

**GROWING UP WITH SMOKERS AND PROBLEM DRINKERS:
SOCIAL REPRODUCTION OF FAMILY ENVIRONMENT AND HEALTH IN LATER ADULTHOOD**

Daphne Kuo, Ph.D.
School of medicine and public health &
Comprehensive Cancer Center
University of Wisconsin-Madison

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INTRODUCTION

This study aims to investigate the life-long impact of childhood health environment on adult health environment, and their joint influences on individual health and mortality. Individual behaviors and health are influenced by family environments in adulthood and in childhood. Understanding the influences is the first step toward disease prevention and improving quality of life in later adulthood. Given that many health problems and diseases in later adulthood are preventable and have roots in childhood, childhood and adulthood experiences should be studied together. Smoking and problem drinking, as leading preventable causes of chronic diseases and health problems, are harmful especially for older adults because the addictions usually start young and the cumulative damage to the addictives is obvious. Moreover, risk behaviors run in the family and the impacts are of multi-generation. Experiences of growing up with smokers and drinkers rarely become the foci of research on the health effects of childhood environment for older adults. The life course perspective is often-ignored in explaining smoking and problem drinking behaviors of older adults. This study will examine the influences of childhood environment from the perspective of social reproduction of health behaviors and family health environment. Smoking and (problem) drinking behaviors of the respondents, their parents, and their family members in adulthood are the center of "health environment" while other observed and unobserved characteristics of childhood and adulthood environment are controlled in the analysis.

LITERATURE REVIEW

There is increasing evidence that childhood environment or early life experiences have long-lasting effects on health and well-being in later adulthood directly and indirectly. Socioeconomic origin is the most studied childhood factor. Some found that SES in childhood has direct influence on health and well-being in later adulthood but others found the influence of SES in childhood is indirectly through socioeconomic status in adulthood (Marmont et al, 1996; Kestilä et al., 2006; Power, Hypponen and Smith, 2005; Hayward and Gorman, 2004; Wray, Alwin, and McCammon, 2005; O’Rand and Hamil-Luker 2005; Wickrama, Conger, and Abraham, 2005; Galobardes, Smith and Lynch 2006; Makinen et al., 2006). Family structure and sibling compositions are also studied frequently. Historical and genealogical data show that number of siblings, death of a sibling, and parental age at birth were related to mortality and frailty (Bengtsson, Brostrom, and Lindstrom 2002; Bengtsson and Brostrom 2005; Gavrilova et al., 2003; Smith et al., 2004).

Experiencing childhood abuses, including sexual, physical, and emotional abuses, is detrimental to the physical and mental health of the adults of various ages. The negative

consequences of childhood abuse include all spectrums of physical health: risk behaviors (sexual behaviors, smoking, problem drinking, and illicit drug use), chronic diseases (diabetes and heart diseases), and mortality, in addition to mental health, depression and suicide (Springer et al., 2006; Dong et al., 2004; Dong et al., 2003; Dong et al., 2002; Anda et al., 1999; Anda et al., 2002; Williamson et al., 2002; Felitti et al., 1998). Childhood health is another important predictor of later adulthood health, in addition to its indirect influences through socioeconomic attainment (Elo 1998; Haas 2004; Johnson and Schoeni 2005; Palloni 2006). Fetus origin assumption suggests that parental characteristics and nutrition intake during the pregnancy might affect the health of the infants, and the propensity for chronic diseases and their risk factors such as diabetics, heart disease and certain types of cancers, controlling for behaviors and socioeconomic status (Law 1993; Barkers 1995; Barkers 1998; Huxley et al, 2000, 2003; Lawlor et al, 2003; Rogers et al 2003; Newsome et al 2003; Owen et al 2003; Lauren et al 2003; Lawlor, Ben-Shlomo and Leon 2004; Forouhi, Hall, and McKeigue 2004; Perry and Lumey 2004). Birth weight and status, as indicators of birth condition and health of the fetus, is related to infant survival, childhood health, intelligence, school performance, socioeconomic achievement, and diseases in young adulthood (e.g., Conley and Bennett 2000, 2001)

Despite of the increasing awareness of the importance of childhood on later adulthood, only few studies focused on long-term influences of childhood health environment, such as smoker parents and problem drinkers in the households (Hill et al 1994, LoCastro et al 2000). Also seldom seen are studies of older adults' health behaviors with controlling for childhood environment, except studies of influences of adverse childhood experiences on risk behaviors (Wray, Alwin and McCammon 2005; Anda et al, 1999). Maternal use tobacco and alcohols during pregnancy have negative impact on birth outcomes such as gestation age, length, and weight. Adverse birth outcomes related to later growth and development. In addition to the potential risk of prenatal exposure to nicotine, the harms of smoker parents to children or young adults include physical health problems caused by the passive smoking, behavioral problems, initiating smoking, and a greater difficulty to kick the habits later (see early review in Richter and Richter 2001; Anda et al., 1999; den Exter Blokland et al, 2005). Second hand smoking is detrimental to health in childhood and beyond. It exacerbates symptoms of asthma, chronic bronchitis, and allergies (Davis 1998). Nonsmokers who have experienced environmental smoking have a higher risk for various forms of cancers and coronary heart disease (Moskowitz, Schwartz and Schieken 1999). Using data from more recent cohorts, parental smoking is associated with children's poor intellectual performance and behavioral problems (Weitzman et al., 1992; Johnson et al., 1999). Similarly, besides fetal alcohol syndromes and later adverse development for infants born to mothers who drank during pregnancy, living with problem drinkers is associated with an early onset of problematic drinking, psychological problems (antisocial behaviors, depressions, anxiety, low-self esteem, or personality disorder), poor academic and intellectual performance, and other illegal drug use among children and young adults (Larkby and Day 1997; Sher 1997; Jacob and Johnson 1997; Ellis, Zucker, and Fitzgerald 1997; Richter and Richter 2001. Dube et al, 2006). In summary, harms from growing up with smokers are mostly via second hand smoking and behavioral learning while harms from growing up with problem drinkers are mostly psychological, mental, and via behavioral learning. These short-term outcomes all indicate possible negative consequences on mental and physical health of later adulthood, but the individual smoking and problem drinking behaviors may be the most damaging to the health in the long run.

The influence of growing up with smokers and problem drinkers is not limited to the health outcomes and individual risk behaviors. Another often-ignored factor to explain the associations between childhood environment and later health is through the process of family formation or mating. Daughters and sons of smokers and drinkers, regardless of their own smoking and drinking status, were more likely to marry to smokers and drinkers. Furthermore, husbands and wives were more similar in health behaviors and health than unmarried men and women. There are several explanations for such a similarity. First, homogamy in personal traits and background is the dominant form of human mating (Johnson and Johnson 1983; Kalmijin 1990; Feng and Baker 1994). Smokers tend to marry to smokers and drinkers tend to marry to drinkers (e.g., Windle 1997; Clark and Etile forthcoming). Whether it is a result of assortative mating in behaviors or in personality is still controversial. Moreover, a couple may influence one another after being married or living together for a period of time. For example, non-smokers who married to a smoker are more likely to smoke later and non-drinkers who married to a drinker are more likely to drink later (Leonard and Das Eiden 1999; Leonard and Mudar 2004; Homish and Leonard 2005; Lewis et al., 2006). This is particularly true for women who do not drink or smoke before the marriage (Leonard and Mudar 2003, 2004; Leonard and Das Eiden 99).

Spousal characteristics, such as socioeconomic status, health risk behaviors, and health status are known to associate with individual health and mortality (e.g., House, Landis, and Umberson 1988; Ross, Mirowsky, and Goldsteen 1990; Shinberg 2001; Egeland et al., 2002; Jaffe et al, 2006). For older men and women who grew up with and later lived with smokers or problem drinkers, their health would be in much higher risk than other men and women. Besides harms caused by smokers parents or problem drinkers in childhood, they are more likely to addict to tobacco or alcohols; and through the process of mating or family formation, they are more likely to suffer from harms caused by an unhealthy environment in adulthood. Of course, in general, family formation per se (including marital quality, kinships, and having children) is a proven protection factor of risk behaviors, though its effects on health are more complicated (Umberson 1987, 1992; Ross, Mirowsky, and Goldsteen 1990; Tucker et al., 1996; Waldron, Hughes and Brookes 1996; Waldron, Weiss, and Hughes 1997; Leonard and Rothbard 1999; Wilson 2002). Given the complexity of inter- and intra-generational similarities in health and mortality, a life course approach, taking social reproduction of family environment into account, is important to assess the individual health inequality.

Figure 1 Relationship between Experiencing Risk Behaviors and Health in Later Adulthood

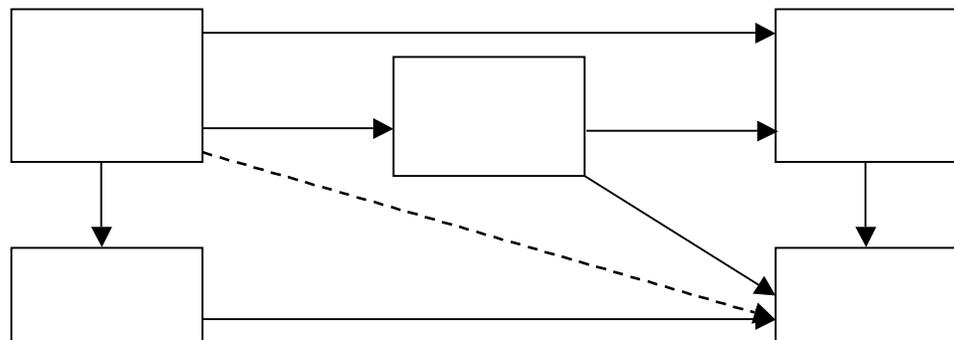


Figure 1 is a conceptual model of how childhood health environment may influence health in later adulthood. The solid arrows indicate influences with published evidence while the dashed arrows indicate possible influences with little published evidence.

METHODS AND DATA

Data

The original WLS sample was consisted of 13,017 randomly selected Wisconsin high school seniors of class 1957. It was about 1/3 of Wisconsin high school seniors at that time. Besides individual and school data collected in 1957 and from parents in 1964, the study continued to collect data from the original respondents (hereafter, graduates) in 1975, 1992, and 2002. The response rate of the graduate sample has been very high, 87.09% for 1964, 90.09% for 1975, and 87.18% for 1992. In 1977, one sibling was randomly selected from the roster of all living siblings for each graduate, but only 2,134 siblings were eventually interviewed in the data. In 1994, the sibling sample was expanded to include the sibling interviewed in 1977, the selected but not interviewed 1977 sibling if the graduate respondent was interviewed in 1992-3, and a newly selected sibling if the selected but not interviewed 1977 sibling was no longer available. There were 4,677 sibling respondents who completed the phone interviews, 4,036 who completed phone interview and mail questionnaire, and 561 who completed the revised mail questionnaires due to funding limit. In 2003-4, the WLS re-interviewed 7,284 graduates by phone and mail; in 2004, 3,862 spouses of graduates were also interviewed; in 2005, 3,252 siblings were interviewed. Most childhood family information, including family incomes, farmer background, father's and mother's education, occupation, residential locations, and religion, were collected in 1957, but some, such as positive relationship with parents, abuses, family configuration and structure, and smokers and problem drinkers in the family, were collected in subsequent interviews from graduates, siblings, parents, and other sources, such as WI State tax record, social security, and schools. Health data were not collected until 1992/1994. Adult life events, such as educational history, occupation and job history, income, social participation, religion, marital history, fertility history, were obtained over time. The WLS also has a rich set of variables on first-degree relative information (age, education, occupation, marital status, health, and others), aspiration, expectations, social comparisons, personality (since 1992), psychological well-being (since 1992), financial inter-transfers (since 1992), health insurance (since 1992), and retirement-related measures (since 1992). The variables are introduced below. In the current proposal, I will analyze WLS graduates using multivariate regression analysis.

VARIABLES

The key independent variables, growing up with smokers and problem drinkers, are measured by two questions in either 1992/1994 and 2003 surveys. In 1994 sibling mail questionnaire and in 2003 graduate mail questionnaire, the respondents were asked to identify the smokers (father, mother, and others) in the family until age 16. In 1992 and 2003 graduate phone interviews, the respondents were asked whether they ever lived with problem drinkers while growing up. To construct the smokers variable, I first used reports from 2003. If the report was missing and the graduate and sibling respondents reported they grew up together, I used the sibling report from 1994 or 2005. Later, I cross-examined 1994 (sibling), 2003 (graduate) and 2005 (sibling) reports to ensure the consistency between respondents and survey years. The consistency between two reports in different years was as high as 95% while the consistency between graduate and sibling respondents (2003 and 2005) was 92%. A similar

measure was adopted to ensure the quality of the variable of growing up with drinkers. For the variables of growing up with problem drinkers, I used the variable from 2003 graduate data; if it was missing, I used the answer in 1992 data. Our respondents all grew up in 1950s when a time smoking was very popular and the harm of smoking was not aware by the general public. About seventy three percent of the graduates respondents grew up with at least one of the parents smoked; about 22% of WLS graduates reported to have grown up with problem drinkers.

I studied 1992 health outcomes of the graduate respondents but for some outcomes, I also used information collected in 2003 (from graduates) to ensure the quality of the variables. The first set of health outcomes is of physical health, which included self-report health, disability which interfered with work, number of diagnosed disease, number of symptoms, diabetes, heart diseases (including hypertension), and cancers. The respondents were asked to rate their health as “excellent”, “good”, “fair”, “poor”, or “very poor”. Most of respondents (88%) rated their health as excellent or good. I created a dichotomous variable with 1 indicating “excellent” to “good” and 0 indicating otherwise. The disability variable indicated respondents with “any physical or mental condition that limits amount or kind of work [you can do] for pay”. The respondents were asked whether they had been diagnosed with any of 16 medical conditions. Forty one percent of respondents reported no diagnosed condition and thirty-two percent reported only one. Since the distribution was skewed, I constructed the question in two ways: 1) with any illness versus with no illness; and 2) with number of conditions at 75th-percentile (2) or more versus less conditions. The respondents were also asked to circle physical symptoms from a list of 22 symptoms. However, many women who circled several symptoms but later reported that they experienced the symptoms less than once per month. Given that most women were in menopause, I did not count symptoms being experienced less than once a month.¹ The total number of physical symptoms was constructed in two ways as the number of diagnosed conditions was, except that the number of symptoms at 75th percentile was 3 or more. Twenty-nine percent of respondents experienced no physical symptoms once or more a month in the last 6 months; Thirty-four percent of respondents experiences three or more symptoms. I also created three indicators to identify respondents with hypertension or heart problem, with diabetes, or with any cancers. About one quarter of our respondents had some form of cardiovascular problems such as hypertension or heart problem. Under five percent of them had either cancer of diabetes.

Risk behaviors were another set of health outcomes. The body mass index score was categorized into two dummy variables: being obese and being extremely obese. The former is defined by BMI greater than 30; the latter is defined as more than 40. Smoking behaviors and experiences are asked in the 1992 mail questionnaire. Smoking behaviors and experiences were measured by three dummy variables: current smokers, ever smokers, and those who ever smoked for 10 years.² Only 80% of WLS 1992 graduates were randomly selected to ask drinking questions in phone interview. Drinking behaviors are measured by two dummy variables: being heavy drinkers and being problem drinkers. I used NIH’s definition to define heavy drinkers: 30

¹ I also analyzed the original number of symptoms. Except that coefficients of gender changed dramatically, there was not changes in any other explanatory or control variables.

² The WLS did not have detailed information on smoking except current and ever smoking status, quantity if currently smoking, and tenure if ever smoking in 1992 mail questionnaire. Detailed information on smoking history such as starting age and time of quitting were asked later in 2003.

drinks and more per month for women and 60 drinks and more per month for men. Respondents who were categorized as heavy drinker or who had seek for professional help for self drinking were considered as problem drinkers. That is, heavy drinker is a variable to measure the current drinking behaviors while problem drinker is a variable to measure the problem drinking history. Health risk variables are further measured by whether the respondents have ever lived with problem drinkers since age 18, and whether anyone smoker inside (current) home. They were also used as explanatory variables in a later stage of analysis.

The graduate respondents did not do very well in health risk behaviors. More than a quarter of WLS graduates were obese, about 6% were extremely obese. Fifty-four percent of men and women have smoked. Seventeen percent of men and women were smoking at age 52 or 53. Forty-five percent of all respondents smoked for more than 10 years; that is, more than 80% of ever smokers smoked more than 10 years. Ten percent of WLS graduates were categorized as heavy drinkers. And 13% of the graduates were either drinking heavily or have seek for help for their drinking behaviors before.

Besides physical health, some characteristics of mental health are also studied. The depression is measured by CES-D. Cognitive ability is measured by adult WAIS. I also include autonomy from Ryff's psychological well-being, neuroticism, and openness from Big five personality scale.

Other explanatory variables include sex, age, verbal abuse, physical abuse, mother's age at the respondent's birth, father's age at the birth of the oldest sibling, number of siblings, birth order, whether a sibling died before the respondent reached age 36, family income at senior year, father's and mother's schooling (in years), father's occupational status (in Duncan SEI), the respondent's plan to go to college at senior year, parental encouragement for college education, the respondent's academic ability at senior (or junior) year, grades at high school, the respondent's completed year of schooling, the respondent's personal earning in 1974, ever being divorced, never being married, number of marriage, the respondent's age at first marriage, total number of biological children, and the respondent's age at birth of his/her first biological child.³

Age was controlled in all equations because some WLS graduates were much older than 17 or 18 years old at 1957. Childhood abuse variables were two key control variables. They were constructed first from the graduate reports in 2003 and then, if they were missing because of refusal or no interview, from the sibling reports in 1994. In 2003, the WLS asked the graduates whether mother/father insulted or swore at the respondent; in 1994, the WLS asked the sibling respondents whether mother/father insulted or swore at the graduates. There were four valid answers: not at all, a little, some, and a lot. I coded "not at all" as 0 and other categories as "1" to indicate verbal abuse from mothers or fathers. The verbal abuse variable was a combination of verbal abuse from either father or mother. Two questions in 2003 questionnaire were used to construct physical abuse variable: whether father/mother slapped, shoved or threw things at the respondents; whether father/mother threat the respondent in way that the respondent would now consider physical abuse. The first question has 4 valid answers (not at all, a little, some and a lot) and the 2nd question has answers of yes and no. I used the answers from 1994

³ Respondent's own occupational aspiration, growing up with both parents, marital problem between parents, positive parenting, residential area (urban or rural), and religion were all controlled in a preliminary analysis. They had either sporadic or no effects on studied outcomes, and did not moderate the effects of main explanatory variables. I did not include them in the equations reported in the present paper.

sibling reports for missing reports from graduates. In 1994, only the question of slapped/shoved/threw was asked. About a quarter of graduates or their siblings report verbal or physical abuse from one or both parents.

The independent or control variables are entered stepwise by time and common nature. I divide them into seven groups: baseline control (sex, age, verbal and physical abuse), family configuration (parental ages at birth, and sibship composition), family socioeconomic status (parental SES), aspiration (encouragement and expectation), high school performance (IQ and grades), personal socioeconomic attainment (income and education), and personal family experiences (marriage and fertility). One's own smoking and drinking and living with smokers currently or problem drinkers after age 18 were entered into the equations to explain physical health outcomes. One's own smoking and drinking were controlled in equations of living with smokers currently and of living with problem drinkers after 18; Living with smokers now and living with problem drinkers after 18 were controlled in equations of one's own smoking and drinking behaviors. Multivariate regressions were used, including both OLS and logistic regressions.

FINDINGS

Those who grew up with smokers or problem drinkers were more likely to smoke more than 10 years, to become heavy drinkers, to seek help for drinking problems later, to live with smokers or problem drinker after 18, and to have poorer health at age 50s (health status, height, depression, hypertension or heart problems, cancer, number of symptoms, and medical conditions). Controlling for one's own smoking and drinking behaviors and living with smokers or problem drinkers after 18, the negative consequences of growing up with smokers or problem drinkers on health remained. Men and women who ever lived with problem drinkers after age 18 or currently were exposed to smokers also tended to report poorer health, more diagnosed illnesses, and more physical symptoms, regardless of their own health behaviors and upbringing. All respondents were growing up in Wisconsin in 1940s: 73% of graduate respondents grew up with smokers and 22% reported grew up with problem drinkers. Besides socioeconomic origin, socioeconomic status in 1975, and marital and fertility history, the control variables included age, gender, verbal and physical abuse in childhood, sibling and family configuration, aspirations at age 18 (encouragement and college plan), and high school performance and IQ. None of the control variables of family origin explained or attenuated significantly the influences of growing up with smokers or problem drinkers. Later life events (marriage and fertility) and socioeconomic attainment did not moderate the associations.