JOINT SUSCEPTIBILITY TO SMOKING AND VAPING AMONG ADOLESCENTS

Since the late 2000s, vaping has seen a rapid increase, and has become a major way of consuming tobacco products, besides cigarettes. This has led to public health concerns due to the lack of long-term data for vaping, the potential of vaping to reverse decreasing tobacco use rates and increase the poly-tobacco use, and mutual enhancement effects. This research takes up the concept of joint susceptibility, which proclaims the influence of shared environments to both smoking and vaping, and raises the questions *Are cigarette and e-cigarette use susceptible to similar social environments, and is this susceptibility dependent on demographic characteristics?*

CROSS-PREDICTION

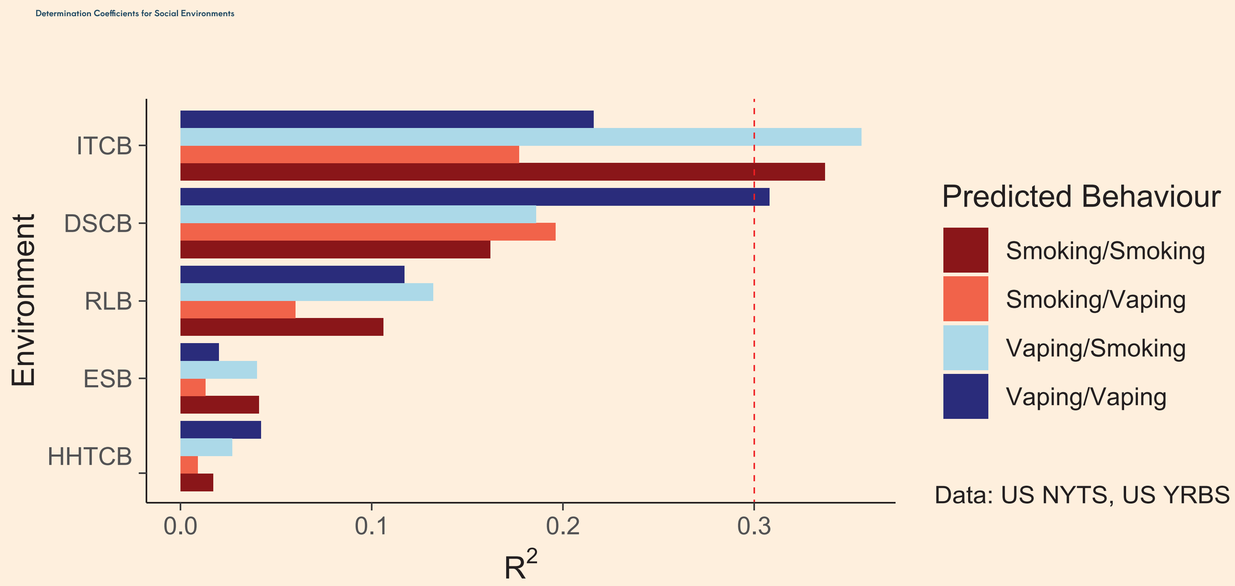
Whereas one's vaping status is best predicted from the vaping models (R^2_{DSCB}=0.308), one's smoking status is surprisingly more accurately determined using vaping models (R^2_{ITCB}=0.356 to R^2_{ITCB}=0.337).

SHARED ENVIRONMENTS

The use of other tobacco products and other substances moderately determine one's cigarette smoking and vaping status across all predicted directions (R^2_{DSCB}=0.213, R^2_{ITCB}=0.272), while household use of tobacco products, and eating and sports behaviour yield lower determination coefficients.

SMOKING AND VAPING DIFFERENCES

Cigarette smoking status is overall best predicted by one's use of other tobacco-based products (R^2_{Smo}=0.337), while the vaping status is best predicted by one's use of other substances (R^2_{Vap}=0.308).



Notes: The five different environments consist of five sets of predictors, see Methods and Data in the Footnotes for more details. **Legend explanation:** Left of the slash is the original outcome for the training data, right of the slash the outcome in the testing data. Vaping/Vaping and Smoking/Smoking indicate direct predictions, Smoking/Vaping and Vaping/Smoking cross-predictions.

SUBGROUP VARIATIONS

The use of other tobacco products better determines smoking and vaping status among women ($R^2_{ITCB:Women}$=0.332), other substances use determines the male status better ($R^2_{DSCB:Men}$=0.279). Both status are better determined for teenagers above 14 than 14 or below ($R^2_{ITCB:>14}$=0.274; $R^2_{DSCB:>14}$=0.236), and for self-reported white teenagers than others ($R^2_{ITCB:White}$=0.318; $R^2_{DSCB:White}$=0.270).

SCAN FOR SUPPLEMENTARY INFORMATION ON METHODOLOGY AND RESULTS

CONCLUSION

The findings show that smoking and vaping is better determined by one's related behaviours, such as use of other tobacco products and other substances, rather than the household tobacco use and broader lifestyle attitudes such as risk preference, eating or sports. Both status are best determined using the same models - and partly even across outcomes -, supporting joint susceptibility assumptions.

Methods and Data: Data from the US National Youth Tobacco Survey (11 waves; 2011-21; n=102,512) and the US Youth Behavioural Risk Survey (3 waves; 2015,2017,2019; n=18,504) was used to create five social environments: Household tobacco consumption (HHTCB), individual consumption of other tobacco products (ICTB), drinking/substance use (DSCB), risky lifestyle (RLB), and eating and sports (ESB). Using logistic regression models, smoking and vaping status as binary outcomes were trained on 90% of the data sets for each of the environments. The coefficients were retained and used on the other 10% of the data. The results show how well predicted and observed outcomes correlate.

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