Submitter Name: Jessica Salvatore
Submitter email: jesalvatore@vcu.edu

Social genetic effects for alcohol use disorder

Jessica Salvatore[1], Peter Barr[1], Sally Kuo[1], Jinni Su[2], Laura Almasy[3], Andrew Brooks[4], Michael Chao[5], Howard J. Edenberg[6], Tatiana Foroud[7], Victor Hesselbrock[8], John Kramer[9], Samuel Kuperman[9], John Nurnberger[10], Danielle Dick[1].

[1]Department of Psychology, Virginia Commonwealth University; [2] Department of Psychology, Arizona State University; [3] Department of Biomedical and Health Informatics, Children's Hospital of Philadelphia; [4] Department of Genetics, Rutgers University; [5] Department of Neuroscience, Mount Sinai School of Medicine; [6] Department of Biochemistry and Molecular Biology, Indiana University; [7] Department of Medical and Molecular Genetics, Indiana University; [8] Department of Psychiatry, University of Connecticut School of Medicine; [9]Department of Psychiatry, University of Iowa; [10] Department of Psychiatry, Indiana University

Compelling preclinical evidence from a rodent model suggests that the genotype of a social partner may influence addiction-related outcomes. Our purpose was to examine evidence for social genetic effects on alcohol dependence in humans, specifically in the context of marriage. Our sample included 645 opposite-sex spousal dyads of European ancestry from the Collaborative Study on the Genetics of Alcoholism. The outcome was DSM-IV alcohol dependence criteria (ADsx). Each spouse's broad genetic predisposition to ADsx was indexed using educational attainment polygenic scores (EduYears-PGS). Educational attainment was selected in view of its strong, negative genetic correlation with alcohol dependence and other substance use disorders and the sample size of the corresponding discovery GWAS. Analyses were fit with multilevel models to account for the non-independence of observations. Spouses modestly resembled one another in their ADsx ($r = 0.11$, $p < 0.01$) and in their EduYears-PGS ($r = 0.11$, $p < 0.01$). Individuals with higher EduYears-PGS had fewer ADsx ($\beta = -0.09$, $p < 0.01$). After accounting for the effects of one's own polygenic score, and the correlations between partners' polygenic scores, we found that marriage to a spouse with a higher EduYears-PGS was associated with having fewer ADsx ($\beta = -0.07$, $p < 0.01$). In conclusion, our findings underscore the potential importance of social genetic effects for understanding the pathways from genotype to substance use disorder phenotype.