Predictors of Risky Alcohol Use in Contemporary Australian Youth: A Machine Learning Approach using the LSAC data

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Introduction: Risky alcohol use in young adulthood is a significant public health concern. Understanding the factors that contribute to risky drinking during this developmental period is essential for informing prevention strategies. This study aims to identify key life course predictors of risky alcohol use in early adulthood among young Australians, leveraging advanced machine learning techniques.

Methods: Data were drawn from the Longitudinal Study of Australian Children (LSAC), a national longitudinal cohort study. A total of 4,983 children, aged 4-5 years in 2004 (Wave 1) were followed up to 18-19 years old. The outcome variable, risky alcohol use, was measured at age 18, defined as >10 standard drinks per week. Predictors from eight domains—sociodemographic factors, adolescent substance use, mental health, school factors, peer influences and parental factors—were included. The SuperLearner package in R was used to test a series of models (LASSO penalised regression, random forest, and kernel support vector machine) to identify the most important predictors or risky alcohol use across childhood and adolescence.

Results: The ensemble model showed good prediction on the test set, with an area under the curve (AUC) of 0.792. The most important predictors were weekly drinking at the previous wave, lifetime cannabis use, lifetime parent financial stress, identifying as female, identifying as male (compared to a reference category of gender diverse), lifetime attention deficit hyperactivity disorder, pre-natal alcohol exposure, housing insecurity, religious involvement, and parent alcohol use problem.

Conclusions: This study highlights the complex interplay of individual, familial, and social factors influencing risky alcohol use in early adulthood. Machine learning techniques identified significant predictors across multiple domains.

Implications for Practice or Policy: These findings can inform the development of prevention strategies aimed at reducing risky drinking behaviours in young Australians.