Web Appendix to

Identifying Sibling Influence on Teenage Substance Use

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A Data

The paper uses data from the first eight rounds of the National Longitudinal Survey of Youth 1997 (NLSY97). The data is collected annually, so we use survey data from 1997 through 2004. In the following paragraphs, we explain how we constructed the variables used in the analysis and list the question names and reference numbers (in parentheses) of the NLSY97 variables we used to construct our dataset.

A.1 Sibling pairs

The NLSY97 original cohort includes 1,892 households with more than one respondent. In order to link respondents to their siblings, we used the variables: *YOUTH_SIBID01.01* (R1308300), *YOUTH_SIBID02.01* (R1308400), *YOUTH_SIBID03.01* (R1308500), *YOUTH_SIBID04.01* (R1308600). For each respondent, these variables return the identification number of up to four other respondents from the same household. Then, we used the variable *HHI2_RELY.01* (R1309100, R1309200, R1309300, R1309400) to characterize the type of relationship between these respondents. For siblings, the NLSY97 distinguishes between full (biological), half, step, foster, and adoptive siblings. The analysis presented in the paper is conducted on a sample of full siblings only. In preliminary work, we estimated many of the models using pairs of full, half, and step siblings, and obtained results similar to those reported in the paper. Finally, as mentioned in the paper, in households supplying more than one sibling pair, we only included pairs with adjacent birth order. To select these pairs, we used the variable *CV_AGE_12/31/96*, which gives the age of each respondent as of December 31, 1996.

A.2 Control Variables

Our set of controls includes several individual, familial and environmental characteristics. Below, we describe each of them and list the raw variables we used to construct them.

- Age is computed using the variable named *CV_AGE_12/31/96* (R1194000), which measures the respondent's age as of December 31st 1996.
- A male dummy, which equals 1 if the respondent is a male, was created using the variable *KEY!SEX* (R0536300).

- Two separate dummy variables for race were created for the Black and Hispanic categories, using the variable *KEY!RACE_ETHNICITY* (R1482600). Each category is mutually exclusive, and white is the reference group.

- Education is measured as the respondent's highest grade completed by age 19, and the grade is normalized by subtracting 12 from it. This variable is constructed by combining the age of the respondent and the yearly variables returning the respondent's highest grade completed in each survey round: *CV_HGC_EVER* (R1204400, R2563100, R3884700, R5463900, R7227600, S1541500, S2011300, S3812200).

- Mother's education is measured as the biological mother's highest grade completed, as reported by the respondent in 1997. Her grade is also normalized by subtracting 12 from it. This variable was constructed from the variable *CV_HGC_BIO_MO* (R1302500).

- AFQT score is measured in percentile and standardized by the age of the respondent at the time of the test. From the summer of 1997 through the spring of 1998, most NLSY97 respondents took the computer-adaptive form of the Armed Services Vocational Aptitude Battery (CAT-ASVAB). The results of the different math and verbal tests were combined and weighted by the NLS program staff to produce the percentile score recorded under the variable *ASVAB_MATH_VERBAL_SCORE_PCT* (R9829600), which is similar to the AFQT score. This variable assumes three decimal places, so we constructed our variable by simply dividing the score by 1000.

- Family structure is measured by a dummy for whether the individual lived with both biological parents at age 12. In 1997, the question *CV_YTH_REL_HH_AGE_12* (R1205000) asks respondents about their relationship to the parent figure or guardian in the household at age 12. If the individual replied that the parent figure was both the biological mother and the biological father, we set our dummy variable to 1 and to 0 otherwise.

- We created three binary variables, describing aspects of the individuals' environment up to age 12. We build these directly from three NLSY questions about particularly violent or traumatizing childhood experiences. The first one is the

variable *YSAQ-517* (R0443900), which records whether the respondent ever had her house or apartment broken into before turning 12 years old. The second one is the variable *YSAQ-519* (R0444100), which records whether the respondent ever saw anyone get shot or shot at with a gun before turning 12. The third one is the variable *YSAQ-518* (R0444000), which records whether the respondent was ever the victim of repeated bullying before turning 12. Since the bullying measure reflects a possibly traumatic childhood experience, it may be thought of as measuring, albeit very imperfectly, some aspect of the individual's mental state and social adjustment.

- We created birth order dummies and a variable measuring the number of full siblings who live in the household, using the household roster data. In particular, we used the variable *YOUTH_ID.01* (R0533400), which gives the respondent's ID number in the household roster, and the variables describing the relationship between household members and the variables returning the ages of the other household members. These variables have names of the form *HHI2_RELX.0Z*, where X is the respondent's roster ID and Z is the ID of the other household respondents, and *HHI2_AGE.0Z* where Z is the ID of the other household respondents.

A.3 Substance Use Measures

In most of our analysis, the main dependent variable is a dummy indicating whether the respondent reports having engaged at least once in a particular behavior since the last interview date. For example, for smoking, the variable takes the value 1 if the respondent reports having smoked since the last interview, and 0 otherwise. For each behavior, we construct this variable from two NLSY variables. The first and most important one is a dummy variable indicating whether the respondent has engaged in the behavior since the last date of interview. When it is available (i.e. for the first survey rounds in general), we use a second dummy variable, which indicates whether the respondent has ever engaged in this type of behavior. This second variable allows checking the consistency of some of the answers in the first question, as well as filling in some of the missing observations. These questions were not asked in every year, and we report below the exact name, reference numbers (in parentheses), and years of the variables we used.

Smoking, Drinking, Marijuana, and Selling drugs For smoking, drinking, marijuana smoking, and selling drugs, the first question (about the respondent's activity last year) was not asked in the first survey round (1997). As a result, we only use data starting in 1998, when respondents are aged 14 through 18. The NLSY variables used to form the dependent variables are:

- Smoking: *YSAQ359* (R2189400, R3508500, R4906600, R6534100, S0921600, S2988300, S4682900) for 1998 through 2004, and $YSAQ360C$ (R0357900, R2189100, R3508200, R4906400) for 1997 through 2000.
- Drinking: *YSAQ364D* (R2190200, R3509300, R4907400, R6534700, S0922200, S2988900, S4683700) from 1998 through 2004, and *YSAQ363* (R0358300, R2189900, R3509000, R4907100) from 1997 through 2000.
- Marijuana: *YSAQ370C* (R2191200, R3510300, R4908400, R6535600, R6535600, S0923200, S2989700) from 1998 through 2004, and *YSAQ369* (R0358900, R2190900, R3510000, R4908100) from 1997 through 2000.
- Selling or helping to sell drugs: *YSAQ394B* (R2196400, R3516000, R4914000, R6540500, S0928000, S2994000) for 1998 through 2004, and *YSAQ430* (R0365000, R2199300, R3518900, R4916900, R6543400, S0930900) for 1997 through 2000.

Cocaine and other hard drugs use The NLSY97 asked respondents about cocaine and other hard drugs use starting in the second survey round (1998). In 1998, the survey asked whether the respondent had ever used these types of drugs, and it is only in 1999 that it started asking whether the respondent had used hard drugs since the last interview. As a result, we restricted our analysis to the last six rounds (1999 to 2004) for this behavior, starting when respondents are between 15 and 19. We used the following variables: *YSAQ372CC* (R3511100, R4909200, R6536400, S0924000, S2990300, S4685500) for 1999 through 2004, and *YSAQ372B* (R2191500, R3510800, R4908900, R6536100, S0923700) for 1998 through 2002.

Cigarette, alcohol and marijuana consumption level To estimate the dynamic ordered probit models, we created indicators of zero, low, and high consumption of cigarettes, alcohol, and marijuana. These indicators were constructed using NLSY97

questions about how many days the respondent engaged in the behavior in the previous month. Respectively, these refer to the NLSY97 questions *YSAQ361* (R035810, R2189500, R3508600, R4906700, R6534200, S0921700, S2988400, S4683000) for smoking cigarettes, *YSAQ365* (R0358500, R2190300, R3509400, R4907500, R6534800, S0922300, S2989000, S4683800) for drinking alcohol, and *YSAQ371* (R0359100, R2191300, R3510400, R4908500, R6535700, S0923300, S2989800, S4684800) for smoking marijuana. Note that all of these questions were asked to all respondents from 1997 through 2004. However, since the rest of the analysis is conducted on data from 1998 onwards, we only used these variables from the second round of the survey onwards.

A.4 Co-residence

For each survey year, we constructed a dummy variable that takes the value 1 if the two siblings live in the same household and 0 otherwise. To construct this indicator, we used data from the household roster, which lists all the members of the respondent's household in each year of the survey, along with some of their characteristics. Household members are assigned an identifier in the household roster, which allows them to be linked across household rosters for different years. However, this identifier is different from the identifier in the main survey, so we cannot directly identify the paired sibling. Instead, we use the information contained in the 1997 household roster about each household member's month and year of birth and relationship to the main respondent in order to identify the sibling. We then used the household roster's person identifier to track this sibling through time and record whether, in each subsequent survey round, he or she still lived with the main respondent. More precisely, we used the variable *YOUTH_ID.01* (R0533400), which gives the respondent's ID number in the household roster, the variables *HHI2_RELX.0Y* describing the relationship between household members (X is the respondent's roster ID and Z is the ID of the other household respondents), and the variables *HHI2_DOB.0Z_M* and *HHI2_DOB.0Z_Y* describing the month and year of birth of household member with ID Y, respectively. To track the household member through rounds of the household roster, we used the variable *HHI2_UID*.

A.5 Family processes and parenting variables

In several rounds, the NLSY97 asked respondents about their relationship with their residential and non-residential parents. Based on these questions, Child Trends, Inc. created a number of scales measuring different aspects of the relationship. In the paper, we used three of these scales for both residential mother and residential father. The first one is an index from 0 to 32 measuring how supportive the youth reports her parents to be (a high score indicates a more supportive relationship). The second one is an index from 0 to 16, measuring the youth's perception of her parents' degree of monitoring (a high score indicates greater monitoring). Results for this index were very noisy and are not discussed in the paper. The third index is a four-category variable describing the youth's perception of her parents' parenting style; this variable equals 1 if the parents are uninvolved, 2 if permissive, 3 if authoritarian, and 4 if authoritative. The corresponding NLSY variables are: *FP_ YMSUPP* (R1485200, R2600700, R3924100) and *P_ YFSUPP* (R1485300, R2600800, R3924200) for the first index, *FP_ YMMONIT* (R1485700, R2601000, R3924400, R5510900) and *FP_ YFMONIT* (R1485800, R2601100, R3924500, R5511000) for the second index, and *FP_ YMPSTYL* (R1486500, R2601400, R3924800, R5511100) and *FP_ YFPSTYL* (R1486600, R2601500, R392490, R5511200) for the third index. Note that questions used to create the first and second indexes were only asked to respondents aged 12 to 14 as of December 31, 1996, while questions underlying the third index were asked to the entire cohort. These NLSY variables are available for 1997 through 1999 for the first index and for 1997 through 2000 for the other two. In our analysis, the variable we use is the index mean over the years with available data. If the respondent's answers were missing for one residential parent, we used the mean for the residential parent that had non-missing values. If the respondent had a non-missing value for both residential parents, we averaged the answers across parents and used that value in our regressions. Finally, we constructed a dummy that equals 1 if the first person the youth turns to for advice is his or her brother or sister and another dummy that equals 1 if the youth turns to someone other than the parents for advice. To build these variables, we used a variable reporting who the youth turns to for help if he or she has an emotional problem or personal relationship problem. In the NLSY97, this variable's name is *YSAQ-351A* (R0357300, R2176000, R3493900, R4892300, S0919200, S4681600).

A.6 Treatment of Missing Data

With the exception of the race and gender dummies, the other variables used in the analysis contain a small number of missing values. We dropped the few observations for which we were missing household roster data and were not able to determine the number of siblings and birth order. In the case of highest grade completed, AFQT, mother's education, family structure, and the three childhood environment dummies, we imputed missing values using predicted values from a regression of the variables on all other six variables. For substance use measures, we dropped cases involving missing values for current values, leads, or lags of y^2 or y^1 that appear in a particular model as well as cases for subsequent years even if the necessary data are available. For example, if an individual has non-missing answers from 1998 to 2000, a missing one in 2001, and a non-missing one in 2002, we only included his answers for 1998 through 2000. We made this choice because we wanted to estimate each of the equations of the dynamic model on a sample that is fairly stable across the years. We estimated both the correlated random effect models on the same sample as the one for the joint dynamic model, so the same observation selection rules apply for both strategies.

B A joint dynamic model of substance use with gateway drugs

When estimating the joint dynamic model of siblings behavior, we explored in preliminary analysis the idea that some drugs may serve as gateway to others. In the model, this idea is captured by letting an individual's substance use be affected by past use of that particular substance, but also by past use of another substance. In order to estimate the direct effect of the gateway drug on the paired substance, we add a set of equations to the system we previously estimated in order to model the dynamic use of the gateway drug.

Denote g_t^1 and g_t^2 the older and younger siblings' use of the gateway drug in period t. The model with gateway drugs includes the following equations for the older sibling for all $t > t_{\min}^1$:

$$y_t^1 = 1(\gamma^1 y_{t-1}^1 + \eta^1 g_{t-1}^1 + X^1\beta^1 + AGE_t^1\Gamma^1 + \alpha^1\varepsilon + \delta^1 v^1 + u_t^1 > 0)$$
$$g_t^1 = 1(\gamma^{1g} g_{t-1}^1 + X^1\beta^{1g} + AGE_t^1\Gamma^{1g} + \alpha^{1g}\epsilon + \delta^{1g} v^1 + u_t^{1g} > 0)$$

and for the younger sibling for all $t > t^2_{\min}$:

$$y^2_t = 1(\lambda^2 y^1_{t-1} + \gamma^2 y^2_{t-1} + \eta^2 g^2_{t-1} + \theta^2 a^1_{t-1} + X^2\beta^2_1 + AGE^2_t\Gamma^2 + \alpha^2\varepsilon + \delta^2 v^2 + u^2_t > 0)$$
$$g^2_t = 1(\lambda^{2g} g^1_{t-1} + \gamma^{2g} g^2_{t-1} + \theta^{2g} a^1_{t-1} + X^2\beta^{2g} + AGE^2_t\Gamma^{2g} + \alpha^{2g}\varepsilon + \delta^{2g} v^2 + u^{2g}_t > 0)$$

Equations similar to equations (8) and (7) specified in section 5.3 of the paper are also included in the model for $t = t^1_{min}$and $t = t^2_{min}$ for both drugs and siblings.

Web Appendix Table 13 reports results for models in which smoking cigarettes and drinking alcohol are considered as gateways to marijuana use and models in which cigarettes, alcohol and marijuana are gateways to hard drug use. The results reported in this table correspond to the main error specification, in which we allow v^1 and v^2 to have different variances, normalize all the factor loadings in the model for the outcome drug to 1, and freely estimate the factor loadings on the family and individual specific components in the gateway equations.

Web Appendix Table 14 reports results from our alternative error specification, in which we restrict $v^1$and v^2 to have the same variance, normalize the factor loadings α^1_0, δ^2_0 and δ^1_0 to one and freely estimate all the other factor loadings. Note that these are broad generalizations of the main and alternative error specifications we imposed for the models without gateway drugs.

C Discussion of the Correlated Random Effects (CRE) approach

We reproduce equations (3) and (4) from section 5.1 of the paper:

$$\begin{aligned} y^1_t &= 1(\gamma^1 y^1_{t-1} + X^1\beta^1 + AGE^1_t\Gamma^1 + \alpha^1\epsilon + \lambda^1 v^1 + u^1_t > 0) \\ y^2_t &= 1(\gamma^2 y^2_{t-1} + \lambda^2 y^1_{t-1} + X^2\beta^2 + AGE^2_t\Gamma^2 + \alpha^2\epsilon + \lambda^2 v^2 + u^2_t > 0) \end{aligned}$$

We have set π^2 in the equation for y^2_t. The first equation already assumes that y^1_t does not depend directly on y^2_{t-1} and any parent's response to y^2_{t-1} does not influence the older sibling's behavior. For simplicity, assume that the outcome y is a continuous variable, the factor loadings are all equal to 1, and that $\beta^1, \beta^2, \Gamma^1$,and Γ^2 are 0. Under these

assumptions, the choices of y_t^1 and y_t^2 are determined by:

$$\begin{aligned} y_t^1 &= \gamma^1 y_{t-1}^1 + \varepsilon + v^1 + u_t^1 \\ y_t^2 &= \gamma^2 y_{t-1}^2 + \lambda^2 y_{t-1}^1 + \varepsilon + v^2 + u_t^2 \end{aligned}$$

Consider the linear least squares projection:

$$y_t^2 = \beta_0 + \beta_1(y_{t-1}^1 + y_{t+1}^1) + \beta_2 y_{t-1}^1 + error \tag{15}$$

Keep in mind that the error components u_t^1 and u_t^2 are person specific, although we have suppressed person subscripts throughout the paper. Assume the following:

(A1) $\gamma^1 = \gamma^2 = 0$, i.e. there is no state dependence from any source, including parental response.

(A2) The distribution of u_t^1 is covariance stationary over t and the age of the older sibling at t with variance $var(u_t^1)$. u_t^1 may be serially dependent.

(A3) $cov(u_t^2,\, u_{t-1}^1) = cov(u_t^2, u_{t+1}^1)$.

Under assumption (A1), we obtain:

$$\begin{aligned} y_{t-1}^1 &= \varepsilon + v^1 + u_{t-1}^1 \\ y_{t+1}^1 &= \varepsilon + v^1 + u_{t+1}^1 \end{aligned}$$

Using the above equations and assuming that (A2) and (A3) hold, some straightforward algebra establishes that the coefficients of the projection of $\epsilon + v^2 + u_t^2$ onto y_{t-1}^1 and y_{t+1}^1 both equal to $[var(\varepsilon) + cov(u_t^2, u_{t-1}^1)]/[var(\varepsilon) + var(v^1) + var(u_t^1) + cov(u_{t-1}^1, u_{t+1}^1)]$. Consequently, β_1 and β_2 in (15) are given by:

$$\begin{aligned} \beta_1 &= \frac{var(\varepsilon) + cov(u_t^2, u_{t-1}^1)}{2var(\varepsilon) + var(v^1) + var(u_t^1) + cov(u_{t-1}^1, u_{t+1}^1)} \\ \beta_2 &= \lambda^2 \end{aligned}$$

Thus, under assumptions (A1), (A2) and (A3), β_2 identifies λ^2, the direct sibling effect.

The basic argument carries over to the case in which y is a binary variable determined according to:

$$\begin{aligned} y^1_{t-1} &= 1(\epsilon + v^1 + u^1_{t-1}) > 0) \\ y^1_{t+1} &= 1(\epsilon + v^1 + u^1_{t+1} > 0) \\ y^2_t &= 1(\lambda^2 y^1_{t-1} + \epsilon + v^2 + u^2_t > 0), \end{aligned} \tag{16}$$

although one must replace (A2) with the assumption that the $u^1_{a,t+a-1}$ are identically distributed. However, if any of the three assumptions above are false, then $\beta_2 \neq \lambda^2$ in (15), except in special cases. Indeed, if any of the assumptions fail, then the coefficients of the projection of $\varepsilon + v^2 + u^2_t$ on y^1_{t-1} and y^1_{t+1} will differ, and the difference will be reflected in β_2. For the same reason, if the effects of ε or v^1 on y^1_{t-1} vary with age a in period t, then the equality restriction on the coefficients of the projection of $\varepsilon + v^2 + u^2_t$ on y^1_{t-1} and y^1_{t+1} will fail. They would vary with a if preferences and costs are such that

$$y^1_t = f(a) + \alpha^1_a \varepsilon + \delta^1_a v^1 + u^1_t,$$

where α^1_a and δ^1_a are age dependent coefficients. The function $f(a)$ is not a problem if the model is additively separable in age, provided that one also controls for the age of each of the siblings in year t. However, in a nonlinear setting such as (16), the presence of $f(a)$ is enough to invalidate the restriction on the projection coefficients, even if α^1_a and δ^1_a do not depend on age.

Following Chamberlain (1984), one could generalize the approach by imposing the assumption that u^1_t and u^2_t are uncorrelated at all leads and lags, but allowing the coefficients of the projection of $\epsilon + v^2$ on leads and lags of y^1_t to depend on a^2_t and a^1_t. We do not pursue this.

Contemporaneous sibling effects Suppose both contemporaneous and lagged behaviors of the older sibling influence the younger child with coefficients λ^{20} and λ^2, respectively. Consider the projection equation

$$y^2_t = \beta_0 + \beta_1(y^1_{t-1} + y^1_t + y^1_{t+1}) + \beta_2 y^1_{t-1} + \beta_3 y^1_t + error \tag{17}$$

In addition to assumptions (A1)-(A3) above, assume:

(A4) The idiosyncratic error components u_t^2 and $u_{t'}^1$ are independent across siblings at all leads and lags.

(A5) u_t^1 is serially uncorrelated.

Then,

$$\beta_1 = \frac{var(\varepsilon)}{3var(\varepsilon) + var(v^1) + var(u_t^1)}$$

and

$$\beta_2 = \lambda^2 \text{ and } \beta_3 = \lambda^{20}$$

where λ^{20} is the contemporaneous effect of y_t^1 on y_t^2. Consequently, under the five assumptions, one can identify the contemporaneous and lagged direct sibling effects.

However, if any of the assumptions (A1) through (A5) fails, then in general $\beta_2 \neq \lambda^2$ and $\beta_3 \neq \lambda^{20}$ in (17). Non-separable forms of age dependence will also pose problems in this case. If only (A5) fails, one can still estimate an average of λ^{20} and λ^2 and test, as we do in the paper, for sibling effects using the regression

$$y_t^2 = \beta_0 + \beta_1(y_{t-1}^1 + y_t^1 + y_{t+1}^1 + y_{t+2}^1) + \beta_2(y_{t-1}^1 + y_t^1) + error. \tag{18}$$

We are particularly concerned that temporal variation in factors such as stresses within the family (e.g., parental unemployment, marital conflict, parental substance abuse) or variation in access to drugs or alcohol in a neighborhood or in a school will lead u_t^2 and u_t^1 to co-vary. Consequently, we place less weight on specification (18). If one uses (15) when (17) is correct, then the coefficient on y_{t-1}^1 will pick up part of the effect of y_t^1, but we will still detect sibling influences.

WEB APPENDIX TABLE 1

Weighted Means of Substance Use Measures

	Full Sample	Male Sample	Female Sample
Smoking cigarettes last year	0.433	0.445	0.419
	(0.003)	(0.005)	(0.005)
Drinking alcohol last year	0.646	0.652	0.639
	(0.003)	(0.005)	(0.005)
Smoking marijuana last year	0.236	0.248	0.223
	(0.003)	(0.004)	(0.004)
Using hard drugs last year	0.067	0.070	0.064
	(0.002)	(0.002)	(0.002)
Selling drugs last year	0.057	0.068	0.045
	(0.002)	(0.002)	(0.002)
Days smoked cigarettes last month	7.579	7.748	7.393
	(0.084)	(0.117)	(0.120)
Days drank last month	3.371	3.629	3.089
	(0.039)	(0.056)	(0.053)
Days smoked marijuana last month	1.902	2.167	1.611
	(0.042)	(0.064)	(0.055)

Note: Standard errors of sample means in parentheses. Means are computed using a set of cross-sectional weights for each survey round in which the data are available. Sample sizes vary from 21,293 to 21,460 for full sample, from 11,043 to 11,153 for males, and from 10,250 to 10,307 for females.

WEB APPENDIX TABLE 2

Risky Behaviors by Age

Age	Smoking cigarettes last year	Drinking alcohol last year	Smoking marijuana last year	Using hard drugs last year	Days smoked cigarettes last month	Days drank alcohol last month	Days smoked marijuana last month
15	0.296	0.420	0.170	0.054	3.148	1.152	0.802
	(0.013)	(0.014)	(0.011)	(0.006)	(0.239)	(0.085)	(0.108)
16	0.341	0.448	0.218	0.058	4.290	1.376	1.249
	(0.011)	(0.011)	(0.009)	(0.005)	(0.219)	(0.076)	(0.110)
17	0.363	0.520	0.242	0.066	5.610	1.779	1.732
	(0.009)	(0.010)	(0.008)	(0.005)	(0.214)	(0.077)	(0.116)
18	0.411	0.578	0.246	0.072	6.607	2.698	1.825
	(0.009)	(0.009)	(0.008)	(0.005)	(0.208)	(0.092)	(0.107)
19	0.423	0.625	0.243	0.059	7.163	3.143	2.096
	(0.009)	(0.009)	(0.008)	(0.004)	(0.218)	(0.097)	(0.118)
20	0.414	0.647	0.237	0.063	7.663	3.401	2.254
	(0.009)	(0.009)	(0.008)	(0.004)	(0.225)	(0.105)	(0.127)
21	0.432	0.712	0.215	0.050	7.948	4.593	2.104
	(0.010)	(0.009)	(0.008)	(0.004)	(0.253)	(0.134)	(0.136)
22	0.435	0.712	0.186	0.055	8.167	4.497	1.782
	(0.012)	(0.011)	(0.009)	(0.005)	(0.294)	(0.151)	(0.146)
23	0.445	0.731	0.171	0.049	8.320	4.641	1.596
	(0.015)	(0.013)	(0.011)	(0.006)	(0.379)	(0.200)	(0.177)

Note: Standard errors of sample means in parentheses. Based on the sample used for the estimation of the dynamic smoking model (N=21,398).

WEB APPENDIX TABLE 3
Estimates of Dynamic Probit Model With Finite Mixture Distribution

	Baseline model				*Model with age interactions*			
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs	Cigarettes	Alcohol	Marijuana	Hard drugs
State dependence parameters								
Old sibling (γ^1)	0.911 ***	0.631 ***	0.691 ***	0.487 ***	0.893 ***	0.595 ***	0.673 ***	0.403 ***
	(0.061)	(0.054)	(0.061)	(0.134)	(0.064)	(0.056)	(0.063)	(0.150)
Young sibling (γ^2)	0.980 ***	0.668 ***	0.739 ***	0.763 ***	0.918 ***	0.599 ***	0.666 ***	0.669 ***
	(0.063)	(0.056)	(0.065)	(0.144)	(0.072)	(0.060)	(0.071)	(0.170)
Sibling's influence parameters								
1st period (λ_0^2)	0.279 ***	0.425 ***	0.294 ***	0.360	0.248	0.501 ***	0.349 **	1.213
	(0.091)	(0.086)	(0.107)	(0.296)	(0.151)	(0.130)	(0.172)	(0.824)
Interaction with age					-0.054	-0.021	-0.035	-0.419
					(0.109)	(0.096)	(0.120)	(0.388)
Later periods (λ^2)	0.012	-0.009	-0.054	0.051	0.174	0.168	0.004	0.575
	(0.027)	(0.057)	(0.067)	(0.216)	(0.139)	(0.130)	(0.145)	(0.731)
Interaction with age					-0.033	-0.045	-0.021	-0.126
					(0.032)	(0.032)	(0.036)	(0.169)

WEB APPENDIX TABLE 3 (cont.)

	Baseline model				*Model with age interactions*			
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs	Cigarettes	Alcohol	Marijuana	Hard drugs
Standard deviation of error term specific to:								
Family (σ_{ε})								
Point 1	-1.212	-1.212	-1.212	-1.212	-1.212	-1.212	-1.212	-1.212
Point 2	-0.058	0.682 ***	-0.554	-0.462	1.282 *	0.859 ***	-0.406	-0.092
	(0.330)	(0.169)	(0.476)	(0.601)	(0.686)	(0.174)	(0.422)	(1.381)
Point 3	0.669 **	1.479 ***	0.382	0.844	2.433 ***	1.667 ***	0.544	1.671
	(0.341)	(0.206)	(0.438)	(1.901)	(0.727)	(0.218)	(0.741)	(1.636)
Weight parameter 1	-0.563 **	-1.549 ***	-0.753	0.186	-1.296 ***	-1.542 ***	-0.707	-0.383
	(0.227)	(0.103)	(1.187)	(2.689)	(0.172)	(0.093)	(1.620)	(2.047)
Weight parameter 2	0.570	0.326	0.433	2.079	0.561 *	0.345	0.571	2.160 **
	(0.797)	(0.380)	(0.473)	(1.964)	(0.322)	(0.426)	(0.583)	(0.945)
Implied weight 1	*0.29*	*0.06*	*0.23*	*0.57*	*0.10*	*0.06*	*0.24*	*0.35*
Implied weight 2	*0.43*	*0.57*	*0.44*	*0.41*	*0.62*	*0.57*	*0.48*	*0.63*
Older sibling (σ_{v^1})	1.061 ***	0.579 ***	0.673 ***	0.813 ***	1.007 ***	0.606 ***	0.668 ***	0.883 ***
	(0.074)	(0.055)	(0.068)	(0.136)	(0.076)	(0.057)	(0.072)	(0.147)
Younger sibling (σ_{v^2})	0.649 ***	0.625 ***	0.703 ***	0.820 ***	0.854 ***	0.684 ***	0.750 ***	0.895 ***
	(0.080)	(0.057)	(0.069)	(0.150)	(0.079)	(0.059)	(0.074)	(0.179)
Log likelihood value	-7711.61	-8346.13	-6933.81	-2619.15	-7246.28	-8063.89	-6732.36	-2504.26

Note: The table reports probit model parameters rather than marginal effects. For each outcome, the left column reports estimates of the basic specification, while the right column reports estimates of the specification where all parameters, excluding the state dependence parameter and unobserved heterogeneity, are allowed to vary with age of the sibling. Standard errors in parentheses. * denotes significant at 10% level, ** at 5% level, and *** at 1% level. Sample sizes vary from 1,286 to 1,661 for the older siblings' models and from 1,079 to 1,661 for the younger siblings' models. All models include the set of controls listed in the footnote to Table 2, as well as older sibling's age dummies. The weight parameters reported above do not correspond to the weights on each mixture, but rather to parameters such as the first weight equals the standard normal CDF evaluated at weight parameter 1 and the second weight equals the difference between the standard normal CDF evaluated at weight parameter 2 and the standard normal CDF evaluated at weight parameter 1. Weights sum to 1, so weight 3 does not need to be estimated.

WEB APPENDIX TABLE 4
Estimates of Coefficients on Control Variables in Dynamic Probit Model
Baseline Model

Older sibling's 1st period				
Outcome substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.055	0.191 **	0.230 **	0.206
	(0.105)	(0.086)	(0.095)	(0.158)
Black	-1.325 ***	-1.015 ***	-0.558 ***	-0.963 ***
	(0.159)	(0.128)	(0.137)	(0.292)
Hispanic	-0.790 ***	-0.211 *	-0.332 **	-0.278
	(0.154)	(0.125)	(0.139)	(0.213)
Highest grade completed at 19	-0.288 ***	0.001	-0.178 ***	0.023
	(0.060)	(0.048)	(0.053)	(0.105)
Mother's education	0.046 **	0.041 **	0.013	0.039
	(0.022)	(0.018)	(0.021)	(0.036)
Asvab	-0.003	0.003	0.003	-0.008 **
	(0.002)	(0.002)	(0.002)	(0.004)
House broken in by 12	0.157	0.007	-0.054	-0.252
	(0.153)	(0.124)	(0.136)	(0.216)
Victim of bullying by 12	0.289 **	0.126	0.241 **	-0.019
	(0.136)	(0.114)	(0.122)	(0.201)
Witness of gun shooting by 12	0.543 ***	0.489 ***	0.752 ***	0.534 **
	(0.183)	(0.146)	(0.154)	(0.249)
Lived w/ bio parents at 12	-0.200	-0.211 **	-0.300 ***	-0.153
	(0.125)	(0.104)	(0.113)	(0.188)
Number of (full) siblings	-0.071	-0.068 *	-0.121 ***	-0.102
	(0.051)	(0.040)	(0.045)	(0.072)
First born	-0.071	0.126	-0.152	-0.289
	(0.231)	(0.193)	(0.210)	(0.339)
Second born	0.227	0.232	-0.045	-0.207
	(0.229)	(0.194)	(0.215)	(0.354)
15 years old dummy	-0.040	-0.212	-0.897 ***	
	(0.338)	(0.287)	(0.303)	
16 years old dummy	0.062	-0.025	-0.802 ***	-1.492 **
	(0.312)	(0.265)	(0.286)	(0.597)
17 years old dummy	0.258	0.254	-0.637 **	-1.188 ***
	(0.307)	(0.262)	(0.271)	(0.407)
18 years old dummy	0.482	0.555 **	-0.540 **	-1.257 ***
	(0.307)	(0.263)	(0.272)	(0.399)
19 years old dummy	0.967 **	1.125 ***	-0.708 *	-1.103 ***
	(0.470)	(0.431)	(0.401)	(0.417)

WEB APPENDIX TABLE 4 (cont.)

Older sibling's later periods				
Substance outcome	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	0.028	0.154 **	0.315 ***	0.152
	(0.080)	(0.061)	(0.068)	(0.105)
Black	-0.722 ***	-0.599 ***	-0.207 **	-0.933 ***
	(0.126)	(0.093)	(0.101)	(0.185)
Hispanic	-0.407 ***	-0.062	-0.213 **	-0.160
	(0.120)	(0.090)	(0.096)	(0.155)
Highest grade completed at 19	-0.301 ***	0.001	-0.162 ***	-0.067
	(0.044)	(0.033)	(0.038)	(0.059)
Mother's education	0.031 *	0.029 **	0.034 **	0.013
	(0.017)	(0.013)	(0.014)	(0.022)
Asvab	0.001	0.010 ***	0.006 ***	0.000
	(0.002)	(0.001)	(0.002)	(0.002)
House broken in by 12	0.139	0.028	0.156	0.053
	(0.118)	(0.085)	(0.096)	(0.141)
Victim of bullying by 12	0.016	0.150 *	0.174 **	0.266 **
	(0.103)	(0.082)	(0.085)	(0.133)
Witness of gun shooting by 12	0.284 **	0.220 **	0.188	0.163
	(0.138)	(0.111)	(0.115)	(0.177)
Lived w/ bio parents at 12	-0.125	0.001	-0.059	-0.217 *
	(0.097)	(0.074)	(0.080)	(0.122)
Number of (full) siblings	-0.137 ***	-0.144 ***	-0.128 ***	-0.167 ***
	(0.040)	(0.029)	(0.037)	(0.060)
First born	-0.207	-0.067	0.040	-0.340
	(0.187)	(0.136)	(0.179)	(0.272)
Second born	-0.043	0.012	0.144	-0.226
	(0.182)	(0.131)	(0.175)	(0.264)
16 years old dummy	-0.605 **	-0.888 ***	-1.577 ***	
	(0.302)	(0.254)	(0.310)	
17 years old dummy	-0.252	-0.384 *	-1.335 ***	-1.605 ***
	(0.267)	(0.202)	(0.245)	(0.451)
18 years old dummy	-0.103	-0.182	-1.424 ***	-1.188 ***
	(0.258)	(0.195)	(0.241)	(0.347)
19 years old dummy	-0.105	0.078	-1.422 ***	-1.523 ***
	(0.258)	(0.193)	(0.239)	(0.336)
20 years old dummy	-0.177	0.174	-1.425 ***	-1.391 ***
	(0.259)	(0.195)	(0.239)	(0.340)
21 years old dummy	-0.045	0.457 **	-1.546 ***	-1.581 ***
	(0.260)	(0.199)	(0.240)	(0.349)
22 years old dummy	-0.134	0.388 *	-1.703 ***	-1.535 ***
	(0.263)	(0.199)	(0.244)	(0.351)
23 years old dummy	-0.177	0.404 *	-1.872 ***	-1.633 ***
	(0.275)	(0.214)	(0.257)	(0.371)
24 years old dummy	0.242	0.808	-1.052 **	-1.082
	(0.427)	(0.548)	(0.470)	(0.708)

WEB APPENDIX TABLE 4 (cont.)

Younger sibling's 1st period				
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.004	-0.015	0.283 ***	0.021
	(0.102)	(0.088)	(0.106)	(0.160)
Black	-0.948 ***	-0.682 ***	-0.434 ***	-0.772 ***
	(0.151)	(0.129)	(0.156)	(0.240)
Hispanic	-0.604 ***	-0.140	-0.129	0.105
	(0.143)	(0.122)	(0.147)	(0.197)
Age of youngest sibling	0.057	0.044	0.117 *	-0.042
	(0.061)	(0.054)	(0.062)	(0.100)
Highest grade completed at 19	-0.261 ***	-0.131 ***	-0.252 ***	-0.093
	(0.050)	(0.043)	(0.047)	(0.077)
Mother's education	0.013	0.016	-0.004	0.054 *
	(0.021)	(0.018)	(0.022)	(0.032)
Asvab	0.001	0.005 **	0.008 ***	-0.003
	(0.002)	(0.002)	(0.002)	(0.004)
House broken in by 12	0.324 **	0.007	0.276 *	-0.039
	(0.143)	(0.119)	(0.142)	(0.220)
Victim of bullying by 12	0.309 **	0.295 **	0.341 ***	-0.164
	(0.133)	(0.115)	(0.130)	(0.197)
Witness of gun shooting by 12	0.525 ***	0.347 **	0.561 ***	0.271
	(0.170)	(0.144)	(0.162)	(0.243)
Lived w/ bio parents at 12	-0.198	0.021	-0.244 **	-0.186
	(0.121)	(0.102)	(0.124)	(0.176)
Number of (full) siblings	-0.130 **	-0.114 ***	-0.126 **	-0.136
	(0.051)	(0.043)	(0.056)	(0.094)
Second born	-0.377 *	-0.048	-0.561 **	-0.829 **
	(0.217)	(0.195)	(0.227)	(0.393)
Third born	-0.050	0.114	-0.338	-0.751 **
	(0.215)	(0.193)	(0.221)	(0.353)
15 years old dummy	-0.233	-0.515 *	-1.455 ***	
	(0.282)	(0.266)	(0.291)	
16 years old dummy	-0.187	-0.374	-1.189 ***	-0.620
	(0.288)	(0.279)	(0.290)	(0.559)
17 years old dummy	0.013	-0.202	-1.068 ***	-0.919
	(0.311)	(0.293)	(0.314)	(0.571)
18 years old dummy	0.380	0.076	-1.136 ***	-0.541
	(0.360)	(0.341)	(0.350)	(0.604)
19 years old dummy				-0.748
				(0.711)
20 years old dummy				-0.991
				(0.683)

WEB APPENDIX TABLE 4 (cont.)

Younger sibling's later periods				
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	0.092	0.023	0.135 *	0.016
	(0.076)	(0.061)	(0.071)	(0.117)
Black	-0.778 ***	-0.649 ***	-0.217 **	-0.486 ***
	(0.115)	(0.093)	(0.103)	(0.180)
Hispanic	-0.544 ***	-0.083	-0.095	-0.283
	(0.113)	(0.089)	(0.099)	(0.173)
Age of youngest sibling	-0.077 *	-0.043	-0.019	0.012
	(0.043)	(0.036)	(0.041)	(0.062)
Highest grade completed at 19	-0.297 ***	-0.032	-0.119 ***	-0.129 **
	(0.040)	(0.030)	(0.036)	(0.058)
Mother's education	0.014	0.026 **	0.017	0.022
	(0.016)	(0.013)	(0.015)	(0.023)
Asvab	0.001	0.010 ***	0.006 ***	0.004 *
	(0.002)	(0.001)	(0.002)	(0.003)
House broken in by 12	0.273 ***	0.018	0.067	0.062
	(0.105)	(0.083)	(0.099)	(0.153)
Victim of bullying by 12	0.101	0.025	0.094	0.002
	(0.097)	(0.081)	(0.091)	(0.153)
Witness of gun shooting by 12	0.247 *	0.297 ***	0.211 *	0.461 ***
	(0.132)	(0.105)	(0.121)	(0.177)
Lived w/ bio parents at 12	-0.149	0.023	-0.089	-0.144
	(0.092)	(0.074)	(0.083)	(0.128)
Number of (full) siblings	-0.134 ***	-0.148 ***	-0.147 ***	-0.163 **
	(0.040)	(0.031)	(0.040)	(0.065)
Second born	-0.268	-0.336 **	-0.511 ***	-0.365
	(0.165)	(0.139)	(0.172)	(0.261)
Third born	-0.066	-0.232 *	-0.297 *	-0.142
	(0.163)	(0.135)	(0.164)	(0.261)
16 years old dummy	-0.109	-0.116	-0.760 ***	
	(0.257)	(0.217)	(0.252)	
17 years old dummy	-0.183	0.196	-0.756 ***	-1.725 ***
	(0.275)	(0.230)	(0.263)	(0.415)
18 years old dummy	0.163	0.387	-0.754 ***	-1.677 ***
	(0.297)	(0.248)	(0.281)	(0.448)
19 years old dummy	0.205	0.574 **	-0.667 **	-1.970 ***
	(0.327)	(0.273)	(0.308)	(0.474)
20 years old dummy	0.287	0.666 **	-0.774 **	-1.917 ***
	(0.356)	(0.299)	(0.338)	(0.522)
21 years old dummy	0.363	0.940 ***	-0.735 **	-2.119 ***
	(0.390)	(0.325)	(0.368)	(0.554)
22 years old dummy	0.470	0.984 ***	-1.206 ***	-2.204 ***
	(0.426)	(0.362)	(0.410)	(0.603)
23 years old dummy	0.606	0.933 **	-0.984 **	-1.989 ***
	(0.504)	(0.429)	(0.490)	(0.738)

WEB APPENDIX TABLE 5
Estimates of Coefficients on Control Variables in Dynamic Probit Model
Model with Age Interactions

	Older sibling's 1st period			
Outcome substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.313	0.157	0.251	1.182
	(0.235)	(0.209)	(0.231)	(0.981)
Male * Age	0.122	0.015	-0.011	-0.292
	(0.099)	(0.093)	(0.100)	(0.300)
Black	-1.578 ***	-0.917 ***	-0.560 *	0.520
	(0.346)	(0.310)	(0.313)	(1.572)
Black * Age	0.104	-0.065	-0.040	-0.535
	(0.142)	(0.131)	(0.131)	(0.473)
Hispanic	-0.466	-0.254	0.122	1.252
	(0.317)	(0.279)	(0.330)	(1.069)
Hispanic * Age	-0.169	-0.008	-0.219	-0.495
	(0.135)	(0.129)	(0.146)	(0.335)
Highest grade completed at 19	-0.371 ***	0.024	-0.212 *	0.139
	(0.137)	(0.110)	(0.123)	(0.531)
Highest grade * Age	0.043	-0.009	0.017	-0.040
	(0.058)	(0.051)	(0.057)	(0.160)
Mother's education	0.141 ***	0.056	0.011	0.065
	(0.051)	(0.044)	(0.050)	(0.163)
Mother's education * Age	-0.043 **	-0.008	0.006	-0.007
	(0.022)	(0.020)	(0.022)	(0.050)
Asvab	-0.006	0.001	0.003	-0.016
	(0.006)	(0.005)	(0.006)	(0.017)
Asvab * Age	0.001	0.001	0.000	0.003
	(0.003)	(0.002)	(0.003)	(0.005)
House broken in by 12	0.460	0.345	-0.021	-0.223
	(0.318)	(0.285)	(0.299)	(1.027)
House broken in by 12 * Age	-0.152	-0.164	-0.021	-0.019
	(0.138)	(0.128)	(0.129)	(0.318)
Victim of bullying by 12	0.391	-0.073	0.408	0.576
	(0.305)	(0.281)	(0.280)	(1.062)
Victim of bullying by 12 * Age	-0.033	0.101	-0.080	-0.228
	(0.137)	(0.130)	(0.125)	(0.333)
Witness of gun shooting by 12	0.111	0.200	0.560	1.898 *
	(0.388)	(0.315)	(0.351)	(1.106)
Witness of gun shooting * Age	0.240	0.168	0.106	-0.434
	(0.177)	(0.150)	(0.157)	(0.365)
Lived w/ bio parents at 12	-0.215	-0.404	-0.669 **	0.934
	(0.275)	(0.246)	(0.272)	(0.947)

WEB APPENDIX TABLE 5 (cont.)

Older sibling's 1st period				
Outcome substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Lived w/ bio parents * Age	0.005	0.093	0.178	-0.306
	(0.118)	(0.112)	(0.119)	(0.288)
Number of (full) siblings	-0.004	-0.053	-0.048	-0.008
	(0.116)	(0.099)	(0.108)	(0.385)
Number of (full) siblings * Age	-0.038	-0.022	-0.035	-0.013
	(0.049)	(0.044)	(0.044)	(0.111)
First born	-0.529	-0.334	-0.198	0.358
	(0.487)	(0.433)	(0.459)	(1.486)
First born * Age	0.210	0.195	0.044	-0.155
	(0.191)	(0.185)	(0.168)	(0.511)
Second born	-0.342	-0.813 *	-0.835 *	-0.131
	(0.485)	(0.435)	(0.484)	(1.368)
Second born * Age	0.252	0.504 **	0.390 **	-0.037
	(0.200)	(0.196)	(0.193)	(0.492)
15 years old dummy	0.433	0.498	-0.830	
	(0.670)	(0.582)	(0.599)	
16 years old dummy	0.337	0.405	-0.746	-3.812 **
	(0.488)	(0.408)	(0.456)	(1.646)
17 years old dummy	0.370	0.424	-0.598 *	-2.294 **
	(0.362)	(0.308)	(0.330)	(0.957)
18 years old dummy	0.439	0.458	-0.569 *	-1.725 **
	(0.374)	(0.346)	(0.314)	(0.669)
19 years old dummy	0.980	0.772	-0.849	-0.945
	(0.674)	(0.685)	(0.578)	(0.791)

WEB APPENDIX TABLE 5 (cont.)

Older sibling's later periods				
Substance outcome	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.097	-0.017	0.106	-0.439
	(0.185)	(0.146)	(0.169)	(0.386)
Male * Age	0.024	0.037	0.044	0.113 *
	(0.033)	(0.028)	(0.032)	(0.068)
Black	-1.360 ***	-0.593 ***	-0.348	-1.632 **
	(0.292)	(0.207)	(0.234)	(0.667)
Black * Age	0.123 **	-0.006	0.026	0.123
	(0.050)	(0.038)	(0.043)	(0.114)
Hispanic	-0.349	-0.021	-0.198	-0.458
	(0.252)	(0.202)	(0.238)	(0.569)
Hispanic * Age	-0.015	-0.011	-0.003	0.052
	(0.043)	(0.038)	(0.045)	(0.100)
Highest grade completed at 19	-0.355 ***	-0.037	-0.156 *	-0.061
	(0.094)	(0.073)	(0.088)	(0.195)
Highest grade * Age	0.011	0.010	-0.001	-0.001
	(0.017)	(0.013)	(0.017)	(0.036)
Mother's education	0.068 *	0.000	0.027	-0.093
	(0.037)	(0.031)	(0.038)	(0.080)
Mother's education * Age	-0.007	0.006	0.002	0.019
	(0.007)	(0.006)	(0.007)	(0.015)
Asvab	-0.002	0.003	-0.001	-0.005
	(0.004)	(0.003)	(0.004)	(0.009)
Asvab * Age	0.001	0.002 **	0.001 *	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
House broken in by 12	0.144	0.283	-0.062	0.077
	(0.265)	(0.203)	(0.236)	(0.516)
House broken in by 12 * Age	-0.001	-0.054	0.047	-0.002
	(0.045)	(0.037)	(0.043)	(0.093)
Victim of bullying by 12	0.080	0.427 **	0.539 ***	0.262
	(0.239)	(0.190)	(0.206)	(0.498)
Victim of bullying by 12 * Age	-0.009	-0.059 *	-0.079 **	0.002
	(0.042)	(0.035)	(0.038)	(0.086)
Witness of gun shooting by 12	0.022	-0.015	0.184	0.305
	(0.308)	(0.258)	(0.280)	(0.706)
Witness of gun shooting * Age	0.063	0.052	0.000	-0.024
	(0.056)	(0.047)	(0.052)	(0.133)
Lived w/ bio parents at 12	-0.108	0.152	0.117	0.246
	(0.223)	(0.168)	(0.193)	(0.424)
Lived w/ bio parents * Age	-0.006	-0.035	-0.039	-0.087
	(0.039)	(0.032)	(0.036)	(0.078)
Number of (full) siblings	-0.113	-0.200 ***	-0.208 **	-0.492 *
	(0.095)	(0.072)	(0.088)	(0.259)

WEB APPENDIX TABLE 5 (cont.)

Older sibling's later periods				
Substance outcome	Cigarettes	Alcohol	Marijuana	Hard drugs
Number of (full) siblings * Age	-0.007	0.010	0.017	0.056
	(0.017)	(0.013)	(0.016)	(0.047)
First born	-0.773 *	-0.547	-0.429	-0.734
	(0.408)	(0.354)	(0.411)	(1.098)
First born * Age	0.110	0.097	0.104	0.065
	(0.074)	(0.066)	(0.074)	(0.219)
Second born	-0.420	-0.319	-0.409	-1.238
	(0.387)	(0.350)	(0.400)	(1.058)
Second born * Age	0.073	0.065	0.120 *	0.179
	(0.071)	(0.066)	(0.073)	(0.207)
16 years old dummy	-0.009	-0.253	-0.836 *	
	(0.499)	(0.431)	(0.506)	
17 years old dummy	0.213	0.106	-0.801 **	-0.599
	(0.414)	(0.336)	(0.391)	(0.976)
18 years old dummy	0.242	0.153	-1.083 ***	-0.491
	(0.343)	(0.268)	(0.322)	(0.670)
19 years old dummy	0.106	0.261	-1.274 ***	-1.137 **
	(0.300)	(0.221)	(0.273)	(0.475)
20 years old dummy	-0.105	0.208	-1.477 ***	-1.260 ***
	(0.281)	(0.207)	(0.254)	(0.408)
21 years old dummy	-0.108	0.349	-1.797 ***	-1.727 ***
	(0.298)	(0.230)	(0.273)	(0.490)
22 years old dummy	-0.336	0.132	-2.159 ***	-1.971 ***
	(0.347)	(0.276)	(0.327)	(0.685)
23 years old dummy	-0.518	0.010	-2.540 ***	-2.393 ***
	(0.417)	(0.348)	(0.409)	(0.923)
24 years old dummy	-0.212	0.306	-1.881 ***	-1.979
	(0.621)	(0.671)	(0.654)	(1.304)

WEB APPENDIX TABLE 5 (cont.)

Younger sibling's 1st period				
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.041	-0.202	0.041	-0.341
	(0.154)	(0.138)	(0.172)	(0.455)
Male * Age	0.025	0.183 *	0.204 *	0.177
	(0.104)	(0.093)	(0.118)	(0.219)
Black	-1.168 ***	-0.718 ***	-0.573 **	0.237
	(0.233)	(0.199)	(0.274)	(0.711)
Black * Age	0.094	0.035	0.150	-0.631
	(0.152)	(0.130)	(0.167)	(0.385)
Hispanic	-0.627 ***	-0.271	-0.099	-0.110
	(0.214)	(0.186)	(0.264)	(0.620)
Hispanic * Age	-0.030	0.203	0.031	0.093
	(0.145)	(0.129)	(0.183)	(0.272)
Age of older sibling	0.041	0.082	0.219 **	0.352
	(0.087)	(0.076)	(0.094)	(0.305)
Age of older sibling * Age	0.019	-0.045	-0.074	-0.178
	(0.066)	(0.059)	(0.072)	(0.171)
Highest grade completed at 19	-0.347 ***	-0.203 ***	-0.369 ***	-0.475 **
	(0.084)	(0.071)	(0.078)	(0.210)
Highest grade * Age	0.063	0.058	0.068	0.163
	(0.052)	(0.044)	(0.048)	(0.100)
Mother's education	0.018	-0.022	-0.009	0.072
	(0.034)	(0.028)	(0.037)	(0.092)
Mother's education * Age	-0.008	0.040 *	0.008	-0.008
	(0.023)	(0.021)	(0.026)	(0.040)
Asvab	0.004	0.007 **	0.010 **	-0.007
	(0.004)	(0.003)	(0.004)	(0.011)
Asvab * Age	-0.002	-0.002	-0.001	0.002
	(0.003)	(0.002)	(0.003)	(0.005)
House broken in by 12	0.287	0.322 *	0.284	-0.712
	(0.221)	(0.188)	(0.226)	(0.663)
House broken in by 12 * Age	0.119	-0.300 **	0.020	0.287
	(0.151)	(0.125)	(0.147)	(0.291)
Victim of bullying by 12	0.267	0.355 **	0.456 **	0.545
	(0.205)	(0.179)	(0.205)	(0.570)
Victim of bullying by 12 * Age	0.039	-0.007	-0.077	-0.333
	(0.140)	(0.123)	(0.128)	(0.293)
Witness of gun shooting by 12	0.627 **	0.507 **	0.390	0.213
	(0.266)	(0.230)	(0.273)	(0.772)
Witness of gun shooting * Age	-0.033	-0.129	0.156	0.008
	(0.186)	(0.148)	(0.172)	(0.342)
Lived w/ bio parents at 12	-0.388 **	-0.066	-0.310	-0.018
	(0.184)	(0.159)	(0.204)	(0.495)

WEB APPENDIX TABLE 5 (cont.)

Younger sibling's 1st period				
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Lived w/ bio parents * Age	0.168	0.068	0.056	-0.100
	(0.132)	(0.115)	(0.141)	(0.234)
Number of (full) siblings	-0.187 *	-0.100	-0.079	0.221
	(0.096)	(0.071)	(0.102)	(0.246)
Number of (full) siblings * Age	0.037	-0.018	-0.033	-0.157
	(0.054)	(0.043)	(0.062)	(0.121)
Second born	-0.517	-0.054	-0.558	-0.224
	(0.357)	(0.313)	(0.370)	(1.120)
Second born * Age	-0.022	0.098	0.091	-0.178
	(0.225)	(0.213)	(0.234)	(0.519)
Third born	-0.083	0.102	-0.381	-0.695
	(0.336)	(0.305)	(0.348)	(0.991)
Third born * Age	-0.019	0.068	0.106	0.070
	(0.223)	(0.216)	(0.230)	(0.465)
15 years old dummy	0.003	-0.629	-1.664 ***	
	(0.489)	(0.424)	(0.514)	
16 years old dummy	-0.032	-0.472	-1.424 ***	-1.990 **
	(0.371)	(0.321)	(0.377)	(0.993)
17 years old dummy	0.043	-0.257	-1.270 ***	-1.473 *
	(0.414)	(0.343)	(0.408)	(0.752)
18 years old dummy	0.242	0.093	-1.309 **	0.028
	(0.604)	(0.517)	(0.594)	(1.320)
19 years old dummy				0.180
				(1.412)
20 years old dummy				1.001
				(2.332)

WEB APPENDIX TABLE 5 (cont.)

Younger sibling's later equations

Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Male	-0.182	-0.275 **	0.069	-0.179
	(0.158)	(0.132)	(0.156)	(0.370)
Male * Age	0.079 **	0.080 ***	0.014	0.041
	(0.034)	(0.031)	(0.034)	(0.085)
Black	-0.985 ***	-0.901 ***	-0.949 ***	-0.940
	(0.233)	(0.187)	(0.244)	(0.618)
Black * Age	0.031	0.059	0.187 ***	0.092
	(0.051)	(0.042)	(0.053)	(0.142)
Hispanic	-0.576 ***	-0.049	-0.148	-0.244
	(0.219)	(0.192)	(0.215)	(0.563)
Hispanic * Age	-0.001	-0.005	0.024	0.000
	(0.046)	(0.046)	(0.048)	(0.128)
Age of older sibling	0.068	-0.053	-0.012	0.198
	(0.095)	(0.079)	(0.087)	(0.207)
Age of older sibling * Age	-0.043 *	0.004	0.002	-0.038
	(0.023)	(0.020)	(0.021)	(0.049)
Highest grade completed at 19	-0.446 ***	-0.151 **	-0.258 ***	-0.358 *
	(0.084)	(0.068)	(0.082)	(0.197)
Highest grade * Age	0.035 *	0.028 *	0.032 *	0.048
	(0.018)	(0.016)	(0.017)	(0.043)
Mother's education	-0.017	0.012	-0.014	-0.002
	(0.034)	(0.029)	(0.030)	(0.072)
Mother's education * Age	0.008	0.004	0.009	0.007
	(0.008)	(0.007)	(0.007)	(0.015)
Asvab	0.004	0.003	0.003	0.001
	(0.004)	(0.003)	(0.004)	(0.009)
Asvab * Age	-0.001	0.002 **	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
House broken in by 12	0.317	-0.018	0.226	-0.253
	(0.212)	(0.181)	(0.211)	(0.531)
House broken in by 12 * Age	-0.007	0.008	-0.046	0.061
	(0.046)	(0.042)	(0.046)	(0.123)
Victim of bullying by 12	0.483 **	0.298 *	0.461 **	-0.163
	(0.195)	(0.176)	(0.210)	(0.456)
Victim of bullying by 12 * Age	-0.091 **	-0.071 *	-0.094 **	0.040
	(0.043)	(0.040)	(0.047)	(0.103)
Witness of gun shooting by 12	-0.326	0.490 **	0.180	0.001
	(0.249)	(0.237)	(0.251)	(0.635)
Witness of gun shooting * Age	0.143 ***	-0.063	-0.006	0.109
	(0.054)	(0.050)	(0.052)	(0.134)
Lived w/ bio parents at 12	-0.195	-0.160	-0.077	-0.088
	(0.176)	(0.153)	(0.175)	(0.416)

WEB APPENDIX TABLE 5 (cont.)

Younger sibling's later periods				
Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Lived w/ bio parents * Age	0.006	0.041	-0.011	-0.028
	(0.039)	(0.036)	(0.040)	(0.092)
Number of (full) siblings	-0.099	-0.163 **	-0.177 **	0.040
	(0.084)	(0.071)	(0.086)	(0.224)
Number of (full) siblings * Age	-0.012	0.001	0.008	-0.050
	(0.018)	(0.015)	(0.018)	(0.053)
Second born	-0.231	-0.672 **	-0.487	-0.451
	(0.363)	(0.318)	(0.367)	(0.816)
Second born * Age	-0.034	0.096	0.005	0.023
	(0.079)	(0.071)	(0.078)	(0.205)
Third born	0.224	-0.266	-0.298	0.048
	(0.355)	(0.307)	(0.351)	(0.814)
Third born * Age	-0.082	0.024	0.007	-0.048
	(0.077)	(0.069)	(0.074)	(0.210)
16 years old dummy	-0.428	0.438	-0.632	
	(0.437)	(0.372)	(0.439)	
17 years old dummy	-0.384	0.553 *	-0.685 *	-2.275 ***
	(0.378)	(0.316)	(0.378)	(0.772)
18 years old dummy	0.167	0.554 *	-0.765 **	-2.067 ***
	(0.344)	(0.284)	(0.335)	(0.611)
19 years old dummy	0.477	0.521 *	-0.777 **	-2.223 ***
	(0.368)	(0.309)	(0.346)	(0.570)
20 years old dummy	0.917 **	0.412	-0.989 **	-1.993 **
	(0.463)	(0.401)	(0.429)	(0.786)
21 years old dummy	1.423 **	0.463	-1.080 *	-1.940 *
	(0.628)	(0.553)	(0.570)	(1.155)
22 years old dummy	2.011 **	0.349	-1.670 **	-1.775
	(0.844)	(0.751)	(0.768)	(1.603)
23 years old dummy	2.669 **	0.062	-1.595	-1.193
	(1.126)	(0.997)	(1.009)	(2.358)

WEB APPENDIX TABLE 6

Estimates of Dynamic Probit Model Allowing the Sibling Effect to Depend on the Gender Mix

		Smoking	Drinking	Marijuana
State dependence	Older Sibling (γ^1)	0.914 ***	0.632 ***	0.688 ***
		(0.063)	(0.054)	(0.061)
	Younger sibling (γ^2)	1.955 ***	0.667 ***	0.737 ***
		(0.063)	(0.056)	(0.065)
Sibling's influence				
1st period	Brothers $(\lambda^2_{mm,0})$	-0.110	0.399 **	0.234
		(0.160)	(0.166)	(0.195)
	Sisters $(\lambda^2_{ff,0})$	0.689 ***	0.349 **	0.521 **
		(0.186)	(0.171)	(0.231)
	Mixed Pair $(\lambda^2_{mf,0})$	0.230 *	0.429 ***	0.238
		(0.131)	(0.117)	(0.149)
Later periods	Brothers (λ^2_{mm})	0.043	-0.015	-0.190
		(0.079)	(0.099)	(0.117)
	Sisters (λ^2_{ff})	0.041	0.086	0.129
		(0.086)	(0.101)	(0.145)
	Mixed Pair (λ^2_{mf})	-0.074	-0.015	-0.030
		(0.069)	(0.075)	(0.088)
Standard deviation of error term specific to:				
Family (σ_ε)		0.758 ***	0.614 ***	0.625 ***
		(0.043)	(0.033)	(0.043)
Older sibling (σ_{v^1})		1.032 ***	0.600 ***	0.678 ***
		(0.076)	(0.061)	(0.067)
Younger sibling (σ_{v^2})		0.667 ***	0.616 ***	0.706 ***
		(0.080)	(0.063)	(0.069)
Log likelihood value		-7482.66	-8365.49	-6925.83

Note: See Table 3.

WEB APPENDIX TABLE 7

Estimates of Dynamic Probit Model Allowing the Sibling's Influence to Depend on the Age Gap

		Smoking	Drinking	Marijuana
State dependence	Older Sibling (γ^1)	0.914 ***	0.632 ***	0.688 ***
		(0.062)	(0.054)	(0.061)
	Younger sibling (γ^2)	0.948 ***	0.670 ***	0.736 ***
		(0.063)	(0.056)	(0.065)
Sibling's influence				
1st period	Main effect (λ_0^2)	0.204 *	0.371 ***	0.256 **
		(0.105)	(0.098)	(0.126)
	Age gap > 2 yrs $(\lambda_{2+,0}^2)$	0.113	0.138	0.122
		(0.195)	(0.190)	(0.220)
Later periods	Main effect (λ^2)	0.011	0.000	-0.091
		(0.028)	(0.060)	(0.072)
	Age gap > 2 yrs (λ_{2+}^2)	-0.028	0.038	0.173
		(0.089)	(0.092)	(0.138)
Standard deviation of error term specific to:				
Family (σ_ε)		0.754 ***	0.615 ***	0.624 ***
		(0.044)	(0.033)	(0.043)
Older sibling (σ_{v^1})		1.036 ***	0.600 ***	0.679 ***
		(0.076)	(0.061)	(0.067)
Younger sibling (σ_{v^2})		0.681 ***	0.614 ***	0.708 ***
		(0.079)	(0.063)	(0.069)
Log likelihood value		-7482.66	-8365.49	-6925.83

Note: See Table 3.

WEB APPENDIX TABLE 8
Estimates of Dynamic Probit Model Allowing for Sibling Influences to Vary with Co-residence

Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
State dependence parameters				
Old sibling (γ^1)	0.905 ***	0.634 ***	0.690 ***	0.502 ***
	(0.062)	(0.054)	(0.061)	(0.132)
Young sibling (γ^2)	0.951 ***	0.668 ***	0.739 ***	0.731 ***
	(0.068)	(0.057)	(0.065)	(0.149)
Sibling's influence parameters				
1st period (λ_0^2)	0.096	0.226	0.380 *	0.504
	(0.192)	(0.174)	(0.204)	(0.415)
Interaction with co-residence	0.137	0.206	-0.113	-0.249
	(0.191)	(0.169)	(0.216)	(0.515)
Later periods (λ^2)	0.080	0.045	-0.062	-0.184
	(0.087)	(0.072)	(0.089)	(0.298)
Interaction with co-residence	-0.042	-0.057	0.021	0.435
	(0.082)	(0.069)	(0.097)	(0.378)
Standard deviation of error term specific to:				
Family (σ_ε)	0.745 ***	0.612 ***	0.624 ***	0.554 ***
	(0.052)	(0.034)	(0.043)	(0.093)
Older sibling (σ_{v^1})	1.038 ***	0.600 ***	0.676 ***	0.770 ***
	(0.079)	(0.061)	(0.067)	(0.132)
Younger sibling (σ_{v^2})	0.834 ***	0.618 ***	0.705 ***	0.859 ***
	(0.081)	(0.063)	(0.069)	(0.155)
Coefficients on co-residence				
Older sibling -1st period	-0.243 *	-0.102	-0.229 *	-0.280
	(0.136)	(0.128)	(0.129)	(0.181)
Older sibling - Later periods	0.030	-0.114 **	-0.036	0.041
	(0.059)	(0.053)	(0.054)	(0.094)
Younger sibling - 1st period	-0.025	-0.048	-0.107	-0.255 ***
	(0.114)	(0.104)	(0.116)	(0.095)
Younger sibling - Later periods	-0.003	-0.063	0.005	0.000
	(0.061)	(0.056)	(0.062)	(0.000)
Log likelihood value	-7168.39	-8015.62	-6604.67	-2492.60

Note: See Table 3.

WEB APPENDIX TABLE 9a

Effect of Shifting the Older Sibling's Probability of Behavior from 0 to 1 in $t^2_{\min}-1$ on the Older and Younger Sibling's Probabilities of Behavior Relative to Baseline (Based on Dynamic Probit Baseline Model)

Smoking cigarettes

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
	Older Siblings						
Baseline	0.4002	0.4091	0.4178	0.4250	0.4274	0.4269	
	(0.0110)	(0.0116)	(0.0115)	(0.0108)	(0.0114)	(0.0135)	
W/ feedback	2.5004	0.5078	0.1360	0.0400	0.0123	0.0040	
	(0.0693)	(0.0469)	(0.0211)	(0.0087)	(0.0034)	(0.0013)	
	Younger Siblings						
Baseline		0.3374	0.3693	0.3818	0.3937	0.3915	0.3845
		(0.0118)	(0.0112)	(0.0135)	(0.0164)	(0.0227)	(0.0309)
W/ feedback		0.1406	0.0424	0.0139	0.0047	0.0017	0.0006
		(0.0763)	(0.0229)	(0.0079)	(0.0029)	(0.0011)	(0.0004)
W/out feedback		0.1406	0.0364	0.0107	0.0033	0.0011	0.0004
		(0.0763)	(0.0196)	(0.0058)	(0.0019)	(0.0006)	(0.0002)

Drinking Alcohol

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
	Older Siblings						
Baseline	0.5556	0.5699	0.6182	0.6695	0.7058	0.7227	
	(0.0123)	(0.0104)	(0.0097)	(0.0093)	(0.0096)	(0.0113)	
W/ feedback	1.8007	0.2960	0.0532	0.0101	0.0020	0.0004	
	(0.0399)	(0.0308)	(0.0105)	(0.0029)	(0.0007)	(0.0002)	
	Younger Siblings						
Baseline		0.4581	0.5015	0.5437	0.5690	0.5849	0.5854
		(0.0129)	(0.0108)	(0.0125)	(0.0165)	(0.0214)	(0.0290)
W/ feedback		0.2492	0.0463	0.0093	0.0020	0.0004	0.0001
		(0.0560)	(0.0131)	(0.0035)	(0.0010)	(0.0003)	(0.0001)
W/out feedback		0.2492	0.0465	0.0094	0.0021	0.0004	0.0001
		(0.0560)	(0.0109)	(0.0026)	(0.0007)	(0.0002)	(0.0001)

WEB APPENDIX TABLE 9 (cont.)

Smoking Marijuana

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
	Older Siblings						
Baseline	0.2512	0.2482	0.2470	0.2370	0.2175	0.1968	
	(0.0109)	(0.0101)	(0.0092)	(0.0086)	(0.0087)	(0.0098)	
W/ feedback	3.9877	0.6485	0.1372	0.0329	0.0084	0.0022	
	(0.1724)	(0.0780)	(0.0296)	(0.0102)	(0.0034)	(0.0011)	
	Younger Siblings						
Baseline		0.2089	0.2456	0.2642	0.2770	0.2842	0.2810
		(0.0099)	(0.0113)	(0.0143)	(0.0190)	(0.0253)	(0.0343)
W/ feedback		0.2681	0.0446	0.0089	0.0019	0.0004	0.0001
		(0.0911)	(0.0216)	(0.0063)	(0.0019)	(0.0006)	(0.0002)
W/out feedback		0.2681	0.0510	0.0117	0.0028	0.0007	0.0002
		(0.0911)	(0.0182)	(0.0046)	(0.0013)	(0.0004)	(0.0001)

Note:"Baseline" corresponds to probabilities of simulated behaviors using the dynamic probit model. "W/ feedback" corresponds to an exogenous shift of the older sibling's probability of behavior from 0 to 1 in the first period, allowing for the effect of this shift on the older sibling's behavior in the later periods. "W/out feedback" corresponds to an exogenous shift of the older sibling's probability of behavior from 0 to 1 in the first period, setting the older sibling's behavior in the later periods to its baseline level. The numbers recorded in the rows labeled "W/out feedback" and "W/ feedback" refer to the average change in said probabilities due to the corresponding exogenous switches in older siblings' behavior, divided by the baseline probability of these behaviors. Parametric boostrap standard errors based on 150 replications in parentheses.

WEB APPENDIX TABLE 9b

Bias Corrected Effect of Shifting the Older Sibling's Probability of Behavior from 0 to 1 in $t^2_{\min}-1$ on the Younger Sibling's Probabilities of Behavior Relative to Baseline (Based on Dynamic Probit Baseline Model)

Smoking cigarettes

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline		0.3311	0.3686	0.3827	0.3951	0.3930	0.3860
		(0.0118)	(0.0112)	(0.0135)	(0.0164)	(0.0227)	(0.0309)
W/ feedback		0.1000	0.0329	0.0115	0.0041	0.0015	0.0005
		(0.0766)	(0.0226)	(0.0078)	(0.0029)	(0.0011)	(0.0004)
W/out feedback		0.1000	0.0254	0.0074	0.0023	0.0007	0.0002
		(0.0766)	(0.0193)	(0.0057)	(0.0018)	(0.0006)	(0.0002)

Drinking Alcohol

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline		0.4486	0.5000	0.5439	0.5695	0.5855	0.5860
		(0.0128)	(0.0108)	(0.0125)	(0.0165)	(0.0214)	(0.0290)
W/ feedback		0.2165	0.0398	0.0080	0.0017	0.0004	0.0001
		(0.0570)	(0.0129)	(0.0034)	(0.0009)	(0.0003)	(0.0001)
W/out feedback		0.2165	0.0397	0.0080	0.0017	0.0004	0.0001
		(0.0570)	(0.0108)	(0.0024)	(0.0006)	(0.0002)	(0.0000)

Smoking Marijuana

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline		0.2067	0.2456	0.2647	0.2775	0.2848	0.2814
		(0.0098)	(0.0113)	(0.0143)	(0.0190)	(0.0253)	(0.0343)
W/ feedback		0.2360	0.0392	0.0079	0.0017	0.0004	0.0001
		(0.0909)	(0.0214)	(0.0062)	(0.0018)	(0.0006)	(0.0002)
W/out feedback		0.2360	0.0446	0.0102	0.0025	0.0006	0.0002
		(0.0909)	(0.0179)	(0.0045)	(0.0012)	(0.0004)	(0.0001)

Note: see Web Appendix Table A9a.

WEB APPENDIX TABLE 9c
Effect of Shifting the Older Sibling's Probability of Behavior from 0 to 1 on the Younger Sibling's Probabilities of Behavior Relative to Baseline (Based on Dynamic Probit Model with both Contemporaneous and Lagged Sibling Effects)

Smoking cigarettes

	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline	0.3367	0.3686	0.3782	0.3903	0.3852	0.3736
	(0.0101)	(0.0113)	(0.0134)	(0.0175)	(0.0231)	(0.0314)
Shock $t^2_{min}-1$	0.0950	0.0246	0.0074	0.0023	0.0008	0.0003
	(0.0827)	(0.0220)	(0.0068)	(0.0022)	(0.0008)	(0.0003)
Shock t^2_{min}	0.2054	0.1097	0.0324	0.0102	0.0035	0.0012
	(0.0925)	(0.0540)	(0.0164)	(0.0054)	(0.0019)	(0.0007)
Shock both	0.3039	0.1351	0.0400	0.0126	0.0042	0.0015
	(0.0964)	(0.0591)	(0.0179)	(0.0059)	(0.0021)	(0.0008)

Drinking alcohol

	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline	0.4602	0.5020	0.5432	0.5695	0.5816	0.5773
	(0.0125)	(0.0127)	(0.0162)	(0.0203)	(0.0267)	(0.0374)
Shock $t^2_{min}-1$	0.2449	0.0468	0.0094	0.0020	0.0005	0.0001
	(0.0530)	(0.0109)	(0.0027)	(0.0007)	(0.0002)	(0.0001)
Shock t^2_{min}	0.0650	0.0340	0.0067	0.0014	0.0003	0.0001
	(0.0551)	(0.0319)	(0.0063)	(0.0014)	(0.0003)	(0.0001)
Shock both	0.3132	0.0814	0.0162	0.0034	0.0008	0.0002
	(0.0648)	(0.0335)	(0.0069)	(0.0016)	(0.0004)	(0.0001)

Smoking marijuana

	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline	0.2098	0.2509	0.2732	0.2865	0.2932	0.2979
	(0.0106)	(0.0117)	(0.0164)	(0.0225)	(0.0296)	(0.0433)
Shock $t^2_{min}-1$	0.2244	0.0413	0.0091	0.0021	0.0005	0.0001
	(0.1065)	(0.0201)	(0.0047)	(0.0012)	(0.0004)	(0.0001)
Shock t^2_{min}	0.3428	0.0523	0.0114	0.0027	0.0007	0.0002
	(0.1310)	(0.0738)	(0.0156)	(0.0038)	(0.0010)	(0.0003)
Shock both	0.5913	0.0967	0.0210	0.0049	0.0012	0.0003
	(0.1645)	(0.0762)	(0.0162)	(0.0040)	(0.0011)	(0.0003)

Note:"Baseline" corresponds to probabilities of simulated behaviors using the dynamic probit model with both contemporaneous and lagged sibling effects. The next line corresponds to an exogenous shift of the older sibling's probability of behavior from 0 to 1 in the period preceeding the first observation of the younger sibling. The next line corresponds to an exogenous shift of the older sibling's probability of behavior from 0 to 1 in the first period we observe the younger sibling."Shocks 1 and 2" correspond to an exogenous shift of the older siblings' probability of behavior from 0 to 1 in both periods. In all three scenarios, we set the older sibling's behavior in the periods following the shock(s) to its baseline values. The numbers reported in all the rows except "Baseline" refer to the average change in said probabilities due to the corresponding exogenous switches in older siblings' behavior, divided by the baseline probability of these behaviors. Parametric boostrap standard errors based on 150 replications in parentheses.

WEB APPENDIX TABLE 10

Effect of Shifting the Older Sibling's Probability of Behavior in Various Periods on the Younger Sibling's Probabilities of Behavior Relative to Baseline (Based on Dynamic Probit Model with Age Interactions)

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
				Smoking Cigarettes			
Baseline		0.3111	0.3941	0.4351	0.5358	0.5800	0.5907
		(0.0161)	(0.0694)	(0.1415)	(0.2138)	(0.2623)	(0.2868)
Shock period $t^2_{\min}-1$		0.1634	0.0324	0.0082	0.0017	0.0005	0.0001
(If younger sib is 15)		(0.1063)	(0.0235)	(0.0073)	(0.0023)	(0.0009)	(0.0004)
Shock period $t^2_{\min}-1$		0.1089	0.0179	0.0044	0.0011	0.0003	0.0001
(If younger sib is 17)		(0.0930)	(0.0223)	(0.0072)	(0.0024)	(0.0008)	(0.0002)
Shock period $t^2_{\min}+1$		0.0000	0.0000	0.0309	0.0067	0.0017	0.0004
(If younger sib is 15)		(0.0000)	(0.0000)	(0.0302)	(0.0087)	(0.0030)	(0.0010)
				Drinking Alcohol			
Baseline		0.4105	0.3822	0.3814	0.3554	0.3168	0.2726
		(0.0191)	(0.0617)	(0.1226)	(0.1817)	(0.2258)	(0.2477)
Shock period $t^2_{\min}-1$		0.2801	0.0516	0.0100	0.0022	0.0004	0.0001
(If younger sib is 15)		(0.0840)	(0.0179)	(0.0048)	(0.0014)	(0.0004)	(0.0002)
Shock period $t^2_{\min}-1$		0.2333	0.0472	0.0094	0.0019	0.0004	0.0001
(If younger sib is 17)		(0.0694)	(0.0218)	(0.0059)	(0.0017)	(0.0005)	(0.0003)
Shock period $t^2_{\min}+1$		0.0000	0.0000	0.0181	0.0037	0.0008	0.0002
(If younger sib is 15)		(0.0000)	(0.0000)	(0.0349)	(0.0078)	(0.0017)	(0.0005)
				Smoking Marijuana			
Baseline		0.1611	0.1815	0.1673	0.1541	0.1577	0.1630
		(0.0144)	(0.0536)	(0.1017)	(0.1433)	(0.1842)	(0.2139)
Shock period $t^2_{\min}-1$		0.3325	0.0518	0.0116	0.0027	0.0004	0.0000
(If younger sib is 15)		(0.1711)	(0.0305)	(0.0085)	(0.0028)	(0.0009)	(0.0001)
Shock period $t^2_{\min}-1$		0.2083	0.0401	0.0070	0.0014	0.0003	0.0001
(If younger sib is 17)		(0.1366)	(0.0306)	(0.0079)	(0.0028)	(0.0013)	(0.0005)
Shock period $t^2_{\min}-1$		0.0000	0.0000	-0.0416	-0.0092	-0.0018	-0.0003
(If younger sib is 15)		(0.0000)	(0.0000)	(0.0615)	(0.0148)	(0.0050)	(0.0010)

Note:"Baseline" corresponds to probabilities of simulated behaviors using the dynamic probit model. Each subsequent row corresponds to an exogenous shift of the older sibling's probability of behavior from 0 to 1 in the indicated period, setting the older sibling's behavior in the later periods to its baseline level. The numbers reported in these rows refer to the average change in said probabilities due to the corresponding exogenous switches in older siblings' behavior, divided by the baseline probability of these behaviors. Parametric boostrap standard errors based on 150 replications in parentheses.

WEB APPENDIX TABLE 11
Estimates of Dynamic Probit Model (Alternative Error Specification)

	Smoking Cigarettes	Drinking Alcohol	Smoking Marijuana	Using Hard Drugs
State dependence parameters				
Older sibling (γ^1)	0.833 ***	0.636 ***	0.632 ***	0.418 ***
	(0.067)	(0.056)	(0.066)	(0.151)
Younger sibling (γ^2)	0.911 ***	0.612 ***	0.713 ***	0.724 ***
	(0.072)	(0.059)	(0.067)	(0.152)
Sibling's influence parameters				
1st period (λ_0^2)	0.008	0.273 **	0.238 *	0.231
	(0.178)	(0.129)	(0.143)	(0.432)
Later periods (λ^2)	0.120	0.037	-0.035	0.092
	(0.077)	(0.062)	(0.074)	(0.224)
Family-specific error term				
Standard deviation (σ_ε)	0.823 ***	0.760 ***	0.530 ***	1.404
	(0.124)	(0.108)	(0.102)	(1.122)
Factor loadings:				
Older sibling, later periods (α^1)	1.110 ***	0.865 ***	1.254 ***	0.755
	(0.188)	(0.145)	(0.242)	(0.658)
Younger sib, 1st period (α_0^2)	1.038 ***	0.808 ***	1.295 ***	0.271
	(0.285)	(0.186)	(0.351)	(0.219)
Younger sib, later periods (α^2)	0.753 ***	0.754 ***	1.214 ***	0.205
	(0.174)	(0.156)	(0.346)	(0.188)
Individual-specific error term				
Standard deviation (σ_v)	0.754 ***	0.455 ***	0.552 ***	0.945 ***
	(0.071)	(0.066)	(0.076)	(0.192)
Factor loadings:				
Older sib, later periods (δ^1)	1.460 ***	1.198 ***	1.406 ***	-0.163
	(0.177)	(0.269)	(0.260)	(0.609)
Younger sib, later periods (δ^2)	1.343 ***	1.726 ***	1.363 ***	1.039 ***
	(0.158)	(0.274)	(0.256)	(0.268)
Log likelihood value	-7486.50	-8367.19	-6931.05	-2620.88

Note: See Table 3.

WEB APPENDIX TABLE 12

Effect of Shifting the Older Sibling's Probability of Behavior from 0 to 1 in $t^2_{\min}-1$ on the Older and Younger Sibling's Probabilities of Behavior Relative to Baseline (Based on Dynamic Probit Model, Alternative Error Specification)

Smoking cigarettes

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
	Older Siblings						
Baseline	0.3992	0.4096	0.4185	0.4265	0.4272	0.4250	
	(0.0113)	(0.0105)	(0.0107)	(0.0100)	(0.0099)	(0.0110)	
W/ feedback	2.5069	0.4414	0.1097	0.0299	0.0087	0.0026	
	(0.0708)	(0.0509)	(0.0214)	(0.0082)	(0.0031)	(0.0011)	
	Younger Siblings						
Baseline		0.3388	0.3713	0.3826	0.3984	0.3947	0.3890
		(0.0117)	(0.0105)	(0.0131)	(0.0172)	(0.0234)	(0.0311)
W/ feedback		-0.0193	0.0061	0.0042	0.0018	0.0008	0.0003
		(0.1117)	(0.0274)	(0.0083)	(0.0027)	(0.0009)	(0.0004)
W/out feedback		-0.0193	-0.0050	-0.0015	-0.0005	-0.0002	-0.0001
		(0.1117)	(0.0275)	(0.0079)	(0.0024)	(0.0008)	(0.0003)

Drinking Alcohol

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
	Older Siblings						
Baseline	0.5556	0.5681	0.6173	0.6718	0.7069	0.7248	
	(0.0120)	(0.0103)	(0.0095)	(0.0093)	(0.0095)	(0.0104)	
W/ feedback	1.8007	0.3056	0.0566	0.0105	0.0021	0.0005	
	(0.0384)	(0.0334)	(0.0111)	(0.0029)	(0.0008)	(0.0002)	
	Younger Siblings						
Baseline		0.4599	0.5028	0.5445	0.5694	0.5837	0.5834
		(0.0124)	(0.0112)	(0.0143)	(0.0200)	(0.0264)	(0.0350)
W/ feedback		0.1667	0.0309	0.0062	0.0013	0.0003	0.0001
		(0.0890)	(0.0152)	(0.0033)	(0.0008)	(0.0002)	(0.0001)
W/out feedback		0.1667	0.0271	0.0049	0.0010	0.0002	0.0000
		(0.0890)	(0.0150)	(0.0029)	(0.0006)	(0.0002)	(0.0000)

WEB APPENDIX TABLE 12 (cont.)

Smoking Marijuana

	$t^2_{min}-1$	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
				Older Siblings			
Baseline	0.2520	0.2472	0.2463	0.2363	0.2188	0.1962	
	(0.0106)	(0.0101)	(0.0099)	(0.0094)	(0.0089)	(0.0095)	
W/ feedback	3.9754	0.5668	0.1082	0.0237	0.0056	0.0013	
	(0.1677)	(0.0758)	(0.0253)	(0.0077)	(0.0023)	(0.0007)	
				Younger Siblings			
Baseline		0.2066	0.2434	0.2631	0.2735	0.2784	0.2764
		(0.0104)	(0.0103)	(0.0138)	(0.0200)	(0.0273)	(0.0372)
W/ feedback		0.2236	0.0369	0.0074	0.0016	0.0004	0.0001
		(0.1539)	(0.0286)	(0.0071)	(0.0020)	(0.0006)	(0.0002)
W/out feedback		0.2236	0.0406	0.0090	0.0022	0.0005	0.0001
		(0.1539)	(0.0289)	(0.0068)	(0.0018)	(0.0005)	(0.0002)

Note: See Web Appendix Table 9.

WEB APPENDIX TABLE 13
Estimates of Dynamic Probit Model Allowing for the Lagged Effect of a Gateway Drug

Outcome drug:	Marijuana	Marijuana	Hard drugs	Hard drugs	Hard drugs
Gateway drug:	Smoking	Drinking	Smoking	Drinking	Marijuana
State dependence for outcome drug					
Older sibling (γ^1)	0.743 ***	0.756 ***	0.581 ***	0.604 ***	0.616 ***
	(0.064)	(0.062)	(0.127)	(0.132)	(0.113)
Younger sibling (γ^2)	1.017 ***	0.805 ***	1.401 ***	1.163 ***	0.790 ***
	(0.054)	(0.062)	(0.092)	(0.120)	(0.124)
State dependence for gateway drug					
Older sibling (γ^{1g})	0.906 ***	0.725 ***	0.852 ***	0.632 ***	0.483 ***
	(0.064)	(0.049)	(0.085)	(0.073)	(0.087)
Younger sibling (γ^{2g})	1.007 ***	0.681 ***	0.941 ***	0.562 ***	0.631 ***
	(0.066)	(0.055)	(0.086)	(0.076)	(0.087)
Lagged effect of the gateway drug					
Older sibling (η^1)	-0.028	-0.127 **	0.158	0.072	-0.091
	(0.062)	(0.064)	(0.108)	(0.138)	(0.097)
Younger sibling (η^2)	-0.295 ***	-0.020	-0.087	-0.105	0.025
	(0.059)	(0.061)	(0.108)	(0.134)	(0.103)
Sibling's influence for outcome drug					
First period (λ_0^2)	0.452 ***	0.387 ***	0.444 **	0.430 *	0.390
	(0.100)	(0.104)	(0.224)	(0.243)	(0.287)
Later periods (λ^2)	0.158 ***	0.092	0.182	0.225	0.080
	(0.053)	(0.060)	(0.151)	(0.157)	(0.172)
Sibling's influence for gateway drug					
First period (λ_0^{2g})	0.208 *	0.352 ***	0.301 **	0.192	-0.149
	(0.116)	(0.114)	(0.145)	(0.124)	(0.264)
Later periods (λ^{2g})	0.132 **	0.079	0.143 *	-0.039	0.073
	(0.058)	(0.054)	(0.084)	(0.074)	(0.079)
Standard deviation of error terms specific to:					
Family (σ_ε)	0.300 ***	0.535 ***	0.140 ***	0.331 ***	0.560 ***
	(0.028)	(0.036)	(0.032)	(0.043)	(0.058)
Older sibling (σ_{v^1})	0.820 ***	0.730 ***	0.828 ***	0.806 ***	0.720 ***
	(0.054)	(0.057)	(0.096)	(0.111)	(0.088)
Younger sibling (σ_{v^2})	0.738 ***	0.720 ***	0.459 ***	0.568 ***	0.823 ***
	(0.045)	(0.059)	(0.062)	(0.072)	(0.110)

WEB APPENDIX TABLE 13 (cont.)

Outcome drug:	Marijuana	Marijuana	Hard drugs	Hard drugs	Hard drugs
Gateway drug:	Smoking	Drinking	Smoking	Drinking	Marijuana
Factor loadings of family specific error term in gateway drug model					
α_0^{1g}	2.757 ***	1.221 ***	8.141 ***	2.174 ***	1.584 ***
	(0.347)	(0.189)	(1.959)	(0.398)	(0.366)
α^{1g}	3.611 ***	0.993 ***	9.384 ***	2.482 ***	1.080 ***
	(0.384)	(0.112)	(2.225)	(0.401)	(0.166)
α_0^{2g}	1.796 ***	1.243 ***	3.443 ***	1.856 ***	2.024 ***
	(0.324)	(0.243)	(1.020)	(0.376)	(0.648)
α^{2g}	1.579 ***	1.085 ***	2.668 ***	1.746 ***	1.077 ***
	(0.248)	(0.152)	(0.667)	(0.320)	(0.205)
Factor loadings on older sibling error term in gateway drug model					
δ_0^{1g}	0.954 ***	0.882 ***	0.811 ***	0.705 ***	1.089 ***
	(0.126)	(0.148)	(0.157)	(0.191)	(0.177)
δ^{1g}	0.755 ***	0.668 ***	0.778 ***	0.416 ***	1.459 ***
	(0.082)	(0.080)	(0.140)	(0.109)	(0.216)
Factor loadings on younger sibling error term in gateway drug model					
δ_0^{2g}	1.268 ***	0.691 ***	2.709 ***	1.704 ***	1.161 ***
	(0.141)	(0.119)	(0.444)	(0.280)	(0.188)
δ^{2g}	1.262 ***	0.919 ***	2.371 ***	1.497 ***	1.032 ***
	(0.119)	(0.083)	(0.394)	(0.219)	(0.139)
Log likelihood value	-13943.69	-14787.61	-8640.72	-9261.26	-7877.30

Note: The table reports probit model parameters rather than marginal effects. Standard errors in parentheseses. * denotes significant at 10% level, ** at 5% level, and *** at 1% level. Sample sizes vary from 1,278 to 1,640 for the older siblings' models and from 1,066 to 1640 for the younger siblings' models. All models include the set of controls listed in the footnote to Table 2, as well as older sibling's age dummies. In this specification, the factor loadings $\alpha_0^1, \alpha^1, \alpha_0^2, \alpha^2, \delta_0^1, \delta^1, \delta_0^2, \delta^2$ are normalized to 1.

WEB APPENDIX TABLE 14

Estimates of Dynamic Probit Model Allowing for the Lagged Effect of a Gateway Drug (Alternative Error Specification)

Outcome drug:	Marijuana	Marijuana	Hard drugs	Hard drugs	Hard drugs
Gateway drug:	Smoking	Drinking	Smoking	Drinking	Marijuana
State dependence for outcome drug					
Older sibling (γ^1)	1.024 ***	0.814 ***	0.866 ***	0.585 ***	0.604 ***
	(0.045)	(0.058)	(0.112)	(0.142)	(0.117)
Younger sibling (γ^2)	0.977 ***	0.791 ***	1.252 ***	1.144 ***	0.823 ***
	(0.058)	(0.062)	(0.116)	(0.124)	(0.127)
State dependence for gateway drug					
Older sibling (γ^{1g})	0.966 ***	0.707 ***	0.908 ***	0.640 ***	0.473 ***
	(0.063)	(0.050)	(0.080)	(0.073)	(0.085)
Younger sibling (γ^{2g})	.098 ***	0.737 ***	0.915 ***	0.577 ***	0.628 ***
	(0.061)	(0.052)	(0.093)	(0.076)	(0.088)
Lagged effect of the gateway drug					
Older sibling (η^1)	-0.187 ***	-0.159 **	0.027	0.042	-0.151
	(0.064)	(0.066)	(0.127)	(0.144)	(0.109)
Younger sibling (η^2)	-0.259 ***	0.003	0.023	-0.114	0.050
	(0.061)	(0.061)	(0.124)	(0.150)	(0.115)
Sibling's influence for outcome drug					
First period (λ_0^2)	0.418 ***	0.386 ***	0.268	0.437 *	0.118
	(0.104)	(0.112)	(0.241)	(0.251)	(0.337)
Later periods (λ^2)	0.127 **	0.036	-0.172	0.206	0.153
	(0.060)	(0.066)	(0.183)	(0.165)	(0.176)
Sibling's influence for gateway drug					
First period (λ_0^{2g})	0.267 **	0.490 ***	0.510 ***	0.184	-0.528 **
	(0.105)	(0.089)	(0.123)	(0.126)	(0.260)
Later periods (λ^{2g})	0.168 ***	0.108 *	0.261 ***	-0.033	0.107
	(0.064)	(0.055)	(0.076)	(0.077)	(0.076)
Standard devition of error terms specific to:					
Family (σ_ε)	0.314 ***	0.459 ***	0.244 ***	0.352 ***	0.403 ***
	(0.042)	(0.045)	(0.053)	(0.065)	(0.070)
Individual (σ_v)	0.834 ***	0.840 ***	0.409 ***	0.639 ***	0.552 ***
	(0.057)	(0.056)	(0.075)	(0.088)	(0.078)

WEB APPENDIX TABLE 14 (cont.)

Outcome drug:	Marijuana	Marijuana	Hard drugs	Hard drugs	Hard drugs
Gateway drug:	Smoking	Drinking	Smoking	Drinking	Marijuana
Factor loadings on family specific error term in the outcome drug equations					
α^1	2.043 ***	1.963 ***	2.573 ***	1.219 ***	1.189 ***
	(0.299)	(0.228)	(0.693)	(0.396)	(0.288)
α_0^2	1.318 ***	1.058 ***	2.357 ***	0.846 ***	2.845 ***
	(0.271)	(0.173)	(0.798)	(0.322)	(0.683)
α^2	0.927 ***	0.951 ***	2.153 ***	0.947 ***	1.346 ***
	(0.180)	(0.131)	(0.661)	(0.272)	(0.328)
Factor loadings on family specific error term in the gateway drug equations					
α_0^{1g}	3.329 ***	3.089 ***	2.039 ***	2.123 ***	2.033 ***
	(0.672)	(0.697)	(0.614)	(0.492)	(0.489)
α^{1g}	3.486 ***	1.527 ***	1.904 ***	2.364 ***	1.375 ***
	(0.493)	(0.167)	(0.524)	(0.498)	(0.278)
α_0^{2g}	1.635 ***	0.989 ***	2.481 ***	1.680 ***	6.194 ***
	(0.314)	(0.164)	(0.730)	(0.401)	(2.014)
α^{2g}	1.164 ***	0.771 ***	1.918 ***	1.546 ***	1.601 ***
	(0.210)	(0.124)	(0.550)	(0.330)	(0.344)
Factor loadings on older sibling specific error term					
δ^1	0.370 ***	0.292 ***	0.882 ***	1.277 ***	1.579 ***
	(0.063)	(0.059)	(0.269)	(0.261)	(0.281)
δ_0^{1g}	2.196 ***	3.313 ***	2.988 ***	0.781 ***	1.519 ***
	(0.486)	(0.800)	(0.601)	(0.262)	(0.289)
δ^{1g}	0.573 ***	0.288 ***	3.097 ***	0.430 ***	1.984 ***
	(0.085)	(0.049)	(0.608)	(0.161)	(0.324)
Factor loadings on younger sibling specific error term					
δ^2	0.875 ***	0.953 ***	0.594 **	0.921 ***	1.514 ***
	(0.084)	(0.088)	(0.239)	(0.210)	(0.311)
δ_0^{2g}	1.081 ***	0.758 ***	2.897 ***	1.527 ***	1.621 ***
	(0.127)	(0.094)	(0.592)	(0.264)	(0.380)
δ^{2g}	0.995 ***	0.832 ***	2.592 ***	1.324 ***	1.521 ***
	(0.095)	(0.074)	(0.523)	(0.213)	(0.242)
Log likelihood value	-13927.22	-14754.10	-8641.74	-9261.98	-7861.85

Note: See Web Appendix Table 13.

WEB APPENDIX TABLE 15

Parameter Estimates of the Joint Dynamic Ordered Probit Model with 5 Categories

		Smoking cigarettes	Drinking alcohol	Smoking marijuana
State dependence parameters				
Older sibling	g_1^1	0.043 ***	0.047 ***	0.046 ***
		(0.011)	(0.006)	(0.010)
	g_2^1	0.026 *	0.018 **	0.041 **
		(0.014)	(0.009)	(0.016)
	g_3^1	0.017	0.010	0.011
		(0.011)	(0.010)	(0.015)
Younger siblin	g_1^2	0.076 ***	0.076 ***	0.085 ***
		(0.011)	(0.006)	(0.011)
	g_2^2	0.020	0.034 ***	0.027
		(0.015)	(0.010)	(0.018)
	g_3^2	0.023 **	-0.024 *	0.008
		(0.012)	(0.012)	(0.015)

Sibling's influence parameters

		Uncor-rected	*Bias corrected*	*Uncor-rected*	*Bias corrected*	*Uncor-rected*	*Bias corrected*
1st period	$l_{1,0}^2$	0.014	0.002	0.011	0.000	0.039*	0.033
		(0.025)	(0.025)	(0.011)	(0.011)	(0.023)	(0.023)
	$l_{2,0}^2$	0.044	0.043	0.015	0.009	0.035	0.031
		(0.039)	(0.040)	(0.022)	(0.022)	(0.040)	(0.040)
	$l_{3,0}^2$	-0.014	-0.016	-0.005	-0.005	-0.056	-0.058
		(0.030)	(0.030)	(0.042)	(0.042)	(0.038)	(0.038)
Later periods	l_1^2	0.012	0.011	-0.003	-0.004	0.012	0.013
		(0.012)	(0.012)	(0.006)	(0.006)	(0.012)	(0.012)
	l_2^2	-0.005	-0.006	-0.013	-0.013	-0.035*	-0.0378*
		(0.018)	(0.018)	(0.009)	(0.009)	(0.020)	(0.020)
	l_3^2	0.003	0.004	0.005	0.005	0.018	0.020
		(0.014)	(0.014)	(0.012)	(0.012)	(0.018)	(0.018)

WEB APPENDIX TABLE 15 (cont.)

	Smoking cigarettes	Drinking alcohol	Smoking marijuana
Standard deviation of error term specific to:			
Family (σ_{ε})	0.796 ***	0.527 ***	0.653 ***
	(0.055)	(0.026)	(0.051)
Older sibling (σ_{v^1})	1.265 ***	0.515 ***	0.831 ***
	(0.070)	(0.041)	(0.072)
Younger sibling (σ_{v^2})	0.874 ***	0.478 ***	0.652 ***
	(0.072)	(0.043)	(0.075)
Thresholds:			
q_1	-0.257	-0.387	0.710
	(0.462)	(0.345)	(0.473)
q_2	0.322	1.216 ***	1.508 ***
	(0.462)	(0.345)	(0.474)
q_3	0.476	1.805 ***	1.697 ***
	(0.461)	(0.345)	(0.475)
q_4	0.736	2.556 ***	2.064 ***
	(0.461)	(0.347)	(0.476)
Log likelihood value	-11961.94	-15445.85	-8536.23

Note: See Table 6.

WEB APPENDIX TABLE 16
Estimates of Coefficients on Control Variables in Dynamic Ordered Probit Model

Older sibling's 1st period			
Outcome substance:	Cigarettes	Alcohol	Marijuana
Male	-0.114	0.179 **	0.405 ***
	(0.115)	(0.075)	(0.116)
Black	-1.474 ***	-0.956 ***	-0.497 ***
	(0.165)	(0.118)	(0.167)
Hispanic	-1.039 ***	-0.291 ***	-0.361 **
	(0.167)	(0.111)	(0.174)
Highest grade completed at 19	-0.442 ***	-0.070	-0.271 ***
	(0.063)	(0.043)	(0.063)
Mother's education	0.025	0.035 **	0.028
	(0.025)	(0.016)	(0.025)
Asvab	-0.003	-0.001	0.002
	(0.003)	(0.002)	(0.003)
House broken in by 12	0.231	-0.002	0.148
	(0.161)	(0.115)	(0.153)
Victim of bullying by 12	0.113	0.031	0.062
	(0.146)	(0.099)	(0.145)
Witness of gun shooting by 12	0.607 ***	0.285 **	0.493 ***
	(0.190)	(0.122)	(0.175)
Lived w/ bio parents at 12	-0.173	-0.143	-0.262 *
	(0.131)	(0.091)	(0.141)
Number of (full) siblings	-0.093 *	-0.080 **	-0.141 **
	(0.054)	(0.038)	(0.058)
First born	-0.027	0.010	0.000
	(0.295)	(0.182)	(0.278)
Second born	0.310	0.112	0.286
	(0.284)	(0.178)	(0.272)
15 years old dummy	-1.207 ***	-0.854 ***	-1.166 ***
	(0.458)	(0.325)	(0.434)
16 years old dummy	-0.730 *	-0.651 **	-0.860 **
	(0.420)	(0.300)	(0.416)
17 years old dummy	-0.391	-0.463	-0.886 **
	(0.415)	(0.294)	(0.408)
18 years old dummy	-0.104	-0.020	-0.671
	(0.415)	(0.292)	(0.408)
19 years old dummy	0.192	0.546	-0.738
	(0.531)	(0.383)	(0.549)

WEB APPENDIX TABLE 16 (cont.)

Older sibling's later periods			
Substance outcome	Cigarettes	Alcohol	Marijuana
Male	0.089	0.350 ***	0.427 ***
	(0.090)	(0.049)	(0.082)
Black	-1.038 ***	-0.535 ***	-0.037
	(0.142)	(0.074)	(0.116)
Hispanic	-0.687 ***	-0.032	-0.132
	(0.133)	(0.077)	(0.114)
Highest grade completed at 19	-0.371 ***	-0.021	-0.181 ***
	(0.050)	(0.028)	(0.045)
Mother's education	0.023	0.038 ***	0.048 ***
	(0.019)	(0.011)	(0.018)
Asvab	-0.002	0.005 ***	0.006 ***
	(0.002)	(0.001)	(0.002)
House broken in by 12	0.198	-0.003	0.170
	(0.130)	(0.067)	(0.108)
Victim of bullying by 12	0.010	0.076	0.228 **
	(0.118)	(0.065)	(0.098)
Witness of gun shooting by 12	0.490 ***	0.213 **	0.206
	(0.156)	(0.088)	(0.132)
Lived w/ bio parents at 12	-0.167	0.006	-0.103
	(0.106)	(0.060)	(0.094)
Number of (full) siblings	-0.168 ***	-0.114 ***	-0.116 ***
	(0.049)	(0.025)	(0.044)
First born	-0.303	-0.063	0.225
	(0.231)	(0.119)	(0.225)
Second born	-0.028	0.028	0.366 *
	(0.222)	(0.115)	(0.218)
16 years old dummy	-0.826 *	-1.310 ***	-1.749 ***
	(0.480)	(0.370)	(0.567)
17 years old dummy	-0.553	-1.004 ***	-1.525 ***
	(0.455)	(0.353)	(0.490)
18 years old dummy	-0.305	-0.775 **	-1.407 ***
	(0.451)	(0.348)	(0.490)
19 years old dummy	-0.233	-0.528	-1.395 ***
	(0.451)	(0.348)	(0.486)
20 years old dummy	-0.180	-0.496	-1.377 ***
	(0.450)	(0.350)	(0.490)
21 years old dummy	-0.115	-0.211	-1.432 ***
	(0.452)	(0.352)	(0.486)
22 years old dummy	-0.169	-0.230	-1.637 ***
	(0.452)	(0.352)	(0.493)
23 years old dummy	-0.095	-0.242	-1.655 ***
	(0.455)	(0.354)	(0.494)
24 years old dummy	0.107	0.172	-0.863
	(0.509)	(0.444)	(0.666)

WEB APPENDIX TABLE 16 (cont.)

Younger sibling's 1st period			
Substance:	Cigarettes	Alcohol	Marijuana
Male	-0.037	0.051	0.243 **
	(0.106)	(0.078)	(0.114)
Black	-1.225 ***	-0.833 ***	-0.531 ***
	(0.159)	(0.114)	(0.173)
Hispanic	-0.802 ***	-0.307 ***	-0.157
	(0.153)	(0.110)	(0.155)
Age of youngest sibling	0.072	0.078	0.177 **
	(0.066)	(0.048)	(0.072)
Highest grade completed at 19	-0.332 ***	-0.098 ***	-0.219 ***
	(0.047)	(0.035)	(0.051)
Mother's education	-0.009	0.006	0.007
	(0.022)	(0.017)	(0.024)
Asvab	0.000	-0.001	0.004
	(0.003)	(0.002)	(0.003)
House broken in by 12	0.293 **	-0.037	0.191
	(0.148)	(0.107)	(0.153)
Victim of bullying by 12	0.175	0.074	0.338 **
	(0.135)	(0.100)	(0.135)
Witness of gun shooting by 12	0.445 ***	0.314 ***	0.336 *
	(0.168)	(0.117)	(0.180)
Lived w/ bio parents at 12	-0.257 **	-0.066	-0.344 ***
	(0.121)	(0.090)	(0.129)
Number of (full) siblings	-0.110 **	-0.123 ***	-0.121 *
	(0.050)	(0.037)	(0.063)
Second born	-0.364	-0.215	-0.316
	(0.241)	(0.182)	(0.258)
Third born	0.040	-0.050	-0.218
	(0.235)	(0.179)	(0.252)
15 years old dummy	-0.872 **	-0.557	-1.066 ***
	(0.414)	(0.368)	(0.409)
16 years old dummy	-0.693 *	-0.389	-0.782 **
	(0.409)	(0.374)	(0.398)
17 years old dummy	-0.401	-0.226	-0.679 *
	(0.406)	(0.373)	(0.390)
18 years old dummy	-0.082	0.153	-0.906 **
	(0.427)	(0.394)	(0.409)

WEB APPENDIX TABLE 16 (cont.)

Younger sibling's later periods			
Substance:	Cigarettes	Alcohol	Marijuana
Male	0.063	0.179 ***	0.197 ***
	(0.079)	(0.050)	(0.074)
Black	-1.005 ***	-0.524 ***	-0.147
	(0.122)	(0.074)	(0.107)
Hispanic	-0.815 ***	-0.069	-0.044
	(0.117)	(0.075)	(0.105)
Age of youngest sibling	-0.038	-0.013	0.012
	(0.046)	(0.028)	(0.042)
Highest grade completed at 19	-0.330 ***	-0.024	-0.126 ***
	(0.041)	(0.025)	(0.036)
Mother's education	0.005	0.029 ***	0.025
	(0.017)	(0.011)	(0.016)
Asvab	-0.001	0.004 ***	0.004 **
	(0.002)	(0.001)	(0.002)
House broken in by 12	0.222 **	0.028	0.046
	(0.111)	(0.068)	(0.100)
Victim of bullying by 12	0.100	0.017	0.129
	(0.100)	(0.066)	(0.095)
Witness of gun shooting by 12	0.430 ***	0.292 ***	0.322 ***
	(0.132)	(0.077)	(0.121)
Lived w/ bio parents at 12	-0.256 ***	0.011	-0.129
	(0.095)	(0.061)	(0.085)
Number of (full) siblings	-0.126 ***	-0.131 ***	-0.146 ***
	(0.041)	(0.024)	(0.042)
Second born	-0.064	-0.229 **	-0.420 **
	(0.189)	(0.114)	(0.177)
Third born	0.142	-0.091	-0.182
	(0.185)	(0.108)	(0.170)
16 years old dummy	-0.895 *	-0.892 **	-0.579
	(0.467)	(0.370)	(0.494)
17 years old dummy	-0.713	-0.652 *	-0.471
	(0.469)	(0.371)	(0.491)
18 years old dummy	-0.445	-0.359	-0.520
	(0.479)	(0.379)	(0.497)
19 years old dummy	-0.406	-0.297	-0.438
	(0.492)	(0.387)	(0.510)
20 years old dummy	-0.235	-0.196	-0.582
	(0.506)	(0.398)	(0.525)
21 years old dummy	-0.233	0.106	-0.499
	(0.530)	(0.405)	(0.536)
22 years old dummy	-0.170	0.047	-0.843
	(0.543)	(0.428)	(0.555)
23 years old dummy	-0.273	0.075	-1.049
	(0.601)	(0.452)	(0.644)

WEB APPENDIX TABLE 17a

Effect of Shifting the Older Sibling's Behavior from Zero to High Consumption in $t^2_{\min}-1$ on the Older and Younger Siblings' Probabilities of Behavior Relative to the Baseline
(Based on the Joint Dynamic Ordered Probit Model with 5 Categories)

Smoking cigarettes - Older siblings

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline							
1-7 days	0.0950	0.0860	0.0869	0.0881	0.0887	0.0892	
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	
8-14 days	0.0220	0.0203	0.0208	0.0212	0.0214	0.0216	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
15-22 days	0.0342	0.0320	0.0329	0.0338	0.0343	0.0348	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
23-30 days	0.1627	0.1914	0.2104	0.2232	0.2294	0.2358	
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)	
W/ feedback							
1-7 days	0.0000	0.2394	0.0089	-0.0019	-0.0012	-0.0003	
	(0.000)	(0.031)	(0.010)	(0.004)	(0.002)	(0.001)	
8-14 days	0.0000	0.3337	0.0459	0.0082	0.0027	0.0008	
	(0.000)	(0.048)	(0.021)	(0.010)	(0.005)	(0.003)	
15-22 days	14.6985	0.3820	0.0686	0.0142	0.0042	0.0008	
	(1.264)	(0.052)	(0.021)	(0.008)	(0.004)	(0.002)	
23-30 days	3.0909	0.5524	0.1204	0.0292	0.0075	0.0020	
	(0.165)	(0.057)	(0.020)	(0.007)	(0.002)	(0.001)	

Note: "Baseline" corresponds to probabilities of simulated behaviors using the dynamic ordered probit model with 5 consumption categories. "W/ feedback" corresponds to an exogenous shift of the older sibling's behavior from zero to one of the highest two consumption categories in the first period, allowing for the effect of this shift on the older sibling's behavior in the later periods. "W/out feedback" corresponds to an exogenous shift of the older sibling's behavior from zero to one of the two highest consumption categories in the first period, setting the older sibling's behavior in the later periods to the baseline level. Both of these simulations are performed so that half of the sample of older brothers is in the 15-22 days category and the other half in the 23-30 days in the first period. The numbers recorded in the rows labeled "W/out feedback" and "W/ feedback" refer to the average change in said probabilities due to the corresponding exogenous switches in older siblings' behavior, divided by the baseline probability of these behaviors. Parametric boostrap standard errors based on 150 replications in parentheses.

WEB APPENDIX TABLE 17 (cont.)

Smoking cigarettes - Younger siblings

	$t^2_{min}-1$	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline							
1-7 days		0.0955	0.0872	0.0894	0.0917	0.0927	0.0927
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
8-14 days		0.0211	0.0200	0.0209	0.0219	0.0224	0.0227
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
15-22 days		0.0317	0.0310	0.0329	0.0348	0.0358	0.0364
		(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
23-30 days		0.1207	0.1653	0.1972	0.2221	0.2362	0.2458
		(0.007)	(0.009)	(0.015)	(0.020)	(0.027)	(0.035)
W/ feedback							
1-7 days		0.1919	0.0167	-0.0017	-0.0020	-0.0008	-0.0003
		(0.057)	(0.011)	(0.004)	(0.002)	(0.002)	(0.001)
8-14 days		0.2571	0.0480	0.0106	0.0022	0.0011	0.0003
		(0.078)	(0.030)	(0.012)	(0.006)	(0.003)	(0.002)
15-22 days		0.2829	0.0657	0.0154	0.0051	0.0010	0.0005
		(0.091)	(0.027)	(0.010)	(0.005)	(0.003)	(0.002)
23-30 days		0.4410	0.1196	0.0365	0.0117	0.0040	0.0013
		(0.147)	(0.040)	(0.014)	(0.005)	(0.002)	(0.001)
W/out feedback							
1-7 days		0.1919	0.0129	-0.0028	-0.0019	-0.0008	-0.0002
		(0.057)	(0.010)	(0.004)	(0.002)	(0.001)	(0.001)
8-14 days		0.2571	0.0437	0.0093	0.0014	0.0007	0.0000
		(0.078)	(0.026)	(0.010)	(0.005)	(0.003)	(0.002)
15-22 days		0.2829	0.0601	0.0134	0.0042	0.0010	0.0004
		(0.091)	(0.025)	(0.009)	(0.004)	(0.003)	(0.001)
23-30 days		0.4410	0.1107	0.0323	0.0100	0.0033	0.0011
		(0.147)	(0.037)	(0.012)	(0.004)	(0.002)	(0.001)

WEB APPENDIX TABLE 17 (cont.)

Drinking alcohol - Older siblings

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline							
1-7 days	0.3200	0.3421	0.3684	0.3913	0.4052	0.4106	
	(0.010)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	
8-14 days	0.0431	0.0569	0.0688	0.0824	0.0923	0.0979	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	
15-22 days	0.0218	0.0335	0.0434	0.0554	0.0649	0.0707	
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	
23-30 days	0.0069	0.0140	0.0198	0.0284	0.0351	0.0395	
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	
W/ feedback							
1-7 days	0.0000	0.2721	0.0273	0.0019	0.0001	0.0000	
	(0.000)	(0.034)	(0.007)	(0.001)	(0.000)	(0.000)	
8-14 days	0.0000	0.7453	0.0931	0.0130	0.0020	0.0003	
	(0.000)	(0.114)	(0.022)	(0.005)	(0.001)	(0.000)	
15-22 days	23.0686	0.9762	0.1215	0.0168	0.0025	0.0004	
	(2.259)	(0.160)	(0.030)	(0.006)	(0.001)	(0.000)	
23-30 days	74.2421	1.2267	0.1630	0.0233	0.0034	0.0005	
	(11.904)	(0.213)	(0.044)	(0.009)	(0.002)	(0.000)	

WEB APPENDIX TABLE 17 (cont.)

Drinking alcohol - Younger siblings

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline							
1-7 days		0.3019	0.3154	0.3461	0.3705	0.3812	0.3904
		(0.011)	(0.009)	(0.011)	(0.013)	(0.016)	(0.019)
8-14 days		0.0367	0.0497	0.0633	0.0758	0.0842	0.0912
		(0.002)	(0.003)	(0.005)	(0.008)	(0.010)	(0.012)
15-22 days		0.0174	0.0288	0.0400	0.0507	0.0588	0.0658
		(0.002)	(0.003)	(0.005)	(0.008)	(0.010)	(0.013)
23-30 days		0.0051	0.0117	0.0186	0.0249	0.0306	0.0358
		(0.001)	(0.002)	(0.005)	(0.007)	(0.009)	(0.012)
W/ feedback							
1-7 days		0.1520	0.0222	0.0030	0.0004	0.0001	0.0000
		(0.168)	(0.029)	(0.005)	(0.001)	(0.000)	(0.000)
8-14 days		0.4223	0.0538	0.0082	0.0013	0.0002	0.0001
		(0.431)	(0.075)	(0.015)	(0.003)	(0.001)	(0.000)
15-22 days		0.6028	0.0603	0.0095	0.0016	0.0001	0.0000
		(0.616)	(0.092)	(0.019)	(0.005)	(0.001)	(0.000)
23-30 days		0.8817	0.0589	0.0079	0.0012	0.0004	0.0001
		(0.958)	(0.099)	(0.021)	(0.004)	(0.001)	(0.000)
W/out feedback							
1-7 days		0.1520	0.0271	0.0042	0.0006	0.0001	0.0000
		(0.168)	(0.028)	(0.005)	(0.001)	(0.000)	(0.000)
8-14 days		0.4223	0.0679	0.0129	0.0026	0.0006	0.0001
		(0.431)	(0.073)	(0.014)	(0.003)	(0.001)	(0.000)
15-22 days		0.6028	0.0805	0.0161	0.0032	0.0006	0.0001
		(0.616)	(0.091)	(0.019)	(0.004)	(0.001)	(0.000)
23-30 days		0.8817	0.0879	0.0164	0.0033	0.0007	0.0002
		(0.958)	(0.097)	(0.019)	(0.004)	(0.001)	(0.000)

WEB APPENDIX TABLE 17 (cont.)

Smoking marijuana- Older siblings

	$t^2_{min}-1$	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline							
1-7 days	0.0888	0.0887	0.0908	0.0908	0.0856	0.0811	
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
8-14 days	0.0129	0.0136	0.0142	0.0143	0.0134	0.0126	
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	
15-22 days	0.0191	0.0209	0.0223	0.0225	0.0210	0.0198	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
23-30 days	0.0286	0.0400	0.0456	0.0474	0.0435	0.0407	
	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	
W/ feedback							
1-7 days	0.0000	0.7756	0.0895	0.0133	0.0031	0.0010	
	(0.000)	(0.114)	(0.026)	(0.007)	(0.003)	(0.001)	
8-14 days	0.0000	1.0703	0.1744	0.0398	0.0119	0.0038	
	(0.000)	(0.169)	(0.051)	(0.020)	(0.009)	(0.005)	
15-22 days	26.4826	1.2129	0.2218	0.0537	0.0155	0.0045	
	(2.679)	(0.192)	(0.059)	(0.021)	(0.009)	(0.004)	
23-30 days	17.7291	1.4359	0.3199	0.0846	0.0245	0.0070	
	(2.108)	(0.222)	(0.074)	(0.027)	(0.011)	(0.004)	

WEB APPENDIX TABLE 17 (cont.)

Smoking marijuana - Younger siblings

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline							
1-7 days		0.0882	0.0961	0.1013	0.1039	0.1054	0.1045
		(0.006)	(0.007)	(0.007)	(0.009)	(0.010)	(0.012)
8-14 days		0.0125	0.0146	0.0161	0.0170	0.0175	0.0176
		(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
15-22 days		0.0180	0.0225	0.0255	0.0272	0.0284	0.0287
		(0.002)	(0.002)	(0.003)	(0.004)	(0.005)	(0.006)
23-30 days		0.0256	0.0413	0.0528	0.0598	0.0647	0.0679
		(0.003)	(0.006)	(0.011)	(0.016)	(0.021)	(0.027)
W/ feedback							
1-7 days		0.1903	0.0250	0.0045	0.0010	0.0001	0.0001
		(0.167)	(0.026)	(0.007)	(0.003)	(0.001)	(0.001)
8-14 days		0.2628	0.0490	0.0107	0.0030	0.0008	-0.0003
		(0.234)	(0.050)	(0.016)	(0.008)	(0.005)	(0.002)
15-22 days		0.3041	0.0613	0.0137	0.0034	0.0013	0.0002
		(0.254)	(0.060)	(0.019)	(0.007)	(0.003)	(0.002)
23-30 days		0.4236	0.0834	0.0200	0.0052	0.0014	0.0005
		(0.346)	(0.085)	(0.026)	(0.009)	(0.003)	(0.001)
W/out feedback							
1-7 days		0.1903	0.0272	0.0055	0.0012	0.0003	0.0001
		(0.167)	(0.022)	(0.005)	(0.002)	(0.001)	(0.000)
8-14 days		0.2628	0.0524	0.0124	0.0038	0.0012	0.0004
		(0.234)	(0.045)	(0.013)	(0.005)	(0.003)	(0.001)
15-22 days		0.3041	0.0644	0.0155	0.0046	0.0015	0.0005
		(0.254)	(0.056)	(0.015)	(0.005)	(0.002)	(0.001)
23-30 days		0.4236	0.0905	0.0249	0.0073	0.0023	0.0008
		(0.346)	(0.078)	(0.022)	(0.007)	(0.002)	(0.001)

WEB APPENDIX TABLE 17b

Bias Corrected Effect of Shifting the Older Sibling's Behavior from 0 to High Consumption in $t^2_{\min}-1$ on the Younger Siblings' Probabilities of Behavior Relative to the Baseline
(Based on the Joint Dynamic Ordered Probit Model with 5 Categories)

Smoking cigarettes - Younger siblings

	$t^2_{\min}-1$	$t^2_{\min}$	$t^2_{\min}+1$	$t^2_{\min}+2$	$t^2_{\min}+3$	$t^2_{\min}+4$	$t^2_{\min}+5$
Baseline							
1-7 days		0.0946	0.0872	0.0894	0.0917	0.0927	0.0927
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
8-14 days		0.0207	0.0199	0.0209	0.0218	0.0223	0.0227
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
15-22 days		0.0310	0.0308	0.0328	0.0347	0.0357	0.0364
		(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
23-30 days		0.1150	0.1626	0.1954	0.2206	0.2348	0.2444
		(0.007)	(0.009)	(0.015)	(0.020)	(0.027)	(0.035)
W/ feedback							
1-7 days		0.1455	0.0116	-0.0016	-0.0015	-0.0005	-0.0001
		(0.059)	(0.010)	(0.004)	(0.002)	(0.001)	(0.001)
8-14 days		0.1924	0.0356	0.0074	0.0019	0.0004	0.0002
		(0.080)	(0.027)	(0.011)	(0.006)	(0.003)	(0.002)
15-22 days		0.2141	0.0476	0.0120	0.0035	0.0009	0.0003
		(0.091)	(0.025)	(0.009)	(0.005)	(0.003)	(0.001)
23-30 days		0.3318	0.0895	0.0272	0.0087	0.0030	0.0010
		(0.145)	(0.039)	(0.013)	(0.005)	(0.002)	(0.001)
W/out feedback							
1-7 days		0.1455	0.0086	-0.0024	-0.0015	-0.0006	-0.0001
		(0.059)	(0.009)	(0.003)	(0.002)	(0.001)	(0.001)
8-14 days		0.1924	0.0311	0.0064	0.0013	0.0004	0.0000
		(0.080)	(0.022)	(0.009)	(0.005)	(0.002)	(0.001)
15-22 days		0.2141	0.0432	0.0101	0.0027	0.0008	0.0003
		(0.091)	(0.024)	(0.008)	(0.003)	(0.002)	(0.001)
23-30 days		0.3318	0.0823	0.0238	0.0074	0.0024	0.0008
		(0.145)	(0.036)	(0.011)	(0.004)	(0.001)	(0.001)

Note: See note to Web Appendix Table A17a.

WEB APPENDIX TABLE 17b (cont.)

Drinking alcohol - Younger siblings

	$t^2_{min}-1$	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline							
1-7 days		0.2959	0.3141	0.3455	0.3701	0.3809	0.3901
		(0.011)	(0.009)	(0.011)	(0.013)	(0.016)	(0.019)
8-14 days		0.0345	0.0490	0.0629	0.0754	0.0838	0.0908
		(0.002)	(0.003)	(0.005)	(0.008)	(0.010)	(0.012)
15-22 days		0.0159	0.0282	0.0396	0.0504	0.0584	0.0654
		(0.002)	(0.003)	(0.005)	(0.008)	(0.010)	(0.013)
23-30 days		0.0045	0.0114	0.0183	0.0246	0.0303	0.0354
		(0.001)	(0.002)	(0.005)	(0.007)	(0.009)	(0.012)
W/ feedback							
1-7 days		0.0670	0.0070	0.0006	0.0000	0.0000	0.0000
		(0.177)	(0.028)	(0.004)	(0.001)	(0.000)	(0.000)
8-14 days		0.2218	0.0155	0.0005	-0.0002	-0.0001	0.0000
		(0.415)	(0.074)	(0.015)	(0.003)	(0.001)	(0.000)
15-22 days		0.3336	0.0148	-0.0003	-0.0004	-0.0003	-0.0001
		(0.578)	(0.092)	(0.019)	(0.004)	(0.001)	(0.000)
23-30 days		0.5137	0.0071	-0.0019	-0.0009	-0.0001	0.0000
		(0.873)	(0.101)	(0.021)	(0.004)	(0.001)	(0.000)
W/out feedback							
1-7 days		0.0670	0.0129	0.0021	0.0003	0.0001	0.0000
		(0.177)	(0.027)	(0.004)	(0.001)	(0.000)	(0.000)
8-14 days		0.2218	0.0313	0.0057	0.0013	0.0003	0.0001
		(0.415)	(0.072)	(0.014)	(0.003)	(0.001)	(0.000)
15-22 days		0.3336	0.0367	0.0069	0.0013	0.0002	0.0001
		(0.578)	(0.091)	(0.018)	(0.004)	(0.001)	(0.000)
23-30 days		0.5137	0.0381	0.0075	0.0015	0.0004	0.0001
		(0.873)	(0.099)	(0.019)	(0.004)	(0.001)	(0.000)

WEB APPENDIX TABLE 17b (cont.)

Smoking marijuana - Younger siblings

	$t^2_{min}-1$	t^2_{min}	$t^2_{min}+1$	$t^2_{min}+2$	$t^2_{min}+3$	$t^2_{min}+4$	$t^2_{min}+5$
Baseline							
1-7 days		0.0874	0.0959	0.1011	0.1037	0.1053	0.1044
		(0.006)	(0.007)	(0.007)	(0.009)	(0.010)	(0.012)
8-14 days		0.0123	0.0145	0.0161	0.0169	0.0174	0.0176
		(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
15-22 days		0.0177	0.0223	0.0254	0.0271	0.0283	0.0287
		(0.002)	(0.002)	(0.003)	(0.004)	(0.005)	(0.006)
23-30 days		0.0248	0.0407	0.0523	0.0593	0.0642	0.0675
		(0.003)	(0.006)	(0.011)	(0.016)	(0.021)	(0.027)
W/ feedback							
1-7 days		0.0998	0.0107	0.0017	0.0003	-0.0001	0.0000
		(0.164)	(0.025)	(0.006)	(0.002)	(0.001)	(0.001)
8-14 days		0.1460	0.0228	0.0031	0.0001	0.0003	-0.0004
		(0.223)	(0.048)	(0.016)	(0.008)	(0.005)	(0.002)
15-22 days		0.1726	0.0287	0.0039	0.0006	0.0001	-0.0001
		(0.239)	(0.057)	(0.017)	(0.007)	(0.003)	(0.002)
23-30 days		0.2516	0.0331	0.0044	-0.0001	-0.0003	-0.0001
		(0.325)	(0.083)	(0.026)	(0.009)	(0.003)	(0.001)
W/out feedback							
1-7 days		0.0998	0.0155	0.0034	0.0008	0.0002	0.0000
		(0.164)	(0.021)	(0.004)	(0.001)	(0.001)	(0.000)
8-14 days		0.1460	0.0298	0.0070	0.0019	0.0008	0.0003
		(0.223)	(0.043)	(0.012)	(0.005)	(0.002)	(0.001)
15-22 days		0.1726	0.0359	0.0080	0.0026	0.0008	0.0002
		(0.239)	(0.053)	(0.014)	(0.005)	(0.002)	(0.001)
23-30 days		0.2516	0.0472	0.0130	0.0038	0.0012	0.0004
		(0.325)	(0.076)	(0.021)	(0.006)	(0.002)	(0.001)

WEB APPENDIX TABLE 18

Estimated Marginal Effect of Control Variables in the CRE Model

	Smoking Cigarettes	Drinking Alcohol	Smoking Marijuana	Using Hard Drugs
Male	0.027	-0.006	0.040**	0.003
	(0.022)	(0.019)	(0.016)	(0.008)
Black	-0.211***	-0.176***	-0.066***	-0.043***
	(0.026)	(0.027)	(0.020)	(0.009)
Hispanic	-0.145***	-0.017	-0.014	-0.009
	(0.027)	(0.027)	(0.022)	(0.011)
Highest grade completed by 19	-0.079***	-0.021**	-0.036***	-0.010***
	(0.011)	(0.010)	(0.007)	(0.004)
AFQT percentile score	0.000	0.002***	0.001***	0.000
	(0.001)	(0.000)	(0.000)	(0.000)
Mother's grade	0.002	0.005	0.001	0.004**
	(0.004)	(0.004)	(0.003)	(0.002)
Lived w/ bio parents at 12	-0.052**	0.003	-0.026	-0.015
	(0.025)	(0.023)	(0.019)	(0.011)
Number of (full) siblings	-0.025**	-0.038***	-0.028***	-0.006
	(0.010)	(0.009)	(0.008)	(0.004)
2nd born	-0.085*	-0.138***	-0.103***	-0.036
	(0.050)	(0.042)	(0.038)	(0.022)
3rd born	-0.012	-0.074*	-0.049	-0.017
	(0.047)	(0.042)	(0.030)	(0.015)
House broken in by 12	0.088***	0.006	0.032	0.002
	(0.028)	(0.027)	(0.020)	(0.011)
Witness of gun shooting by 12	0.089**	0.102***	0.071***	0.037***
	(0.036)	(0.033)	(0.025)	(0.014)
Victim of bullying by 12	0.050*	0.052*	0.054***	-0.004
	(0.029)	(0.027)	(0.020)	(0.011)
Young sibling age 16	0.021	0.036	0.048*	
	(0.027)	(0.028)	(0.026)	
Young sibling age 17	0.038	0.113***	0.061*	-0.025***
	(0.035)	(0.033)	(0.031)	(0.008)

WEB APPENDIX TABLE 19

Linear Probability Model of Young Sibling's Behavior with Fixed Effects

	Smoked last year	Drank last year	Marijuana last year	Used Hard drugs last year	Days smoked last month	Days drank last month	Day used marijuana last month
y^1_{t-1}	0.028**	0.045***	0.017	0.017	0.022	0.012	0.005
	(0.014)	(0.015)	(0.014)	(0.016)	(0.014)	(0.014)	(0.016)
Younger sibling's age dummies:							
16	0.017	0.027	0.064***		0.648*	0.291	0.890***
	(0.019)	(0.022)	(0.018)		(0.359)	(0.205)	(0.237)
17	0.012	0.091***	0.088***	-0.008	1.668***	0.667***	1.575***
	(0.022)	(0.024)	(0.020)	(0.013)	(0.434)	(0.246)	(0.325)
18	0.056**	0.140***	0.095***	0.018	2.341***	1.443***	1.416***
	(0.024)	(0.026)	(0.023)	(0.015)	(0.535)	(0.298)	(0.354)
19	0.060**	0.179***	0.115***	0.002	2.679***	1.421***	1.817***
	(0.025)	(0.029)	(0.025)	(0.015)	(0.595)	(0.327)	(0.380)
20	0.067***	0.181***	0.105***	0.005	3.224***	1.325***	1.724***
	(0.025)	(0.030)	(0.027)	(0.015)	(0.610)	(0.360)	(0.368)
21	0.081***	0.216***	0.096***	-0.006	3.067***	2.323***	1.601***
	(0.027)	(0.032)	(0.028)	(0.016)	(0.636)	(0.410)	(0.371)
22	0.101***	0.189***	0.030	-0.006	3.606***	1.558***	1.033***
	(0.029)	(0.035)	(0.029)	(0.016)	(0.724)	(0.484)	(0.359)

WEB APPENDIX TABLE 19 (cont.)

	Smoked last year	Drank last year	Marijuana last year	Used Hard drugs last year	Days smoked last month	Days drank last month	Day used marijuana last month
Older sibling's age dummies:							
17	-0.0150	-0.0613*	0.0174		-1.424**	-1.007**	-0.102
	(0.0291)	(0.0355)	(0.0287)		(0.662)	(0.400)	(0.328)
18	0.0131	-0.0533	0.0239	0.0599***	-0.774	-1.183***	-0.408
	(0.0288)	(0.0336)	(0.0271)	(0.0197)	(0.643)	(0.379)	(0.356)
19	0.0203	-0.0544*	0.0142	0.0258	-0.588	-1.381***	-0.152
	(0.0277)	(0.0318)	(0.0259)	(0.0160)	(0.617)	(0.371)	(0.379)
20	0.0198	-0.0670**	0.00423	0.0175	-0.583	-1.281***	-0.360
	(0.0260)	(0.0298)	(0.0243)	(0.0154)	(0.581)	(0.350)	(0.387)
21	0.0280	-0.0616**	-0.0156	0.00409	-0.429	-0.976***	-0.323
	(0.0230)	(0.0267)	(0.0238)	(0.0151)	(0.545)	(0.335)	(0.379)
22	0.0180	-0.0509**	-0.0142	0.0112	-0.0979	-0.407	-0.209
	(0.0203)	(0.0235)	(0.0212)	(0.0133)	(0.469)	(0.309)	(0.331)
23	-0.00698	-0.0415**	-0.0292*	0.00817	-0.00515	-0.255	-0.0450
	(0.0169)	(0.0196)	(0.0171)	(0.0111)	(0.387)	(0.284)	(0.267)

Note: Standard errors clustered at household level in parentheses. * denotes significant at 10% level, ** at 5% level, and *** at 1% level. Sample sizes vary between 7,056 and 8,698. For all behaviors but doing hard drugs, the reference category for dummies is age 15 for the younder siblings and age 16 for the older siblings. For doing hard drugs, the reference cateogory is taken to be one year later since there are no data available on hard drug use behavior for younger siblings at 15 and older siblings at 16.

WEB APPENDIX TABLE 20
Estimates of Dynamic Probit Model With All Parenting Variable Controls

Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
State dependence parameters				
Old sibling (γ^1)	0.904 ***	0.652 ***	0.676 ***	0.533 ***
	(0.065)	(0.055)	(0.063)	(0.140)
Young sibling (γ^2)	0.934 ***	0.656 ***	0.724 ***	0.752 ***
	(0.069)	(0.058)	(0.067)	(0.153)
Sibling's influence parameters				
Initial condition (λ_0^2)	0.212 **	0.408 ***	0.248 **	0.426
	(0.105)	(0.088)	(0.112)	(0.298)
Later periods (λ^2)	0.069	0.011	-0.060	0.079
	(0.071)	(0.058)	(0.069)	(0.236)
Standard deviation of error term specific to:				
Family (σ_ε)	0.716 ***	0.610 ***	0.612 ***	0.489 ***
	(0.053)	(0.034)	(0.043)	(0.105)
Older sibling (σ_{v^1})	1.046 ***	0.581 ***	0.649 ***	0.779 ***
	(0.081)	(0.064)	(0.069)	(0.136)
Younger sibling (σ_{v^2})	0.835 ***	0.630 ***	0.697 ***	0.862 ***
	(0.081)	(0.063)	(0.069)	(0.154)
Effect of parenting style				
Older sibling - Initial eq	-0.246 **	-0.203 **	-0.406 ***	-0.211
	(0.099)	(0.079)	(0.089)	(0.137)
Older sibling - Later eq	-0.177 **	-0.214 ***	-0.252 ***	-0.162 *
	(0.072)	(0.059)	(0.063)	(0.097)
Younger sibling - Initial eq	-0.126	-0.098	-0.093	-0.121
	(0.092)	(0.080)	(0.096)	(0.145)
Younger sibling - Later eq	-0.156 **	-0.116 **	-0.073	0.019
	(0.070)	(0.058)	(0.063)	(0.106)
Effect of intensity of parenting monitoring				
Older sibling - Initial eq	-0.004	-0.021	-0.022	-0.019
	(0.028)	(0.022)	(0.025)	(0.040)
Older sibling - Later eq	-0.021	0.008	-0.019	-0.008
	(0.022)	(0.015)	(0.018)	(0.028)
Younger sibling - Initial eq	-0.053 *	-0.036	-0.028	-0.090 **
	(0.027)	(0.023)	(0.028)	(0.044)
Younger sibling - Later eq	-0.036 *	-0.013	-0.019	-0.015
	(0.019)	(0.016)	(0.019)	(0.033)

WEB APPENDIX TABLE 20 (cont.)

Substance:	Cigarettes	Alcohol	Marijuana	Hard drugs
Effect of supportiveness of parent-child relation				
Older sibling - Initial eq	-0.009	0.013	-0.011	-0.033
	(0.017)	(0.014)	(0.014)	(0.026)
Older sibling - Later eq	-0.012	0.001	-0.007	-0.017
	(0.014)	(0.011)	(0.011)	(0.017)
Younger sibling - Initial eq	-0.038 **	-0.019	-0.050 ***	-0.038
	(0.016)	(0.014)	(0.017)	(0.028)
Younger sibling - Later eq	-0.009	0.002	-0.036 ***	-0.054 ***
	(0.013)	(0.010)	(0.013)	(0.021)
Log likelihood value	-7463.61	-8341.15	-6888.63	-2608.05

Note: Standard errors in parentheses. * denotes significant at 10% level, ** at 5% level, and *** at 1% level. All models include the set of controls listed in the footnote to Table 2, as well as older sibling's age dummies. In this specification, we also included three measures of family processes: 1) a measure of parenting style, 2) a measuring of parental monitoring and 3) a measure of how supportive the parent is to the child. See Web Appendix A for more information about these variables. In this specification of the dynamic probit model, for each measure, we used an average across the sibling pair's responses because the questions of parental monitoring and the measure of supportiveness were only asked to children between the ages of 12 and 14 in 1997 and we therefore have a lot of missing values, especially among older siblings.