Common Genetic Influences on Impulsivity Facets Relate to Goal Management, Psychopathology, and Personality

Daniel Gustavson¹, Carol Franz¹, William Kremen¹, Robin Corley², John Hewitt², & Naomi Friedman²,
¹University of California, San Diego, ²University of Colorado Boulder

Correspondence: dgustavson@ucsd.edu

This Work was Supported by NIH Grants: AG050595, AG022381, AG047903, MH063207

Summary and Discussion

Main Hypothesis was Supported: Goal management abilities were strongly related to the common genetic factor (& moderately with the environmental factor)

Other Comparisons: Sensation seeking was mostly unrelated to other facets. Non-emotional facets (premeditation, sensation seeking) were less related to psychopathology than emotional facets. Lack of perseverance was more similar to urgency than premeditation (but uniquely predicted procrastination)

Method:
Participants: 754 individuals. All same-sex twins
M = 22.80 yrs, SD = 1.27, 398 females

Impulsivity: UPPS-P Impulsive Behavior Scale
Other Measures (All Latent Variables)
Goal Management Failures (2 questionnaires)
Procrastination (3 questionnaires)
Neuroticism (age 17 and age 21)
Extraversion (age 17 only)
Internalizing Symptoms (GAD, MDD)
Externalizing Symptoms (ASPD, 4 substance use disorders)

Results

1. Independent Path Model

Common genetic influences on all facets except sensation seeking (A_{imp})
Nonshared environmental influences on all facets (E_{imp})
Little evidence for shared environmental influences (C_{imp})
Different genetic/environmental factor structures

2. Genetic Associations with Self-Regulation, Personality, and Psychopathology

- Genetic influences common to all facets (A_{imp}) accounted for 14-40% of variance in other constructs
- Environmental influences common to all facets (E_{imp}) were only moderately associated with Goal Management Failures and Extraversion
- After accounting for impulsivity, genetic influences unique to most constructs were nonsignificant
- Each construct was predicted by unique variance in at least one facet (e.g., E_{NU})

Variance Explained by General Impulsivity | Variance Explained by Facet-Specific Components | Variance Unique to the That Construct
--- | --- | ---
| | Negative Urgency | Positive Urgency | Lack of Premeditation | Lack of Perseverance | Sensation Seeking | 
A | E | A | E | A | E | A | E

Self-Regulation
Goal-Management Failures 40% 6% 4% 17% 34%
Procrastination 36% 3% 2% 7% 14% 2% 36%

Personality
Neuroticism 25% <1% 13% 12% 12% <1% 38%
Extraversion 14% 3% 7% 4% 64%

Psychopathology Symptoms
Internalizing 27% 3% 5% 5% 3% 52% 6%
Externalizing 30% 2% 2% 2% 45% 20%

Negative associations are displayed RED TEXT Nonsignificant associations are displayed in GREY TEXT

Background:
“Impulsivity” is a heterogeneous construct
The UPPS-P highlights five facets
(1) Negative Urgency (giving into cravings in good or bad moods)
(2) Positive Urgency (acting without thinking)
(3) Lack of Premeditation (giving up on difficult tasks)
(5) Lack of Perseverance (enjoying exciting activities)

Goals of the Study
Hypothesis: Impulsivity facets are united to the extent that they index an inability to activate/maintain goals
Other comparisons:
Is sensation seeking unrelated to other facets?
Are emotional facets more related to psychopathology?
Is lack of perseverance more like urgency or premeditation?

Background:
“Impulsivity” is a heterogeneous construct
The UPPS-P highlights five facets
(1) Negative Urgency (giving into cravings in good or bad moods)
(2) Positive Urgency (acting without thinking)
(3) Lack of Premeditation (acting without thinking)
(4) Lack of Perseverance (giving up on difficult tasks)
(5) Sensation Seeking (enjoying exciting activities)

Goals of the Study
Hypothesis: Impulsivity facets are united to the extent that they index an inability to activate/maintain goals
Other comparisons:
Is sensation seeking unrelated to other facets?
Are emotional facets more related to psychopathology?
Is lack of perseverance more like urgency or premeditation?