96.5	3.5	
17	856	15.0	81.7	18.3		67.8	32.2		95.2	4.8	
18 or more	2,281	40.1	77.8	22.2		60.1	39.9		93.3	6.7	
Drop Out					<0.0001			<0.0001			<0.0001
No	3,109	54.6	87.9	12.1		75.8	24.3		97.8	2.3	
Yes	2,586	45.4	77.6	22.4		62.8	37.2		92.5	7.5	
Mother's Education					0.005			0.08			0.30
None	942	16.5	86.1	13.9		72.5	27.5		95.8	4.3	
Elementary	3,996	70.2	82.5	17.5		69.0	31.0		95.1	4.9	
Secondary	654	11.5	85.0	15.0		71.9	28.1		96.6	3.4	
University	103	1.8	75.7	24.3		65.1	35.0		96.1	3.9	
Monthly Household Expenditure					0.07			0.003			0.51
Low	1,853	32.5	84.7	15.3		72.7	27.3		94.9	5.1	
Medium	1,914	33.6	83.3	16.7		69.3	30.7		95.5	4.5	
High	1,928	33.9	81.9	18.2		67.7	32.3		95.7	4.3	
Father Present					0.185			0.320			0.001
No	1,936	34.0	82.3	17.7		69.0	31.0		94.1	5.9	

Yes	3,759	66.0	83.7	16.3		70.3	29.7		96.1	3.9
Parental Alcohol Abuse					0.004			<0.0001		<0.0001
No	4,747	83.4	83.9	16.1		71.0	29.1		96.0	4.0
Yes	948	16.6	80.1	19.9		64.4	35.7		92.5	7.5

a. The survey questions regarding reported use of tobacco, alcohol and drugs were dichotomous. Smoking status was defined as currently or not currently smoking tobacco. Alcohol consumption status was defined as currently or not currently consuming alcohol. Drug use status was defined as having tried or not having tried an illicit drug.

b. Chi-square tests were used to investigate differences in smoking, drinking and drug use according to adolescent, household and parental characteristics.

c. Current smokers, current drinkers and ever drug users were defined as adolescents who responded affirmatively to the respective questions: 1) “Do you currently smoke?” 2) “Do you currently drink alcohol, even if just occasionally?” 3) “At some time have you consumed a drug even if just occasionally or at parties?”

SD=standard deviation; SSS=subjective social status

Table 3: Pearson Correlations between Subjective and Objective Social Class Variables and Substance Use Behaviors

	Community SSS	Society SSS	Maternal Education	Household Expenditure	Tobacco Use	Alcohol Use	Drug Use
Community SSS	1.00						
Society SSS	0.25**	1.00					
Maternal Education <sup>a</sup>	0.10**	0.02	1.00				
Household Expenditure <sup>b</sup>	0.12**	0.02	0.19**	1.00			
Tobacco Use	0.03*	-0.04*	0.02	0.04*	1.00		
Alcohol Use	0.03*	-0.04*	0.01	0.06**	0.44**	1.00	
Drug Use	0.02	-0.02	-0.01	-0.005	0.29**	0.22**	1.00

a. Maternal education was included as a continuous variable in this table based on the total number of years a mother reported attending school.

b. Total monthly household expenditures were included as a continuous variable in this table, based on a household's total monthly expenditures on food items, services and short-term goods.

\* $p < .05$ ; \*\* $p < .0001$

Table 4 Smoking status and alcohol consumption by Society SSS and Community SSS (n=5,695)<sup>a</sup>

	Total		Current Smoker <sup>b</sup>				Current Drinker					
	Mean	SD	No Mean	SD	Yes Mean	SD	F value p-value	No Mean	SD	Yes Mean	SD	F value p-value
Society <sup>c</sup> SSS	5.34	2.3	5.38	2.4	5.15	2.3	7.58 0.006	5.40	2.4	5.21	2.3	7.37 0.007
Community SSS	5.05	2.4	5.02	2.4	5.20	2.4	6.31 0.012	5.01	2.4	5.15	2.3	4.11 0.043

a. Analysis of variance (ANOVA) was used to determine whether community and society SSS differed across categories of smoking and drinking. All F values have 1 degree of freedom.

b. Current smokers and current drinkers were defined as adolescents who responded affirmatively to the respective questions: 1) “Do you currently smoke?” 2) “Do you currently drink alcohol, even if just occasionally?”

c. Both society SSS and community SSS are represented by a 10-rung ladder. The society SSS ladder asks adolescents to locate their parents in relation to the rest of Mexican society. The community SSS ladder asks adolescents to rank themselves in comparison to their group of friends. A 10 represents those with the highest ranking. A 1 represents those with the lowest ranking.

Table 5 Multiple logistic regression analyses of current smoking and current drinking on socio-demographic characteristics (odds ratios, robust 95% confidence intervals) in a sample of Mexican urban adolescents living in poverty (n=5,695)

	<u>Current Smoker</u>		<u>Current Drinker</u>	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Community SSS	1.05** (1.02 - 1.09)	1.04* (1.00 - 1.08)	1.04** (1.01 - 1.06)	1.03* (1.00 - 1.06)
Society SSS	0.95*** (0.92 - 0.97)	0.96* (0.93 - 0.99)	0.96*** (0.93 - 0.98)	0.97* (0.94 - 0.99)
Mother's Education <sup>a</sup>				
Elementary		1.32** (1.08 - 1.62)		1.17 (0.96 - 1.41)
Secondary		1.41* (1.05 - 1.89)		1.30 (0.95 - 1.78)
University		2.27*** (1.41 - 3.63)		1.51 (0.83 - 2.72)
Household Expenditure <sup>b</sup>				
Medium		1.17 (0.96 - 1.42)		1.26** (1.07 - 1.47)
High		1.27* (1.01 - 1.60)		1.32*** (1.11 - 1.56)
Gender (1=female)		0.20*** (0.16 - 0.23)		0.38*** (0.33 - 0.44)

Age (years)	1.17*** (1.13 - 1.22)	1.23*** (1.19 - 1.28)
School Dropout (1=yes)	1.90*** (1.60 - 2.26)	1.53*** (1.35 - 1.74)
Father Present (1=yes)	0.88 (0.74 - 1.04)	0.99 (0.87 - 1.14)
Parental Alcohol Abuse (1=yes)	1.30** (1.05 - 1.60)	1.34** (1.08 - 1.65)

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\*Significant at 5%; \*\* significant at 1%; \*\*\*significant at 0.1%

All models control for clustering at the neighborhood level.

a. Maternal education was broken down into indicator variables—some elementary, some secondary, and some university. These variables are in contrast to the reference category of no education.

b. Total household expenditures were divided into tertiles. The medium and high tertiles are in contrast to the lowest tertile.

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## CHAPTER 3

### ADOLESCENT SOCIAL POSITION AND OBESITY-RELATED BEHAVIORS: WHO ARE THE MOST AT-RISK AMONG THE POOR?

#### Abstract

**Purpose:** This cross-sectional study examines multiple dimensions of social position in relation to obesity-related behaviors in an urban adolescent population from households within the bottom 20<sup>th</sup> percentile of income distribution in Mexico. Multiple objective and subjective measures of social position are used including parental education, household expenditures, community and society subjective social status, and school dropout status.

**Methods:** A total of 5321 Mexican adolescents, aged 12-22 years, provided information on obesity-related behaviors and indicators of adolescent subjective and objective social position in a house-to-house survey in 2004. A parent in each household provided information on socioeconomic status at the parental and household levels. The adolescent sample is representative of households living within the bottom quintile of income within seven Mexican states.

**Results:** Ordinal logistic regressions are used to estimate the associations of parental, household and adolescent indicators of social position and obesity risk. Adolescents who perceived themselves as higher in social status in reference to their local community and those who had not dropped out of school had lower odds of having adopted obesity-related behaviors. We found no significant association between obesity risk and parental education or household expenditures.

**Conclusion:** This study provides evidence for an inverse association between subjective social position and obesity risk among Mexican adolescents living in poverty. Adolescents with higher relative social position, based on youth-specific measures, are less likely to be at-risk for obesity than those with lower relative social position.

## Introduction

Obesity, a serious chronic condition (1), is rapidly increasing worldwide, even among countries previously considered to be “developing” (2, 3). In low-income countries, defined as having a per capita gross domestic product (GDP) <\$2500 USD (4), socioeconomic status (SES) is positively associated with the prevalence of obesity (5). In upper-income countries, however, the poor have a disproportionate likelihood of being obese and suffering from higher incidences of obesity-related morbidity and mortality (5). In other words, the overall pattern between social position as measured by SES and obesity shifts from being positive in low-income countries to negative in high-income countries (6). Within upper-middle-income countries undergoing a nutritional and economic transition, including Mexico, Turkey, Brazil and Chile, there is evidence of a negative association between socioeconomic status and obesity (7). Obesity is already present in a large segment of the Mexican population (8). It is estimated that between 24% and 43% of the adult population in Mexico is overweight or obese (5). Underlying the trends in overweight and obesity within developing countries, such as Mexico, are increases in availability and consumption of high fat and refined carbohydrate products, snack foods and high calorie sodas, declines in physical activity, and increases in time spent on sedentary behaviors associated with mass media technology (2, 7, 9, 10).

Few studies have examined sub-populations within middle-income countries to determine whether it is the GDP of the country or the income level of the sub-population that best reflects the patterns of association between social position and obesity. In one study of rural pre-school children living within the lowest quintile of income within Mexico, increased risk of obesity and overweight was associated with lower maternal social position (11). This is similar to the pattern of association found between social position and obesity within upper-middle-income countries. In contrast, a study conducted on adults in rural Mexico, aged 18-65, also living within the lowest quintile of income, found a higher prevalence of overweight or obesity among those with a relatively higher social position (12). These studies suggest that even within socioeconomically homogenous sub-populations within Mexico, there are meaningful socioeconomic gradations associated with obesity that are inconsistent with the national patterns determined by Mexico’s GDP.

While these two studies examined the links between obesity and social position among Mexican children and Mexican adults, there are no published studies that have looked at the association between social position and obesity risk within a low-income adolescent population in Mexico. Adolescence is the transitional period from childhood to adulthood. It is possible that adolescent social status may not only be influenced by the SES of the family of origin, but by their peer networks as well (13). Detectable variations in social position among Mexico’s poor adolescents may provide us with a clue as to who is the most at-risk population among this already high-risk group.

To examine this question, we studied a sample of urban adolescents from households defined as being in the bottom 20<sup>th</sup> percentile of the income distribution in Mexico and examined multiple dimensions of social position in relation to obesity-related behaviors. We aim to identify the adolescents at highest risk of reporting having adopted obesity-related behaviors, including the consumption of sweetened, carbonated beverages and high calorie, low nutrient food, television viewing, and lack of physical activity. Evidence consistently shows that these behaviors are independently linked with obesity (2, 7, 14, 15). We are including multiple

measures of social position—parental education, household expenditures, community and society subjective social status, and school dropout status—as each captures unique aspects of the multi-dimensional nature of social position (16). We hypothesize that the association between social position and risk behaviors in this low-income sample will be positive (see Figure 1), matching the pattern seen among the low-income adult population of Mexico (12), and within other low-income populations within upper-middle-income countries, such as Brazil (17).

By helping to explain the links between social position and obesity among the poor, this study provides insight into the pathways between relative deprivation and health-related outcomes among adolescents. Results from the Mexican National Health Survey 2000 indicate that up to 19% of Mexican adolescents aged 10 to 17 were classified as overweight or obese according to the percentiles from both the Centers of Disease Control and Prevention and the International Obesity Task Force (18). By 2006, according to the National Survey for Health and Nutrition, up to 23% of Mexican adolescents aged 12 to 19 were considered overweight or obese (19). Obesity and overweight during adolescence are highly predictive of serious health risks throughout adulthood, including adult obesity and numerous preventable diseases, such as diabetes, hypertension and cardiovascular disease (1, 20). Furthermore, the prevalence of overweight and obesity is increasing among Mexico's poor population (18). The identification of high-risk adolescent populations within countries undergoing nutritional transitions may help inform interventions to prevent obesity and its associated co-morbidities during adulthood.

## Methods

### *Procedure (study design and sampling)*

This cross-sectional study used data from the 2004 evaluation of the Mexican government's poverty alleviation program, Oportunidades. In the 2004 program, urban areas (defined as having 50,000 to 1 million inhabitants) within seven states in Mexico, with the highest density of eligible households ( $\geq 500$ ) were selected and matched to comparison areas for evaluation purposes. Following this process, a random set of census tracts was identified within the areas with probability proportional to size. From this sample of 204 urban areas, a sub-set of 157 areas was selected for the adolescent risk behavior component. Each household was visited up to three times to identify adolescents and young adults, aged 12-22, heretofore referred to as adolescents, and to collect household SES and adolescent risk behavior data. A total of 7900 adolescents were identified. Of this group, 6,929 (75%) had complete questionnaire, parental, household and neighborhood data.

Approval for the 2004 study was obtained by the Research Committee at the National Institute of Public Health in Mexico, and by the Committee on the Protection of Human Subjects at the University of California at Berkeley. A detailed explanation of the survey procedures was given and an informed consent declaration was obtained prior to participation. Both parental consent and youth assent were obtained for adolescents under 16 years of age. Data for the adolescent survey were collected using an audio-computer assisted self-interview system. A supplemental survey on household and parental socioeconomic status was also administered to the parents.

Adolescent survey data included information on obesity-related behaviors, social position (community and society subjective social status, and school dropout status), and demographic characteristics). Adolescents who were outside of the age range of 12 to 22 years ( $n=2$ ) did not

meet our study criteria and were excluded from analysis. Further, adolescents missing data on society subjective social status (n=272), community subjective social status (n=358), school dropout status (n=139) and ethnicity (n=846) were excluded from the final sample. Our final sample for this analysis included 5321 adolescents (77% of the original sample). Compared to adolescents who were included in the study, those that were excluded due to incomplete data were more likely to be female (p=0.001), be older (p<0.0001), indigenous (p=0.018), school dropouts (p<0.0001), have less educated parents (p<0.0001), and more likely to have lower community social status scores (p=0.0387).

### *Measures*

#### *Adolescent socioeconomic position (adolescent self-report):*

*Perceived social position indicators.* A modified version of the Subjective Social Status (SSS) Scale-Youth Version was completed (21). Several 10-rung ladders were depicted, one of which was the standard SSS scale, while the others were new for this 2004 evaluation study. For the ladder scales, the top represents those with the highest ranking and the bottom represents those with the lowest ranking. The standard *Society SSS* question asked adolescents to make a relative comparison on the rich-to-poor ladder scale of their current household with “all households in Mexico.” A second question, *Community SSS*, asked adolescents to rank themselves compared to their close group of friends.

*Objective social position indicator.* Adolescents were also asked whether they had dropped out of school (yes/no).

#### *Sociodemographic covariates (adolescent self-report):*

Adolescents provided data on age (continuous), sex (male/female) and indigenous status (does or does not speak an indigenous language).

#### *Objective parental and household socioeconomic position (from parents' survey):*

*Maternal and paternal education.* Maternal and paternal education were first categorized into dichotomous variables: high school education or above (yes/no). Subsequently these categories were pooled to create a new 3-category indicator of parental high school education attainment: neither parent, one parent, both parents.

*Total monthly household expenditure.* Total monthly household expenditures were estimated by adding parents' reports of 'household reported weekly expenditure on food items', 'monthly expenditure on services and short term goods,' and 'other expenditures', and was divided into quartiles (0-25%, 26-50%, 51-75%, 76-100%).

#### *Adolescent obesity-related behaviors (adolescent self-report):*

Adolescents were asked how many bags of chips, packets of cakes or sweet breads and packets of sweets they consumed and how many sodas during the prior day. The authors made

two binary variables: junk food consumption (yes/no) and soda consumption (yes/no). One or more pieces of junk food and one or more sodas were respectively used to distinguish consumption from no consumption. Regarding sedentary behavior, adolescents were asked the number of hours they watched television during their last viewing. Adolescents who reported viewing television 3 hours or more were classified as television watchers. Adolescents were also asked the number of days they exercised during the previous week. A dichotomous variable was created, categorizing adolescents into those who reported ever having exercised during the previous week and those who did not. These four obesity-related behaviors were then combined to create an *obesity risk index* based on the adoption of 0-2, 3 or 4 of these behaviors.

### *Statistical analysis*

Statistical analyses were conducted using STATA 10.1 (STATA Corporation, College Station, TX). Descriptive statistics were generated of the study sample, and we calculated the proportion of adolescents within each obesity-related behavior category according to the obesity risk index categories.

To examine the associations between the obesity risk index and sex, indigenous status, school dropout status, parental high school education, and household expenditures, we conducted chi-square analyses. The difference in the proportion of adolescents within each above-mentioned covariate category was calculated according to whether they were classified as having adopted 0-2, 3 or 4 obesity-related risk behaviors. Analysis of variance (ANOVA) was used to determine the difference in mean age, society SSS, and community SSS according to each of the 3 obesity risk index categories. Spearman correlations were run to examine the correlations between each of the social position indicators, with the exception of school dropout status. The bivariate associations between school dropout status and the other social position indicators were examined using Kruskal-Wallis equality-of-populations rank tests for continuous indicators and chi-square analyses for categorical indicators.

To examine the association between the 3-category obesity risk index (0-2, 3, or 4 behaviors) (dependent variable), and social position (independent variables), we used ordinal logistic regression analyses. The first model examines the independent association between parental and household social position indicators and the obesity risk index. The second model examines the association between school dropout status, an objective adolescent measure, and obesity risk. The third model examines the association between adolescent SSS and obesity risk. The final model includes all social position indicators. All analyses controlled for age, sex, indigenous status, welfare status (adolescents from recipient households of the Mexican government's poverty alleviation program, "Oportunidades"), the fixed effect of state (adolescent residency in one of seven sample states in Mexico), and clustering at the neighborhood level.

## **Results**

### *Description of Study Variables*

The mean age of the sample is  $17.11 \pm 2.04$  years and has slightly more females (52.18%) than males (Table 1). Only 4.22% of the sample is indigenous and 44.73% of adolescents are school dropouts. For 74.74% of the sample, neither parent has received a high



school education, compared to 6.14%, for whom both parents had a high school education. The mean ranks for society and community SSS are 5.36 (SD=2.35) and 5.04 (SD=2.36), respectively.

Over half of the adolescents in our sample (55.74%) reported zero to two obesity-related behaviors, 28.20% reported three behaviors and 16.06% reported having adopted all four obesity-related risk behaviors. Of those who reported adopting three of the four behaviors, 100% of them included soda consumption (Table 2).

More obesity-related risk behaviors were reported in females compared with males ( $p<0.0001$ ) and in non-indigenous adolescents compared with indigenous ones ( $p<0.0001$ ) (Table 3). Age was not associated with obesity risk. More obesity-related behaviors were reported in adolescents who had dropped out of school compared with those who had not ( $p<0.0001$ ). Obesity risk behaviors were not significantly related to adolescents' parents' high school education, household expenditures, or society SSS. However, a greater number of obesity risk behaviors were associated with a lower mean community SSS score ( $p\text{-value}<0.0001$ ).

#### *Correlates of Social Position Indicators*

According to Bonferroni-adjusted Spearman correlations in Table 4, all presented indicators of social position, with the exception of society SSS, had small to moderate significant correlations ( $p<0.05$ ) with each other. Society SSS was only significantly correlated with community SSS ( $r=0.25$ ). According to Kruskal-Wallis equality-of-populations rank tests in our sample (results not shown), school dropout status is significantly associated with community SSS ( $p=0.0001$ ). Based on Chi-square tests (results not shown), school dropout status is significantly associated with parental high school attainment ( $p<0.0001$ ) and total monthly household expenditures ( $p<0.0001$ ).

#### *Associations between Social Position and Obesity Risk Index*

According to ordinal logistic regression analyses (Table 5), the first model shows no significant association between parental education, household expenditures and the obesity risk index. In the second model that examined the association between school dropout status and obesity-risk, adolescents who had dropped out of school had increased odds of obesity risk (OR=1.47; 95% CI: 1.31 - 1.65). In the third model that explored the association between society and community SSS and obesity-risk, lower community SSS rank was associated with an increased risk for obesity-related behaviors (OR: 0.95; 95% CI: 0.93-0.98). In the final model, which simultaneously controlled for all social position indicators, school dropout status (OR=1.43; 95% CI: 1.27-1.62) and community SSS (OR=0.96; 95% CI: 0.94-0.99) remained significant. No other indicators showed a significant association with obesity risk. All models controlled for age, sex, indigenous status, welfare status, fixed effect of state, and clustering at the community level. There was no effect modification of the social position-obesity risk associations by age, gender and ethnicity in any of the regression analyses.

## **Discussion**

Previous studies have shown that even within socioeconomically homogeneous cohorts, there are meaningful socioeconomic gradations associated with obesity. Yet, the direction of this association is unclear in middle-income countries undergoing a rapid nutritional and economic transition and few studies have examined these relationships among adolescents. This study tested the hypothesis that increased risk of obesity, as measured by obesity-related behaviors, is associated with a relatively higher social position among poor adolescents in urban Mexico. A similar pattern of associations was found among poor adults in rural Mexico (12).

Our findings show that within the poorest quintile of the urban Mexican adolescent population, both objective and subjective measures of adolescent social position are associated with adolescent obesity-related behaviors. Yet, contrary to our hypothesis, increased risk of obesity was associated with a lower social position. Specifically, school dropout status, a measure of objective social position, and perceived lower status within the adolescent's community (community SSS) were independently associated with an elevated risk of obesity-related behaviors, with school dropout status having the strongest association. Our findings are consistent with results among adult cohorts at the national level in Mexico (7), and in other upper-middle income countries such as Brazil, Turkey and South Africa (7) using body mass index to assess obesity status and quartiles of years of education to assess SES. However, our results are not in agreement with study findings of low-income Mexican adults living in rural areas (12). The difference in findings may in part reflect differences in meaning of social position measures in different urban/rural contexts (16). For example, rural Mexico may more closely resemble the nutritional profile of low-income countries, where obesity risk is linked to higher SES (5, 22). Divergent findings may also be explained by differences in development between adolescents and adults.

The underlying differences in meaning that we attribute to measures of social position within given social hierarchies may also be a function of age and specificity (16). Notably, only youth-specific measures of adolescent social position maintained their independent association to obesity risk in our study. Unlike a previous study (11) that explored the relationship between risk of obesity and maternal social position among preschoolers living in Mexico, parental education and household expenditures did not uniquely contribute to obesity risk among adolescents in the multivariable models that we tested. Our findings are consistent with other cross-sectional studies of adolescents. For example, one study of public school students in Morelos, Mexico, aged 11-19, found that a composite SES indicator, based on household belongings and parental income, was not correlated with body mass index, while the adolescents with more years of education were less likely to be overweight (23). Another study, conducted in the United States, among a relatively homogenous cohort of youth on the upper SES spectrum, attending an urban public junior high and high school from the same school district, found that after controlling for age, school site, number of people in the house and race-by-sex group, parental education and household income were not significantly associated with obesity. In contrast, adolescents' perceived community standing within the school was significantly inversely associated with obesity (24). That this study found obesity risk associated with adolescent measures of social position as opposed to household and parental measures of social position provides additional evidence for the importance of the more proximate and specific influence of peer networks on adolescent social position (13, 24).

If in fact further research in diverse settings continues to demonstrate that youth-specific measures of their social position are more important determinants of health than measures of parental social position, this would suggest that adolescents are more likely to locate themselves

in the social hierarchy in relation to where they stand vis a vis their peers rather than their parents. This would have important implications for research since difference in findings between parental and household measures of social position and youth-based measures may suggest the presence of misclassification bias.

Finally, our findings also demonstrate that social stratification, as measured by perceived social status, is able to detect nuanced variations in social position that may go undetected when using standard measures of social position among relatively homogenous socioeconomic cohorts. This is consistent with another study, using the same Mexican adolescent cohort, which found a more consistent association between measures of perceived social status and substance use than standard objective measures (13). Our study provides evidence of the utility of subjective measures of social position when studying socioeconomic variations in a group with little socioeconomic variability.

Some clear limitations are evident in this study. First, extensive questions regarding dietary intake, physical activity and sedentary behavior were not included in the house-to-house survey. We relied on self-reported measures and dietary recall was based on the previous day. We used junk food and soda consumption as a proxy for dietary intake, exercise during the past week as a proxy for physical activity, and time spent watching television as a proxy for sedentary behavior. These measures are not as sensitive as measures of caloric intake, fitness and more detailed measures of sedentary behavior. Second, due to the adolescents dropped from the study, the effect of social position on obesity risk might be conservative, underestimating the association between low social position and increased risk of obesity-related behaviors. Third, the findings are limited in generalizability to Mexican adolescents living in the bottom twentieth percentile of wealth in urban areas in Mexico. Fourth, due to the cross-sectional nature of our study, we cannot determine the direction of the associations.

In conclusion, this study suggests an inverse social gradient in adolescent obesity risk among this socioeconomically homogenous cohort, based on objective and subjective youth-specific measures of social position. It provides additional evidence that different measures of social position capture unique dimensions of relative rank, and that measures of adult social position may be subject to misclassification bias if used to capture adolescent social position. More research is needed to establish youth-specific measures of social position, and to understand the links between social position and obesity among adolescent cohorts in diverse socioeconomic and national contexts.

Figure 1. A Psychosocial Model for Obesity Risk among the Poor during Adolescence

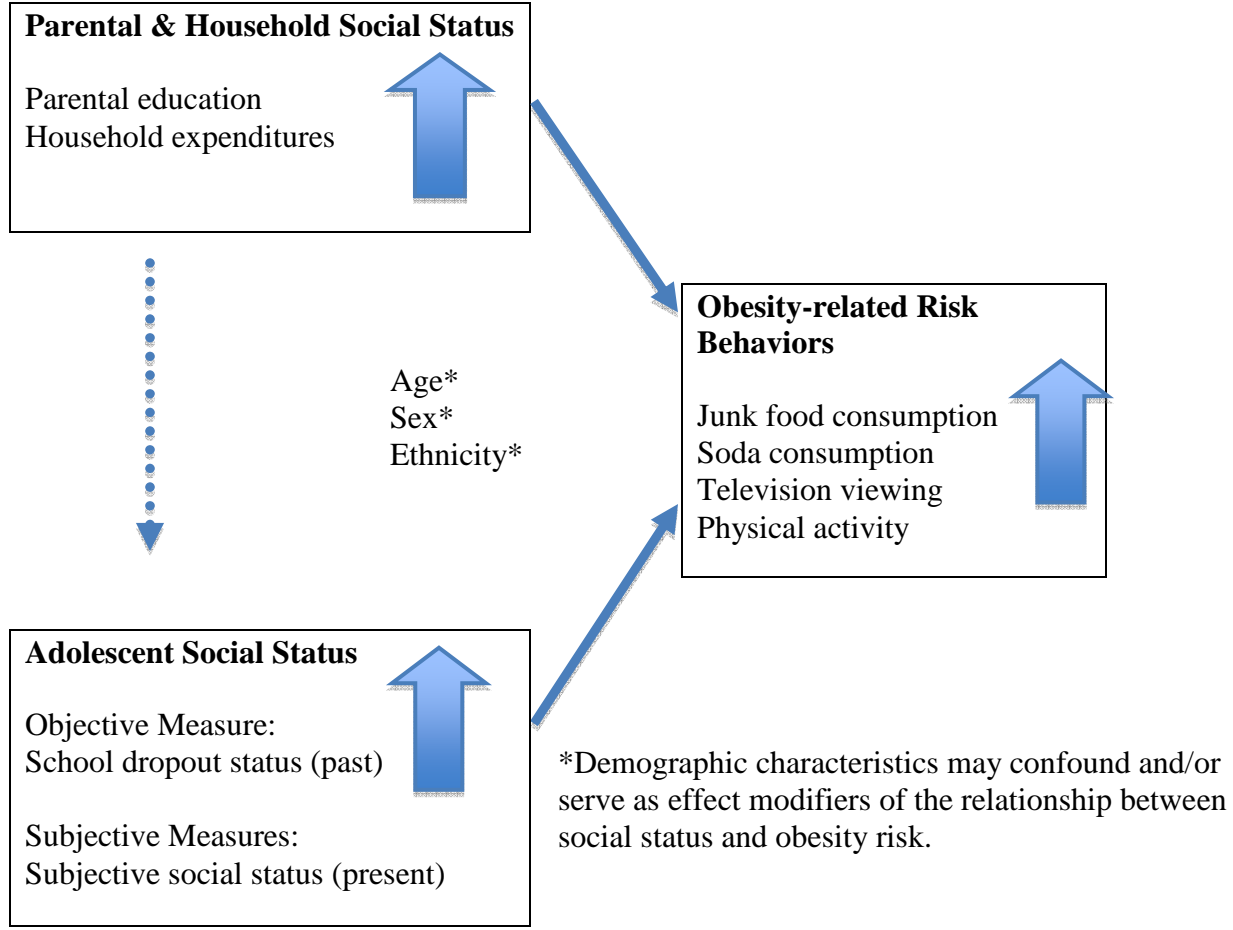


Table 1: Demographic and social position measures of adolescent study participants (n=5321)

Covariates	Total (%)	Mean (SD) <sup>b</sup>
<b>Demographic Characteristics</b>		
Age (12-22 years)		17.11 (2.04)
<b>Sex</b>		
Male	2540 (47.82)	
Female	2772 (52.18)	
<b>Indigenous</b>		
No	5088 (95.78)	
Yes	224 (4.22)	
<b>Adolescent Social Position Indicators</b>		
<b>Adolescent Dropout Status</b>		
No	2936 (55.27)	
Yes	2376 (44.73)	
Society SSS <sup>a</sup> (1-10)		5.36 (2.35)
Community SSS <sup>a</sup> (1-10)		5.04 (2.36)
<b>Parental and Household Social Position Indicators</b>		
<b>Parents High School Education</b>		
Neither	3970 (74.74)	
One	1016 (19.13)	
Both	326 (6.14)	
<b>Household Expenditures</b>		
0-25	1323 (24.91)	
26-50	1299 (24.45)	
51-75	1364 (25.68)	
76-100	1326 (24.96)	

a. Both society SSS and community SSS are represented by a 10-rung ladder. The society SSS ladder asks adolescents to locate their family in relation to other families in Mexican society. The community SSS ladder asks adolescents to rank themselves in comparison to their group of friends. A 10 represents those with the highest ranking and a 1, those with the lowest ranking.

b. Standard deviation (SD)

Table 2: Proportion (%) of obesity-related risk behaviors within each category of the obesity risk index (n=5321)

Obesity Risk Index	Total	Four Obesity-related Behaviors							
		Junk food		Sodas		TV		Exercise	
		None	$\geq 1$	None	$\geq 1$	<3 hrs	$\geq 3$ hrs	No	Yes
0-2 behaviors	2961	55.35	44.65	58.05	41.95	58.97	41.03	47.32	52.68
3 behaviors	1498	31.44	68.56	0.00	100.00	30.64	69.36	62.08	37.92
4 behaviors	853	0.00	100.00	0.00	100.00	0.00	100.00	100.00	0.00

Binary variables were made to categorize aspects of adolescents' diet, sedentary behavior and physical activity level. Junk food was based on reported quantity of chips, cakes, sweet breads and sweets consumed yesterday. Soda was based on reported number of sodas consumed yesterday. Television viewing was used to capture sedentary behavior and was categorized by the number of hours the adolescent reported watching during their last viewing. Exercise was defined as adolescent report of physical activity on any day during the previous week.

Table 3: Chi-square and analysis of variance tests show bivariate associations between covariates and obesity risk (n=5321)

Covariates	Obesity Risk Index <sup>a</sup> (0-2 vs. 3 vs. 4 Risk Behaviors)			p-value <sup>c</sup>
	0-2 n (%) <sup>b</sup>	3 n (%)	4 n (%)	
Total	2961 (55.74)	1498 (28.20)	853 (16.06)	
Sex				<0.0001
Male	1410 (47.62)	774 (51.67)	356 (41.74)	
Female	1551 (52.38)	724 (48.33)	497 (58.26)	
Indigenous				<0.0001
No	2808 (94.83)	1456 (97.20)	824 (96.60)	
Yes	153 (5.17)	42 (2.80)	29 (3.40)	
Adolescent Dropout Status				<0.0001
No	1745 (58.93)	811 (54.14)	380 (45.55)	
Yes	1216 (41.07)	687 (45.86)	473 (55.45)	
Parents High School Education				0.379
Neither	2188 (73.89)	1123 (74.97)	659 (77.26)	
One	586 (19.79)	286 (19.09)	144 (16.88)	
Both	187 (6.32)	89 (5.94)	50 (5.86)	
Household Expenditures				0.368
0-25	739 (24.96)	354 (23.63)	230 (26.96)	
26-50	732 (24.72)	263 (24.23)	204 (23.92)	
51-75	776 (26.21)	379 (25.30)	209 (24.50)	
76-100	714 (24.11)	402 (26.84)	210 (24.62)	
	mean (SD) <sup>b</sup>	mean (SD)	mean (SD)	p-value <sup>d</sup>
Age (12-22 years)	17.10 (2.04)	17.11 (2.03)	17.18 (2.02)	0.5519
Society SSS (1-10)	5.40 (2.34)	5.32 (2.31)	5.28 (2.42)	0.3137
Community SSS (1-10)	5.16 (2.40)	4.97 (2.28)	4.75 (2.33)	<0.0001

a. The obesity risk index is based on the number of obesity risk behaviors (0-2, 3, or 4) adopted by the

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given adolescent. The behaviors used to create the index are: consumption of 1 or more sodas yesterday; consumption of one or more servings of junk food yesterday, watching 3 or more hours of television during the last viewing, and not exercising at all during the past week.

- b. Sample size (n); proportion (%); standard deviation (SD)
- c. Chi-square tests were used to determine the proportion of adolescents within each obesity risk category according to the categories of each categorical variable.
- d. Analysis of variance (ANOVA) was used to determine whether continuous covariates differed across categories of obesity risk. All values have 2 degrees of freedom.

Table 4: Spearman correlations between multiple social position indicators and the index of obesity risk (n=5321)

Social Position Indicators	1	2	3	4
1. Society SSS	1.00			
2. Community SSS	0.25*	1.00		
3. Parental High School	0.02	0.11*	1.00	
4. Household Expenditures	0.04	0.11*	0.13*	1.00

\*p<0.05 (Bonferroni-adjusted p-values)



Table 5: Ordinal Logistic Regression Analyzes of the associations between multiple indicators of social position and the obesity risk index with 3 behavior categories: 0-2, 3, or 4 † (n=5321)

Social Position Variables	Parental and Household	Adolescent (objective)	Adolescent (subjective)	All Indicators
<b>Parental and Household Social Position Indicators</b>				
Household Expenditures (reference=0-25%)				
26-50%	0.93 (0.79 - 1.09)			0.94 (0.81 - 1.10)
51-75%	0.89 (0.76 - 1.05)			0.94 (0.80 - 1.11)
76-100%	0.97 (0.82 - 1.13)			1.02 (0.88 - 1.20)
Parental High School (reference=neither)				
One Parent	0.92 (0.78 - 1.08)			0.97 (0.83 - 1.15)
Both Parents	0.91 (0.72 - 1.15)			1.01 (0.80 - 1.26)
<b>Objective Adolescent Social Position Indicator</b>				
School dropout status (reference=no)		1.47** (1.31 - 1.65)		1.43** (1.27 - 1.62)
<b>Subjective Adolescent Social Position Indicators</b>				
Society SSS (continuous)			1.00 (0.97 - 1.02)	0.99 (0.97 - 1.01)
Community SSS (continuous)			0.95** (0.93 - 0.98)	0.96** (0.94 - 0.99)

Odds ratios (OR) and robust 95% confidence intervals in parentheses

\*\* p<0.01, \* p<0.05

All models controlled for age, sex, indigenous status, fixed effect of state, Oportunidades-recipient status, and clustering at the neighborhood level. †The outcomes for the three ordinal logistic regression models are the obesity risk index based on number of obesity risk behaviors (0-2, 3, or 4).

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## CHAPTER 4

## PERCEPTION OF SOCIAL MOBILITY: DEVELOPMENT OF A NEW PSYCHOSOCIAL INDICATOR ASSOCIATED WITH ADOLESCENT RISK BEHAVIORS

### Abstract

Social class gradients have been explored in adults and children, but not extensively during adolescence. The first objective of this study was to examine the association between adolescent risk behaviors and a new indicator of adolescent relative social position, adolescent “*anticipated social mobility*.” Second, it investigated potential underlying demographic, socioeconomic and psychosocial determinants of this indicator. Data were taken from the 2004 urban adolescent module of *Oportunidades*, a cross-sectional study of Mexican adolescents living in poverty. *Anticipated social mobility* was calculated for each subject by taking the difference between their rankings on two 10-rung ladder scales that measured (1) projected future social status and (2) current subjective social status within Mexican society. Adolescents with higher *anticipated social mobility* were significantly less likely to report alcohol consumption, drinking with repercussions, compensated sex, police detainment, physical fighting, consumption of junk food or soda, or watching  $\geq 4$  hours of television during the last viewing. They were significantly more likely to report exercising during the past week and using a condom during last sexual intercourse. These associations remained significant with the inclusion of covariates, including parental education and household expenditures. Multiple logistic regression analyses show higher *anticipated social mobility* to be associated with staying in school longer and having higher perceived control. The present study provides evidence for the usefulness of *anticipated social mobility* as an indicator for understanding the social gradient in health during adolescence. This research suggests the possibility of implementing policies and interventions that provide adolescents with real reasons to be hopeful about their trajectories.

### Introduction

### *Social gradient in health during adolescence*

There is substantial evidence of a social gradient in many measures of physical and mental health among adults (1, 2) and young children (3, 4). Less is known about the associations between social position and health during adolescence, generally defined as individuals between the ages of 12 and 22, and existing findings are inconsistent (5-7). Assessment of subjective status has provided evidence for negative social gradients in health during adolescence for some physical, psychological and behavioral health indicators, including overweight /obesity (8, 9), self-rated health (10), depressive symptoms (8, 11), and substance use (12, 13). Other studies have shown “equalization” occurring during adolescence, in which class-based differences that exist during childhood disappear during adolescence only to reemerge in adulthood (5).

Various explanations have been offered for the relative absence of an effect of social class as measured by objective indicators—such as occupational grade, educational attainment level and income—on adolescent health: First, adolescent class identity may be less influenced by differential access to material resources (e.g. income), and more influenced by social processes associated with social position such as national educational systems, meritocratic structure, redistributive policies, peer structures (14), cultural norms and values, and future expectations (15). Second, while household and parental indicators of SES may be useful proxies for the social status of infants and younger children, they may be less appropriate in assessing adolescent social position and social and economic resources; adolescents may already have attained a different social position than that of their parents, such as a different educational attainment level or occupational grade (12). Adolescents are in a transition between being defined by their parents’ social position and by their own. It is possible that adolescent social status may be influenced not only by the socioeconomic status of the family of origin and current status, but also by projections of a potential future socioeconomic trajectory (15), yet no studies to date have examined the associations between adolescent anticipated social position and health.

### *Intergenerational social mobility and adolescent health*

“Social mobility” has been defined as a shift made by individuals from one level of social status to another within a given social hierarchy. Adolescents’ evaluations of their socioeconomic position may not only consist of a cognitive averaging of external measures of their current socioeconomic status, but may also involve additional factors that could affect their perceptions of their future opportunities (Figure 1). These factors, which may be associated with social disadvantage, include demographic characteristics, such as dropping out of school, and developmental shifts and psychosocial factors involving social relationships (e.g. network support) and psychological resources (e.g. perceived control) (10).

Change in social standing can occur between and within generations (16). Intergenerational social mobility involves the social status of the target person and their parents and is measured by parent-child differences in income, educational attainment and/or occupation. Several studies have found upward social mobility among adolescents and young adults in relation to their parents to be associated with better self-reported health (17), lower tobacco smoking (18-20), alcohol consumption (19, 20), consuming a high fat diet (19, 20), and eating sweets each day (19) and with a higher likelihood of being physically active (19). Some studies

found no association between upward social mobility and smoking prevalence (20), alcohol consumption (20), and body mass index (21).

Attempts to measure the association between intergenerational mobility and health and risk behaviors among adolescents and young adults present numerous methodological complications, which may explain the pattern of inverse trends (17-19), or mixed results or no association (19-21) found in both cross-sectional and prospective cohort studies. First, measures of intergenerational mobility during adolescence and early adulthood should be regarded as provisional, since young participants, as young as 16-23 years (17-21) may still be attaining their education or establishing a career path; their socioeconomic trajectory from childhood to adulthood may not yet be determined. A second limitation is that indicators of parental and adolescent socioeconomic status can be incomparable. There is a range of ways to calculate intergenerational social mobility, involving both the SES of the parent/legal guardian and that of the adolescent or young adult. Some studies attempt to calculate intergenerational social mobility by classifying both the parent and the young participant into the same social status categories (e.g. non-university versus university or manager/professional versus non-manager/professional) (18, 21). This is a complicated issue. For example, if a participant is in school and does not yet have an occupation, they may be asked to state the occupation for which they are studying (21). This may not be relevant for many adolescents and young adults, as secondary education and some college degrees do not prepare individuals for a specific occupation. Other studies may use completely distinct social status categories or indicators. For example, one study calculated intergenerational occupational social mobility by comparing the occupation of the parent (upper white collar, lower white collar, blue collar or farmer) to the educational achievement and type of educational training of the young participant (e.g. vocational or not; school dropout or not) (19). When intergenerational social mobility is determined using different measures of social status, the estimated difference between the two social positions is not directly comparable (22). No measures of anticipated social mobility have been used in epidemiologic research. Such measures may overcome the abovementioned methodological limitations that arise when using objective measures of social mobility.

### *Present study*

This paper presents data on a new adolescent psychosocial measure, developed to overcome the methodological limitations of standard measures of intergenerational social mobility and to examine the association between anticipated intergenerational social mobility and health-related behaviors during adolescence. We assess the association between adolescent *anticipated social mobility* and twelve risk behaviors. We further explore the extent to which these associations can be explained by conventional measures of socioeconomic position, such as maternal and paternal education and total monthly household expenditures per person. We also investigate potential demographic, socioeconomic and psychosocial factors involved in the process of anticipating upward mobility versus stagnation or lower future status. The specific aims of the study are: 1) to establish whether *anticipated social mobility* is associated with adolescent risk behaviors; and 2) to identify socioeconomic, demographic, and psychosocial factors that may determine adolescent *anticipated social mobility*. Findings may inform the discussion of how to reduce health inequities in adolescence and early adulthood.

## **Methods**

### *Procedure (study design and sampling)*

The analyses use data gathered in 2004 for the evaluation of a poverty alleviation program in Mexico. All data were collected using an audio-computer assisted self-interview system, supplemented with a socioeconomic household questionnaire. The survey included 157 urban (defined as having 50,000 to 1 million inhabitants) towns in seven states in Mexico. Households were selected first, using census data for all census tracts. Areas with 500 or more eligible households were identified, and a sample of those with the highest density of eligible households was selected and then matched to comparison areas for evaluation purposes. Following this process, a random set of census tracts was identified within the areas with probability proportional to size. From this sample of 204 urban areas, a sub-set of 157 areas was selected for the adolescent risk behavior component. Up to three visits were made to each household in these areas to collect data on household SES as well as data on adolescent risk behavior. A total of 7900 adolescents, aged 12-22 years of age, were identified in this way. Of this group, 6,929 (75%) had complete questionnaire, parental, household and neighborhood data.

We used data from the general household survey on household and parental SES as well as data from the adolescent survey. The survey included adolescent objective and subjective indicators of social position (current and future subjective social status, school dropout status, paid job), adolescent psychosocial characteristics (perceived control, team or group membership, social support), and adolescent demographics (age, sex). Adolescents who were married (n=212), had children (n=788) or were outside of the age range of 12 to 22 years (n=2) did not meet our study criteria and were excluded from analysis. Further, adolescents missing data on perceived social mobility (n=564), school dropout status (n=100), paid work (n=47) and group membership (n=27) were excluded from the final sample. Our final sample for this analysis included 5189 adolescents (75%) of the original sample). We compared the adolescents with and without social mobility data. Those missing data were more likely to be older by 2.6 months on average, to have dropped out of school, to have parents with less than a primary education, to have lower perceived control and less social support, to be more likely to have used a condom during last sexual intercourse, to have watched over four hours of television during their last viewing, and to be less likely to exercise. There were no significant differences by sex, paid job, household expenditures, team or group membership, substance-related behaviors, sexual activity, compensated sex, deviant behaviors, and diet.

The study was approved by the Research Committee at the National Institute of Public Health in Mexico, and by the Committee on the Protection of Human Subjects at the University of California at Berkeley. Participants were invited to take part in the 2004 study after receiving a detailed explanation of the survey procedures and signing an informed consent declaration. If the adolescent was under 16 years of age, parents were asked to provide consent and the adolescent was asked to provide assent.

### *Measures*

*“Anticipated Social Mobility”* (adolescent self-report)

A modified version of the Subjective Social Status (SSS) Scale-Youth Version was completed (8). Several 10-rung ladders were depicted (see Appendix), one of which was the

standard SSS scale, while the others were new for this study. For all of the ladder scales, the top represents those with the highest ranking, the richest households, and the bottom represents those with the lowest ranking, the poorest households. The standard SSS question asked adolescents to make a relative comparison on the rich-to-poor ladder scale of their current household with “all households in Mexico.” A second question asked adolescents to think of the family they will have in the future (i.e. spouse and children), and to make a prediction of how their future nuclear household will compare with “all households in Mexico.” No time period in the future was specified.

The authors calculated *anticipated social mobility* within the society as the difference in rank between anticipated future social position and perceived current social position, within the society. The scores could range from -9 to 9. Those who reported an equivalent rank or a rank of 1 or more steps lower in the future compared to the current ladder scale (0 to -9) were classified as “**stable or downwardly mobile**”, while those who reported a higher rank (1-9) were classified as “**upwardly mobile**”.

*Sociodemographic covariates (adolescent self-report)*

Adolescents provided data on age (continuous) and sex (male/female).

*Objective adolescent socioeconomic position (adolescent self-report)*

Adolescents were asked whether they had dropped out of school and whether they currently have a paid job.

*Objective parental and household socioeconomic position (from parents’ survey)*

*Maternal and paternal education.* Maternal and paternal education were represented by dichotomous variables: ‘primary education or less’, ‘secondary and above.’

*Total monthly household expenditure.* Total monthly household expenditure was estimated adding parents’ reports of ‘household reported weekly expenditure on food items’, ‘monthly expenditure on services and short term goods,’ and ‘other expenditures’, and was divided into a binary variable, based on a median split, to classify households into low and high consumption.

*Adolescent psychosocial measures (adolescent self-report)*

*Perceived control.* A modified version of the General Perceived Control (Mastery) scale (23), developed by Pearlin and Schooler (1978) was used. It consists of seven items rated on a 4-point Likert scale from “strongly agree” to “strongly disagree.” Sample items include, “I have little control over the things that happen to me,” “There is little I can do to change many of the important things in my life,” “What happens to me in the future mostly depends on me,” and “I can do just about anything I really set my mind to do.” A summary score was used to create a dichotomous variable based on a median split: ‘low control’ and ‘high control.’



*Social support.* Adolescents provided data on the total number of close friends they had and the number of close friends with whom they discussed personal problems. A summary score was used to create a binary variable based on a median split for ‘low’ and ‘high’ social support.

*Team or group membership.* Adolescents responded to the question, “do you belong to a sports or recreational team or group?” (yes/no).

#### *Adolescent risk behaviors (adolescent self-report)*

*Substance use.* Adolescents were asked if they currently smoke (yes/no), and the average number of beers and liquor they consume in a normal week. Drinking was defined by consuming greater than 5 beers or shots of hard liquor in a normal week. Drinking with repercussions was defined as those who reported drinking alcohol, even if just occasionally, and who over the last 30 days had an occasion in which they failed to complete an activity, like going to school or work, as a result of their alcohol consumption (yes/no).

*Sexual behavior.* Adolescents reported if they had ever had sexual intercourse (yes/no). If yes, they were asked if they had used a condom during the last time they had sex (yes/no). To determine if they had ever participated in compensated sex, they were asked a series of questions regarding receipt of gifts from various sexual partners after they had had sex (coded yes for compensated sex if they had done so from any partner).

*Deviant and aggressive behaviors.* Adolescents were asked: 1) if they had ever been detained by the police (yes/no), and 2) how many physical altercations they had been in. The latter was dichotomized to distinguish adolescents who reported having ever been in a fight and those who had not.

*Obesity-related behaviors.* Adolescents were asked for the prior day how many bags of chips, packets of cakes or sweet breads and packets of sweets they consumed and how many sodas. Two binary variables were made: high/low junk food consumption and high/low soda consumption. Three or more pieces of junk food and 3 or more sodas were respectively used to distinguish high from low consumption. Regarding sedentary behavior, adolescents were asked the number of hours they watched television during their last viewing. Adolescents who reported viewing 4 hours or more were classified as heavy television watchers, whereas those watching fewer than 4 hours were reported as light television watchers. Adolescents were also asked the number of days they exercised during the previous week. A dichotomous variable was created, categorizing adolescents into those who reported ever having exercised during the previous week and those who did not.

#### *Statistical analysis*

Statistical analyses were conducted using STATA 10.0 (STATA Corporation, College Station, TX). Descriptive statistics were generated; one-sample test of proportions was used to investigate sampling characteristics according to demographic, socioeconomic, and psychosocial factors and risk behaviors.

To examine the associations between adolescent *anticipated social mobility* and risk behaviors, we conducted chi square analyses. The difference in the proportion of adolescents who reported having adopted the behavior of interest was calculated according to whether they were classified as being "downwardly mobile" versus "stable" or "upwardly mobile." Logistic regression analyses were conducted, examining the association between adolescent anticipated social mobility and risk behaviors, controlling for objective SES. All analyses controlled for age, sex, dropout status, welfare status, fixed effect at the state level and clustering at the neighborhood level.

The second aspect of the study, examining the association between *anticipated social mobility* (dependent variable), and demographic, socioeconomic and psychosocial characteristics (independent variables), used Pearson correlation analyzes. Multiple logistic regression analysis were run, mutually controlling for adolescent demographic and socioeconomic characteristics (age, sex, paid work, school dropout), parental and household SES (e.g. maternal education, paternal education, total monthly household expenditures per person), psychosocial factors (e.g. perceived control, belonging to a group or team, social support), and other covariates, including welfare status (adolescents from recipient households of the Mexican government's poverty alleviation program, "Oportunidades"), the fixed effect of state (adolescent residency in one of seven sample states in Mexico) and clustering at the neighborhood level.

## Results

### *Sample characteristics*

Adolescent *anticipated social mobility* scores were approximately normally distributed (mean=0.80, standard deviation=2.11) (Figure 2). The sample is described in Table 1. Just over half (54%) of the adolescents in the sample were classified as being upwardly mobile, defined as adolescents having a rank of 1 or more steps higher on the future ladder compared to the current ladder scale.

### *Anticipated mobility and risk behaviors*

Upward social mobility was significantly associated with a lower prevalence of drinking, ( $p=0.008$ ), drinking with repercussions ( $p=0.004$ ), engaging in compensated sex ( $p=0.002$ ), being detained by the police ( $p=0.002$ ), getting into physical altercations ( $p=0.007$ ), being within the top 20<sup>th</sup> percentile of junk food consumption ( $p=0.002$ ) and soda consumption ( $p=0.001$ ), and watching many hours of television ( $p<0.0001$ ). It was also significantly associated with a higher prevalence of condom use during last intercourse ( $p=0.011$ ) and doing more physical exercise ( $p<0.0001$ ) (Table 2). No significant associations were found between *anticipated social mobility* and current tobacco smoking or with being sexually active.

In adjusted logistic regression analyzes (Tables 3 and 4), controlling for objective indicators of SES (parental education and household expenditures), and other covariates (age, sex, welfare status, the fixed effect of state and clustering at the community neighborhood level), adolescents who were classified as being upwardly mobile compared to those who were classified as being stable or being downwardly mobile are less likely to report drinking (OR=0.81, 95% CI: 0.66-0.99), drinking with repercussions (OR=0.63, 95% CI: 0.41-0.97), compensated sex (OR=0.54, 95% CI: 0.34-0.86), police detainment (OR=0.80, 95% CI: 0.67-

0.96), getting into physical altercations (OR=0.88, 95% CI: 0.77-0.99), eating  $\geq 3$  servings of junk food yesterday (OR=0.83, 95% CI: 0.72-0.96), drinking  $\geq 3$  sodas yesterday (OR=0.81, 95% CI: 0.68-0.96), and watching  $\geq 4$  hours of television during their last viewing (OR=0.79, 95% CI: 0.71-0.87). They were more likely to report exercising during the previous week (OR=1.26, 95% CI: 1.14-1.40) and using a condom during last intercourse (OR=1.45, 95% CI: 1.04-2.01).

Logistic regression analyses were run using a 3-way variable for anticipated social mobility (downward, stable, and upward) to examine whether downward mobility or stable social position was driving our associations. When stable social position was the reference population, upward social mobility was not significantly associated with our outcomes of interest. However, when downward social mobility was the reference population, the effect size of the associations between upward social mobility and the given risk behaviors increased and remained statistically significant, suggesting that adolescents in our study sample are at a lower risk of having adopted the given risk behaviors compared to the adolescents who are downwardly mobile.

### *Correlates of anticipated mobility*

In Pearson correlation analyses (Table 5), *anticipated social mobility* was significantly correlated with a greater likelihood of having parents with more than a primary education, greater monthly household expenditures per person, having greater perceived control, belonging to a team or being a member of a group, having more social support, and with a lower likelihood of having a paid job and dropping out of school. Age and sex were not significantly correlated with upward social mobility (data not shown). In the multiple logistic regression model (Table 2), controlling for covariates (age, sex, welfare status, the fixed effect of state and clustering at the community level), adolescents who were classified as being upwardly mobile, compared to those who were classified as being stable or downwardly mobile, were more likely to have stayed in school (OR=0.61, 95% CI: 0.55-0.69) and to have greater perceived control (OR=1.06, 95% CI: 1.69-2.12). No other characteristics remained significant in the adjusted analysis. There was no evidence of co-linearity among parental and household SES and adolescent SES variables.

## **Discussion**

This study set out to explore the usefulness of a new psychosocial indicator, *anticipated social mobility*, for understanding risk behaviors during adolescence. This is the first study to introduce the concept of anticipated mobility, adolescents' expected intergenerational transmission from disadvantage from their family of origin to their future nuclear family. We began by calculating the difference between each subject's rankings of current and anticipated familial social status. This new and simple approach overcomes several methodological limitations that arise when measuring intergenerational social mobility with conventional objective indicators of social position. As adolescence is a period of social and economic transition, and social rank may therefore be a moving target, this new construct adds the important dimension of expectations. Our study demonstrates that *anticipated social mobility* is significantly associated with multiple risk behaviors within the context of Mexican society,

providing evidence for the usefulness of this new indicator in informing our understanding of the social gradient in health.

The data reveal that among adolescents in our sample who were classified as “upwardly mobile” on our scale of *anticipated social mobility* (as compared to those classified as “stable” or “downwardly mobile,”) there is a significantly lower prevalence of excessive drinking, problem drinking, compensated sex, police detainment, physical altercations, consumption of large quantities of junk food and soda, and watching multiple hours of television during last viewing. Among this group, there is a significantly higher prevalence of exercising and condom use during last intercourse.

Our findings are consistent with other studies, which have found that adolescent expectations, including lack of anticipated future opportunities, little perceived control and low levels of optimism, may put adolescents at-risk for adopting health-compromising behaviors (24-29). For example, lack of anticipated future opportunities has been shown to be associated with teen pregnancy, substance use and juvenile crimes (24). Little sense of control over one’s life has been associated with nonuse of contraception among females (25) and greater likelihood of initiating smoking (26). Low levels of optimism have been shown to be associated with an increased risk of overdosing (27), experiencing anger, a precursor of violent behavior (28), and being more stressed (29). There is also evidence that adolescents who are less hopeful about the future are more fatalistic (30).

Can previous research findings and theory help us to tease apart the causal directions for the significant cross-sectional associations that we found in this study? The research done by others suggests that sexual, obesity-related, deviant and substance use behaviors are more likely a consequence than a cause of anticipated social mobility. However, the social selection versus social causation debate around health has been a long and complicated one. According to social selection theory, individuals who are healthiest may be more likely to be upwardly mobile and more capable of moving up the social hierarchy and attaining high socioeconomic standing (31, 32). Alternatively, it has been argued that poor social and material circumstances increase disease risk, thereby producing a social gradient in health (2, 16). The results of our study may enhance the quality of this discourse. While some risk behaviors may indeed result from the anticipation of upward mobility, or lack thereof, the second part of our study suggests that it may be useful to consider what factors contribute to the optimism involved in believing in one’s ability to rise above current conditions.

We investigated the associations between adolescent *anticipated social mobility* and multiple socioeconomic and psychosocial factors. Perceived control and school dropout status remained statistically significant in multiple logistic regression models. Both of these factors reflect current and future social and economic conditions, opportunities and life options of the young participants. Adolescents who drop out of school or do not believe they have much control over their destiny may accurately anticipate less upward mobility and thus be more likely to adopt risk behaviors. The importance of education for social mobility has been established in previous studies (33). That perceived control remained in the equation further points to the potentially important role of mastery and hope in the way adolescents determine their future social standing in relation to their current social standing.

### *Limitations*

There are some important limitations to note, each of which suggests directions for future research. The cross-sectional nature of our study precludes our ability to make causal inferences. While a growing body of research suggests the importance of subjective measures of adolescent social status in understanding the links between relative deprivation and health during adolescence, adolescent *anticipated social mobility* is a new construct that has not yet been validated. Although audio computer-assisted self-interviews were used to solicit honest responses, adolescent self-report of risk behaviors could still be biased, particularly for the sensitive questions involving substance use and sexual, deviant and aggressive behaviors. Our study findings cannot be generalized to adolescents outside of Mexico or not living in extreme poverty.

### *Conclusion*

Our findings suggest the importance of adolescent *anticipated social mobility*, a new psychosocial indicator that measures adolescent predictions of their socioeconomic trajectory. This easily assessed component of adolescent relative deprivation suggests the importance of future expectations, a dimension of hope, in understanding the social gradient in adolescent health. Future research into the associations between *anticipated social mobility*, hope, optimism, and the inequality of opportunity in general, will help determine the role of psychosocial and structural factors in adolescent risk behaviors. Future research should examine these associations among diverse national and socioeconomic adolescent and young adult cohorts, including disadvantaged youth. Whether adolescent *anticipated social mobility* explains differentials in adult health remains to be determined. This research suggests the possibility of implementing policies and interventions that provide adolescents with real reasons to be hopeful about their trajectories.

Figure 1: Theoretical model of associations between anticipated social mobility and socioeconomic status, demographic characteristics, psychosocial factors, and health-related behaviors.

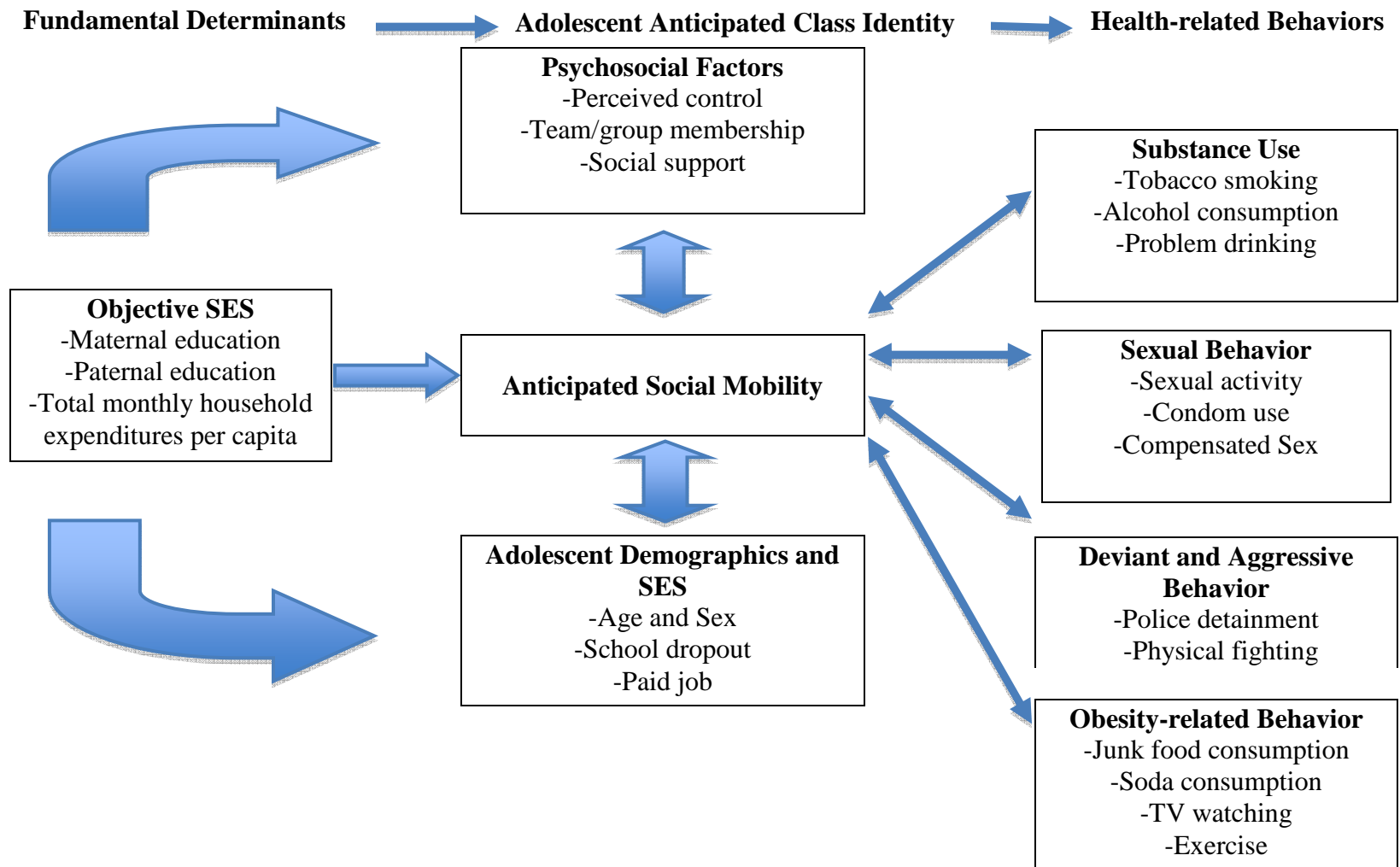


Figure 2: Distribution of adolescent anticipated social mobility scores (mean=0.80, standard deviation=2.11) overlaid with a normal distribution

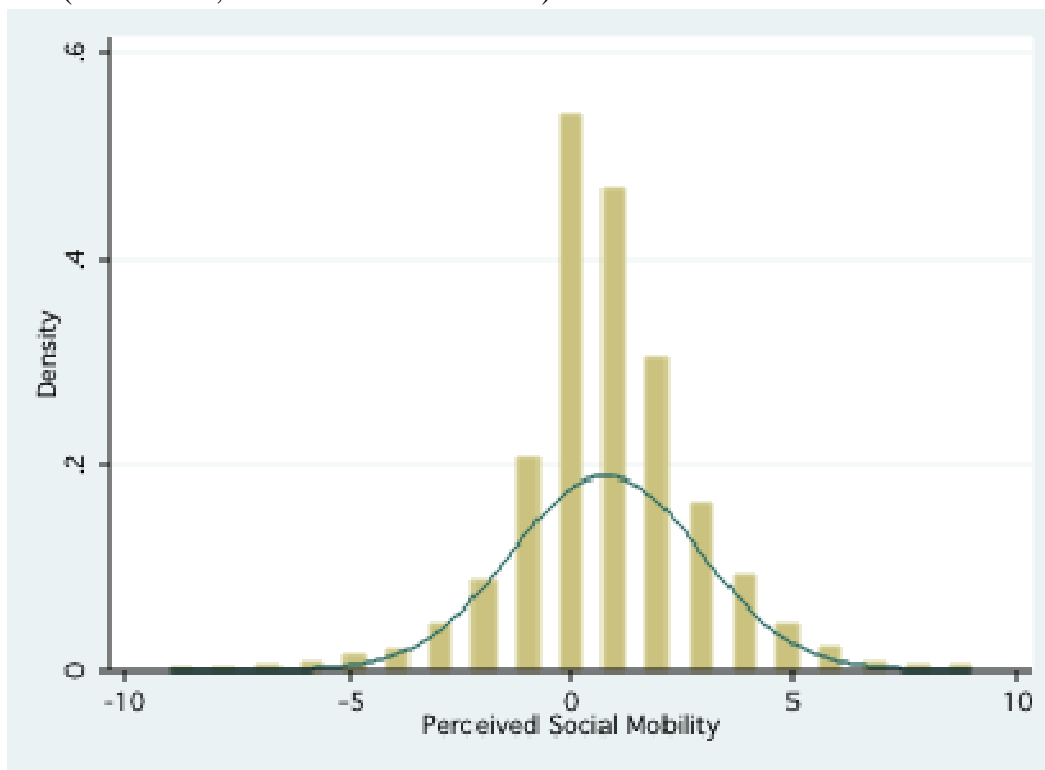


Table 1  
Study sample characteristics according to demographic, socioeconomic, psychosocial and risk behavior factors<sup>a</sup>

Variable	# Of responses for given question (n)	Prevalence of given factor (%)
<b>Adolescent Demographics and Socioeconomic Status</b>	5189	
Age (years)	16.85 (mean)	1.93 (SD <sup>ξ</sup> )
Sex (female=1)		50.78
School dropout (yes=1)		38.83
Paid job (yes=1)		62.94
<b>Parental and Household Socioeconomic Status Indicators</b>	5189	
Maternal education (secondary and above=1)		35.27
Paternal education (secondary and above=1)		33.71
Monthly household expenditures (high consumption=1)		50.38
<b>Psychosocial Factors</b>	5189	
Perceived control (high=1)		47.33
Team or group membership (yes=1)		39.26
Social support (high=1)		45.71
<b>Risk Behaviors</b>		
Currently smoke (yes=1)	5166	17.05
Excessive alcohol consumption (5 drinks or more=1)	5189	7.15
Problem drinking (yes=1)	1589	6.42
Sexually active (yes=1)	5189	20.74
Condom use (yes=1)	808	53.34
Compensated sex (yes=1)	1068	9.46
Detained by police (yes=1)	5167	7.93
Fight (2 or more=1)	5167	35.16
Junk food consumption (3 or more=1)	5189	22.86
Soda consumption (3 or more=1)	5189	12.51
Television watching (4 hours or more=1)	5189	40.41
Exercise (yes=1)	5189	49.68
<b>Adolescent Anticipated Class Identity</b>	5189	
Adolescent Anticipated Social Mobility (upward=1)		54.33

<sup>a</sup> One sample test of proportions were used to investigate the difference in percentage of the study sample with and without given descriptive characteristics

<sup>ξ</sup> Standard Deviations

Note: Total monthly household expenditures per person, perceived control and social support are dichotomous variables created using a median split. Problem drinking, condom use, and compensated sex are all filter questions on the adolescent survey and therefore have a fewer number of responses.



Table 2: Proportion (%) engaging in risk behavior according to anticipated social mobility

Risk Behavior Variables	Sample Size (n)	Society Mobility		p-value
		Downward/ No Change	Upward	
Currently Smokes	5166	17.33	16.82	0.628
Excessive Drinking ( $\geq 5$ drinks)	5189	8.19	6.28	0.008
Problem Drinks*	1589	8.38	4.81	0.004
Sexually Active	5189	21.05	20.47	0.604
Used Condom during Last Sexual Intercourse	808	48.42	57.44	0.011
Had Compensated Sex	1068	12.40	6.94	0.002
Has been Detained by Police	5167	9.21	6.87	0.002
Fights ( $\geq 2$ )	5189	25.15	21.25	0.001
Junk Food Consumption ( $\geq 3$ )	5189	24.81	21.21	0.002
Soda Consumption ( $\geq 3$ )	5189	14.22	11.07	0.001
Television Watching ( $\geq 4$ hours)	5189	44.18	37.25	<0.0001
Exercises	5189	45.11	53.53	<0.0001

Note: Adolescents completed survey questions on risk behaviors and perceived social status (used to create the social mobility indicator) at the same time; all data is cross-sectional. Problem drinking, condom use, and compensated sex are filter questions on the adolescent survey and therefore have a fewer number of responses.

\* Problem drinking refers to the adolescents who reported drinking alcohol, even if just occasionally, and who over the last 30 days had an occasion in which they failed to complete an activity, like going to school or work, as a result of their alcohol consumption (yes/no).

Table 3: Logistic regression analyses showing the cross-sectional associations between parental and household objective SES and adolescent anticipated social mobility and risk behaviors associated with substance use, and sexual and delinquent behavior ^ (Odds Ratios and Robust 95% Confidence Intervals presented)

Social Status Variables	Excessive Drinking	Problem Drinking	Condom Use	Compensated Sex	Police Detainment	Physical Fighting
Upward Social Mobility	0.81* (0.66-0.99)	0.63* (0.41 - 0.97)	1.45* (1.04 - 2.01)	0.54** (0.34 - 0.86)	0.80* (0.67 - 0.96)	0.88* (0.77 - 0.99)
High Maternal Education	1.09 (0.84-1.41)	0.88 (0.57 - 1.38)	1.45* (1.04 - 2.04)	0.96 (0.61 - 1.50)	1.1 (0.86 - 1.41)	1.08 (0.91 - 1.27)
High Paternal Education	1.12 (0.87-1.45)	0.74 (0.42 - 1.28)	0.85 (0.59 - 1.22)	1.26 (0.74 - 2.14)	0.82 (0.63 - 1.06)	0.83* (0.70 - 0.98)
High Household Expenditures	1.11 (0.89-1.38)	1.29 (0.76 - 2.19)	1.13 (0.85 - 1.50)	0.83 (0.53 - 1.31)	0.94 (0.76 - 1.15)	1.14 (0.99-1.32)
Observations	5189	1559	808	1048	5167	5189

\*\* p<0.01, \* p<0.05

^All models control for age, sex, dropout status, state, welfare status and clustering at the community level.

Note: No change in or downward social mobility=reference category for social mobility; no education through primary=reference category for maternal and paternal education; low =reference category for monthly household expenditures. Table does not include currently smokes and sexually active because there was no significant association between these risk behaviors and anticipated social mobility (see Table 3).

Table 4: Logistic regression analyses showing the cross-sectional associations between parental and household objective SES and adolescent anticipated social mobility and obesity-related risk behaviors (n=5189) ^ (Odds Ratios and Robust 95% Confidence Intervals presented)

Social Status Variables	Ate Junk Food	Drank Soda	Watched TV	Exercised
Upward Social Mobility	0.83* (0.72 - 0.96)	0.81* (0.68 - 0.96)	0.79** (0.71 - 0.87)	1.26** (1.14 - 1.40)
High Maternal Education	0.85* (0.75 - 0.98)	0.98 (0.81 - 1.18)	0.9 (0.79 - 1.03)	1.01 (0.91 - 1.13)
High Paternal Education	0.95 (0.83 - 1.09)	0.82* (0.69 - 0.97)	0.93 (0.82 - 1.05)	1.17** (1.04 - 1.32)
High Household Expenditures	1.07 (0.94 - 1.23)	1.08 (0.92 - 1.26)	0.91 (0.81 - 1.02)	1.27** (1.09 - 1.49)

\*\* p<0.01, \* p<0.05

^All models control for age, sex, dropout status, state, welfare status and clustering at the community level

Note: No change in or downward social mobility=reference category for social mobility; no education through primary=reference category for maternal and paternal education; low =reference category for monthly household expenditures.

Table 5: Correlates of Adolescent Anticipated Upward Social Mobility (n=5189)

Socioeconomic and Psychosocial Variables	Pearson Correlations (r)	Logistic Regression (OR / 95% CI) ^
Maternal Education ( $\geq$ secondary=1)	0.04**	0.98 (0.85-1.12)
Paternal Education ( $\geq$ secondary=1)	0.04**	1.06 (0.94-1.20)
Monthly Household Expenditures (high=1)	0.05**	1.09 (0.96-1.24)
Paid work (yes=1)	-0.03*	1.02 (0.91-1.14)
School Dropout (yes=1)	-0.14**	0.61** (0.55-0.69)
Perceived Control (high=1)	0.18**	1.89** (1.69-2.12)
Team/group Membership (yes=1)	0.03*	1.06 (0.95-1.18)
Social Support (high=1)	0.04*	1.08 (0.96-1.21)

\*\* p<0.01, \* p<0.05

^The multiple logistic regression analysis reports odds ratios and robust 95% confidence intervals. The model controls for age, sex, welfare status, fixed effect of state, and clustering at the community level. No education through primary=reference category for maternal and paternal education; low =reference category for monthly household expenditures, perceived control and social support.

## Appendix

### Subjective Social Status Ladder Questions

We are going to ask you to look at a ladder. On the ladder, the highest rung represents the most rich or the most important people and the lowest rung of the ladder represents the most poor or the least important people.



#### Current Society Subjective Social Status Ladder

Imagine that all of the households in Mexico were on this ladder. In comparison with all households in Mexico, on which rung of the ladder would you place your family (with whom you currently live)?

#### Future Society Subjective Social Status Ladder

Now, think of your own family (your spouse or spouse and children) that you will have in the future. In comparison with all of the households in Mexico, where do you believe your family will be located?

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## CHAPTER 5

### CONCLUSIONS

#### Discussion

My dissertation research contributes to the literature on health inequities by providing data on cross-sectional associations between objective and subjective indicators of social class and risk behaviors in a vulnerable urban Mexican adolescent population. My findings provide evidence that there is a social gradient in health during adolescence. Subjective measures of adolescent class identity, including subjective social status and *anticipated social mobility*, may be more effective than conventional indicators of social class in explaining the association between social position and health during this transitional period. This conclusion suggests the usefulness of subjective indicators of adolescent class identity for further studies of adolescent populations, particularly those with a restricted range of socioeconomic statuses.

Chapter 2 found that the SSS ladders for community and society were differentially related to adolescents' use of substances. Adolescents who perceived themselves as higher in social status in reference to their peers (community SSS) reported *more* smoking and drinking. These findings are consistent with what we found using objective SES measures. In contrast, adolescents who perceived their families as higher in social status in reference to others in Mexican society (society SSS) reported *less* smoking and drinking. This study provides evidence that very low-income adolescents who have higher perceived social status within their peer group are at greater risk of substance use than those lower in perceived social position.

Chapter 3 tested the hypothesis that increased risk of obesity, as measured by obesity-related behaviors, is associated with a relatively higher social position among poor adolescents in urban Mexico. My findings show that within the poorest quintile of the urban Mexican adolescent population, both objective and subjective measures of adolescent social position are associated with adolescent obesity-related behaviors. Yet, contrary to my hypothesis, increased risk of obesity was associated with a lower social position. Specifically, school dropout status, a measure of objective social position, and perceived lower status within the adolescent's community (community SSS) were independently associated with an elevated risk of obesity-related behaviors, with school dropout status having the strongest association. This chapter suggests an inverse social gradient in adolescent obesity risk among this socioeconomically homogenous cohort, based on objective and subjective youth-specific measures of social position. It provides additional evidence that different measures of social position capture unique dimensions of relative rank, and that measures of adult social position may be subject to misclassification bias if used to capture adolescent social position.

Chapter 4 explores the usefulness of a new psychosocial indicator, *anticipated social mobility*, for understanding risk behaviors during adolescence. This is the first study to introduce the concept of anticipated mobility, adolescents' expected intergenerational transmission from disadvantage from their family of origin to their future nuclear family. We began by calculating the difference between each subject's rankings of current and anticipated familial social status. This new and simple approach overcomes several methodological limitations that arise when



measuring intergenerational social mobility with conventional objective indicators of social position. As adolescence is a period of social and economic transition, and social rank may therefore be a moving target, this new construct adds the important dimension of expectations. Our study demonstrates that *anticipated social mobility* is significantly associated with multiple risk behaviors within the context of Mexican society, providing evidence for the usefulness of this new indicator in informing our understanding of the social gradient in health. The data reveal that among adolescents in our sample who were classified as “upwardly mobile” on our scale of *anticipated social mobility* (as compared to those classified as “stable” or “downwardly mobile,”) there is a significantly lower prevalence of excessive drinking, problem drinking, compensated sex, police detainment, physical altercations, consumption of large quantities of junk food and soda, and watching multiple hours of television during last viewing. Among this group, there is a significantly higher prevalence of exercising and condom use during last intercourse. My findings demonstrate the usefulness of adolescent *anticipated social mobility*, as an indicator. This easily assessed component of adolescent relative deprivation suggests the importance of future expectations, a dimension of hope, in understanding the social gradient in adolescent health.

### **Limitations and Future Research Directions**

The cross-sectional nature of the studies presented in this dissertation precludes my ability to make causal inferences regarding the social class-health relationship or to identify the mechanisms through which perceived class identity influence adolescent health. Although prior research suggests that assessment of social position is a predictor rather than a consequence of health status, it is possible that adolescent risk behaviors, such as tobacco use, are a way for some adolescents to gain in social status or rank. Future research is needed to examine the long-term impact of adolescent perceived class identity on population health. Understanding the causal associations between adolescent social status and population health will contribute to our understanding of lifecourse determinants of population health may have important policy implications. Statistical modeling that allows for the complex bidirectional nature of the social class-health relationship will benefit research on the causal pathways, linking social position and health. Another major limitation of these studies, in addition to their cross-sectional nature, is their generalizability. As these studies were all conducted on Mexican adolescents living in poverty, study findings may not be generalizable to adolescents in other national and socioeconomic contexts. Both the replication of these studies among different adolescent samples and the prospective examination of adolescent perceived class identity and population health may inform *how* and *when* to intervene throughout the life course.

### **Conclusion**

Social stratification—as reflected by the community and society scales of subjective social status and the new indicator, *anticipated social mobility*—is associated with multiple risk behaviors among Mexican adolescents living in poverty. Indicators of perceived class identity inform the association between social position and health-related outcomes during adolescence. These analytic tools are able to explain variation in adverse outcomes among adolescents sharing the same socioeconomic environments. These relatively new indicators have not been used widely. While the studies presented in this dissertation provide evidence in support of perceived

class identity being associated with health-related outcomes among adolescents, future research is needed to determine if the same pattern of associations is found between adolescent perceived class identity and other health outcomes and risk factors, including leading causes of morbidity and mortality in this age group. Further, it remains for future research to determine the utility of these indicators among adolescents in different national, racial/ethnic and socioeconomic contexts. In addition, longitudinal studies that begin during early adolescence and continue into adulthood will be needed to better understand the effects of adolescent perceived class identity on adult health outcomes.

Much more needs to be done in the area of relative social position if we are to understand how the social environment impacts population health, behavior and well-being. It is imperative to know why some youth from the same socioeconomic status have different health outcomes and risk behaviors. This dissertation supports the conclusion of previous studies that research on the social gradient in health among adolescents benefits by the inclusion of subjective social position indicators.