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Can a computer algorithm help people to set and change gambling limits?

What this research is about

Most people gamble for fun and without problems. Yet, a small number of people experience gambling-related problems. Protecting players and minimizing harm have become important for the gambling industry. As such, many gambling companies have installed tools to help people gamble safely.

The most popular of these tools are ones that help people to set money and time limits. For money limits, people can limit how much they deposit, bet, or lose when gambling. For time limits, people limit how much they gamble at any given time. Limits can be set freely by players or they can be set by the gambling operator. For example, the Norwegian Government's national lottery operator *Norsk Tipping* introduced a maximum monthly loss limit of 20,000 NOK across all games in September of 2016.

Research on limit setting tools suggests that people find them helpful. Research also suggests that these tools can help people gamble responsibly. This is particularly true for people with gambling problems. However, most studies on limit setting tools do not take place in real-world gambling settings. Also, it is not known what may help people set limits in the first place or encourage them to change their limits. In this study, the researchers aimed to determine what behaviours may predict limit setting. Gambling operators can use this information to prompt players to set and change limits when needed.

What the researcher did

Norsk Tipping provided the researchers with player data. This consisted of a 20% random sample of all

What you need to know

For some people, gambling can result in serious harm. Many gambling operators have installed tools to help people gamble safely. The most popular of these tools are limit setting tools. The researchers examined what variables help predict whether people set and change their limits. They did so using real player data from 70,879 players. The Norwegian Government's national lottery operator provided the data. Computer algorithms were used to help identify what best predicted if players changed their limit setting. The variables that emerged as important were if players received feedback that they had reached 80% of their global monthly loss limit, personal monthly limit, and the amount bet. Theoretical loss and whether players had increased their limit in the past were also important. Gambling operators can use the results to help players set limits on their gambling. Doing so may help people gamble safely.

players from January 2017 to June 2017. This resulted in a total of 70,789 players.

The researchers selected 33 different variables to predict limit setting. These variables included age and gender. Bet and loss for different types of gambling activity, as well as the total were included. The number of days played was a variable. The players' monthly loss limit was also included. The researchers included if players received feedback that they reached 80% of their global monthly loss limit. Problematic gambling was identified using *PlayScan*, a player tracking tool.

Computer algorithms were then used to identify variables that predicted the likelihood that players changed their global monthly loss limit during April to June 2017. To do this, the researchers divided the dataset into an 80/20 split. 80% was a training dataset for the algorithms. The researchers then used the other 20% as the test dataset. The researchers used five different algorithms. They then looked at which algorithm had the best performance, to see what variables best predicted limit setting.

What the researcher found

The average age of players was 41. About 28% of players were female. From January to March 2017, the participants in the training dataset on average bet NOK 11,638. They lost NOK 2,399. They played an average of 16 days. The average monthly global loss limit was NOK 5,100. A total of 10% of the players chose the maximum global loss limit of NOK 20,000. 5% of the players were gambling problematically. A total of 6.7% had changed their global monthly loss limit at least once from April to June 2017. Specficially, 6.3% increased their limit while 0.7% decreased their limit.

The best performance on the test dataset was by the gradient boost machine learning algorithm. Several variables were important in predicting if players changed their global monthly loss limit. These included players receiving feedback that they had reached 80% of their global monthly loss limit. Personal monthly limit and amount bet were also important. So was theoretical loss. Theoretical loss is calculated using total bet size and house advantage. It reflects how much a player is likely to risk. It is also a measure of how much a player will lose over time, due to house advantage. Lastly, whether players had increased their limit in the past was also important. Most of these predictors also emerged as important when using the other algorithms.

How you can use this research

This research can be used by gambling operators to help people gamble responsibly. Gambling operators can examine their player data to look at what might predict people setting limits. This information can be

used to send timely prompts to players to set and change their limits. Doing so may help people gamble more responsibly.

About the researchers

Michael Auer is affiliated with neccton Gmbh in Muellendorf, Austria. **Mark D. Griffiths** is affiliated with the Psychology Department at Nottingham Trent University in Nottingham, UK. For more information about this study, please contact Mark Griffiths at mark.griffiths@ntu.ac.uk.

Citation

Auer, M., & Griffiths, M. D. (2019). Predicting limit-setting behavior of gamblers using machine learning algorithms: A real-world study of Norwegian gamblers using account data. *International Journal of Mental Health and Addiction*. Advance online publication. https://doi.org/10.1007/s11469-019-00166-

Study funding

About Gambling Research Exchange (GREO)

Gambling Research Exchange (GREO) has partnered with the Knowledge Mobilization Unit at York University to produce Research Snapshots. GREO is an independent knowledge translation and exchange organization that aims to eliminate harm from gambling. Our goal is to support evidence-informed decision making in safer gambling policies, standards, and practices. The work we do is intended for researchers, policy makers, gambling regulators and operators, and treatment and prevention service providers.

Learn more about GREO by visiting greo.ca or emailing info@greo.ca.

Information item	Value
Title	Predicting limit-setting behavior of gamblers using machine learning algorithms: A real-world study of Norwegian gamblers using account data
Article URL	https://link.springer.com/article/10.1007/s11469-019-00166-2
Author	"Auer, Michael", "Griffiths, Mark D."
Journal	International Journal of Mental Health and Addiction
Year published	2019
Keywords	gambling, problem gambling, responsible gambling tools, limit setting, gambling algorithms
Geographic coverage	Norway
Study population	N=70,789 clients of *Norsk Tipping* gambling company
DOI	https://doi.org/10.1007/s11469-019-00166-2
Citation	Auer, M., & Griffiths, M. D. (2019). Predicting limit-setting behavior of gamblers using machine learning algorithms: A real-world study of Norwegian gamblers using account data. *International Journal of Mental Health and Addiction*. Advance online publication. https://doi.org/10.1007/s11469-019-00166-2
Sampling procedure	Convenience sampling–the researchers were given access to a 20% random sample of active players from January to June 2017
Response rate	N/A
Study design	Observational (cross sectional)
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