Continuity or Discontinuity between Substance Experimentation, Regular Use, and Dependence Symptoms in Adolescence: Twin and Adoption Results

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Abstract
Heath and colleagues (A.C. Heath, J. Meyer, L. A. Eaves, and N.C. McGue, 1991) found that adults who had tried alcohol before age 13 or 14 years old were significantly more likely to report that alcohol use at age 21 was more frequent than at age 19. However, more recent studies published after 1991 have suggested that abstainers from cannabis use are qualitatively distinct from quantity and frequency dimensions of alcohol use in adults. In adolescent substance use, the distinction between substance and time onset initiation as a basis for diagnosing substance dependence has been made. The distinction of substance and time onsets may remain in the overlap between liability dimensions for experimentation, regular use, and dependence. Data on adolescent substance use have been collected from the Colorado Adoption Project and participants in the Colorado Adoption Project using interview and questionnaire instruments. For a measure of substance dependence that includes alcohol, tobacco, marijuana, and other drugs, based on the number of substances tried, and corrected for age within gender, the correlation for 293 MZ twin pairs was 0.39, for 269 DZ twin pairs was 0.39, far 140 non-adopted siblings pairs was 0.35, and for 131 adopted sibling pairs was 0.21. We used the multiphase approach for understanding data implementation in ICA to examine whether the dependence dimension could be distinguished from dimensions of use and experimentation.

Introduction
The Colorado Center on Antisocial Drug Dependence is a collaborative effort between the University of Colorado at Boulder and the University of Colorado Health Science Center in Denver. Clinical problems at residential treatment facilities and outpatient clinics present with high levels of substance dependence across multiple substances and high levels of conduct disorder. Familiar resemblance between adolescents and their family members for substance dependence and antisocial personality disorder suggests the possibility of a underlying genetic vulnerability. A primary goal of the collaborative center's data analysis is to identify environmentally informative unselected community samples to guide selection of phenotypes prior to genetic analysis. The phenotype chosen for future genetic analysis represents a summary of dependence symptoms across ten substance classes (including tobacco and alcohol), adjusted for number of substances tried, to criterion, and further adjusted for age at assessment and gender of subject. In this study, subjects are not differentiating temperament or usage. We have found a somewhat higher score of zero.

Health and colleagues (Heath et al., 1991) have suggested that abstainers from cannabis use is qualitatively distinct from quantity and frequency dimensions of alcohol use in adults. In different studies (e.g., Heath et al., 1991; Stallings et al., 1999), suggest that different aspects of smoking and drinking behaviors may be at least partially distinct environmentally, with shared environmental effects more important in initial use. Epidemiological studies of adolescent substance use trajectories (e.g., Chassin et al., 2000) have demonstrated that early alcohol trajectories establish a substantial portion of substance use behavior patterns, but that substantial portions of the behavior is not necessarily determined by the early trajectories. This study reports developmental trends for initial substance use, regular use, and number of dependence symptoms during adolescence, and rates for initiating and for multiple substance use. We will begin to explore how changes in smoking and drinking use may potentially confound different dimensions of use in this large cross-sectional study.

Methods
Between January 1993 and March 15, 2001, we have conducted 3636 diagnostic interviews with community-based samples of twins, full siblings, and adoptive siblings recruited without regard to substance use at conduct disorder symptoms. Of these interviews, 1997 (44%) had been with female subjects. The subjects ranged in age from 11 through 25 years. Of the first sample comprised of 2026 twins and a near-in-age sibling if available. The second sample comprised of 710 participants in the Colorado Adoption Project (CAP). The twins were interviewed, once as adolescents, and once as young adults. The third sample comprised of adolescents and their siblings matched to adolescent probands in the treatment and outpatient facilities on the basis of ethnicity, gender, age.

Measures
The Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM) questions on tobacco, alcohol, and illicit substances were used to elicit information on their substance use and dependence. The questions were based on the widespread use of the Composite International Diagnostic Interview-IV by the World Health Organization. The four main symptom criteria for dependence are: (1) tolerance, (2) withdrawal symptoms, (3) difficulty control, (4) continued use despite the adverse consequences. The symptoms were revised to include measures of substance use for alcohol, tobacco, and the four main symptom criteria for dependence.

Analyses and Results
The combined samples yield at least 100 subjects for each age category between 13 and 21. Nine subjects younger than 5.18 and 43 subjects between 22.5 and 26 have been included in the age 12 and age 22 age categories, respectively. Proportion of males and females are approximately equal across the age ranges. Figure 1 shows the predicted age effects for boys and girls on the number of substances tried as a function of age, with the number of substances tried tending to be significant across the various age classes. The regression predictions for boys and girls were overlaid substantially, and range from a little less than 0 substances at age 12 to approximately 1 substances by age 22.

Discussion
We are using data from unselected community samples of twins and siblings to inform worry about of potential for genetic analysis in a selected sample of adolescent probands undergoing treatment for substance abuse. We used the multistage approach for multiple substance use patterns in the interested in comparability across samples, because the selected sample probands show high levels of use across three substances. Although we believe such patterns are justifiable on the basis of at least partially overlapping etiological factors, it is the case that they are vulnerable to in the time course of the development and transmission between initiation, use, and dependence for different substances.

References

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