

Introduction

The pervasiveness of socioeconomic health disparities across health outcomes is well established; however, few studies devote attention to the development of these differences at pivotal life course stages. Such studies may lend insight into understanding the mechanisms through which health disparities widen as an individual ages through middle adulthood (Hayward et al. 2000). The proposed analysis examines the effects of parental socioeconomic status, leaving home for the first time, and family composition on change in healthy behaviors between adolescence and emerging adulthood. The proposed analysis has three specific goals. The first goal is to identify the degree to which engagement in seven healthy habits changes within individuals between adolescence (ages 12-17) and emerging adulthood (ages 18-23). The second goal is to evaluate the effects of parental socioeconomic status, race-ethnicity, and family composition during adolescence on healthy behavior change between adolescence and emerging adulthood. The third goal is to evaluate whether leaving home during the transition into emerging adulthood affects healthy behavior change between adolescence and emerging adulthood.

Background

Life course theory posits that individuals make decisions within a realm of social opportunities and constraints that “set in motion cumulating advantages and disadvantages” later in life (Elder 1998). Emerging adulthood, which occurs between the ages of 18 and 25, is unique as a life-course stage not only because of the unprecedented level of freedom and experimentation that occurs during this period, but also because emerging adults differ from both adolescents and older adults (Arnett 2000; 1997). Unlike adolescents, emerging adults tend not to live with their parents. Unlike adults, emerging adults are often unmarried and without children (Arnett 2000). Emerging adults are more likely to binge drink and smoke than older adults, but they may also be more likely to devote time to exercise or to the development of a healthy diet (Blum et al. 2000). The transition into emerging adulthood is an especially important area of study given the importance of social context in structuring health status and the degree of change that occurs regarding social environment during this transitional period.

Previous research provides a foundation for why healthy behavior engagement is intricately tied with social structure, and therefore an indicator of emerging health disparities. According to fundamental cause theory (Link and Phelan 1995) socioeconomic status structures access to the ‘downstream’, proximate causes of disease (and tools of disease prevention) such as access to care, healthy behaviors, neighborhood quality, and health information. Thus, although engagement in healthy behaviors is protective of chronic illness and early death, these behaviors are also reflective of the social context in which an individual is embedded. Social conditions structure the ability for individuals to engage in healthy behaviors such as smoking, exercise, sleep habits, and maintaining a healthy weight (Mulatu and Schooler 2002; Lantz et al. 2001, Mulatu and Schooler 2002; Williams 1990). The proposed analyses test whether parental socioeconomic status and family structure are two elements of social structure that account for change in healthy behaviors between adolescence and emerging adulthood.

Home leaving is also a particularly important experience for some emerging adults. The effect of home-leaving on healthy behavior change is likely to be significant for a number of reasons. First, parents are not as able to monitor the healthy behaviors of emerging adults who live away from home as they are emerging adults who still live at home. Second, family background (such as parental socioeconomic status, family composition, and parental health behaviors) may not continue to affect emerging adult’s healthy behaviors after leaving home, either through changes in access to health-promoting resources or through financial support. Third, home-leaving allows the adolescent, within the constraints of social structure, to choose to maintain, improve, or withdraw from the healthy habits learned in the home.

Race and ethnicity are highly significant indicators of health inequality. Studies attribute part of the significant race-ethnic variation in health outcomes during adolescence to socioeconomic inequality (Harris et al. 2006; Blum et al. 2000). However, controlling for socioeconomic indicators does not always explain the race-ethnic variation in health outcomes. For example, black and Hispanic adolescents are more likely than their non-Hispanic counterparts to be overweight or obese after controlling for socioeconomic status (Hedley et al. 2004; Strauss and Pollack 2001). Thus, it is likely that race-ethnicity exerts an independent, negative effect on many health outcomes and that the transition into emerging adulthood could be a significant point of health divergence between non-Hispanic whites, non-Hispanic blacks, and Hispanics.

Research Design and Methods

Data

Hypotheses are tested using waves 1 and 3 of the National Longitudinal Study of Adolescent Health (Add Health), in-home interviews and parent interviews (Udry 2003). Data were collected from students at 80 high schools and 52 feeder middle schools across the United States sampled with unequal probability of selection (Harris et al. 2003). Add Health is nationally representative when proper weighting adjusts for the complex sampling strategy. In the proposed sample, respondents are ages 12-17 at wave 1 and ages 18-23 by wave 3, meaning that the entire sample will have transitioned from adolescence into emerging adulthood between waves 1 and 3. Nearly all respondents (96%) live at home at wave 1 (T1). The proposed sample is restricted to students who were unmarried, childless, and living with parents or other guardians at wave 1 and who remain unmarried and childless at the time of the wave 3 interview.¹ By wave 3 (T3), a majority (57%) have left home for the first time. Those with missing data on the variables listed below are also excluded from the sample. Sensitivity analyses will later assess the need to impute any missing data due to non-random missingness.

Measures

Measurement of Life-Course position (Emerging Adulthood)

Because healthy behaviors have had more time to change for the 23 year old emerging adult than they have for the 18 year old emerging adult, this study operationalizes emerging adulthood in two ways: It is represented by two age categories (ages 18-20 at wave 3 and ages 21-23 at wave 3) and as a continuous age measure (dummy variables representing the ages of 18-23 at wave 3, with age 18 as the reference category).

Measurement of Healthy Habits

Healthy behaviors are measured using indicators similar to those used in the Alameda County Survey (see Wiley and Camacho 1980; Belloc and Breslow 1972). Each of seven healthy habits is assigned a value of 1 or 0 at wave 1 and wave 3, where 1 signifies that the behavior is engaged in and 0 signifies that the individual does not report this behavior. An index of the seven healthy behaviors is constructed for each wave of data by summing the scores for individual healthy behaviors, resulting in a score of 0-7 at T1 and at 0-7 at T3 for each individual. The dependent variable in all analyses is healthy behavior change over time (T3-T1). Baseline levels of healthy behaviors (T1) are taken into account in models 2-3. Wiley and Camacho (1980) found this index of healthy behaviors to be a more powerful predictor of healthy behavior change over time than single healthy behaviors. Supplemental analyses will also examine the change over time in single healthy behaviors and the changing effects of

¹ Although the health effects of entry into parenthood and marriage are well-established and are important for an understanding of how the family affects health change over time, these transitions indicate an exit from emerging adulthood and are therefore beyond the scope of the proposed analyses.

family composition or socioeconomic status on these behaviors, and will reveal whether patterns observed using the summed index of seven healthy behaviors are driven primarily by change in one or two specific healthy behaviors. The seven healthy behaviors are adequate sleep, tobacco use, eating regularly, eating breakfast, exercise, maintaining a healthy weight, and alcohol use.

Measurement of Social Context and Control Variables

Measurements of social context, included in all multivariate models (measured at T1 during adolescence), control for household structure (1= two biological parents, 0=step-parents, single parent, other), family of origin socioeconomic status (1= highest education achieved by any resident parent of adolescent is equal to or greater than a bachelor's degree), neighborhood (census tract), baseline (T1) levels of healthy behavior engagement, and some indicators of parental health status (tobacco use, binge drinking, obesity) (McLanahan 2004; Call and Nonnemaker 1999; Goldscheider and Goldscheider 1999; Wickrama et al. 1999; Resnick et al. 1997). Models will also control for gender (1=male) and birth weight. Current (T3) cohabitation with a romantic partner and length of cohabitation are also taken into account. Some models will examine the conditional (moderating) effect of socioeconomic status, gender, or race-ethnicity on healthy behaviors rather than control for differences due to these characteristics.

Analytic Strategy

The first goal of the proposed analyses is to identify how engagement in seven healthy habits changes within individuals between adolescence and emerging adulthood. I hypothesize that healthy behavior engagement will decrease as adolescents transition into emerging adulthood. I further hypothesize that early emerging adults ages 18-20 will retain a higher number of healthy behaviors than later emerging adults ages 21-23.

To identify change in healthy behavior engagement between adolescence and emerging adulthood, a multilevel model will be employed. This is because the clustering of individuals in neighborhoods is known to be associated with several measures of physical and mental health (Robert 1999; Aneshensel and Sucoff 1996) and an unconditional, two-level hierarchical model controls for the clustering of individuals in neighborhoods. The proposed models will predict change in healthy behavior engagement (T3-T1) regressed on baseline (T1) individual predictors and level two baseline (T1) controls for the clustering of individuals in neighborhoods. The unconditional model is represented as follows:

$$Y_{ij} = \beta_{0j} + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \mu_{0j}$$

Y_{ij} represents the dependent variable in all models, the change in healthy behaviors between T1 and T3 for individual i living in neighborhood j plus a random individual-level error term (r_{ij}). The intercept, β_{0j} , represents the average change in healthy behavior engagement (T3-T1) for an individual living in the average neighborhood (γ_{00}), plus a random neighborhood-level error term, μ_{0j} . The random effect, μ_{0j} , will test whether there is significant variation across neighborhoods in healthy behavior change over time. r_{ij} will test whether significant variation exists across individuals. The unconditional model, model 1a, provides a test for Hypothesis 1a, that the number of healthy behaviors engaged in during emerging adulthood (T3) will be less than the number of healthy behaviors engaged in during adolescence (T1).

The model testing Hypothesis 1b will build on the unconditional model. Hypothesis 1b predicts that individuals aged 18-20 (early emerging adults) at T3 will retain, on average, a higher number of healthy behaviors reported during adolescence than their aged 21-23 at T3 (later emerging adults) counterparts. Model 1b will add a Level-1 dichotomous indicator of age group (1=age 21-23, later emerging adult, 0=age 18-20, early emerging adult).

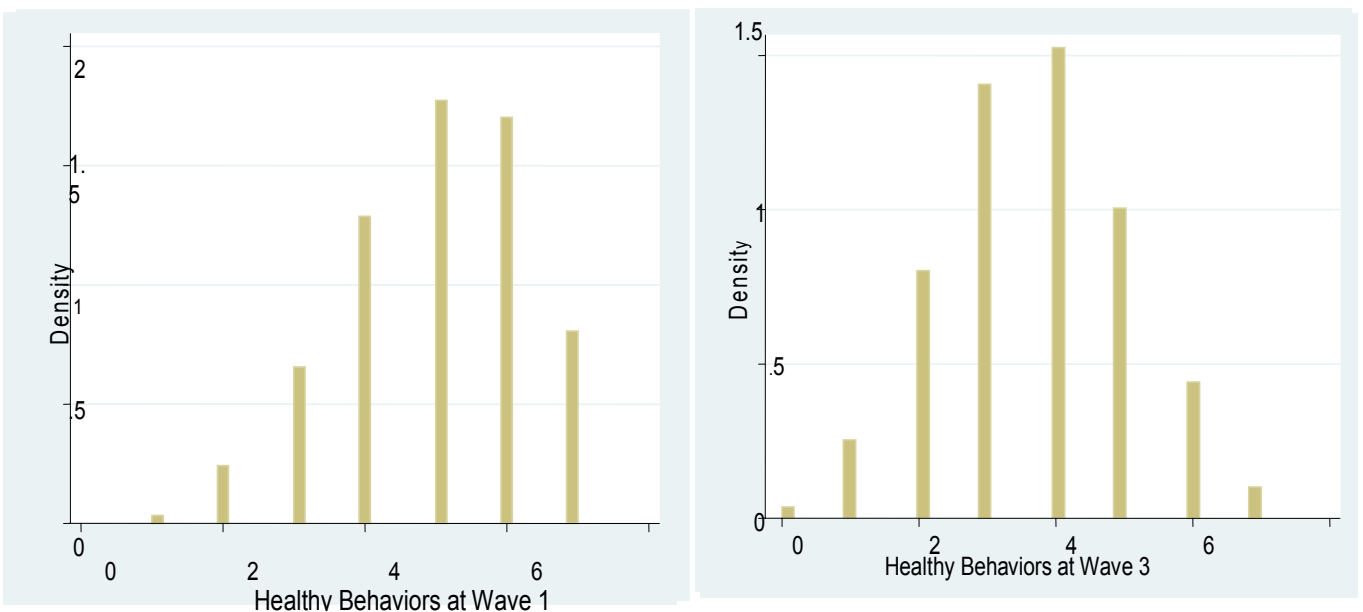
Model 2 will add contextual variables to the unconditional two-level model presented in Aim 1. Hypothesis 2a predicts that higher levels of parental education will be associated with a smaller loss in healthy behaviors between T1 and T3. Hypothesis 2b predicts that not living with two biological married parents will be associated with a larger loss in healthy behaviors. Hypothesis 2c predicts that non-white emerging adults will report a larger loss in healthy behaviors than their non-Hispanic white counterparts.

Model 3 will evaluate whether leaving home during the transition into emerging adulthood affects healthy behavior change between adolescence and emerging adulthood. I hypothesize that those who leave home during the transition into emerging adulthood will vary significantly from their same-age counterparts who do not leave home.

Preliminary Analyses

Preliminary analyses use the first and third waves of the Add Health data to describe key changes in the variables of interest. Figure 1 depicts a histogram of healthy behavior scores (0-7) among all adolescents at wave 1 and the same healthy behaviors during emerging adulthood at wave 3.

Figure 1. Count of healthy behaviors at wave 1 (ages 11-17) and at wave 3 (ages 18-23) (n=9963)



Controlling for Add Health design effects, the average number of healthy behaviors drops from 5.01 to 3.65 between waves as this sample ages from 11-17 to 18-23. Bivariate analyses, shown in Table 1, demonstrate that parental education, race-ethnicity, age and leaving home to live independently are each associated with T3-T1 change in healthy behavior engagement. The proposed analyses expand preliminary analyses by adding contextual variables to each model and by utilizing multilevel models.

Table 1. Bivariate regressions of independent variables and relationship with (T3-T1) change in healthy behaviors (n=9,963)

<i>Independent variables</i>	Healthy Behavior Change (T3-T1)
Parental education (1= any residential parent earned at least a bachelor's degree)	.11† (.06)
African-American or Black (1=non-Hispanic black)	-.02 (.05)
Hispanic (1=Hispanic)	.078* (.035)
Home-leaving	.15** (.04)
Age	.22*** (.02)

***p<0.001 **p<.01 *p<0.05 †p<.10

Reference List

- Aneshensel, Carol S. and Clea A. Sucoff. 1996. "The Neighborhood Context of Adolescent Mental Health". *Journal of Health and Social Behavior*. 37(4):293-310.
- Arnett, Jeffrey Jensen. 2003. "Conceptions of the Transition to Adulthood among Emerging Adults in American Ethnic Groups." *New Directions for Child and Adolescent Development*. 100:63-75.
- . 2000. "Emerging Adulthood: A Theory of Development from the Late Teens through the Twenties." *American Psychologist*. 55(5):469-480.
- . 1997. "Young People's Conceptions of the Transition to Adulthood." *Youth & Society*. 29(1):3-23.
- Barker, David J.P., Clive Osmond, Tom J. Forsen, Eero Kajantie, and Johan G. Eriksson. 2005. "Trajectories of Growth among Children Who Have Coronary Events as Adults." *The New England Journal of Medicine*. 353:1802-1809.
- Belloc, Nedra B. and Lester Breslow. 1972. "Relationship of Physical Health Status and Health Practices." *Preventive Medicine*. 1:409-421.
- Blum, R.W., T. Beuhring, M.L. Shew, L.H. Bearinger, R.E. Sieving, and M.D. Resnick. 2000. "The Effects of Race/Ethnicity, Income, and Family Structure on Adolescent Risk Behaviors." *American Journal of Public Health*. 90(12):1879-1884.
- Breslow, Lester and James E. Enstrom. 1980. "Persistence of Health Habits and Their Relationship to Mortality." *Preventive Medicine*. 9:469-483.
- Call, Kathleen Thiede and James Nonnemaker. 1999. "Socioeconomic Disparities in Adolescent Health: Contributing Factors." *Annals of the New York Academy of Sciences*. 896(1):352-355.
- Chantala, Kim and Joyce Tabor. 1999. *National Longitudinal Study of Adolescent Health: Strategies to Perform a Design-Based Analysis using the Add Health Data*. <http://www.cpc.unc.edu/projects/addhealth/files/weight1.pdf>
- Elder, Glen H. 1998. "The Life Course as Developmental Theory." *Child Development*. 69(1):1-12.
- Geronimus, Arline T. 1992. "The Weathering Hypothesis and the Health of African-American Women and Infants: Evidence and Speculations." *Ethnicity and Disease*. 2:207-221.
- Geronimus, Arline T., John Bound, Timothy A. Waidmann, Cynthia G. Colen, and Dianne Steffick. 2001. "Inequality in Life Expectancy, Functional Status, and Active Life Expectancy across Selected Black and White Populations in the United States." *Demography*. 38(2):227-251.
- Goldscheider, Frances and Calvin Goldscheider. 1999. *The Changing Transition to Adulthood: Leaving and Returning Home*. Thousand Oaks, CA: Sage Publications.

- Hallfors, Denise D., Martha W. Waller, Daniel Bauer, Carol A. Ford, and Carolyn T. Halpern. 2005. "Which Comes First in Adolescence – Sex and Drugs or Depression." *American Journal of Preventive Medicine*. 29(3):163-170.
- Harris, Kathleen Mullan, Francesca Florey, Joyce Tabor, Peter S. Bearman, Jo Jones, and J. Richard Udry. 2003. The National Longitudinal Study of Adolescent Health: Research Design [WWW document]. URL: <http://www.cpc.unc.edu/project/addhealth/design>.
- Harris, Kathleen Mullan, Penny Gordon-Larsen, Kim Chantala, and J. Richard Udry. 2006. "Longitudinal Trends in Race/Ethnic Disparities in Leading Health Indicators from Adolescence to Young Adulthood." *Archives of Pediatric and Adolescent Medicine*. 160:74-81.
- Harris, Kathleen Mullan, Rosalind Berkowitz King, and Penny Gordon-Larsen. 2005. "Healthy Habits among Adolescents: Sleep, Exercise, Diet, and Body Image." In *What Do Children Need to Flourish? Conceptualizing and Measuring Indicators of Positive Development*. Eds. Kristin Anderson Moore and Laura H. Lippman. p. 111-132.
- Hayward, Mark D. Eileen M. Crimmins, Toni P. Miles, and Yu Yang. 2000. "The Significance of Socioeconomic Status in Explaining the Racial Gap in Chronic Health Conditions." *American Sociological Review*. 65: 910-30.
- Hedley, Allison A., Cynthia L. Ogden, Clifford L. Johnson, Margaret D. Carroll, Lester R. Curtin, and Katherine M. Flegal. 2004. "Prevalence of Overweight and Obesity among U.S. Children, Adolescents, and Adults, 1999-2002." *Journal of the American Medical Association*. 291:2847-2850.
- House, James S., James M. Lepkowski, Ann M. Kinney, Richard P. Mero, Ronald C. Kessler and A. Regula Herzog. 1994. "The Social Stratification of Aging and Health." *Journal of Health and Social Behavior*. 35:213-34.
- Krieger, Nancy. 1999. "Embodying Inequality: A Review of Concepts, Measures, and Methods for Studying Health Consequences of Discrimination." *International Journal of Health Sciences*. 29(2):295-352.
- Lantz, Paula M., John W. Lynch, James S. House, James M. Lepkowski, Richard P. Mero, Marc A. Musick, and David R. Williams. 2001. "Socioeconomic Disparities in Health Change in a Longitudinal Study of U.S. Adults: The Role of Health Risk Behaviors." *Social Science and Medicine*. 53:29-40.
- Link, Bruce G. and Jo Phelan. 1995. "Social Conditions as Fundamental Causes of Disease." *Journal of Health and Social Behavior*. 35(Extra issue):80-94.
- McLeod, Jane D. and Michael J. Shanahan. 1996. "Trajectories of Poverty and Children's Mental Health." *Journal of Health and Social Behavior* 37(3): 207-220.
- Miech, Richard Allen and Michael J. Shanahan. 2000. "Socioeconomic Status and Depression over the Life Course." *Journal of Health and Social Behavior*. 41:162-76.
- Mulatu, Mesfin Samuel and Carmi Schooler. 2002. "Causal Connections between Socio-economic Status and Health: Reciprocal Effects and Mediating Mechanisms." *Journal of*

Health and Social Behavior. 43:22-41.

- Mullan Harris, Kathleen Rosalind Berkowitz King and Penny Gordon-Larsen. 2003. "Healthy Habits among Adolescents: Sleep, Exercise, Diet, and Body Image." Paper presented at the Indicators of Positive Development Conference, March 12-13 2003, Washington, D.C.
- National Sleep Foundation. 2000. *Adolescent Sleep Needs and Patterns: Research Report and Resource Guide*. The National Sleep Foundation.
http://www.sleepfoundation.org/atf/cf/%7BF6BF2668-A1B4-4FE8-8D1A-A5D39340D9CB%7D/sleep_and_teens_report1.pdf
- Resnick, Michael D., Peter S. Bearman, Robert William Blum, Karl E. Bauman, Kathleen M. Harris, Jo Jones, Joyce Tabor, Trish Beuhring, Renee Sieving, Marcia Shew, Marjorie Ireland, Linda Bearinger, and Richard J. Udry. 1997. "Protecting Adolescents from Harm: Findings from the National Longitudinal Study on Adolescent Health." *Journal of the American Medical Association*. 278(10):823-832.
- Robert, Stephanie A. 1999. "Socioeconomic Position and Health: The Independent Contribution of Community Socioeconomic Context." *Annual Review of Sociology* 25: 489-516.
- Rogers, Richard, Robert Hummer and Charles Nam. 2000. *Living and Dying in the USA: Health, Behavioral, and Social Differentials of Adult Mortality*. San Diego, Ca: Academic Press.
- Starfield, B. A. W. Riley W. P. Witt and J. Robertson. 2002. "Social Class Gradients in Health during Adolescence." *Journal of Epidemiology and Community Health*. 56:354-361.
- Strauss, Richard S. and Harold A. Pollack. 2001. "Epidemic Increase in Childhood Overweight, 1986-1998." *Journal of the American Medical Association*. 286:2845-2848.
- Telama, R., X. Yang, L. Laakso, and J. Viikari. 1997. "Physical Activity in Childhood and Adolescence as Predictor of Physical Activity in Young Adulthood." *American Journal of Preventive Medicine*. 13(4):317-323.
- Turner, R. Jay and William R. Avison. 2003. "Status Variations in Stress Exposure: Implications for the Interpretation of Research on Race, Socioeconomic Status, and Gender." *Journal of Health and Social Behavior* 44:488-505.
- Udry, J. Richard. 2003. *The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994-1996; Wave III, 2001-2002* [machine readable file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill.
- Wickrama, K.A.S., Rand D. Conger, Lora Ebert Wallace, and Glen H. Elder, Jr. 1999. "The Intergenerational Transmission of Health-Risk Behaviors: Adolescent Lifestyles and Gender Moderating Effects." *Journal of Health and Social Behavior*. 40(3):258-272.
- Wiley, James A. and Terry C. Camacho. 1980. "Life-Style and Future Health: Evidence from the Alameda County Study." *Preventive Medicine*. 9(1):1-21.
- Williams, David R. 1990. "Socioeconomic Differentials in Health: A Review and Redirection." *Social Psychology Quarterly*. 53: 81-99.

Williams, David, Yan Yu, and James S. Jackson. 1997. "Racial Differences in Physical and Mental Health." *Journal of Health Psychology* 2(3): 335-351.