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Smoking in offspring of alcoholic twins

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BACKGROUND

- Genes contribute to the transmission of nicotine and alcohol dependence in families
- Genetic influence on nicotine and alcohol dependence overlap
- Nicotine dependence is more common in subjects with history of alcohol dependence
- Parents influence smoking in young adults

OBJECTIVE

- Characterize smoking in offspring of twins with history of alcohol dependence
- Characterize smoking in twin generation
- Determine risk for young adult smoking behaviors as a function of father-child closeness in a design that accounts for the genetic risk imparted from paternal nicotine dependence and alcohol dependence

METHODS

Sample derived from Children of Alcoholics study (1999-present)

- Fathers
  - 1464 twin fathers sampled from the Vietnam Era Twin Registry
  - All had at least 1 child 12-26 yrs old in 1999
  - Twin pairs either concordant or discordant for alcohol dependence. Controls were non-alcoholic twin pairs
  - 1,213 (83%) fathers responded to diagnostic telephone interview
- Mothers
  - 1,064 biological and/or rearing mothers were eligible
  - 862 (81%) eligible mothers responded to diagnostic telephone interview
- Offspring
  - 1,487 offspring with consent from both parents were eligible
  - 1,270 (85%) eligible offspring responded to diagnostic telephone interview

Measurements

- Twin father report
  - lifetime nicotine dependence
  - lifetime alcohol dependence
- Offspring report
  - father-child closeness
  - Age
  - Gender

Offspring smoking measures

- Ever try cigarettes
- Age onset try smoking
- Regular smoking (Smoke > 100 cigs)
- Quit/reduce smoking
- Age quit smoking
- Failed cessation
- Years smoked
- Mean cigarettes in typical day
- Nicotine withdrawal
- DSM-IV criteria nicotine dependence

Analytic Approach

- Independent variables: paternal nicotine dependence, paternal alcohol abuse/dependence included to account for sampling design and to control for genes common to ND, offspring age and parent-child closeness
- Dependent variables: smoking initiation, regular smoking, 1 pls nicotine dependence symptom, DSM-IV nicotine dependence, quit attempt, successful cessation
- Logistic Regression
- STATA used to account for clustered data when computing 95% confidence intervals

Twin 4 group risk design

- Grp 1: MZ and DZ twins with ND,

high genetic/ high environmental risk

- Grp 2: MZ with no-ND, co-twin with ND,

high genetic/ low environment

- Grp 3: DZ with no-ND, co-twin with ND,

medium genetic/ low environment

- Grp 4: MZ and DZ twins with no ND,

low genetic/ low environment

RESULTS

TABLE 1

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TABLE 2

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Table 3. Smoking history by Twin 4 group risk design

Smoking status (’92)	Grp 1 MZ & DZ ND twins	Grp 2 MZ no ND index with ND co-twin	Grp 3 DZ no ND index with ND co-twin	Grp 4 MZ and DZ no ND
Ever reg. smoker	98.0%	53.8%	57.1%	26.5%
Current smoker	56.4%	33.9%	36.5%	25.0%

Reg. smoker- smoked 30pls days in a row in lifetime

Current smoker – reg. smoker who smoked in year prior to interview

Table 4. Genetic and environmental influences on offspring smoking behavior adjusted for COAT sampling design (alcohol dependence (AD)

	Offspring smoking variables					
Risk groups*	ever try cig.	reg. smoker	ND 1sx	DSM-IV ND	quit attempt	quit
MZ & DZ ND	**1.4 (1.1-1.8)**	**2.5 (1.8-3.4)**	**2.4 (1.7-3.4)**	**2.5 (1.6.-4.2)**	0.8 (0.5-1.5)	**0.5 (0.2-0.8)**
MZ no ND/ ND co-twin	1.1 (0.7-1.8)	**2.0 (1.2-3.3)**	**2.0 (1.2-3.3)**	1.6 (0.7-3.4)	**0.4 (0.2-0.9)**	0.6 (0.2-1.5)
DZ no ND/ ND co-twin	0.9 (0.6-1.3)	1.6 (0.9-2.7)	1.4 (0.9-2.7)	1.4 (0.7-2.8)	0.7 (0.3-1.5)	0.7 (0.3-1.7)
MZ & DZ AD	1.3 (0.9-1.8)	0.9 (0.6-1.2)	1.0 (0.7-1.4)	0.9 (0.6-1.5)	1.3 (0.8-2.3)	1.0 (0.5-1.8)
MZ no AD/ AD co-twin	1.2 (0.8-1.8)	0.9 (0.6-1.4)	1.0 (0.6-1.5)	0.9 (0.5-1.7)	1.2 (0.6-2.5)	1.4 (0.7-2.9)
DZ no AD/ AD co-twin	1.0 (0.7-1.5)	0.7 (0.5-1.1)	1.0 (0.6-1.5)	0.9 (0.5-1.7)	1.4 (0.7-2.9)	0.8 (0.3-2.0)

Father-child close	**0.5 (0.3-0.8)**	**0.4 (0.3-0.6)**	**0.4 (0.3-0.6)**	**0.4 (0.3-0.6)**	**0.3 (0.2-0.6)**	1.0 (0.5-1.8)
Offspring age:						
18-22 y.o.a.	**4.8 (3.6-6.4)**	**4.2 (3.1-5.8)**	**4.6 (3.2-6.4)**	**3.0 (1.8-5.0)**	**1.9 (1.1-3.3)**	1.6 (0.7-3.6)
23-26 y.o.a.	**4.0 (3.0-5.4)**	**3.8 (2.7-5.3)**	**3.7 (2.6-5.3)**	**3.1 (1.9-5.3)**	**2.5 (1.4-4.6)**	**3.0 (1.4-6.8)**

CONCLUSIONS

- Smoking histories, quit attempts and ND are more common in offspring 18 years or older
- Smoking is present in non-ND fathers but seems to not increase risk in offspring
- Offspring at high genetic and high environmental risk were more likely to try cigarettes, become regular smoking, have 1 ND sx, have DSM-IV ND and were less likely to successfully quit
- Father – child closeness was protective for offspring smoking behaviors.