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Predicting Substance Use Disorders: A Multifactorial Risk Index Combining Clinical, Environmental, and Genetic Risk Factors

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Substance use disorders (SUDs) incur serious social and personal costs. Tools that identify persons at risk before problems develop may improve prevention efforts. We tested whether models that include polygenic scores (PGS) and an index of environmental/clinical risk factors can identify individuals meeting criteria for DSM-IV: 1) alcohol dependence, 2) drug dependence, and 3) any substance dependence (alcohol, other drug, or nicotine). We used four samples: 1) the National Longitudinal Study of Adolescent to Adult Health; 2) the Avon Longitudinal Study of Parents and Children; 3) the Collaborative Study on the Genetics of Alcoholism; and 4) the Finnish Twin Cohort Study. Our exposures included a risk index composed of ten previously validated items and PGS of drinks per week, problematic alcohol use, externalizing problems, major depressive disorder, and schizophrenia. In the full models, PGS for externalizing (OR's = 1.13 – 1.25) and the risk index (OR's = 1.34 – 1.62) were associated with all three outcomes, PGS for problematic alcohol use was associated with alcohol dependence and any substance dependence (OR's = 1.10 – 1.13). Those in the to the top 10% of the risk index and PGS (relative to the bottom 90%) had were at 4.00 - 9.13 times the risk for each SUD. Measures of genetic, clinical, and environmental risk demonstrate modest ability to identify those at risk for SUDs in young adulthood. Our ability to detect those at risk will improve as PGS become more powerful and we include additional risk factors.