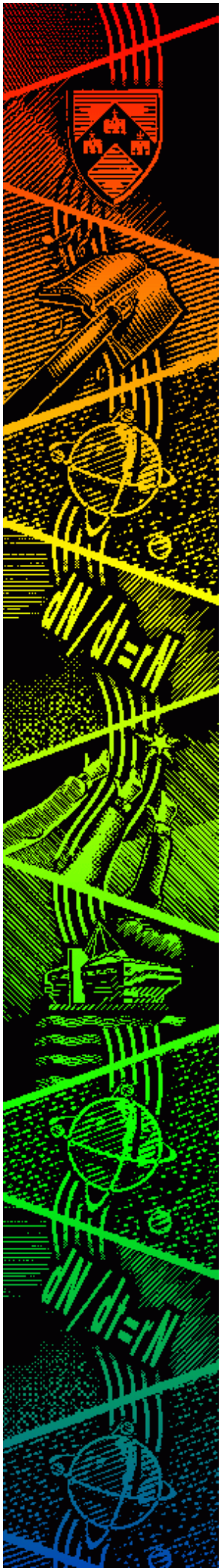

THE UNIVERSITY of York

Discussion Papers in Economics

No. 10/03

The Effects of Daughters on Health Choices and Risk Behaviour

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8 December 2009

Abstract

Little is known about why some human beings make risky life-choices. This paper provides evidence that people's health decisions and addictive actions are influenced by the gender of their children. Having a daughter leads individuals -- in micro data from Great Britain and the United States -- to reduce their smoking, drinking, and drug-taking. The paper's results are consistent with the hypothesis that human beings 'self-medicate' when under stress.

Keywords: Addictive behaviour**;** gender; daughters; smoking; drinking; attitudes.
JEL: D1; I1
Acknowledgments: Dan Gilbert and Daniel Nettle gave us particularly helpful comments on this paper. We are also grateful for valuable discussions with Gordon Brown, Bruce Charlton, and Amanda Goodall.

1. Introduction

Understanding risky decisions is important but difficult. Because of the problem of uncovering genuine causality, this is not an easy area in which to make scientific progress.

The paper provides evidence that people's risky health choices are shaped by the gender of their children. Having daughters rather than sons leads people to reduce their smoking, drinking, and drug-taking. The estimated effects are found to be large. To our knowledge, the study is the first to look in modern data at links between parents' health and child gender. For pre-industrial data, however, there is a research literature that links the birth of daughters to greater longevity of the parent (Helle et al, 2002, for example) -- although this result has recently been challenged in important research by Cesarini et al (2009). In that arena, the debate is not settled.

The present study is complementary to related work by Pham-Kanter (2009) -- done independently of the present paper -- who shows that child gender is a predictor of the weight of the child's mother. More broadly, it is known that females typically exhibit higher degrees of risk-aversion than males (Eckel and Grossman, 2002). There is also evidence that attitudes to risk are passed in part down from parents to their children (Dohmen et al, 2006). It is also believed that children matter more widely. For instance, there is evidence in the USA that having a son relative to having a daughter increases the probability of marriage for non-married couples (Lundberg and Rose, 2003). Having a first-born son increases the father's labor supply, whilst a first-born daughter reduces it (Lundberg and Rose, 2002; Choi, Joesch, and Lundberg, 2008).

The aim of this paper is to contribute to the literature by arguing that child gender influences a parent's tendency to engage in risky health behaviour. Using two different nationally representative samples of men and women, one covering Great Britain and one the United States, this paper documents evidence that having daughters compared to having sons reduces the probability of smoking and having a drinking or drugs problem. The effects are large and statistically significantly different from zero. Our main data, which are taken from the British Household Panel Survey, are longitudinal in nature. This makes it possible to observe people before

and after they have a new child of either gender. We test for successful 'quitting' of risky health behaviours. Consistent evidence, at the cross-sectional level, is obtained using an American data set, the Behavioural Risk Factor Surveillance System.

Beyond its inherent interest, there are some scientific advantages to the study of children's gender. Nature assigns it. Following earlier literature, it is possible to think of the gender of a baby arriving in a household as an exogenous event. Hence we have the character of a quasi-experiment where Nature randomly chooses the child's gender. We are then able to examine the 'switchers' in parental health behaviour: it is possible to explore what happens after a new child enters a household, and to see whether baby girls and baby boys have different observable consequences. Consistent with the idea of causality flowing from the gender of children on to later parental behaviours, the paper discovers in British data that, when compared to the year before the birth, men and women are more likely to quit smoking and drinking after the birth of a daughter rather than a son.

A potential difficulty for an analysis of this sort is the possibility of endogenous family stopping rules. Consider, for example, that for an unobservable reason, the people who have already decided to quit smoking are also those who prefer to stop having children after a boy is born, whilst habitual smokers tend to stop having children once a girl is born. Then there will emerge a positive association -- because smokers will be the only ones with strings of male babies -- between being a smoker and being a parent with a disproportionate number of sons. Nevertheless, this issue can be solved by looking at, for instance, the gender of the <u>first</u> child who is born. Whatever one's stopping rule as a parent, one starts with an initial baby; unlike the later composition of the family, the gender of the first born is uncontrollable (given no selective abortion). Hence we report, later in the paper, results for the first-born alone.

Factors contributing to success in quitting smoking, and major drinking of alcohol, include emerging signs of poor health, improved socio-economic status, and older age (see, e.g., Stall, 1986; Hymowitz et al, 1992, 1997; Bucholz et al, 1995; Graham and Der, 1999; Clark and Etilé, 2002; Tarani, Head, and Bartley, 2004). Some research in economics focuses on public policy interventions such as the effects of raising

cigarette taxes (DeCicca, Kenkel, and Mathios 2008; Gruber, 2002) and the setting of a minimum drinking age (Carpenter and Dobkin, 2009). To the best of our knowledge, there are no studies in the medical or social science journals on the effects of the gender of a person's children on risky health behaviours.

2. Data

The first data set used in this paper is the British Household Panel Surveys (BHPS), Waves 1-15. This is a nationally representative random sample of British households, containing over 10,000 adult individuals, conducted between September and Christmas of each year starting from 1991 (see Taylor et al 2002). Respondents are interviewed in successive waves; households who move to a new residence are interviewed at their new location; if an individual splits off from the original household, the adult members of their new household are also interviewed.

Children are interviewed once they reach 11 years old. The sample has remained representative of the British population since the early 1990s. Numbers of adult children are not recorded fully in the data set, so this paper focuses on offspring who live at home.

In this British data set, which runs from 1991 to 2006, we focus our attention on respondents who are aged 60 and below. This produces a total of 150,215 observations (25,249 individuals). Conditioning on those who have tried smoking before entering Wave 1 of the BHPS gives us a sub-sample of 'Ever smoked' of 52,506 observations (6,047 individuals). Of those, 58% say they still smoke at the year of the survey. Of the full sample containing all respondents aged 60 and below, 819 observations (417 individuals), which is less than 1% of the full sample, reported health problems related to either alcohol or drugs[1]. The mean number of children in a household is 1.04 with a standard deviation of 1.14. Roughly half of those children are girls; the mean of number of daughters in a household is 0.49 with a standard deviation of 0.74. There is almost a 50% split in the respondent's gender. Approximately 7% have a university bachelor degree as their highest qualification;

[1] We cannot separate the British sample into those with only an alcohol problem and those with only a drug problem. The American data set is cleaner in identifying drinkers from others in that respect.

2% have a masters or doctorate; 9% are self-employed; 6% are unemployed; 3% are retired; 14% are living with a partner; 7% are divorced; and 16% have never been married. Furthermore, approximately 40% of the sample are 'switchers', i.e. they either quit or took up smoking during their time in the panel. Means and standard deviations of other potential confounding influences on smoking are presented in Table A1 in the appendix.

Our other data source is the American Behavioural Risk Factor Surveillance System (BRFSS) for 2007. The BRFSS is a national survey of the United States administered by the Centre for Disease Control (CDC). The survey has been conducted yearly since its inception in 1984. The BRFSS asks questions about health status, physical activity and risk behaviours for a representative U.S. sample. To allow an analogous comparison with the British data, we also restrict our sample to individuals under the age of 60 who have smoked at least 100 cigarettes in their lifetime by the time of this survey.[2]

In the BRFSS, we know how many children live in the respondent's household, but interviewers only ask questions about one randomly chosen child in the household. Therefore, we only know the gender and age of one of the children in the household. Because of this limitation, we eliminate respondents with multiple children and include only households with zero or one child in the household.

After these restrictions, we have slightly over 90,000 individuals in the sample.[3]

Of this remaining sample, just under half (49%) are still smoking at the time of the survey. In our analysis of alcohol intake, we examine the daughter effects on reduced alcohol intake to cut blood pressure, conditional on the individual having a history of high blood pressure. Approximately a third of the BRFSS sample reports having some history of high blood pressure, and of these individuals, 44% have attempted to reduce their alcohol intake in order to control their blood pressure.

[2] There is no question that asks "have you ever tried smoking in the past", so we use this survey question to condition on the fact that someone is either currently smoking or has been a smoker in the past.
[3] The BRFSS is believed to be the largest telephone health survey in the world, surveying over 350,000 people each year.

After eliminating households with multiple children, approximately 22% of remaining households have a child. Less than half of households with a child provide specific information (such as age and gender) about their child. We know that approximately 5% of the households have a daughter, approximately 5% of households have a son, and approximately 12% of households have a child where the gender of that child is unknown.[4] The average age of the respondents is 47 years and 57% of the sample is female. 27% hold at least a bachelor degree, 30% have partially completed college, and 23% have a high school degree as their highest level of educational attainment. Means and standard deviations of key variables of the BRFSS sample are shown in Table A2 in the appendix.

3. The Effects of Daughters on Risky Health Behaviours

3.1. Smoking

Are parents less likely to smoke after having daughters?

Figure 1 makes a first and cross-sectional pass at this question by using the BHPS from Great Britain. Its columns show, for randomly selected British parents, that smokers have systematically more sons than daughters. Among families with only one child, almost 63% of parents with a boy are smokers compared to 56% of parents with a daughter (conditioning on having smoked a cigarette before entering the sample in 1991). The same is also true for people with two children. We can also reject the null hypothesis that the mean values are equal at the 5% level for both groups. Note that Figure 1 includes only children who are on the household roster (i.e. those children who are dependents aged 0-15 and children who are over 15 but remain at home).

Figure 1 might be a cross-section illusion or the product of reverse causality. An advantage of longitudinal data is that we can examine the effects of daughters on quitting smoking. Figure 2 measures on the y-axis the size of the change in smoking

[4] Conditional on a household providing information about a child living at home, approximately half of these children are known to be girls.

among parents who either just had a first-born son or a first-born daughter in that year. Here, a significant proportion of those who recently had a first-born daughter went on to quit smoking during that year. The change is statistically significant at the 5% level. Having a son, by contrast, does not contribute significantly to more people quitting.

An argument may arise that in principle some babies will be aborted because of their sex, as measured by ultra-scan in the womb. This would make the gender mix of the family potentially endogenous. However, it should be noted that selective abortion because of the gender of the baby is illegal in Britain (abortion is legal only where the mother's physical or mental health is at stake). In addition to this, and importantly, it is hard to see how it could explain the longitudinal correlation for the quitters. Because we see effects in panel data, not just in cross-sections, the selective-abortion thesis would require that for some reason the quitting among parents takes place before the selected birth of a female.

To control for possible confounding influences, pooled BHPS regression-equation evidence is set out in Table 1. The first set of evidence comes from simple logit equations in which the dependent variable is a binary variable to capture smoking-still. The key independent variable here is the number of daughters. We also control for the total number of children, the respondent's age, age-squared, sex, subjective health status, education, employment, marital status, and regional and wave dummies.

Holding the total number of children constant, we can see from the first column of Table 1 that having more daughters is associated negatively and statistically significantly at the 1% level with the probability that the parent is still a smoker. The coefficient on the number of daughters is -0.132 with a statistically well-determined standard error of 0.048. Men are significantly less likely to be smoking-still compared to women, whilst smoking has an inverse U-shaped relationship with age, maximizing at around 24. Highly-educated individuals and those who perceive themselves to be healthy are less likely to still be smoking. Smokers are also more likely to be unemployed, disabled, divorced, widowers, separated, and never married. By contrast, people in higher income households are more likely to have quit smoking.

Column 2 of Table 1 checks whether the effects of daughters on smoking-still found in the previous column varies by the daughters' age. Here we divide the 'number of daughters' variable into three different age-groups: (a) daughters aged 0-3, (b) daughters aged 4-11, and (c) daughters aged 12 and over. The cross-sectional effects of daughters on parents' propensity to quit smoking are decreasing monotonically with daughters' age: the coefficients are -0.218**, -0.159**, and -0.079. The daughter effect on smoking cessation is strongest when the daughter is very young. Based on the estimated coefficients in Column 2 of Table 1, having two young daughters (aged 0-4) is associated in the logit with a fall in the probability of smoking-still from 59% to 48%. This is a large effect. It is approximately half the ceteris-paribus cross-sectional effect of having a masters or a doctoral degree. It almost offsets the positive effect that unemployment has on smoking within a cross-section equation.

The last four columns split the sample by gender and age-group. The 'number of daughters' variable continues to enter the smoking-still equations in a negative manner. For both sexes, the daughter effects are negative and statistically significant at least at the 10% level. The negative effect of daughters on smoking is statistically significant only in the older age-group (aged>35) sub-sample regression.

Could the results be driven by the possibility of smokers adopting the keep-having-children-until-a-girl-is-born rule?

To address this question, a natural way of looking at how daughters can affect their parents' smoking behaviour is to explore the fixed-effects structure of smoking equations. Table 2a does this by re-estimating Table 1's regression equations using a conditional logit estimator. Controlling for unobserved heterogeneity in the smoking-still equations, the coefficient on the number of daughters, in the first column of Table 2a, is -0.300 with a standard error of 0.084. What this implies is that individuals are significantly more likely to quit smoking during the year of having an additional daughter in the household. Splitting the daughter variable by age also produces coefficients that are both negative and statistically significant at least at the 5% level, and are also decreasing monotonically; the numbers are -0.437**, -0.274**, and -

0.190* for daughters 0-3, daughters 4-11, and daughters 12 and over, respectively. Moreover, the coefficients on the number of daughters are similar in Columns 3 (females), 4 (males), and 6 (age>35). It is not possible, within the columns of Table 2a, to reject the null hypothesis that the coefficients in these three groups are equal in size.

A further check on the paper's thesis is to look (only) at the consequences of first-born children. This test -- it can be done on the nth-born but first-born provides the largest sample -- is by its nature the least susceptible to stopping-rule bias. Table 2b reveals that in Britain the same finding emerges. Daughters lead people to give up cigarettes.

Turning to American evidence, Table 2a gives the results of a smoking-still equation estimated on the BRFSS07 for the United States. The first column shows that the coefficient on having a child is negative and statistically significant while the coefficient on daughter has a negative sign. Nevertheless, the coefficient on daughter is not statistically significantly different from zero at conventional levels.

By breaking the daughter variable down by age, however, a sharper result emerges.

The second column of Table 2a demonstrates that having a young daughter (aged 0-4) is associated negatively and statistically significantly at the 1% level with the probability of smoking-still. The effects of daughters on parents' propensity to quit smoking are also decreasing monotonically with daughters' age. This seems consistent with the BHPS evidence. The coefficients in this logit equation imply that, conditional on having smoked at least 100 cigarettes in one's lifetime, having a daughter under the age of 4 decreases the likelihood of smoking-still from 49% to 42%, ceteris paribus.

Table 3 reports estimates for logit regression equations using this same data, where the dependent variable is a binary variable equal to one if an individual has either quit or attempting to quit smoking in the last 12 months. Having a daughter increases the probability of quitting or attempting to quit for men and for those over age 35, which is again compatible with the results from British data. The logit estimates suggest that

for men having a daughter increases the probability of quitting or trying to quit from 77% to 80%. This is less dramatic.

Reverse causality

We also experimented considerably with the idea that there might be reverse causality. Experiments with lags, however, found no evidence that child gender could be predicted by, for example, smoking.

Results are available upon request.

3.2. Alcohol and drug consumption

Using the BHPS, Table 5 investigates the implications of having daughters on having either an alcohol or a drug problem. The dependent variable here is a dummy variable which takes a value of 1 if the individual has health problems related to drugs or alcohol and 0 otherwise. All of the individuals under the age of 60 are used in this analysis.

The first column of Table 5 provides the estimates of a pooled logit regression equation with the number of daughters as an independent variable. Similar to our results for smoking, we see that the coefficient on the number of daughters has a negative sign in the "having an alcohol or a drug problem" equation, but is not statistically significantly different from zero at conventional levels. What this implies is that at the cross-section there is *ceteris paribus* no clear difference in terms of drugs and alcohol-related problems by number of daughters in the household.

However, an interesting pattern emerges when we restrict our sample to those who have a history of alcohol or drug problems. Of this group of 2,765 individuals, approximately 27% report still having health problems related to drugs or alcohol. Conditioning on individual fixed effects, the second column of Table 3 indicates that having additional daughters significantly reduces the probability of individuals reporting to *continue* having either alcohol or drug problems. The coefficient on the number of daughters is negative (-0.692), and it is statistically significant at the 5%

level. Based on these estimates, having two additional daughters in the household reduces the probability of individuals reporting they still have alcohol or drug problems from 27% to 13%.

Next, we re-visit the American data and estimate cross-section logit equations on reduced alcohol intake. The results are reported in Table 6. The dependent variable is a dummy variable with a value of 1 if the individual has reduced his or her alcohol intake to reduce blood pressure and 0 otherwise. Conditioning on having a record of high blood pressure, those individuals who have a daughter living in the same household tend to have significantly reduced their alcohol intake compared to those without a daughter in the household. Consistent with the results on smoking-still, the coefficient on daughter in the reduced alcohol intake equations is positive and statistically significant at the 5% level only in the male and the older cohort. The logit coefficients imply that having a daughter increases the probability of reducing alcohol intake from 48% to 56%, all else constant. However, the daughter effect on reduced alcohol intake seems to be strongest when the daughter is in her teenage years, i.e. aged 12 and over. Here there is some degree of contrast with, for example, the smoking equations on the British data set.

4. Transmission

Why would there be a link between people's health actions and the gender of their children? There is research evidence that bringing up sons is inherently more stressful than bringing up daughters; male children are more aggressive, noisier, more worrisome, and harder to placate. For example, several studies find that the incidence of tantrums, over-activity, fighting, and disobedience is higher in boys (Crowther *et al,* 1981; Prior *et al.* 1993). This effect might operate in absolute terms or merely in relative terms when compared to the consequences of having daughters.

Human adults can if they wish choose to 'self-medicate'. They may do this, when under strain, by using substances such as tobacco and alcohol. A combination of these two assumptions leads to the prediction that the parents of boys will be observed to consume larger quantities of cigarettes and of alcoholic drinks than the parents of girls. Such a pattern would not necessarily be seen in an identical way at every point

in the life cycle. As the parents' children age, the parents' use of these substances would be predicted to alter in a way that depends on the relative stressfulness of sons and daughters at children's different ages. Conventional wisdom is that parenting boys is more stressful during early childhood, but parenting girls may more difficult during adolescence. Nevertheless, smoking and drinking would here be more prevalent among parents of offspring that engendered greater strain. This is a form of 'relative stress' theory of why daughters might be associated with healthier behaviour among their fathers and mothers.

So does having a daughter relative to having a son make parents feel generally healthier? To test this, Table 7 estimates reduced-form fixed-effects subjective health and mental distress equations using British longitudinal data.

The subjective health (SH) variable is constructed using the responses from the question: "Please think back over the last 12 months about how your health has been. Compared to the people your own age, would you say your health has on the whole been excellent, good, fair, poor, or very poor?" The SH responses are coded so that 1 = "very poor health" and 5 = "excellent health". The measure of mental distress is taken from the answers to the 12 items from the negative affect scale of the composite General Health Questionnaire (GHQ-12), which covers feelings of happiness, strain, depression and ability to cope, anxiety-based insomnia, and lack of confidence, among others. We use the responses to the GHQ-12 question to construct a 'Likert measure of mental distress'. This is a psychological strain score ranging from 0 to 36. It is the simple sum of the responses to the 12 questions, coded so that the lowest level of distress scores 0 and the highest distress scores 36.

Consistent with the earlier results on the effects of daughters on smoking-still, having an additional daughter is associated on average with an improvement in subjective health and a decrease in the level of psychological distress for the parent. Having an extra child, on the other hand, is associated negatively with both measures of health. The child-gender effects on health are more pronounced among parents with young daughters.

Further complementary evidence is provided in the lower half of Table 7.

5. Conclusions

Little is known about why some human beings choose to take actions that are risky. This paper exploits random variation in child gender. It finds that human beings' risky health choices and addictive actions are influenced by the gender of their children.

Using a combination of cross-sectional and longitudinal data for two nations, the paper finds that having daughters rather than sons increases the likelihood that people cut back on their smoking, drinking, and drug-taking. The effects on reduced risky behaviour are large. Ceteris paribus, every additional daughter rather than son makes a person approximately 6% more likely to quit smoking and 7% less likely to have an alcohol or drug problem. The paper also documents evidence that this result is not explained by reverse-causality or family stopping-rules. The empirical findings -- as in Table 7 -- are consistent with the idea that human beings may 'self-medicate' when under stress.

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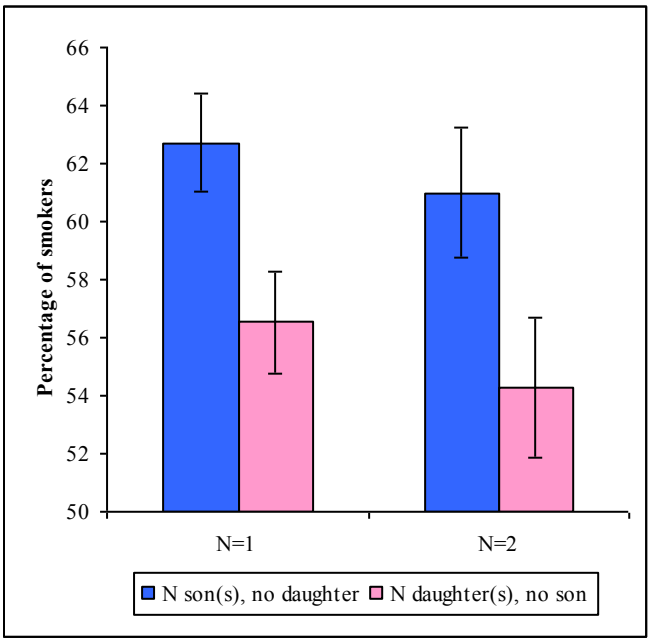
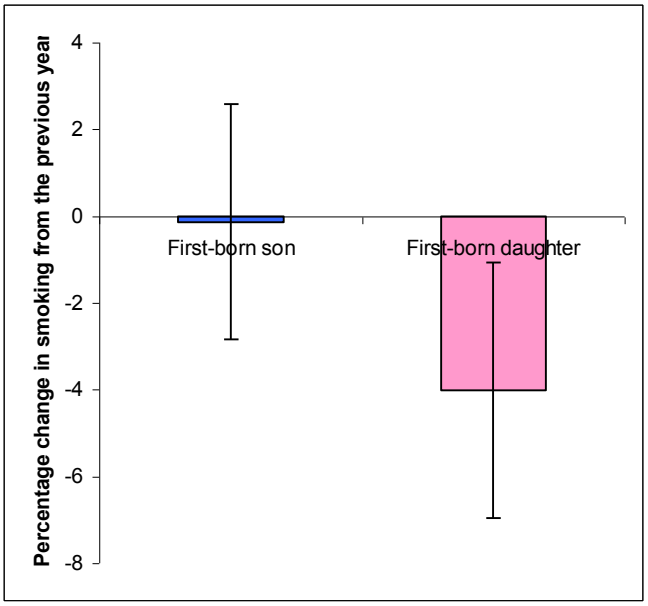
Figure 1: The Likelihood of Smoking in One-Child (N=1) and Two-Child (N=2) Families: BHPS, 1991-2005



Note: In the first double column, there are 3,247 observations with one son and no daughter in the dark-colored vertical bar, and 3,227 observations with one daughter and no son in the light-colored vertical bar. In the second double column, there are 1,929 observations with two sons and no daughter, and then 1,702 observations with two daughters and no son. 4-standard-errors (95% C.I.) are reported: two s.e. above and two below. Standard errors are robust to clustering by personal identification.

Figure 2: Quitting Smoking and the Gender of the First Born (BHPS 1991-2005)



Note: The sample is restricted to those with a first born. There are 765 observations of parents with a first-born son, and 623 observations of parents with a first-born daughter. 4-standard-errors (95% C.I.) are reported: two s.e. above and two below. Standard errors are robust to clustering by personal identification. The difference in the columns becomes statistically significant when regression controls are added in Table 2b.

Table 1: Cross-section Equations for Smoking-Still (Logit), BHPS 1991-2005

	All	All	Women	Men	Age<=35	Age>35
Number of daughters	-0.132		-0.127	-0.148	-0.104	-0.139
	[0.048]**		[0.065]+	[0.070]*	[0.068]	[0.057]*
Number of daughters: age<4		-0.218				
		[0.062]**				
Number of daughters: age>=4 & age<12		-0.159				
		[0.055]**				
Number of daughters: age>12		-0.079				
		[0.055]				
Number of children: one	-0.020	-0.025	0.049	-0.037	-0.003	0.014
	[0.061]	[0.062]	[0.085]	[0.090]	[0.097]	[0.074]
Number of children: two	-0.145	-0.154	-0.098	-0.108	0.204	-0.211
	[0.079]+	[0.079]+	[0.112]	[0.113]	[0.124]+	[0.096]*
Number of children: three	0.065	0.053	0.152	0.060	0.446	-0.002
	[0.117]	[0.118]	[0.162]	[0.173]	[0.187]*	[0.137]
Number of children: four	-0.033	-0.052	-0.063	0.085	0.495	-0.242
	[0.186]	[0.188]	[0.258]	[0.267]	[0.283]+	[0.226]
Number of children: more than four	0.297	0.291	0.124	0.496	0.216	0.494
	[0.333]	[0.332]	[0.458]	[0.464]	[0.480]	[0.391]
Men	-0.159	-0.154			0.160	-0.307
	[0.055]**	[0.055]**			[0.078]*	[0.068]**
Age	0.042	0.040	0.035	0.030	0.225	0.106
	[0.016]**	[0.016]*	[0.022]	[0.022]	[0.048]**	[0.043]*
Age-squared/100	-0.089	-0.088	-0.066	-0.089	-0.441	-0.154
	[0.019]**	[0.019]**	[0.028]*	[0.027]**	[0.088]**	[0.045]**
Health: poor	-0.250	-0.250	-0.310	-0.166	-0.053	-0.293
	[0.088]**	[0.088]**	[0.122]*	[0.128]	[0.178]	[0.098]**
Health: fair	-0.300	-0.298	-0.374	-0.215	-0.125	-0.321
	[0.098]**	[0.098]**	[0.130]**	[0.149]	[0.177]	[0.112]**
Health: good	-0.524	-0.520	-0.564	-0.468	-0.391	-0.515
	[0.101]**	[0.101]**	[0.136]**	[0.152]**	[0.181]*	[0.115]**
Health: excellent	-0.722	-0.718	-0.786	-0.635	-0.601	-0.709
	[0.107]**	[0.107]**	[0.144]**	[0.160]**	[0.184]**	[0.124]**
Education: completed first degree	-0.773	-0.767	-0.856	-0.679	-0.705	-0.777
	[0.094]**	[0.094]**	[0.133]**	[0.131]**	[0.124]**	[0.124]**
Education: completed higher degree	-1.003	-0.995	-1.056	-0.956	-0.939	-1.001
	[0.184]**	[0.184]**	[0.251]**	[0.273]**	[0.241]**	[0.242]**
Self-employed	-0.122	-0.120	-0.319	-0.023	-0.176	-0.078

	[0.079]	[0.079]	[0.137]*	[0.099]	[0.124]	[0.093]
Unemployed	0.455	0.454	0.293	0.558	0.329	0.549
	[0.071]**	[0.071]**	[0.101]**	[0.099]**	[0.098]**	[0.098]**
Retired	-0.256	-0.246	-0.310	-0.286	-0.556	-0.232
	[0.104]*	[0.104]*	[0.141]*	[0.160]+	[0.964]	[0.108]*
Maternity leave	-0.365	-0.337	-0.425	1.399	-0.396	-0.144
	[0.098]**	[0.099]**	[0.104]**	[0.927]	[0.121]**	[0.168]
Look after family	-0.043	-0.030	-0.048	0.128	-0.180	0.025
	[0.075]	[0.075]	[0.079]	[0.301]	[0.096]+	[0.100]
Full-time student	-0.501	-0.514	-0.529	-0.414	-0.567	-0.054
	[0.096]**	[0.096]**	[0.120]**	[0.160]**	[0.105]**	[0.205]
Disabled	0.292	0.294	0.444	0.213	0.237	0.340
	[0.098]**	[0.098]**	[0.140]**	[0.142]	[0.254]	[0.105]**
Government training	0.014	0.004	-0.371	0.308	-0.170	0.625
	[0.223]	[0.224]	[0.289]	[0.341]	[0.257]	[0.375]+
Other types of employment	0.119	0.118	-0.085	0.583	-0.342	0.304
	[0.191]	[0.191]	[0.220]	[0.372]	[0.274]	[0.248]
Ln(real equivalent household income)	-0.325	-0.332	-0.300	-0.354	-0.288	-0.331
	[0.035]**	[0.036]**	[0.047]**	[0.054]**	[0.051]**	[0.046]**
Cohabiting with a partner	0.649	0.647	0.676	0.659	0.711	0.665
	[0.068]**	[0.068]**	[0.093]**	[0.099]**	[0.082]**	[0.102]**
Widowed	0.702	0.700	0.610	0.754	2.477	0.615
	[0.195]**	[0.195]**	[0.229]**	[0.358]*	[1.042]*	[0.200]**
Divorced	0.614	0.606	0.616	0.613	1.004	0.549
	[0.094]**	[0.094]**	[0.122]**	[0.148]**	[0.180]**	[0.103]**
Separated	0.649	0.643	0.544	0.822	0.721	0.662
	[0.118]**	[0.118]**	[0.153]**	[0.184]**	[0.171]**	[0.148]**
Never married	0.702	0.682	0.710	0.704	0.939	0.539
	[0.089]**	[0.089]**	[0.121]**	[0.131]**	[0.106]**	[0.148]**
Constant	3.611	3.754	3.395	4.011	0.550	2.023
	[0.485]**	[0.491]**	[0.665]**	[0.716]**	[0.881]	[1.099]+
Observations	52164	52164	26937	25227	19366	32793
Pseudo R-squared	0.09	0.09	0.08	0.12	0.07	0.08
Log Pseudo Likelihood	-32164.9	-32156.45	-16661.87	-15276.21	-11085.01	-20822.11

Note: +<10%; *<5%; **<1%. Reference groups are no children, female, health: very poor, employed full-time, married, and Wave 1: 1991. Standard errors are clustered by personal identification and are reported in parentheses. Each individual in the sample started smoking before entering the panel and/or has experience smoking. Regional (20) and wave (15) dummies are included in all equations.

Table 2a: Panel Equations for Smoking-Still (Conditional Logit), BHPS 1991-2005

	All	All	Women	Men	Age<=35	Age>35
Number of daughters	-0.300		-0.328	-0.279	-0.121	-0.363
	[0.084]**		[0.121]**	[0.119]*	[0.137]	[0.130]**
Number of daughters: age<4		-0.437				
		[0.099]**				
Number of daughters: age>=4 & age<12		-0.274				
		[0.097]**				
Number of daughters: age>12		-0.190				
		[0.095]*				
Number of children: one	0.050	0.060	0.152	-0.080	-0.472	0.608
	[0.084]	[0.084]	[0.120]	[0.123]	[0.131]**	[0.130]**
Number of children: two	0.147	0.136	0.227	0.029	-0.349	0.707
	[0.124]	[0.124]	[0.182]	[0.175]	[0.204]+	[0.194]**
Number of children: three	0.019	-0.019	-0.009	0.026	-0.286	0.448
	[0.179]	[0.180]	[0.267]	[0.246]	[0.307]	[0.276]
Number of children: four	0.171	0.089	-0.098	0.303	-0.269	1.121
	[0.282]	[0.284]	[0.411]	[0.400]	[0.489]	[0.430]**
Number of children: more than four	0.939	0.827	-0.317	1.690	-1.288	3.017
	[0.570]+	[0.568]	[0.854]	[0.781]*	[0.973]	[1.004]**
Observations	20781	20781	10909	9872	8920	9784
Group	1988	1988	1027	961	1012	1055
Pseudo R-squared	0.09	0.09	0.1	0.08	0.07	0.12
Log Pseudo Likelihood	-7271.79	-7268.03	-3748.21	-3484.36	-3196.31	-3242.65

Note: +<10%; *<5%; **<1%. Same controls as in Table 2.

Table 2b: Panel Equations for Smoking-Still (Conditional Logit) with a First-Born Variable, BHPS 1991-2005

	All	All
First-born son	0.004	
	[0.106]	
First-born daughter		-0.448
		[0.127]**
Observations	11,067	10,558
Group	1,268	1,240
Pseudo R-squared	0.09	0.09
Log Pseudo Likelihood	-3853.83	-3612.12

Note: +<10%; *<5%; **<1%. Same controls as in Table 2a. For each regression, there is at least only one child in the family and that child is either a first-born girl or a first-born boy.

Table 3: Cross-section Equations for Smoking-Still (Logit), BRFSS 2007

	All	All
Has daughter	-0.019	
	(0.045)	
Has daughter: age<4		-0.267**
		(0.085)
Has daughter: 4<=age<=12		0.038
		(0.063)
Has daughter: age>12		0.003
		(0.053)
Female	0.028+	0.028+
	(0.015)	(0.015)
Age	0.051**	0.049**
	(0.006)	(0.006)
Age squared	-0.001**	-0.001**
	(0.000)	(0.000)
Black	0.113**	0.113**
	(0.029)	(0.029)
Hispanic	-0.324**	-0.324**
	(0.032)	(0.032)
Education: Completed High School	-0.307**	-0.307**
	(0.028)	(0.028)
Education: Completed Some College	-0.472**	-0.472**
	(0.028)	(0.028)
Education: Completed College	-0.940**	-0.939**
	(0.030)	(0.030)
Health: Very Good	0.265**	0.265**
	(0.022)	(0.022)
Health: Good	0.436**	0.437**
	(0.023)	(0.023)
Health: Fair	0.491**	0.491**
	(0.028)	(0.028)
Health: Poor	0.496**	0.497**
	(0.036)	(0.036)
Self-employed	-0.026	-0.026
	(0.024)	(0.024)
Unemployed	0.316**	0.316**
	(0.032)	(0.032)
Homemaker	0.072*	0.075*
	(0.035)	(0.035)
Student	-0.273**	-0.276**
	(0.059)	(0.059)

Retired	-0.087**	-0.086**
	(0.033)	(0.033)
Disabled	0.081**	0.081**
	(0.028)	(0.028)
10K<Income<15K	0.169**	0.170**
	(0.037)	(0.037)
15K<Income<20K	0.258**	0.258**
	(0.034)	(0.034)
20K<Income<25K	0.135**	0.134**
	(0.031)	(0.031)
25K<Income<35K	0.059*	0.060*
	(0.029)	(0.029)
35K<Income<50K	-0.116**	-0.116**
	(0.027)	(0.027)
50K<Income<75K	-0.272**	-0.272**
	(0.027)	(0.027)
Income>75K	-0.464**	-0.464**
	(0.027)	(0.027)
Widowed	0.495**	0.494**
	(0.036)	(0.036)
Divorced	0.482**	0.481**
	(0.019)	(0.019)
Separated	0.569**	0.568**
	(0.043)	(0.043)
Never Married	0.325**	0.323**
	(0.023)	(0.023)
Has Children	-0.108**	-0.109**
	(0.023)	(0.023)
Child Interviewed	-0.057	-0.051
	(0.037)	(0.037)
Constant	0.190	0.240*
	(0.120)	(0.122)
Observations	90,450	90,450

Note: +<10%; *<5%; **<1%. The sample contains only individuals with only one or no children.

Table 4: Cross-section Equations for Either Quit or Have Tried to Quit Smoking in Last 12 months (Logit), BRFSS 2007

	All	Women	Men	Over 35	Under 35
Has daughter	0.057	-0.008	0.162+	0.134*	-0.147
	(0.053)	(0.066)	(0.086)	(0.062)	(0.100)
Observations	91,095	51,693	39,402	77,425	13,670

Note: +<10%; *<5%. Same controls as in Table 3. The dependent variable is a dummy variable, taking the value of 1 if the individual has either quit or have tried to quit in the last 12 months and 0 otherwise. The sample contains solely individuals with only one or zero children.

Table 5: Cross-section and Panel Equations for Alcohol or Drug Problem, BHPS 1991-2005

	Logit	Conditional Logit
Number of daughters	-0.176	-0.692
	[0.155]	[0.323]*
Number of children: one	0.107	0.127
	[0.208]	[0.308]
Number of children: two	-0.173	0.182
	[0.247]	[0.470]
Number of children: three	-0.550	0.455
	[0.336]	[0.667]
Number of children: four	-0.135	0.834
	[0.507]	[0.953]
Number of children: more than four	-0.176	-0.332
	[0.155]	[0.087]**
Men	0.946	
	[0.155]**	
Age-squared/100	-0.025	-0.332
	[0.009]**	[0.087]**
Health: poor	-0.169	-0.456
	[0.148]	[0.239]+
Health: fair	-0.932	-1.261
	[0.178]**	[0.262]**
Health: good	-1.998	-2.246
	[0.228]**	[0.290]**
Health: excellent	-3.230	-2.809
	[0.268]**	[0.386]**
Education: completed first degree	-0.041	0.708
	[0.294]	[0.943]
Education: completed higher degree	-0.638	-12.495
	[0.872]	[2,237.521]
Self-employed	0.419	-0.232
	[0.253]+	[0.304]
Unemployed	1.634	0.216
	[0.141]**	[0.209]
Retired	0.574	0.294
	[0.667]	[0.684]
Maternity leave	0.296	-0.439
	[0.604]	[0.838]
Look after family	0.711	-0.680
	[0.231]**	[0.372]+

Full-time student	-0.499	-0.132
	[0.220]*	[0.384]
Disabled	1.710	0.802
	[0.196]**	[0.254]**
Government training	0.052	0.595
	[0.597]	[0.774]
Other types of employment	0.666	0.063
	[0.533]	[0.647]
Ln(real equivalent household income)	-0.271	0.028
	[0.038]**	[0.114]
Cohabiting with a partner	0.881	-0.191
	[0.204]**	[0.348]
Widowed	-0.487	-0.744
	[0.755]	[0.876]
Divorced	1.139	-0.172
	[0.244]**	[0.452]
Separated	1.522	0.512
	[0.254]**	[0.422]
Observations	146,025	2,765
Group	-	344
Pseudo R-squared	0.230	0.170
Log Pseudo Likelihood	-3848.500	-726.134

Note: +<10%; *<5%; **<1%. The dependent variable is a dummy variable, taking the value of 1 if the individual has a health problem related to either drug or alcohol and 0 otherwise. Standard errors are in parentheses. Regional (20) and wave (15) dummies are included in both equations.

Table 6: Cross-section Equations for Have Reduced Alcohol Intake to Improve Blood Pressure (Logit), BRFSS 2007

	All	Women	Men	Over 35	Under 35	All
Has daughter	0.325*	0.456*	0.250	0.330*	0.216	
	(0.136)	(0.217)	(0.174)	(0.146)	(0.434)	
Has daughter: age<4						0.383
						(0.328)
Has daughter: 4<=age<=12						0.141
						(0.192)
Has daughter: age>12						0.296*
						(0.148)
Observations	20,014	8,029	11,985	18,874	1,001	20,014

Note: *<5%. The dependent variable is a dummy variable, taking the value of 1 if the individual has reduced alcohol intake to reduce blood pressure (conditioning on the person has been diagnose with high blood pressure) and 0 otherwise. Same control as in Table 4. The sample contains only individuals with only one or no children.

Table 7: Fixed-Effects Equations for Subjective Health and Mental Distress, BHPS 1991-2005

	All	All
A) Subjective health status		
Has daughter	0.082+	
	(0.045)	
Has daughter: age<4		0.141*
		(0.056)
Has daughter: 4<=age<=12		0.073
		(0.052)
Has daughter: age>12		0.053
		(0.048)
Number of children: one	-0.140**	-0.141**
	(0.047)	(0.047)
Number of children: two	-0.233**	-0.228**
	(0.067)	(0.067)
Number of children: three	-0.311**	-0.299**
	(0.097)	(0.098)
Number of children: four	-0.257	-0.237
	(0.152)+	(0.152)
Number of children: more than four	0.412	0.431
	(0.262)	(0.262)
Observations	52,521	52,521
B) Mental distress		
Has daughter	-0.126	
	(0.107)	
Has daughter: age<4		-0.217+
		(0.116)
Has daughter: 4<=age<=12		-0.268*
		(0.106)
Has daughter: age>12		0.012
		(0.101)
Number of children: one	0.307**	0.296**
	(0.098)	(0.098)
Number of children: two	0.256+	0.251+
	(0.139)	(0.139)
Number of children: three	0.709**	0.725**
	(0.203)	(0.204)
Number of children: four	0.915**	0.942**
	(0.315)	(0.316)
Number of children: more than four	0.223	0.217

	(0.544)	(0.544)
Observations	51,320	51,320

Note: +<10%; *<5%; **<1%. Same controls as in Table 1 (except for subjective health variable itself). The subjective health variable is on a 5-point scale, coded so that 1=very poor health,…, 5=excellent health. The mental distress variable is on a so-called GHQ 37-point scale, coded so that 0=lowest mental distress,…, 36=highest mental distress.

Table A1: Descriptive statistics, BHPS Waves 1-15

	All	
	Mean	**S.D.**
Smoking still	0.58	0.49
Health problems: drugs/alcohol	0.005	0.07
Number of children	1.04	1.14
Number of daughters	0.49	0.74
Number of daughters: age<4	0.08	0.29
Number of daughters: age>=4 & age<12	0.19	0.47
Number of daughters: age>12	0.23	0.51
Sex	0.49	0.50
Age	40.05	11.68
Subjective health (1=very poor, …, 5=excellent)	3.77	2.38
Education: completed first degree	0.07	0.26
Education: completed higher degree	0.02	0.13
Self-employed	0.09	0.28
Unemployed	0.06	0.23
Retired	0.03	0.16
Maternity leave	0.01	0.10
Look after family	0.09	0.29
Full-time student	0.03	0.16
Disabled	0.06	0.25
Government training	0.00	0.05
Other types of employment	0.00	0.06
Ln(real equivalent household income)	9.43	0.70
Cohabiting with a partner	0.14	0.35
Widowed	0.01	0.12
Divorced	0.07	0.26
Separated	0.02	0.15
Never married	0.16	0.37
Observations	52,506	
Number of individuals	20,781	

Table A2: Descriptive statistics, BRFSS 2007

	All	
	Mean	**S.D.**
Smoking still	0.49	0.50
High blood pressure	0.32	0.46
Reduced alcohol intake (given a history of high blood pressure)	0.44	0.50
Has child	0.22	0.42
Child interviewed (conditional on children)	0.43	0.49
Has daughter	0.05	0.22
Has daughter: age<4	0.01	0.09
Has daughter: 4<=age<=12	0.02	0.12
Has daughter: age>12	0.03	0.16
Female	0.57	0.50
Age	47.57	10.37
Black	0.07	0.26
Hispanic	0.06	0.23
Education: completed high school	0.33	0.47
Education: completed some college	0.30	0.46
Education: completed college	0.27	0.45
Subjective health (1=poor, 5=excellent)	2.67	1.13
Self-employed	0.11	0.31
Unemployed	0.06	0.24
Homemaker	0.05	0.21
Student	0.02	0.12
Retired	0.06	0.24
Disabled	0.12	0.33
Income<10K	0.06	0.23
10K<Income<15K	0.05	0.22
15K<Income<20K	0.06	0.24
20K<Income<25K	0.08	0.27
25K<Income<35K	0.11	0.31
35K<Income<50K	0.15	0.36
50K<Income<75K	0.17	0.37
Income>75K	0.23	0.42
Widowed	0.04	0.20
Divorced	0.21	0.41
Separated	0.03	0.18
Never Married	0.16	0.37
Observations	90,450	