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### **Analysis of Transmissible Liability Index in Longitudinal Twin Datasets for Studying Resistance to Substance Use**

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Research attention is commonly focused on the high end of the distribution of liability to engage in substance use, targeting related risk factors. It may be more promising to systematically reverse the perspective to the factors enhancing the aspect of liability that is opposite to risk, i.e., resistance to substance use (Vanyukov et al. 2016). The resistance perspective requires identification of high-resistance individuals. Furthermore, there are no face-valid indicators of elevated resistance to substance use to date. Accordingly, we have developed a methodology for quantification of an index of liability, enabling measurement of substance use resistance. In this study, we examine genetic and environmental components of variance of this transmissible liability index and its correlation with measures of substance use and misuse.

Data from two prospective twin samples (Virginia Twin Study of Adolescent and Behavioral Development and Minnesota Twin and Family Study) were assessed for liability to substance use during adolescence. An analysis of both samples estimated the contribution of genetic and environmental factors to substance use liability variance and the contribution of sources of covariation with lifetime use of tobacco, alcohol and illicit drug use and dependence. Additive genetic and unique environmental effects accounted for substance use liability variance. Familial factors contributed significantly to the correlation between the liability index and substance use. These results are consistent with the liability index as a potential predictor of substance use.