

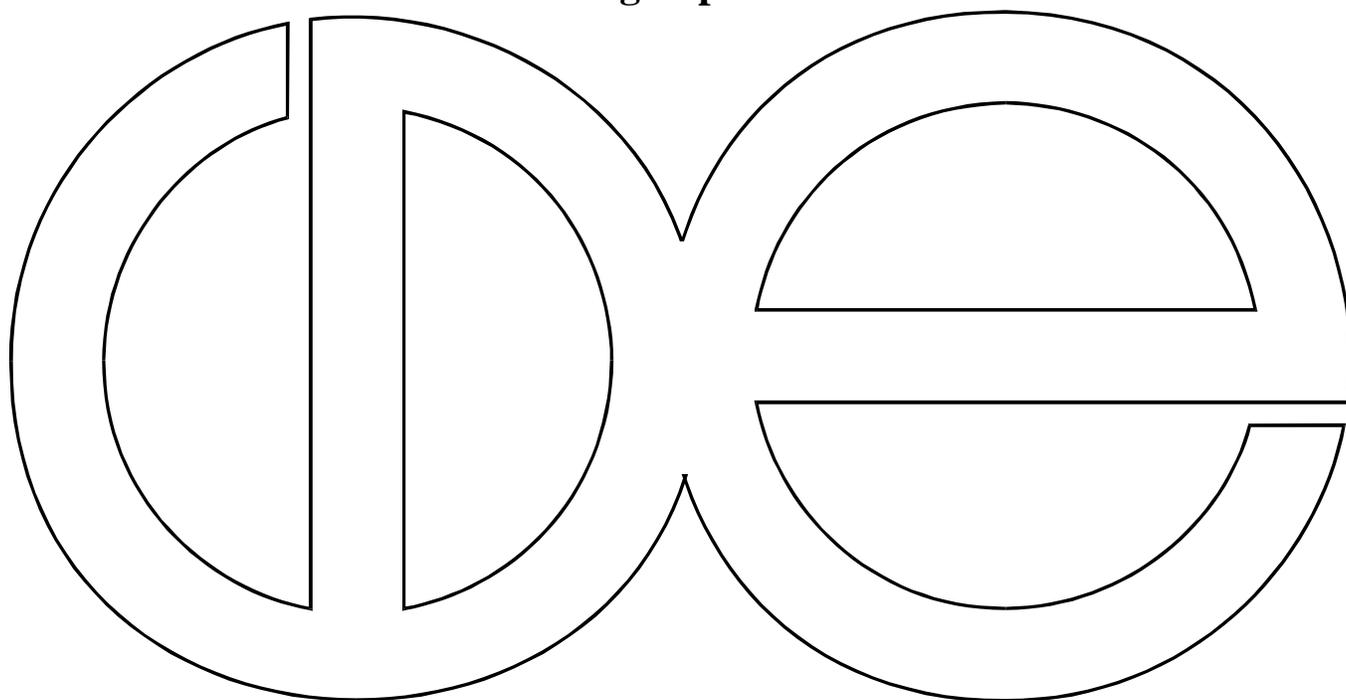
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**Gender, Early Life Circumstances, and Smoking**

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Using a large longitudinal sample of mid-life men and women, we study the long-term relationship between early life circumstances and regular smoking. Early life circumstances have profound influences on smoking experiences. Smoking is learned, but certain conditions foster this learning. Contrary to a common belief, poverty and family structure do not associate with smoking in our sample. Attachment to social norms, adverse family environments, and school performance are all related to smoking initiation, continuation, or cessation. Gender differences can be observed in individual smoking histories, influences of early life circumstances, and the duration of those influences. The effects of cognitive ability and parental encouragement for college education on women's smoking experiences suggest a plausible cohort effect.

In this paper, we study the relationships between childhood environment and smoking behaviors at mid-life. The childhood environment includes socioeconomic origin, family structure and composition, health environment, religion, residence, abuse, personal ability, and achievement aspiration. Smoking behaviors at mid-life include smoking at age 50, ever smoking up to age 50, and quitting smoking. There are many factors that explain the initiation and continuation of regular smoking. We are mainly interested in the long-term direct effects of childhood characteristics on smoking, with and without controls for later socioeconomic status and life events, and gender differentials in those effects.

Smoking is both an established cause and an epidemiologic predictor of many diseases. It is a major risk factor for cardiovascular diseases, including ischemic heart disease, stroke, and atherosclerosis. Smoking is also an important contributory cause of many cancers, including, most strongly, lung cancer. Heart disease, stroke, and cancers are the most frequent causes of death in the United States and other developed countries. In addition, smoking contributes significantly to chronic obstructive pulmonary disease (COPD), asthma, and other respiratory diseases. Thus smoking is either a major or contributory factor in the etiology of the top causes of death. It has now become the number one cause of death for women (U.S. Department of Health and Human Services 2001). Estimates are that over \$50 billion are accrued in direct medical costs from smoking, and each year smoking accounts for 430,000 deaths in the United States and over 5 million years of potential life lost. The Behavioral Risk Factor Surveillance System (BRFSS) showed that the prevalence of adult cigarette smoking ranged from 13.8% to 31.7% among all states in 1996 and 1997 (CDC, 2000). Tobacco use is clearly one of the most significant public health problems in the United States and elsewhere, both because of its direct impact, and because it is a preventable cause of morbidity and mortality.

Smoking starts at young ages and is addictive. According to US Department of Health and Human Services's report (2001), smokers usually learned smoking before young adulthood, mainly between ages 12 and 18. About forty to sixty percent of male smokers and ten to thirty percent of female smokers started smoking daily by age 18. About three quarters of smokers ever wanted or attempted to quit smoking one point or another. Female smokers are less likely to quit than their male counterparts. More than fifty percent of ever smokers older than 50 quit. Apparently, many other smokers continue. Are any early life circumstances associated with the onset of smoking also associated with smoking continuation or cessation?

Though many studies have tried to explain smoking behaviors, there is a lack of research on the long term influences of its early determinants. Research on smoking initiation has tended to study adolescents. Research on determinants of smoking maintenance and cessation has studied both adults and adolescents. While adolescent data are likely to be cross-sectional or short-term longitudinal with few exceptions, adult data rarely have information on the early life circumstances which explain most smoking initiation. They cannot answer questions on long-term effects. Here, in contrast, we use a large longitudinal sample of mid-life women and men with extensive information on childhood environment to investigate the effects of early life circumstances on smoking initiation and maintenance over 33 years, net of the effects of major adult social and economic status characteristics.

## **Literature Review**

Research on social determinants of smoking behaviors is mostly confined to short term observations or cross-sectional comparisons (see reviews from Flay et al. 1983 and Conrad et al. 1992). Smoking initiation is mostly explained from sociological and social psychological

perspectives. The mechanisms are socialization, learning, peer or social pressure, and social bonds. In contrast, cessation and maintenance are mainly explained from physiological, psychological, and biological perspectives. The mechanisms are stress, depression, and biological or genetic propensity to addiction.

### **Socioeconomic Status and Regular Smoking**

Socioeconomic origin is the most studied factor of early family environment. Current socioeconomic status (SES) is associated with adult smoking behaviors, but findings from adolescent samples failed to support a consistent relationship between parental socioeconomic status and regular smoking. In Conrad et al.'s (1992) review, the onset of smoking, mainly experimental smoking, was related to compromised socioeconomic conditions. Chassin et al. (1992) found parental education was significantly related to adolescent smoking. Glendinning et al. (1994) found no connection between family class and adolescent smoking in Scotland. Lowry et al. (1996) also found an inverse relationship between responsible adult's schooling, family income, and regular smoking. Tuinstra et al. (1998) found no relationship between parental education and daily smoking among Dutch boys and girls, but a non-linear relationship between father's occupational level and daily smoking among girls. Family income did not affect smoking behaviors for California youth (Hu et al. 1998). Emmons et al. (1998) found that college students of college-educated parents were more likely to smoke. Harrell et al. (1998) found lower SES increased the risk of experimental smoking only, and lower parental education did not predict smoking. Data from Monitoring the Future surveys did not support parental education and regular smoking of adolescents (USDHHS 2001).

Associations between current and ever smoking and SES have consistently been seen in

adult samples. Among 18-35 year olds in the 1987 National Health Interview Survey and the 1982-84 Hispanic Health and Nutrition Examination Survey, persons with less than high school education were consistently more likely to start smoking cigarettes, controlling for race/ethnicity and gender (Escobedo et al., 1990). Using the National Health Interview Survey 1983-1991, Zhu et al. (1996) concluded that persons with 9-11 years of education were more likely to smoke and less likely to quit, compared to persons with other educational levels. Crude measures of individual socioeconomic status, such as occupational category, employment, and housing rental status, are inversely related to smoking (Duncan, Jones, and Moon 1999). The strong inverse relationship between occupational status and smoking, after controlling for sex, race, age and educational level, was confirmed by the Minnesota Heart Survey (Knutsson et al., 1996). Research has demonstrated a clear relationship between the smoking habit and adult social class (Blaxter, 1990). Individual poverty level was positively related to smoking (USDHHS 2001). Areas with greater deprivation have higher smoking rates in the UK (Kleinschmidt, Hills, and Elliott, 1995). Multilevel models demonstrate that the relationships between deprivation and smoking habit are complex, but that neighborhood-level effects are significant even after accounting for individual variations. That is, the area surrounding an individual is an important predictor of smoking status, and by extension, social context is important (Duncan, Jones, and Moon, 1999). In Amsterdam, Netherlands, the higher prevalence of smoking in deprived areas can be explained by both individual SES (i.e., income, occupational status, and educational level) and area deprivation level (Reijneveld, 1998).

Inconsistencies in findings between adult and adolescent samples complicate a seemingly causal relationship between regular smoking and socioeconomic status in childhood.

Socioeconomic status in childhood is the major predictor of socioeconomic status in adulthood. And the onset of smoking is usually early in life. One would expect a causal relationship between regular smoking and socioeconomic origin. Thus, other variables of early life circumstance which may associate with socioeconomic status in adulthood may have fostered smoking initiation.

### **Other Early Life Circumstances and Regular Smoking**

Parenting style, family structure, parental supervision and involvement, having smokers in the family, intelligence, school performance, achievement ambition, religiosity, residential area, and risky behaviors are related to regular smoking among adolescents (Waldron and Lye 1990, Conrad et al. 1992, Glendinning et al. 1995, Radziszewska et al. 1996, Emmons et al. 1998, Anda et al. 1999, USDHHS 2001). The associations between smoking and those variables are mostly explained by two mechanisms: social control (social bonds) and learning. Crimes, deviant behaviors, and delinquency may result from a lack of supervision by parents and other adults. There are four components of social bonds: attachment, commitment, involvement, and beliefs. Once bonds to social norms have been detached, it is more likely for one to commit criminal or deviant activities (Hirschi 1969). For example, children from intact families are less likely to initiate smoking because of the supervision of both parents (Conrad et al. 1992, Glendinning et al. 1995, Flay et al. 1998, Anda et al. 1999). Inconsistent or absent parenting, and conflicts between parents and other family members, contribute to the loss of social bonds between parents and children (Sokol-Katz et al. 1997). Harsh family environment, such as unemployment of the household head, incarceration of family members, poverty, abuse, and violence, may decrease attachment and commitment to the family and thus increase the chances

of smoking (Anda et al. 1999). Unengaged parenting style has been shown to predict adolescent smoking (Radziszewska et al. 1996). Economic deprivation may cause conflicts between parents, marital instability, economic pressure, inconsistent parenting, decreasing authority, and children's self-confidence, and thus detach the social bonds between parents and children. Economic deprivation has been shown to cause anxiety, hyperactivity, and problematic behaviors among young children (Pagani, Boulerice and Tremblay 1997). Alternatively, encouragement, involvement, closeness, and attachment to/from significant others may decrease the chance of smoking (Conrad et al. 1992, Glendinning et al. 1995). Strong religious belief and a sense of community strengthen commitment, involvement and beliefs and thus help prevent smoking (Daly et al. 1997, Emmons et al. 1998). Better performance in school and confirmation to schooling also decrease the likelihood to smoke by strengthening commitment to social norms (Waldron and Lye 1990, Conrad et al. 1992, Glendinning et al. 1995, Hu et al. 1998, Flay et al. 1998).

Antisocial or delinquent behaviors may be learned from and reinforced by parents, older siblings, peers, and other adults (Akers et al. 1979). One learns to smoke through imitation and modeling and strengthens the habit by finding acceptance from others. This suggests that having parents or siblings who smoke may increase one's chance to initiate smoking and to become a regular smoker (Conrad et al. 1992, Kandel et al. 1994, Distefan et al. 1998, Flay et al. 1998, Anda et al. 1999). The more smokers present in the household, the more opportunity one has to learn how to smoke. Siblings may facilitate the opportunities for one to learn smoking simply by having smoker friends. Younger siblings may learn how to smoke by imitating older siblings (Conrad et al. 1992). Smoking was quite acceptable in 1950s and 1960s, so intact family with

two parents who smoked might enhance the opportunity to learn how to smoke. In certain cultures or during certain historical periods, smoking has been considered as an admission ritual to adulthood, especially for men (Waldron 1991). We may also explain the possible influences of economic deprivation on smoking as part of poverty culture. Unhealthy life styles associated with poverty include meals of poor nutrition, smoking, lack of exercise, and violence (Crisler 2000). For example, the amount of fat in the diet is much higher for poor people than for others. Through learning, by the same token, one growing up in economic deprivation is more likely to smoke.

Psychological and biological factors may also explain what makes smokers start, continue, and stop. Smokers initiate or do not quit smoking mostly because of peer pressure, stress, depression, and, possibly, genetic propensity. Peer pressure is an oft-cited reason for the initiation and maintenance of smoking in adolescence (e.g., Swan et al. 1991, Flay et al. 1994). Teenagers who did not smoke had few peers who smoked, whereas teenagers who smoked indicated that an overwhelming number of their best friends also smoked (Green 1979). Previous research also confirms the hypothesis that smoking is a response to stress and depression. Nicotine is an activating substance that may have a beneficial effect on depression (Klimek et al. 2001), or at least on some of its vegetative signs and psychomotor retardation (Carmody 1989). Depression is a risk factor for smoking (Glassman et al. 1990, Bardone et al. 1998). Sometimes, smoking is seen as a response to a stressor. One may adopt smoking as a device to release stress and anxiety (Warburton 1992). The stressor is usually a continuous stressor, and can include stress from family or other personal relationships, job and occupations, finances, life events, or numerous other causes. We may also consider poor performance in

school and peer pressure as stressors for the onset of smoking. A study of 10<sup>th</sup> graders found that the effects of life strain on cigarette use were moderate net of other social influences (Allison et al. 1997). Like excessive consumption of alcohol, this adaptation to stress is ultimately maladaptive because of the negative health outcomes that are associated with smoking. Most studies support that smokers have a higher level of stress than non-smoker (Sheahan and Latimer 1995, Todd et al. 1996, Weinrich et al. 1996, Lloyd and Lucas 1997). New research further shows that nicotine dependence seems to exacerbate stress. Adult smokers, though smoking, reported a higher level of stress than non-smokers; adolescent smokers report increasing levels of stress as they developed regular patterns of smoking and smoking cessation led to reduced stress (Parrott 1999).

Smoking is addictive. Still, some kick the habit while others do not. Following a group of 10<sup>th</sup> and 11<sup>th</sup> graders from New York public schools from 1971 to 1989, Chen and Kandel (1995) found that there was no initiation into cigarettes smoking after age 29. By age 29-30, 40% of ever smokers had quit and by age 34-35, 50% of ever smokers had quit. Long-term and repeated observations on 212 Swedish men and women between ages 12 and 36 showed that transitions from non-smoking to smoking or from light smoking to heavy smoking occurred mostly by age 20, transitions from light smoking to non-smoking occurred mostly by age 20, and transitions from heavy smoking to non-smoking occurred mostly after age 20 (Janson 1999). That is, some types of smokers kick the habit easier than others. Who are they? Women, heavy, and long-time smokers are less likely to quit. But do the factors that foster smoking also influence its continuation?

We argue that mechanisms fostering smoking may influence subsequent cessation and

maintenance differently. As an adaptation for stress, smoking may be seen as a physical and psychological reaction toward abnormality such as adverse environment and peer pressure. That is, smoking may serve certain psychological or physiological functions. However, once the strain is removed, or the social bond or attachment has been repaired, the motivation or situation which foster and support smoking disappears and smoking may not serve any function in the smoker's life. On the contrary, smoking may then be perceived as standing in the way of becoming "normal," so that the smoker becomes motivated to quit. For example, the 1999 Youth Risk Behavior Survey showed that two thirds of grade 9-12 girls and boys had ever "tried" smoking, but only about fifty percent of them become regular smokers (USDHHS 2001). That is, influences of curiosity and peer pressure might cease once curiosity is satisfied or peer pressure is removed. From the perspective of social learning and socialization, however, smoking becomes part of individual identity and value. To change the habit, the smoker has to change the identity and value as well. The environment from which one learns to smoke is less likely to discourage smoking. Many may start to smoke out of curiosity or peer pressure, but with smokers in the family, it is more difficult to quit. Having smokers in the family might also indicate one's genetic propensity to substance addition (Spitz et al. 1998) or other biological influences, for example, the impact of maternal smoking during pregnancy on the level of testosterone level of female offspring (Kandel and Udry 1999). Thus smokers who learn smoking or have a genetic or biological propensity to substance addition might need a longer time or more attempts to kick the habit than other smokers. The link between early family circumstances and adult smoking behaviors is critical to understanding the social and psychological processes of smoking habits and thus may provide valuable information on public health policy.

Our specific research questions are: 1) Will socioeconomic characteristics of origins influence the onset of smoking over the life course? 2) How do other variables of childhood environment, which are usually highly associated with SES, such as religion, residence, parenting, siblings, and family relationship, foster smoking over the life course? Are there any gender differences in these effects? 3) How well do these same early life circumstances variables explain smoking behavior at mid-life? Are there any long-term direct impacts on smoking at mid-life? Do they influence men and women differently?

From the literature review, we propose the following hypotheses:

1. Adverse environment such as broken families, growing up in poverty, or abuse foster smoking over life course;
2. Achievement ambitions, school performance, and religious attachment curb smoking;
3. Exposure to smokers, higher birth order, and the number of brothers and sisters increase the chance to learn smoking;
4. Only some influences of childhood environment on smoking are long-term and moderated by adult life events;
5. The influences of learning to smoking are more likely to be long-term than short-term; and
6. Some influences on smoking are more persistent among women than among men.

### **Data, Variables, and Methods**

The Wisconsin Longitudinal Study (WLS) is used in the current research. The WLS stands alone among large-scale studies on aging and mid-life in obtaining health and socioeconomic information directly from male and female respondents and from their randomly

selected siblings (Hauser, et al. 1992; Hauser, et al. 1994). The WLS is a longitudinal survey that has collected information on family background, education, occupation, income and other social characteristics from a cohort of high school graduates since 1957, and similar information from randomly selected siblings since 1977. The latest wave of the study surveyed approximately 8500 high school graduates (hereafter called “primary respondents”) at ages 53 and 54 in 1992-3, and 4500 of their siblings, primarily aged 45 to 64. Information on health, personality, psychological well-being, inter-generational and intra-generational relationships, and financial transfers was collected in the 1992 primary respondent and the 1994 sibling questionnaires. Some data on the family environment in childhood were acquired retrospectively from siblings in 1994. Since the original primary respondents of the WLS represented the population of Wisconsin high school seniors in 1957, they are almost exclusively non-Hispanic white high school graduates.

Questions regarding smoking behaviors were first asked in 1992 and 1994. Respondents were asked whether they currently or had ever smoked regularly. For those who had ever smoked, the daily numbers of cigarettes consumed and the duration in years of smoking were collected. Absence of information on starting and ending times of smoking spells, however, limits our ability to assess causality between later life events and smoking behaviors. In the current paper we only study smoking behaviors of the primary respondents.

Descriptive statistics of all variables are reported in Table 1. Our dependent variables are two dummy variables indicating whether the primary respondents ever or currently smoked regularly. “Smoking regularly” was self-defined by the respondents. As shown in the table, the majority of male respondents have smoked regularly during at least one period of their lives.

Approximately half of the female respondents smoked regularly during at least one period of their lives.

Independent variables including individual characteristics, family environment, socioeconomic status, and later life course experiences were obtained from 1957, 1975, 1992, and 1994 surveys. *Individual characteristics* are high school rank, intelligence (i.e., measured mental ability), achievement ambition, and religiosity. High school rank was obtained from school records. The variable was measured by converting original rank into percentile rank and then normalizing into 3 digit score. Intelligence is measured by percentile of normalized scores on the Henmon Nelson IQ test administered to all Wisconsin high school juniors the year prior to the first survey, and was obtained from high school records. Achievement ambition includes a continuous measure of occupational aspiration (in 1950 Duncan SEI score of the occupation named by the respondent) and a dichotomous indicator of whether the respondent planned to go to college. Both were reported by respondents in 1957. Religiosity is measured by self-reported frequency of church attendance in 1957.

*Socioeconomic origin* is indicated by parental education (in years of schooling), mother's working status in 1957 (dichotomous outcome), and father's occupational status (Duncan SEI scores) in 1957. Poverty status is measured by the ratio of family income to needs in 1957.

*Family environment* variables obtained from the 1957 survey include family structure, parental encouragement for college, and family/sibling composition. Family structure in childhood was indicated by whether the respondent was living with both parents in 1957. A dummy indicator shows parental encouragement for college education. Family/sibling

composition is measured by number of brothers, number of sisters, and birth order.<sup>1</sup> Other family environment variables reported in 1957 included metropolitan and rural residence and membership in Catholic and Christian orthodox denominations. Religiosity was measured by the respondent's 1957 report of church attendance, with the ordinal responses coded as never = 1; less than a few times per year = 2; a few times per year = 3; once a month = 4; two or three times per month = 5; once a week = 6.

Several family environment variables were obtained retrospectively in 1992 and 1994. Prevalence of smoking in the childhood household was measured by a summary of smokers in the household, including parents and other family members, reported in 1992. Parental marital problems and physical/verbal abuse in the childhood environment were reported by a randomly selected subsample of sibling respondents in 1994. The presence of at least one reported parental marital problem was indicated by a dummy variable. The original physical and verbal abuse questions covered abuse or violence between parents, between parents and siblings, and between siblings. We summarized the answers into two dichotomous variables indicating whether any violence or verbal abuse had ever occurred in the household. Given that some siblings might not grow up with the primary respondents, and so could not report on the respondent's household violence and verbal abuse, our sample has been restricted to primary respondents who grew up with a randomly-selected sibling in the same household. Thus our sample includes only non-singleton respondents.

*Later life course experiences* are our control variables. They are military service,

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<sup>1</sup> We studied number of sisters and number of brothers, instead of number of siblings, so that we can measure influences of size and gender composition of the sibship.

education, marriage, fertility, working status, occupational status, and personal income, all except military service measured in 1992. Military service was reported in the 1975 survey, and was treated as an early life course experience in the final model of ever smoking. The educational level in 1992 was measured in four categories: high school graduates (reference group), some college education, college graduates, and beyond college.<sup>2</sup> Marital experiences were measured by age at first marriage, currently re-married, and currently in first marriage. We used the indicator of currently married to measure currently re-married status after controlling for currently in first marriage. The omitted category was currently unmarried. Number of children was an indicator for fertility over the life course. A dichotomous variable indicated labor market status (employed/not employed) in 1992. Occupational status was measured by two dimensions: the percentage in the respondent's 1992 occupational category who had completed one or more years of college and the percentage who earned \$10,000 a year or more in 1969 (Hauser and Warren 1997). We transformed the raw percentages into started logit scores, following Hauser and Warren's recommendation, using the formula  $\ln [(percentage + 1)/100 - percentage + 1]$ . Personal income was divided into seven categories: \$0-10,000 (reference), \$10,001-20,400, \$20,401-28,800, \$28,801-34,000, \$34,001-45,500, \$45,501-63,500, and \$63,501 and beyond, and entered using six dummy indicators.

## Results

Tables 2 and 3 report logistic regression coefficients and standard errors for the effects of the major independent variables on ever and current smoking for men and women. A logistic regression coefficient represents the predicted change in the log-odds of a dichotomous outcome

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<sup>2</sup> We also used the educational level in 1975. That did not change the outcomes.

corresponding to a unit increase in an explanatory variable. In the text we also report odds ratios corresponding to unit increases, which are obtained by exponentiating the logistic regression coefficients.

The analytical sample includes 1,323 men and 1,484 women. In models E1 through E5 of the two tables we analyze respondents' reports of ever smoking regularly. Models C1 and C2 are models of respondents' reports of current regular smoking. The explanatory variables in model C1 for current smoking are identical to those in model E5 of ever smoking. We will compare coefficients in the current and ever smoking equations to discuss possible influences of corresponding variables on smoking maintenance.

### **Smoking Patterns Over the Life Course**

Table 1 shows that up to age 50, 47% of WLS women and 60% of WLS men have ever smoked regularly. Sixty-five percent of female smokers eventually quit while seventy percent of male smokers quit. Current smokers tend to have smoked longer than former smokers. Male smokers tend to have smoked longer than female smokers. The average years of smoking is 30.5 years for female current smokers and 32 for male current smokers; it is 16.6 years for female former smokers and 18.1 for male former smokers. Figures 1a and 1b show distributions of years of smoking by smoking status and sex. For female current smokers, the median is 32 years, the first quartile is 30, and the third quartile is 35. For male current smokers, the median is 30 years, the first quartile is 30, and the third quartile is 35. Among former smokers, for women, the median is 15 years, the first quartile is 8 and the third quartile is 25; for men, the median is 17, the first quartile is 10 and the third quartile is 25. So the distribution of years of smoking for current smoker is more right-hand skewed for men than for women and that for former smokers

is more left-hand skewed for women than for men. Whether quitting smoking or not, male smokers tend to have smoked longer than female smokers. About fifty percent of former smokers have smoked less than 15 years. Three quarters of current smokers have smoked for more than 30 years and one quarter of them have smoked for more than 35 years; that is, fifty percent of current smokers started to smoke regularly between age 17 or 18 to age 22 or 23. Among these fifty percent of smokers, most women appear to start smoking about 3 years later than men, because the median is 32 for women and 35 for men. Since we do not have a complete smoking history, we might slightly underestimate total years of smoking in the lifetime or overestimate age at onset of smoking for current smokers.

### **Early Life Circumstances and the Onset of Regular Smoking**

Models E1 to E5 in tables 2 and 3 show the influences of early life circumstances on the onset of regular smoking for men and women. Model E1 considers only the effects of parental education and economic attributes. In model E1, for a woman, the risk of becoming a regular smoker decreases with her mother's 1957 employment (MOMWK57), while for a man, it increases with his father's occupational status (FAOCC). The odds of ever smoking for women who had working mothers are 61.8 percent of the odds for similar women whose mothers did not work ( $\exp(-.482) = .618$ ).

Model E2 adds a set of non-economic characteristics of the origin family. For women, the odds of smoking are still significantly lowered by the presence of a working mother, but men's odds of smoking no longer vary significantly with father's occupational status. While intact family structure (INTAC) does not have any effect on men's or women's risk of becoming regular smokers, sibling composition (NSISLIV, but not NBROLIV) and birth order (BORSIB)

seem to affect women's smoking. The positive estimated effect of women's birth order (.141) means that women of younger birth order are more likely to smoke regularly; a difference of one position in the birth order corresponds to a relative odds of  $\exp(.141) = 1.15$ , or a 15 percent increase in the odds of smoking. However, the number of sisters has a marginally significant tendency to decrease women's risk of ever smoking.

Women of Catholic or Orthodox Christian upbringing (CATH) were more likely to ever smoke than those of other religious beliefs or no religious belief ; the odds ratio is 1.61. Women from families experiencing verbal abuse (ABUSC) and men from families experiencing physical violence (VIOLC) have higher risks of becoming regular smokers than other women and men. The odds ratios are 1.31 and 1.67 respectively. That is, women growing up in families in which verbal abuse was reported (by a sibling) have 31 percent greater odds of ever smoking, and men growing up in families where physical abuse was reported have 67 percent greater odds of smoking. The number of smokers in the household (HHSMKRN) increases both men's and women's chances of ever smoking regularly. The odds for men are increased by 125 percent ( $\exp(.810) = 2.25$ ) for each additional smoker in the household, while the comparable increase for women is 73 percent ( $\exp(.546) = 1.73$ ). Finally, religiosity (RELIG), measured by church attendance in categories, decreases the risk of ever becoming a regular smoker for both men and women: the predicted odds of ever smoking are reduced by 11 percent ( $\exp(-.116) = .890$ ) for men, and 21 percent for women ( $\exp(-.250) = .779$ ) for each one-step upward shift in the ordinal response concerning adolescent church attendance.

Model E3 enters high school achievement and ambition variables into the ever-smoking equations. High school rank (HSRSCORQ) is inversely and strongly related to both men's and

women's chances of ever smoking regularly: for men a 10-point advantage in the percentile rank-normalized score corresponds to a 26 percent decline in the odds of ever smoking regularly ( $\exp(-.300) = .741$ ), while for women the decrease is 31 percent ( $\exp(-.371) = .690$ ). Men with college plans (PLNCOL) had 35 percent lower odds ( $\exp(-.429) = .651$ ) of ever smoking than other men, but this effect was not significant for women. Women with parents encouraging them to go to college (PARENCQ) had 35 percent higher odds of ever smoking than other women of similar characteristics, but the effect for men is insignificant. Surprisingly, we found that intelligence measured at the junior year of high school was positively related to the chance of smoking. For women, the odds of ever smoking increase by 29 percent for an increase of 10 IQ points ( $\exp(.256) = 1.29$ ), holding other characteristics constant. The effect of intelligence for men is weaker ( $\exp(.099) = 1.10$ ) and only weakly significant.

Model E4 adds characteristics of the childhood residential location. Growing up in a metropolitan area (METRO) decreased the odds of ever smoking by 33 percent for men ( $\exp(-.405) = .667$ ), but the effect is not seen among women. Growing up in a rural area (RURAL57) showed a weakly significant negative effect on later smoking for both men and women. Thus, growing up in a non-metropolitan, non-rural area is most conducive to later smoking. In the final model, E5, we find that military service also increased men's chances of ever smoking. The odds for men who have served in military to smoke is 39 percent higher ( $\exp(.331) = 1.39$ ) than for similar men who have not served. The effect of military service for women is not significant.

All significant coefficients do not change much across various equations. This implies that influences of these variables are relatively independent from one another and from later

entered variables. Coefficients of some variables do not reach our preferred significance level,  $p < 0.05$ , but their influences are consistent across equations, for example, number of siblings, poverty level, and verbal abuse on women's smoking, and intelligence and living in rural area on men's smoking. High school rank, smokers in the household, and religiosity affect both men and women, and gender differences are negligible. Socioeconomic variables do not have much influence on smoking initiation.

### **Current Smoking, Maintenance, and Cessation**

The first model, C1, for current smoking includes the same set of explanatory variables as the model E5 for ever smoking. The purpose is to compare two sets of coefficients in order to understand the possible long-term influences of early life circumstances on current smoking or the influences of those variables on the maintenance of smoking. Religiosity, number of smokers in the household, and high school grades have similar and significant influences on current smoking for both men and women in model C1, as compared with model E5 for ever smoking. For WLS women, the effects of having had a working mother, younger birth order, and parental encouragement for college education on the risk of current smoking hold as strongly as before. Intelligence does not affect women's current smoking at midlife any longer. Women from metropolitan areas are less likely to smoke currently than other women now while they were not less likely to have ever smoked before. Metropolitan origins decrease the odds of current smoking by 38 percent ( $\exp(-.483) = .617$ ), holding other influences constant. For WLS men, achievement ambitions, such as occupational aspiration (OCST57) and plans for college, residential area in childhood, military service, and presence of family violence do not affect the risk to smoke any longer. No other early life circumstance has significant effects on smoking for

WLS men at mid-life.

The second model for current smoking, model C2, adds current education, labor force status, occupation, income, marital status, age at first marriage, and number of children, all measured in 1992. These additional control variables are listed in table 1, but their logistic regression coefficients in model C2 are not reported in tables 2 and 3. In model C2 religiosity and high school grades do not affect men's chance to smoke, after controlling for education, occupation, income, marital status, and fertility, while the impact of the number of smokers in the childhood household remains strong. For women, current education, occupation, income, marital status, and fertility do not moderate the influences of working mother, younger birth order, religiosity, number of smokers in childhood household, parental encouragement for college, high school grade, or metropolitan residence on the chances of smoking at mid-life. Holding constant other factors, men's odds of smoking at mid-life are increased by 91 percent for each additional smoker in the childhood household ( $\exp(.649) = 1.91$ ), and those for women are increased by 105 percent ( $\exp(.716) = 2.05$ ). The odds of current smoking are reduced by 36 percent for women with working mothers ( $\exp(-.454) = .635$ ), and by 39 percent for women growing up in metropolitan areas ( $\exp(-.496) = .610$ ), but are increased by 53 percent for women with parental encouragement to go to college ( $\exp(.423) = 1.53$ ). And one position younger in the birth order increases the odds of smoking at midlife by 14 percent ( $\exp(.131) = 1.14$ ).

In summary, the number of smokers in the childhood household is the only early family circumstance which has a long-lasting impact on the maintenance of smoking for both women and men. Women's chances of smoking at mid-life are still influenced by many childhood circumstances. These influences do not diminish over time and are not moderated by later social

and economic conditions. The influences of achievement ambitions and family violence on the onset of regular smoking for men do not last to mid-life. The same is also true for the influences of religion and intelligence on women's chances to smoke. Catholic or Orthodox Christian women tend to quit smoking, and women of higher intelligence, controlling for high school performance, also tend to quit smoking over time.

## **Discussion**

Our findings on ever smoking among a group of mid-life women and men support those from earlier studies using adolescent data. For example, socioeconomic background does not have consistent influences on the onset of regular smoking.<sup>3</sup> Our study also confirms that other early circumstances which may be correlated with SES origin have important independent effects on the onset of regular smoking. These circumstances include an adverse home environment (such as violence and verbal abuse in the family), achievement motivation, religiosity, higher birth order, parental encouragement to attend college, higher mental ability, better school performance, the presence of other smokers in the household, and non-metropolitan residence during adolescence. Some of those influences did not last into mid-life. For example, higher mental ability and Catholic/Orthodox Christian upbringing increased women's chances of smoking regularly at some point but did not affect their chances of smoking regularly at mid-life. That is, female smokers of higher mental ability and Catholic/Orthodox Christian upbringing were also more likely to quit by mid-life. We are puzzled about the effect of Catholic/Orthodox Christian upbringing, but given the ethnic distribution of the Wisconsin population in the 1950s,

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<sup>3</sup> Even though working mother is treated as a socioeconomic background characteristic in our study, it could also be interpreted from other aspects, for example, parenting style.

the variable might be an indicator of neighborhood or ethnicity, instead of religion per se. For men, lower ambition and the presence of family violence fostered the initiation of regular smoking, but male smokers with a history of family violence or lower ambition were also more likely to quit than other male smokers. A similar apparent resilience to adverse childhood environment was also found among female smokers who had experienced verbal abuse. We believe that socioeconomic achievement in adulthood may have mediated the negative relationships between men's risk of smoking and both high school grades and ambition. Military service increases the risk of becoming a regular smoker for men. We note here that the military services have frequently provided free or low cost cigarettes to servicemen. Pressure from service and peers also may have fostered the adoption of smoking.

Influences of social bonds and social learning on the onset of regular smoking are both partially supported. Children who had more attachment to social norms as evidenced by being more religious, more achievement oriented, and doing better in school were less likely to ever smoke regularly, while children who had indicators of poorer social bonds such as family violence were more likely to smoke regularly. The strongest and most persistent factors of childhood environment may operate through mechanisms of social learning, which is suggested by the effects of smokers in the household and of younger birth order. Smokers in the household not only directly endanger the health of household members through second-hand smoke, but also endanger the offspring through socialization; children learn smoking from authority figures, such as parents and older siblings. One may also argue that the effect of household smokers indicates a possible effect of genetic propensity or a possible biological effect of impact of mother's smoking during pregnancy. At the beginning, we suggested that influences of social

bonds were more likely to be short-run but that influences of social learning should be long-run. Our findings for WLS men support this argument, but our findings for WLS women do not.

Gender differences in smoking experiences can be observed not only in patterns of smoking history, but also in types of influences and length of those influences. Women are less likely to quit smoking than men, though they tend to start smoking later than men. We also found that men's chances of smoking are more determined by individual ambition while women's chances of smoking are more determined by factors associated with other members in the family such as birth order and parental encouragement. Once current socioeconomic achievement is controlled, men's ambition and high school achievement do not affect smoking any longer. We also found that influences of early circumstances have a longer impact on women than on men. For women, most of the effects on the onset of smoking also last until mid-life. This may partially explain the difficulty of quitting smoking for women. However, it is also possible that our control variables of later social and economic status do not explain smoking maintenance for women, so the long-last influences of childhood variables might include influences of unmeasured adult circumstances which are associated with childhood variables. For example, weight control and gender role attitudes are affected by childhood environment characteristics which affect smoking (Waldron 1991), but these are not in our final models of current smoking.

The positive relationships between mental ability, parental encouragement and women's chance of initiating regular smoking are surprising, but very plausible. Mental ability after controlling for high school grade, and parental encouragement after controlling for achievement ambition, may indicate unmeasured personal traits and attitudes of parents and offspring or

unmeasured family environment. Measured mental ability is associated with open-mindedness to new experiences, strong curiosity, and innovation. For teenagers, smoking was to “rebel without a cause” and, like most people believed at that time, “without harm”. The possibility that curiosity and rebelliousness are involved in the onset of smoking is consistent with the observation that female smokers of high mental ability were also more likely to quit by mid-life.

The persisting positive effects of parental encouragement to attend college on women’s risk of smoking may indicate possible influences of gender role attitudes. In the 1950s, prior to the widespread awareness of the detrimental effects of smoking on health, smoking was acceptable for men, but was less acceptable for women. Parents who encouraged daughters to go to college were likely to be less conservative and more gender egalitarian. Liberal parents may not have perceived the smoking as a deviant behavior for their daughters to the degree that conservative parents did. Daughters’ smoking might be more acceptable or understandable to liberal parents, regardless their own opinions on smoking.

## **Conclusion**

There is a lack of research on the long-term influences of early determinants of smoking on adult smoking. Different from earlier studies, we use a large longitudinal sample of mid-life women and men with extensive information on childhood environment to investigate the effects of early life circumstances on smoking initiation and maintenance over 33 years. Our findings verify many findings on smoking initiation from studies using data on adolescents. Adverse family environment and personal characteristics foster the onset of smoking, but their influences do not last and achievement in later life can overcome these effects. Women and men smoke for different reasons, but the impact of early life circumstances on smoking lasts longer for women

than for men.

In the current study, we discuss smoking cessation by comparing whether a respondent has ever smoked and currently smokes. The operational definitions of cessation and initiation of smoking are inconsistent in the existing literature. For example, in our study, “smoking regularly” is defined by the respondents, while in other studies it could be so broad as to include “experimental smoking” or could be as narrow as “smoking every day for at least 30 days.” Smoking cessation is even more difficult to define because one might start and quit smoking many times. Firmer conclusions about smoking initiation and cessation over the life course require smoking history data and, thus, the use of more sophisticated methods.

Better understanding of the process of smoking initiation and cessation will entail a great amount of additional work. Given the complicated social history of tobacco marketing in this country, and various social implications of cigarette smoking among different racial/ethnic and cultural groups, studies of the general population or comparative studies between countries may be needed to understand the influence of macro factors. Examining propensities to substance abuse among certain populations may call for a samples of siblings or twins. It would be also interesting to see whether early life circumstances have any influences on the duration of smoking over a more extended span of the life course.

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Figure 1a. Boxplot of Years of Smoking, Current Smoker

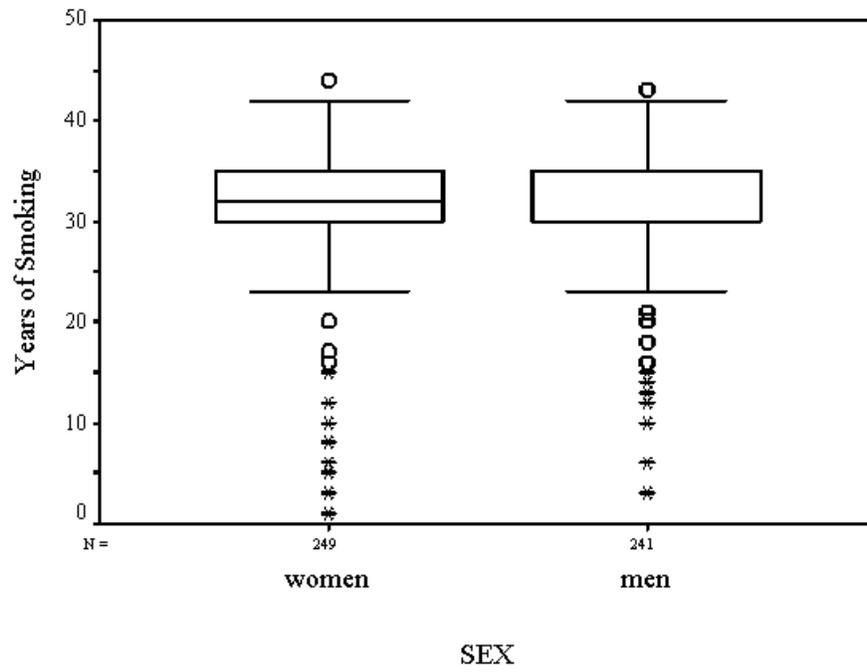
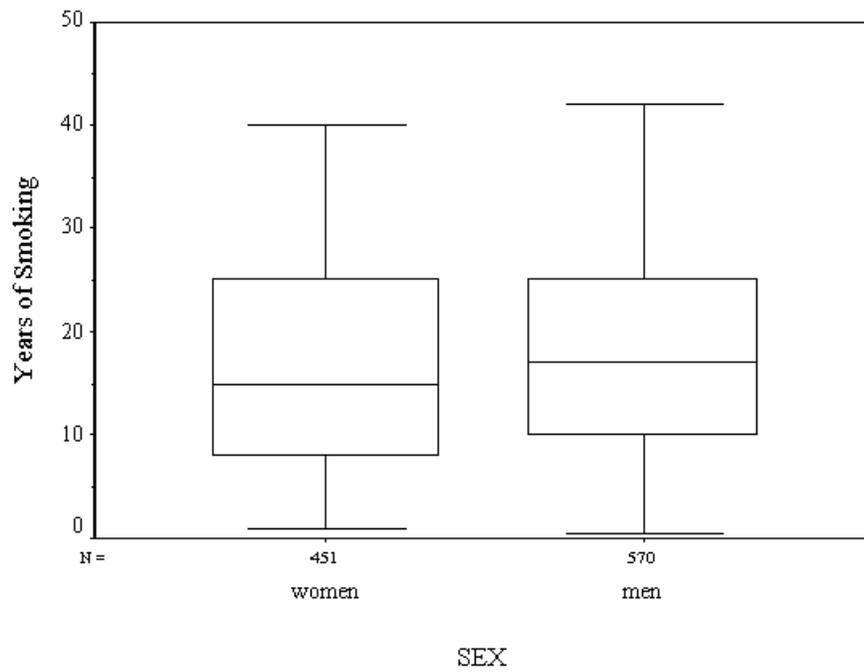


Figure 1b. Boxplot of Years of Smoking, Former Smokers



**Table 1. Descriptive Statistics**

Variables	Definition	Women (N=1484)		Men (N=1341)	
		Mean	s.d.	Mean	s.d.
SMOKENOW	Current Smoking	0.168	0.374	0.180	0.384
SMOKEVER	Ever Smoking	0.472	0.499	0.605	0.489
	Average Years of Smoking (Ever Smokers)	21.567	11.261	22.134	10.988
	Average Years of Smoking (Current Smokers)	30.534	7.031	31.681	7.198
	Average Years of Smoking (Former Smokers)	16.616	10.033	18.097	9.752
<b>Early Life Circumstances</b>					
BMMAED	Mother's education, in years, best measure	10.590	2.781	10.750	2.795
BMFAED	Father's education, in years, best measure	9.900	3.372	10.073	3.542
MOMWK57	Mother was working in 1957	0.621	0.485	1.653	0.476
FAOCC	Father's occupation, in Duncan SEI, best measure	3.565	2.389	3.615	2.447
PRATIO	Income to needs ratio at 1957	1.955	1.925	1.972	1.865
INTAC	Living with both parents, 1957	0.934	0.248	0.934	0.249
NSISLIV	Number of sisters, [1-11]	1.586	1.421	1.461	1.285
NBROLIV	Number of brothers, [1-11]	1.522	1.420	1.490	1.399
BORSIB	Birth order, [1-11]	2.278	1.627	2.197	1.571
CATH	Catholic or Orthodox Christian, 1957	0.427	0.495	0.404	0.491
RELIGS	Church attendance, 1957 [1-6]	5.086	1.457	4.503	1.666
HHSMKRC	Number of smokers in childhood household, 1992 [0-3]	0.717	0.451	0.740	0.439
PMARPRB	Parental marital problems, sibling proxy report, 1994	0.164	0.371	0.166	0.373
VIOLC	Violence in the family, sibling proxy report, 1994	0.421	0.494	0.439	0.497
ABUSC	Verbal abuse in the family, sibling proxy report, 1994	0.511	0.500	0.538	0.499
OCST57	Occupational Aspiration, 1950 SEI	52.551	15.176	51.697	26.552
PLNCOL	Plan for college at 1957	0.538	0.499	0.509	0.500
PARENCO	Parent's encouragement for college, 1957	0.526	0.500	0.632	0.482
IQHNCRQ	Junior IQ, Hemon-Nelson percentile normalized	102.425	13.969	103.324	14.490
HSRSCORQ	High school grade percentile rank-normalized	106.206	13.543	98.992	13.728
METRO	Living in metropolitan area, 1957	0.161	0.368	0.147	0.354
RURAL57	Living in rural area, 1957	0.216	0.411	0.207	0.406
RMILTY	Ever in military service, 1975	0.009	0.097	0.569	0.495
<b>Control Variables</b> (not shown in tables 2 and 3)					
EDUC92C1	Some college at 1992	0.162	0.369	0.154	0.361
EDUC92C2	College graduate at 1992	0.148	0.356	0.161	0.368
EDUC92C3	Advanced degree at 1992	0.098	0.298	0.201	0.401
RCWK92	Currently working at 1992	0.803	0.398	0.937	0.242
LRSEIED	Log (% of one year or more college), 1992 Occupation	-2.655	0.384	-2.672	0.465
LRSEINC	Log (% of earning at least \$14.3 per hr), 1992 Occupation	-3.505	0.524	-3.025	0.439
PINC92C1	Personal income [\$10001-20400]	0.215	0.411	0.056	0.230
PINC92C2	Personal income [\$20401-28800]	0.182	0.386	0.124	0.330
PINC92C3	Personal income [\$28801-34000]	0.072	0.259	0.101	0.301
PINC92C4	Personal income [\$34001-45500]	0.097	0.296	0.214	0.410
PINC92C5	Personal income [\$45501-63500]	0.036	0.187	0.188	0.391
PINC92C6	Personal income [\$63501-highest]	0.015	0.121	0.214	0.410
CURMAR	Currently married at 1992	0.810	0.393	0.870	0.336
CURMAR1	Currently in the first marriage, 1992	0.700	0.459	0.711	0.453
AGEMAR1	Age at first marriage	21.385	3.540	23.548	4.006
NKID92	Number of children in 1992	3.063	1.717	2.783	1.551

Note: IQ and High School grade are adjusted by 1/10 in the regression equation.

**Table 2. Childhood Environment and Smoking, Wisconsin Longitudinal Study, Men (N=1341)**

Outcome	Ever Smoking										Current Smoking			
	E1		E2		E3		E4		E5		C1		C2	
Model	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.								
Constant	<b>0.755</b>	<b>0.311</b>	<b>0.384</b>	<b>0.489</b>	<b>2.046</b>	<b>0.718</b>	<b>2.176</b>	<b>0.724</b>	<b>1.905</b>	<b>0.731</b>	-0.067	0.887	-2.163	1.422
BMAED	0.006	0.023	0.010	0.025	0.014	0.025	0.013	0.025	0.008	0.025	-0.025	0.032	-0.021	0.033
BMFAED	-0.016	0.021	-0.020	0.022	-0.015	0.022	-0.015	0.022	-0.016	0.023	-0.002	0.028	0.020	0.029
MOMWK57	<i>-0.209</i>	<i>0.119</i>	-0.079	0.126	-0.044	0.130	-0.029	0.132	-0.029	0.132	-0.132	0.160	-0.164	0.166
FAOCC	<b>0.066</b>	<b>0.029</b>	<i>0.056</i>	<i>0.031</i>	<i>0.057</i>	<i>0.032</i>	0.043	0.034	0.045	0.034	0.026	0.040	0.037	0.042
PRATIO	-0.057	0.034	-0.042	0.036	-0.039	0.035	-0.037	0.035	-0.031	0.035	0.019	0.046	0.027	0.049
INTAC			-0.211	0.255	-0.128	0.262	-0.118	0.262	-0.116	0.263	-0.335	0.294	-0.429	0.305
NSISLIV			0.073	0.053	0.057	0.055	0.054	0.055	0.055	0.055	0.035	0.065	0.005	0.067
NBROLIV			-0.034	0.049	-0.053	0.051	-0.050	0.051	-0.058	0.051	0.012	0.062	0.026	0.064
BORSIB			-0.004	0.049	0.013	0.051	0.011	0.051	0.011	0.051	0.010	0.061	0.041	0.063
CATH			0.217	0.127	0.153	0.131	0.173	0.135	0.164	0.135	0.066	0.163	0.147	0.168
RELIGS			<b>-0.116</b>	<b>0.038</b>	<b>-0.115</b>	<b>0.039</b>	<b>-0.116</b>	<b>0.039</b>	<b>-0.113</b>	<b>0.039</b>	<b>-0.109</b>	<b>0.045</b>	<i>-0.093</i>	<i>0.048</i>
HHSMKRC			<b>0.810</b>	<b>0.133</b>	<b>0.766</b>	<b>0.136</b>	<b>0.721</b>	<b>0.138</b>	<b>0.701</b>	<b>0.139</b>	<b>0.687</b>	<b>0.205</b>	<b>0.649</b>	<b>0.211</b>
PMARPRB			0.279	0.174	0.288	0.178	0.271	0.179	0.278	0.179	-0.197	0.213	-0.175	0.221
VIOLC			<b>0.510</b>	<b>0.146</b>	<b>0.487</b>	<b>0.150</b>	<b>0.492</b>	<b>0.151</b>	<b>0.500</b>	<b>0.151</b>	0.196	0.189	0.166	0.196
ABUSC			-0.199	0.149	-0.235	0.153	-0.232	0.153	-0.229	0.154	0.028	0.196	0.018	0.204
OCST57					<b>0.007</b>	<b>0.003</b>	<b>0.007</b>	<b>0.003</b>	<b>0.007</b>	<b>0.003</b>	0.002	0.004	0.005	0.005
PLNCOL					<b>-0.429</b>	<b>0.177</b>	<b>-0.417</b>	<b>0.177</b>	<b>-0.389</b>	<b>0.178</b>	-0.255	0.217	-0.057	0.229
PARENCO					-0.058	0.158	-0.061	0.159	-0.053	0.160	-0.265	0.189	-0.203	0.197
IQHNSCRQ (x10)					<i>0.099</i>	<i>0.054</i>	<i>0.109</i>	<i>0.055</i>	<i>0.106</i>	<i>0.055</i>	0.068	0.067	<b>0.159</b>	<b>0.071</b>
HSRSCORQ (x10)					<b>-0.300</b>	<b>0.058</b>	<b>-0.306</b>	<b>0.058</b>	<b>-0.292</b>	<b>0.059</b>	<b>-0.171</b>	<b>0.070</b>	-0.095	0.075
METRO							<b>-0.405</b>	<b>0.178</b>	<b>-0.418</b>	<b>0.179</b>	-0.390	0.232	-0.367	0.243
RURAL							<i>-0.305</i>	<i>0.171</i>	<i>-0.297</i>	<i>0.172</i>	-0.304	0.225	-0.365	0.232
RMILTY									<b>0.331</b>	<b>0.123</b>	<i>0.285</i>	<i>0.156</i>	<i>0.329</i>	<i>0.165</i>
-2LL	1790.00		1710.99		1652.79		1645.21		1638.03		1186.96		1130.90	
d.f.	6		19		27		29		30		30		48	

Note:

1.  $p < .05$  in bold and  $p < .1$  in italics
2. In the equations, a set of indicators of missing values are also controlled.
3. See Table 1 for variable description.

**Table 3. Childhood Environment and Smoking, Wisconsin Longitudinal Study, Women (N=1484)**

Outcome	Ever Smoking										Current Smoking			
	E1		E2		E3		E4		E5		C1		C2	
Model	coeff.	s.e.	coeff.	s.e.	coeff.	s.e.								
Constant	0.277	0.286	0.759	0.468	2.132	0.671	2.130	0.672	2.107	0.673	1.079	0.854	1.352	1.393
BMAED	0.003	0.022	0.017	0.023	0.022	0.024	0.023	0.024	0.022	0.024	0.028	0.031	0.028	0.032
BMFAED	0.020	0.020	0.033	0.021	0.031	0.022	0.030	0.022	0.031	0.022	-0.023	0.028	-0.018	0.029
MOMWK57	<b>-0.482</b>	<b>0.109</b>	<b>-0.427</b>	<b>0.114</b>	<b>-0.392</b>	<b>0.117</b>	<b>-0.378</b>	<b>0.119</b>	<b>-0.375</b>	<b>0.119</b>	<b>-0.422</b>	<b>0.153</b>	<b>-0.454</b>	<b>0.156</b>
FAOCC	<i>0.049</i>	<i>0.027</i>	0.028	0.028	0.031	0.028	0.023	0.030	0.024	0.030	0.054	0.039	0.054	0.039
PRATIO	-0.029	0.030	<i>-0.056</i>	<i>0.033</i>	<i>-0.060</i>	<i>0.035</i>	<i>-0.061</i>	<i>0.035</i>	<i>-0.061</i>	<i>0.035</i>	-0.088	0.061	-0.073	0.063
INTAC			-0.273	0.231	-0.205	0.236	-0.195	0.237	-0.184	0.237	-0.358	0.279	-0.291	0.283
NSISLIV			<i>-0.074</i>	<i>0.045</i>	<i>-0.079</i>	<i>0.046</i>	<i>-0.078</i>	<i>0.046</i>	<i>-0.080</i>	<i>0.046</i>	-0.015	0.060	-0.012	0.062
NBROLIV			-0.067	0.046	<i>-0.088</i>	<i>0.047</i>	<i>-0.085</i>	<i>0.047</i>	<i>-0.086</i>	<i>0.047</i>	-0.060	0.062	-0.056	0.063
BORSIB			<b>0.141</b>	<b>0.044</b>	<b>0.146</b>	<b>0.045</b>	<b>0.145</b>	<b>0.045</b>	<b>0.146</b>	<b>0.045</b>	<b>0.119</b>	<b>0.056</b>	<b>0.131</b>	<b>0.057</b>
CATH			<b>0.479</b>	<b>0.119</b>	<b>0.506</b>	<b>0.122</b>	<b>0.498</b>	<b>0.123</b>	<b>0.499</b>	<b>0.123</b>	0.230	0.158	0.248	0.162
RELIGS			<b>-0.250</b>	<b>0.040</b>	<b>-0.245</b>	<b>0.041</b>	<b>-0.243</b>	<b>0.041</b>	<b>-0.242</b>	<b>0.041</b>	<b>-0.198</b>	<b>0.047</b>	<b>-0.194</b>	<b>0.051</b>
HHSMKRC			<b>0.546</b>	<b>0.126</b>	<b>0.505</b>	<b>0.129</b>	<b>0.494</b>	<b>0.130</b>	<b>0.497</b>	<b>0.130</b>	<b>0.707</b>	<b>0.191</b>	<b>0.716</b>	<b>0.195</b>
PMARPRB			-0.113	0.155	-0.177	0.159	-0.185	0.160	-0.189	0.160	-0.023	0.198	-0.027	0.202
VIOLC			-0.003	0.133	0.007	0.136	0.010	0.137	0.009	0.137	0.012	0.173	-0.009	0.177
ABUSC			<b>0.274</b>	<b>0.134</b>	<i>0.262</i>	<i>0.138</i>	<i>0.264</i>	<i>0.138</i>	<i>0.269</i>	<i>0.138</i>	0.197	0.178	0.212	0.180
OCST57					-0.004	0.004	-0.004	0.004	-0.004	0.004	0.004	0.006	0.007	0.006
PLNCOL					-0.208	0.148	-0.207	0.148	-0.213	0.149	<b>-0.426</b>	<b>0.193</b>	-0.315	0.201
PARENCO					<b>0.297</b>	<b>0.149</b>	<b>0.297</b>	<b>0.149</b>	<b>0.298</b>	<b>0.149</b>	<b>0.392</b>	<b>0.191</b>	<b>0.423</b>	<b>0.195</b>
IQHNCRQ (x10)					<b>0.256</b>	<b>0.054</b>	<b>0.256</b>	<b>0.054</b>	<b>0.255</b>	<b>0.054</b>	0.098	0.068	<i>0.124</i>	<i>0.070</i>
HSRSCRQ (x10)					<b>-0.371</b>	<b>0.058</b>	<b>-0.370</b>	<b>0.058</b>	<b>-0.370</b>	<b>0.058</b>	<b>-0.276</b>	<b>0.073</b>	<b>-0.253</b>	<b>0.075</b>
METRO							-0.015	0.161	-0.019	0.161	<b>-0.483</b>	<b>0.222</b>	<b>-0.496</b>	<b>0.225</b>
RURAL							-0.117	0.160	-0.119	0.160	0.153	0.208	0.190	0.211
RMILTY									0.505	0.618	0.591	0.663	0.722	0.705
-2LL	2017.90		1922.67		1865.20		1846.66		1863.99		1244.25		1219.81	
d.f.	6		19		27		29		30		30		48	

Note:

1.  $p < .05$  in bold and  $p < .1$  in italics
2. In the equations, a set of indicators of missing values are also controlled.
3. See Table 1 for variable description.

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