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The Influences of Parent, Sibling and Friend Behaviors on Smoking Initiation, Regular Smoking and Nicotine Dependence

Hong Xian, Jeffrey F. Scherrer, Hui Pan, Theodore Jacob, Kathleen K. Bucholz





BACKGROUND

- Cigarette smoking is the leading cause of cancer mortality in the United States
 - Accounts for 30% of all cancer deaths
- Adolescents and young adults continue to start smoking and develop nicotine dependence (ND)
 - Daily 4,000 children between 12-17 try cigarettes
 - 22% of high school students are regular smokers and over half of smokers in their 20s are nicotine dependent in the United States

BACKGROUND (Cont.)

- Genetic and environmental factors contribute to smoking initiation, regular smoking and ND
 - Genetic factors account for 46-84% of risk for initiation, 58-74% of the risk for regular smoking and between 33-70% of the risk of ND

BACKGROUND (Cont.)

- Parents, siblings and friends influence smoking in young adults
 - Increased smoking shown to be associated with:
 - Greater parent-child conflict
 - Lower levels of attachment
 - Inconsistent parenting
 - Older sibling substance use
 - Friend and peer smoking

OBJECTIVE

 Examine associations between parent, sibling and peer level variables and offspring smoking initiation, regular smoking, and ND in an offspring-of-twins design that accounts for familial vulnerability

METHODS

Sample and Data Derived from Twins as Parents (TAP) and Children of Alcoholics (COA) studies (1999-present):

- Fathers
 - 1,107 twin fathers sampled from the Vietnam Era Twin Registry
 - Twin pairs either concordant or discordant for alcohol dependence
 (AD) (COA) or illicit drug dependence (DD) (TAP). Controls were non-AD or DD twin pairs
- Mothers
 - 1,023 biological and/or rearing mothers
- Offspring
 - 1,919 offspring between 12-32 years of age

Outcome Measures

- Smoking initiation: ever tried cigarettes
- Regular smoking: 21 cigarettes per day, smoking 3 or more times per week for a minimum of 3 weeks
- Fagerstrom Test for Nicotine Dependence (FTND)

Predictor Variables

- Parents Report:
 - Twin ND 4 group design variable
 - Twin DD-AD 7 group design variable
 - Maternal and paternal substance use history

Predictor Variables (cont.)

Offspring report:

- Mother-child / father-child closeness
- Mother / father strictness
- Mother / father consistency
- Mother / father school pressure
- Sibling alcohol and drug use
- Friend smoking, alcohol and drug use
- School smoking, alcohol and drug use
- Sociodemographics

4 ND Group Design Variable

Group 1: Monozygotic (MZ) and Dizygotic (DZ) twins with ND:	High genetic-high environmental risk (HG-HE)
Group 2: Non-ND MZ twins with ND co-twins:	High genetic-low environmental risk (HG-LE)
Group 3: Non-ND DZ twins with ND co-twins:	Medium genetic-low environmental risk (MG-HE)
Group 1: non-ND MZ and DZ twins:	Low genetic-low environmental risk (LG-LE)

7 DD-AD Group Design Variable

Group 1: MZ and DZ twins with DD and with / without AD	Group 2: Non-DD twins with a MZ DD co-twin with / without AD
Group 3: Non-DD twins with a DZ DD co-twin with / without AD	Group 4: MZ and DZ twins with AD only
Group 5: Non-AD twins with a MZ AD co-twin	Group 6: Non-AD twins with a DZ AD co-twins
Group 7: non-DD and non-AD MZ and DZ twins	

Analytic Approach

- Univariate multinomial logistic regression
- Multivariate multinomial logistic regression of significant univariate variables
- All analyses adjusted for sampling bias
- SAS surveylogistic used to account for clustered family data when computing 95% confidence intervals

RESULTS

Mean age (range)

21.4(12 - 32)

Gender: female

51%

Father's race

93.5% White

Parents' education:

Father

64% ≥ h.s.

Mother

63% ≥ h.s.

Table 2. Smoking variables for all offspring respondents (N = 1919)		
32.7%		
34.8%		
16.2%		
16.4%		

Table 3. Multinomial logistic regression modeling results showing association [Odds Ratios] between parent, sibling and peer behaviors and offspring smoking outcomes.

	Offspring smoking outcome variable		
Predictive Variable	Ever Smoked	Regular smoker	FTND
DD & AD 7-Group:			
1: MZ & DZ twins w/ DD & w/w.o AD	1.036	1.207	1.125
2: non-DD twins w/ MZ DD cotwin w/w.o AD	1.064	1.398	1.668
3: non-DD twins w/ DZ DD cotwin w/w.o AD	0.756	1.433	0.790
4: MZ & DZ twins w/ AD only	1.366	1.041	1.477
5: non-AD twins w/ MZ AD cotwin	1.254	1.298	1.317
6: non-AD twins w/ DZ AD cotwin	1.645	1.262	1.560
7: non-DD & AD twins w/ non-DD & AD cotwins	1.00	1.00	1.00

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Predictive Variable Ever Smoked		FTND
Paternal ND 4-group:			
ND Group1 (HG-HE)	0.810	1.077	2.095
ND Group2 (HG-LE)	0.629	1.073	1.449
ND Group3 (MG-LE)	0.667	0.879	1.037
ND Group4 (LG-LE)	1.00	1.00	1.00
Maternal heavy smoking index (HSI):			
Non-smoker	1.00	1.00	1.00
Low HSI	1.198	1.696	1.155
High HIS	1.094	1.185	1.690

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Ever Smoked	Regular Smoker	FTND
Mom problem drinking	1.253	1.864	2.490
Dad problem drinking	1.194	1.152	1.235
Mom strictness: less strict average more strict	0.757 1.0 0.839	1.174 1.00 0.760	0.877 1.0 0.944
Dad strictness: less strict average more strict	1.050 1.0 1.410	0.834 1.0 1.499	0.913 1.0 1.053
Mom not consistent	1.108	1.395	1.648
Dad not consistent	1.533	1.166	1.368

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Ever Smoked	Regular Smoker	FTND
Mom closeness: very close	1.0	1.0	1.0
some what close not close	1.260	1.380	1.435
	1.199	1.566	0.952
DAD closeness: very close	1.0	1.0	1.0
some what close not close	1.075	1.112	1.195
	0.953	1.718	1.586
Mom school pressure: a lot some a little none	1.295	0.946	0.967
	1.0	1.0	1.0
	0.819	0.479	1.200
	1.177	1.406	1.398
Dad school pressure: a lot some a little none	0.951	0.875	0.892
	1.0	1.0	1.0
	1.113	0.818	0.567
	0.357	0.146	0.187

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Ever	Regular	ETND
	Smoked	Smoker	FTND
Sib drug use: no any drug	1.0	1.0	1.0
mj only	2.106	2.866	1.807
mj + other drg / other drg	1.576	2.869	2.087
# Friends smoked: none	1.0	1.0	1.0
a few	1.589	2.485	4.516
a quarter or more	2.178	7.730	22.397
# Friends drank alc: none	1.0	1.0	1.0
a few	1.780	1.687	0.738
a quarter or more	2.075	1.199	0.855

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Ever Smoked	Regular Smoker	FTND
# Friends used drug: none	1.0	1.0	1.0
	1.818	3.008	2.308
	1.774	3.872	2.795
# Students smoked: none or few a quarter to half a half or more	1.0	1.0	1.0
	1.078	1.179	1.203
	1.322	1.179	1.654
# Students drank alc: none or few a quarter to half a half or more	1.0	1.0	1.0
	1.096	1.465	0.950
	1.121	1.920	1.250
# Students used drug: none or few a quarter to half a half or more	1.0	1.0	1.0
	1.17	0.766	0.986
	1.261	1.261	1.503

Table 3 Continued.

	Offspring smoking outcome variable		
Predictive Variable	Ever Smoked	Regular Smoker	FTND
Kid age	1.112	1.173	1.224
Dad's race: non-white	1.923	3.343	1.987
Mom edu: < high sch	1.128	0.732	1.151
Dad not married	1.354	1.127	2.091

CONCLUSIONS

- Genetic vulnerability and exposure to a family smoking environment contributes to FTND:
 - Paternal ND is significantly associated with offspring being FTND.
 - Maternal heaviness of smoking associated with offspring FTND.
- Family environmental factors contribute to offspring smoking:
 - Parental divorce associated with offspring FTND
 - Sibling and friends' substance use have robust impacts on smoking behaviors.

CONCLUSIONS (Cont.)

- Parenting and parent-offspring relationship is a weak predictor of smoking after accounting for genetic risk, sibling and peer influences
- Public health efforts to prevent initiation and progression of smoking should target peer smoking

STRENGTHS and LIMITATIONS

• Strengths:

- Offspring-of-twins design
- Non-clinical sample and structured method of data collection
- Offspring age range

Limitations:

- Retrospective self-report
- Limited variation in race
- Sample size

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