Prediction of cannabis use disorder severity from genetic and behavioral data
Ariel Ketcherside, Milind Rao, Shikha Prashad

Team Interactions / Meetings
We have had multiple in-person and online team meetings:

Online

Mar. 7, 2017 – Ariel, Milind, Shikha
Mar. 16, 2017 – Ariel, Milind, Shikha
May 12, 2017 – Ariel, Milind, Shikha
Aug. 29, 2017 – Ariel, Milind, Shikha
Jan 5, 2018 - Ariel, Milind, Shikha
Feb. 8, 2018 – Ariel, Milind, Shikha

In-person

Mar. 9, 2017 – Ariel, Shikha
May 19, 2017 – Ariel, Shikha
Sep. 14, 2017 – Ariel, Shikha

We have also had numerous online chat interactions.

Project Overview
Background: The occurrence of cannabis use disorder (CUD) is approximately 10% in cannabis users, but will likely increase with cannabis legalization. Identifying risk factors for CUD and alleles that encode them may help quantify susceptibility in cannabis users. However, exploratory genetic analyses require large sample sizes to overcome the volume and complexity of genetic variability. Multilocus genetic profile (MLGP) scores infer the additive effect of multiple alleles, but these scores do not reflect allele interactions. Thus, our aim was to apply a machine learning method to identify risk alleles associated with CUD to develop a MLGP score using relatively small sample sizes and accounting for interactions between alleles.
Methods: We employed the least absolute shrinkage and selection operator (LASSO) technique on GWAS data from 235 cannabis users and assessed their cannabis use-related problems (Marijuana Problems Scale; MPS). A hypothesis-driven approach reduced the number of SNPs to only those with a previous association with CUD. The LASSO algorithm was optimized with MPS scores predictors for each SNP and interactions between SNPs as features.
Results: This method identified SNPs and allele interactions that contributed to the prediction of CUD severity. The number of risk alleles for each SNP correlated with MPS scores and subjective craving.
Conclusion: This method may reveal alleles and combinations thereof that contribute to CUD and benefit MLGP development to identify susceptible cannabis users. This will facilitate better diagnostic criteria for, and biological understanding of, CUD in conjunction with the goals of the Research Domain Criteria.

Research Progress
Our abstract has been accepted as a poster presentation at the Society of Biological Psychiatry Annual Meeting in New York in May 2018.

List of presentations, posters, conferences, publications
Presentation at the CSoI Annual Meeting in December 2016
Presentation at the CSoI Virtual Brown Bag Series on March 16, 2017.
Presentation at the Society of Biological Psychiatry Annual Meeting in May 2018.

Remaining budget

Spent: $40 for abstract submission to the annual meeting of the Society of Biological Psychiatry
Pending:

Item	Paid by	Amount
Initial Budget	CSoI	6,000.00
Abstract Submission for the annual meeting of the Society of Biological Psychiatry	Ariel	40.00
Registration for conference - Shikha Prashad	Shikha	745.00
Registration for conference - Ariel Ketcherside	Ariel	745.00
Registration for conference (student) - Milind Rao	Milind	295.00
Total Spent		1825.00
Remaining		4175.00