

Card pack and loot box spending are both positively correlated with problem gambling but not linked to negative mental health

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INTRODUCTION

Card packs are physical products providing random content in exchange for money. To illustrate: *Magic: The Gathering* (Wizards of the Coast, 1993 – Present) is one of the most popular trading card games. On 11 April 2023, a card pack from the *Phyrexia: All Will Be One* set could be bought for between US\$3.49–US\$4.49 (MTGGoldfish 2023c). Most cards in the pack have very little monetary value on the secondary market. However, at least one of the cards in the pack occupies a ‘rare/mythic rare’ slot that has the potential to be highly valuable (MTG Wiki 2022). From the aforementioned pack worth about US\$4.00: the player has a very small chance of finding a ‘mythic rare’ ‘Elesh Norn, Mother of Machines’ card with a resale value of US\$33.28 on the secondary market (MTGGoldfish 2023a) or a much higher chance of obtaining a so-called ‘rare’ ‘Malcator, Purity Overseer’ card worth merely US\$0.25 (MTGGoldfish 2023b) in that same slot. Companies rely on randomised card packs to monetise physical trading or collectible card games because players are required to buy many card packs in order to obtain the rare cards they are looking for (Švelch 2020; Mattinen, Macey, and Hamari 2023).

Loot boxes are equivalent digital products inside video games that can similarly be bought with real money to obtain randomised rewards. Both products are

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psychologically similar to gambling because the player can ‘win’ by obtaining rare and valuable rewards or alternatively ‘lose’ by obtaining non-valuable rewards (Drummond and Sauer 2018). Loot box spending has been repeatedly and reliably linked to problem gambling (Zendle and Cairns 2018; Garea et al. 2021; Spicer et al. 2022). This gave a strong justification for more strictly regulating loot boxes. There are many similarities between virtual loot boxes and physical card packs and significant interest amongst stakeholders in exploring the potential harms of card packs (Macey and Bujić 2022). Indeed, because card packs often are capable of providing players of stronger cards that would give them an in-game advantage, they may be viewed as more desirable than many loot boxes that only provide cosmetic items.

However, only one previous study considered the link between card pack spending and problem gambling and failed to find a meaningful positive correlation (Zendle et al. 2021). That study had a number of shortcomings. Firstly, that study did not inquire as to the participants’ loot box spending and so was unable to report the relationships between loot box spending and card pack spending and problem gambling in the same sample. Secondly, card-based video games (*e.g.*, *Magic: The Gathering Arena* (Wizards of the Coast, 2019 – Present)) offer *virtual* card packs that would broadly be viewed as loot boxes, and that previous study did not inquire as to player’s spending on those mechanics specifically. Thirdly, that study did not measure participants’ mental wellbeing and psychological distress and so could not comment on whether there may be links between mental health and card pack spending.

METHOD

Substantially improving on that previous study’s methodology, we recruited card game players living in English-speaking Western countries ($N = 1,961$) through Prolific to reassess the links between card pack and loot box spending on one hand and problem gambling and mental health outcomes on the other. Our final sample of 1,961 achieved 0.99 power across both correlational and equivalence testing.

Sample characteristics are described in Table 1.

Characteristic	# (%)
Age	
18–24	246 (12.5%)
25–29	378 (19.3%)
30–34	456 (23.3%)
35–39	348 (17.8%)
40–45	267 (13.6%)
45+	262 (13.4%)
Missing data	4 (0.2%)
Sex	
Male	996 (50.8%)
Female	962 (49.1%)
Missing data	3 (0.2%)
Ethnicity	
White	1414 (72.1%)
Asian	222 (11.3%)
Black	151 (7.7%)
Mixed	127 (6.5%)
Other	39 (2.0%)
Prefer not to say	1 (0.1%)
Missing data	7 (0.4%)
First Language	

English	1792 (91.4%)
Chinese	22 (1.1%)
Others	143 (7.3%)
Missing data	4 (0.2%)
Country of Residence	
United States	848 (43.2%)
United Kingdom	831 (42.4%)
Canada	162 (8.3%)
Australia	82 (4.2%)
New Zealand	18 (0.9%)
Ireland	17 (0.9%)
Missing data	3 (0.2%)
Student Status	
Yes	402 (20.5%)
No	1,435 (73.2%)
Missing data	124 (6.3%)
Employment Status	
Full-Time	1158 (59.1%)
Part-Time	270 (13.8%)
Unemployed (and job seeking)	184 (9.4%)
Not in paid work (e.g., homemaker, retired or disabled)	127 (6.5%)
Due to start a new job within the next month	22 (1.1%)
Other	66 (3.4%)
Missing data	134 (6.8%)

Table 1: Demographics (N = 1,961)

RESULTS AND DISCUSSION

Spending money on physical card packs ($r = 0.15$), loot boxes ($r = 0.31$), and virtual card packs (a specific type of loot boxes found in a specific genre of card-based video games; $r = 0.19$) were all linked to problem gambling. The relationship between card packing spending and problem gambling was markedly weaker than that between loot box spending and problem gambling.

Curiously, spending money on virtual card packs, which is a sub-category of loot boxes, specifically was less strongly correlated with problem gambling, indicating certain loot boxes might be more harmful than others (at least to some players), which means that there might be particularly harmful forms of loot boxes that remain to be specifically identified for stricter regulation (e.g., social casino games (Zendle, Flick, Deterding, et al., 2023: 4:16)). Previous studies have identified the many aspects in which loot boxes could differ from each other (Ballou et al., 2020; Sato et al., 2023); however, the one study that empirically looked at certain aspects thought to be potentially particularly problematic and harmful (such as the ability to ‘cash out’ loot box prizes, *i.e.*, convert them into real-world money) concluded that those aspects did not obviously strengthen the relationship between loot box spending and problem gambling (Zendle, Cairns, et al., 2019: 188). Other aspects of loot box design that have hitherto not been investigated should also be scrutinised to explain why spending on certain loot boxes appear to be more strongly correlated with problem gambling than spending on other loot boxes.

Spending money on all these gambling-like products were *not* linked to negative mental health outcomes (*i.e.*, worse mental wellbeing or more severe psychological distress) as confirmed through equivalence testing (Lakens, Scheel, and Isager 2018)

after setting our smallest effect size of interest (SESOI) to Spearman's $r = 0.1$, based on a more conservative convention (Ferguson 2009, 532–533; 2023, 3).

CONCLUSION

Card pack and especially loot box spending are both positively correlated with problem gambling but not linked to negative mental health outcomes. Around the world, policymakers are at a crossroads: how should gambling-like game mechanics be regulated? The current legal definitions of 'gambling' in many countries should be modernised using scientific evidence (Xiao et al. 2022): presently, the law regulates products that are less strongly correlated with problem gambling and therefore arguably less potentially harmful (e.g., card packs), but fails to regulate arguably more harmful products that are more strongly correlated with problem gambling (e.g., loot boxes).

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