

A Behavioral Genetic Analysis of Adolescent Sensation Seeking and Substance Use

Maggie Morris, James Madole & Kathryn P. Harden, Ph.D
Department of Psychology, University of Texas at Austin



Background

- Sensation Seeking is a personality trait that captures an individual's drive to search for novel and intense experiences¹
- Adolescence is the period during which most people experience their highest levels of sensation seeking²
- High levels of sensation seeking predict substance use, particularly among adolescent³
- Using a twin design to explore the environmental and genetic influences driving the co-occurrence of sensation seeking and substance use

Hypotheses

- Significant positive association between sensation seeking and substance use
- Moderate additive genetic (A), shared environmental (C), and non-shared environmental (E) influences for both sensation seeking and substance use
- Common genetic factors (A) that influence both sensation seeking and substance use

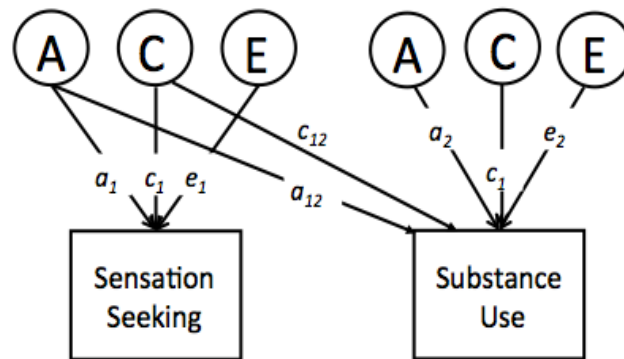
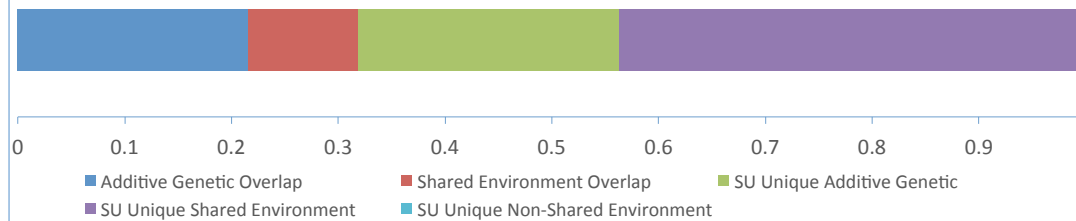
Measures

- Zygosity: MZ or DZ
- Sensation Seeking: 8 items scored 1-5, maximum composite score of 40
- Substance Use: 11 substances, composite score 0-11, square root transformed 0-3.5

Participants and Procedure

- 817 (mean age = 15.67 years, range = 13.45-20.11) adolescents from the Texas Twin Project
- Sensation Seeking and Substance Use measured using self-report survey

Proportion of Shared Variance for Sensation Seeking and Substance Use



Sensation Seeking:
A: .49, C: .01 E: .50

Substance Use:
A: .46, C: .537, E: .004

Bivariate Crosspaths:
A₁₂: .22, C₁₂: .10

Summary

- Significant positive correlation between sensation seeking and substance use ($r = .32, p < .001$)
- Moderate genetic (A), and non-shared environmental (E), influences for sensation seeking
- Moderate genetic (A), and shared environmental (C) influences for sensation seeking
- Significant overlap in variance driven by genetic factors (A)

Conclusions

- Adolescent sensation seeking and substance use are related.
- Both sensation seeking and substance use are both independently heritable
- Shared environmental influences (C) on sensation seeking and non-shared environmental influences (E) on substance use were approximately zero
- The correlation between sensation seeking and substance use is primarily and significantly due to overlapping genetic influences

References

- 1 Popham, L. E., Kennison, S. M., & Bradley, K. I. (2011). Ageism, sensation-seeking, and risk taking behavior in young adults. *Current Psychology, 30*, 184-193.
- 2 Bidwell, L. C., Knopik, V. S., Audrain-McGovern, J., Glynn, T. R., Spillane, N. S., Ray, L. A., ... Leventhal, A. M. (2015). Novelty seeking as a phenotypic marker of adolescent substance use. *Substance Abuse: Research and Treatment, 9*(1), 1-10.
- 3 Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology, 44*(6), 1764-1778.