Sofia University St. Kliment Ohridski
Faculty of Economics and Business Administration
Master´s Programme in
Applied Econometrics and Economic Modelling

AEEM Course in Microeconomic modelling
Research Project conducted by:
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Prediction of cannabis users

1 Aim

- The objective of the study is to try to asses the influence of demographic variables and personality traits on cannabis consumption. The aim is to create a model to predict cannabis users, which could be used both by legal cannabis suppliers and by policy makers.
- Main research question:

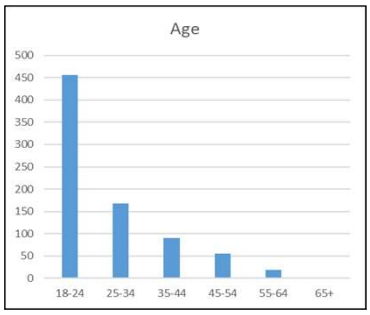
Can we create a model to predict the probability to be a cannabis user?

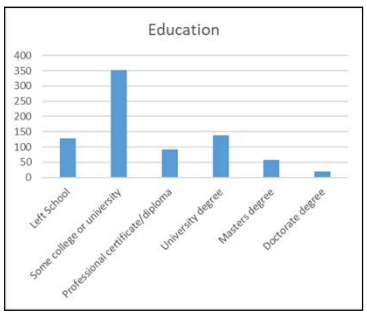
2 Data and methods

- 1885 observations from , UK, USA, Australia, Canada, New Zealand, Republic of Ireland, Other
- Demographic variables: Age, Gender, Education
- Personality traits:
  - "Big Five personality traits": Neuroticism (N), Extraversion(E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C)
  - Impulsiveness
  - Sensation seeking (SS)
- Substances: Cannabis, Nicotine, Caffeine, Chocolate, Alcohol
- Methods: Logit logistic regression, heteroscedasticity test

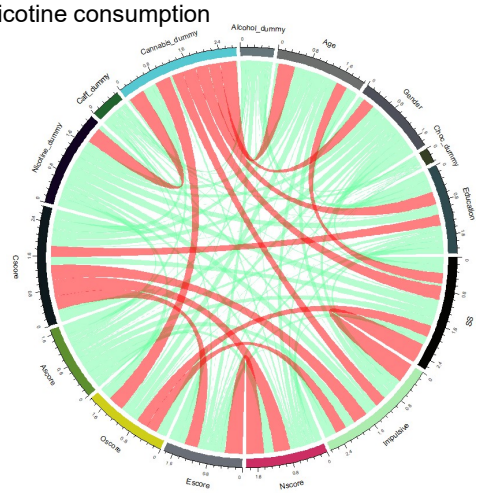
3 Descriptive Statistics

- Descriptive Statistics – Cannabis users





- Correlations between variables and chosen variables Education, Gender, Age, Openness to Experiences, Sensation Seeking, Nicotine consumption



4 Results

- Coefficients (White's heteroscedasticity consistent standard errors)
- Due to correlations we exclude most of the personality traits, however, they cannot be ignored exactly due to those connections

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glm(formula = Cannabis_dummy ~ Education + Gender + Oscore +     SS + Age +
    Nicotine_dummy, family = binomial, data = cannabis.training)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.5024  -0.6996  -0.3366   0.7202   2.8625

Coefficients:
                Estimate Std. Error z value  Pr(>|z|)
(Intercept)   -4.468226   0.608426 -7.3439 2.074e-13 ***
Education     -0.339275   0.051461 -6.5929 4.314e-11 ***
Gender1        0.647422   0.144349  4.4851 7.287e-06 ***
Oscore         0.107651   0.012469  8.6335 < 2.2e-16 ***
SS             0.083576   0.022546  3.7070 0.0002098 ***
Age           -0.510642   0.064460 -7.9219 2.339e-15 ***
Nicotine_dummy  1.232067   0.143990  8.5566 < 2.2e-16 ***
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 1765.4  on 1290  degrees of freedom
Residual deviance: 1194.9  on 1284  degrees of freedom
AIC: 1208.9
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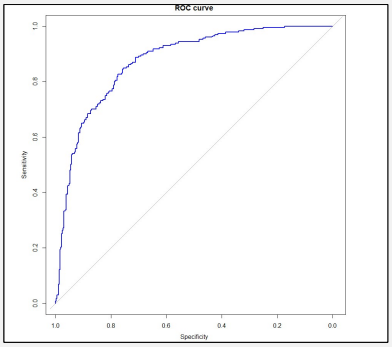
Confusion matrix		
Predicted/ Actual	NO	YES
NO	298	53
YES	65	178

Accuracy	0.8013
Sensitivity	0.8209
Specificity	0.7706



- Cut-off value: 0.5
- Area under the curve: 0.8735

5 Conclusion and discussion

The potential user with the highest probability has the following profile: college male student, 18-24 years old, open to experiences and strong sensations, tobacco user

Younger people have a higher chance of consuming cannabis, which declines with age and education

There is a strong relationship between tobacco and cannabis consumption

5 References

Lee-Winn, A. E., Mendelson, T., & Johnson, R. M. (2018). Associations of personality traits with marijuana use in a nationally representative sample of adolescents in the United States. Addictive behaviors reports, 8, 51–55. doi:10.1016/j.abrep.2018.06.005

Kristman-Valente, A. N., Hill, K. G., Epstein, M., Kosterman, R., Bailey, J. A., Steeger, C. M., … David Hawkins, J. (2017). The Relationship Between Marijuana and Conventional Cigarette Smoking Behavior from Early Adolescence to Adulthood. Prevention science : the official journal of the Society for Prevention Research, 18(4), 428–438. doi:10.1007/s11121-017-0774-4

Carliner, H., Mauro, P. M., Brown, Q. L., Shmulewitz, D., Rahim-Juwel, R., Sarvet, A. L., … Hasin, D. S. (2017). The widening gender gap in marijuana use prevalence in the U.S. during a period of economic change, 2002-2014. Drug and alcohol dependence, 170, 51–58. doi:10.1016/j.drugalcdep.2016.10.042

Fehrman, Elaine, and Egan, Vincent. Drug consumption, collected online March 2011 to March 2012, English-speaking countries. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2016-09-09. https://doi.org/10.3886/ICPSR36536.v1

Fehrman, E., Muhammad, A. K., Mirkes, E. M., Egan, V., & Gorban, A. N. (2017). The Five Factor Model of personality and evaluation of drug consumption risk. In Data Science (pp. 231-242). Springer, Cham.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. Annual review of psychology, 41(1), 417-440.

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