Social genetic effects for alcohol use disorder

Jessica Salvatore¹, Peter Barr¹, Sally Kuo¹, Jinni Su², Laura Almasy³, Andrew Brooks⁴, Michael Chao⁵, Howard J. Edenberg⁶, Tatiana Foroud⁷, Victor Hesselbrock⁸, John Kramer⁹, Samuel Kuperman⁹, John Nurnberger¹⁰, Danielle Dick¹.

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