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Are video game loot boxes associated with gambling among young Pacific adults in New Zealand?

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ABSTRACT

Aim: There is concern that gaming by young Pacific people can lead to gambling, but this is unclear. This study looked at whether there was an association between buying a video game loot box and gambling.

Methods: We conducted an online survey via Facebook of Pacific (mostly Samoan) New Zealand gamers aged between 16-30 years inclusive with a non-Māori, non-Pacific comparison group. The online survey ran from the 21st of April 2020 till the 30th of June 2020 and disseminated via social media (Facebook and Instagram) using email. We tested whether there was any association between buying an in-game loot box with any gambling activity within the last six months among gamers.

Results: The study included 828 participants with the Pacific group of n=402 and a comparison group of non-Māori, non-Pacific (nMnP, n=426). A typical Pacific gamer played nearly every day for two to five hours at a time. About 25% of gamers had bought a loot box and about a third of gamers had gambled recently. However, there was no association between buying a loot box and gambling (p=0.811) for Pacific, or for non-Māori, non-Pacific (p=0.727). In multiple logistic regression modelling, older age (OR=1.27, 95%CI [1.21,1.33]) was the only predictor of gambling.

Conclusions: We did not find any association between buying a loot box and gambling. A longitudinal study would ascertain if there was a link between the two.

Key words: Pacific adult, gambling, young Pacific, loot box

INTRODUCTION

Online video gaming is the tsunami that is taking the world by storm. In this research we examine the convergence of gaming and gambling in New Zealand (NZ). Specifically, we investigated loot boxes- which are virtual boxes that contain random items or perks that can be bought in-game often with real-world money.¹⁻⁴ Many games have loot boxes such as: Counter-Strike Global Offensive (CS:GO), Star Wars Battlefront 2, Overwatch, Apex Legends, Fortnite Battle Royale, PlayerUnknown's: Battlegrounds (PUBG). Typically, a player shells out money for the loot box, only to get disappointed after opening it to find a common, cheap random item, rather than the rare item they were hoping for. Consequently, the player will have to purchase an indeterminate amount of loot boxes to obtain the item.⁴ Loot boxes resemble slot machines because they do not require skill and the prize is randomly determined.⁴ Some gamers that play CS:GO, rather than be stuck with an unwanted item, sell it on an open in-game market (e.g. the steam community store⁵ usually for a loss).^{1,2} Though, if you strike it lucky by obtaining a rare

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item, you can sell it at an exorbitant price on the steam market- the record is \$150K USD.⁶

There is some evidence that loot boxes are a form of gambling^{2,3,7} and because of their gambling like

features they may be a gateway to problem gambling.^{2,8} Regulation of loot boxes by governments will be necessary² as analysts predict they (loot boxes) will drive a large proportion of the generated USD \$230 billion for the video gaming industry by 2022.² However, the NZ government does not consider that loot boxes meet the legal definition of gambling and so has adopted a wait and see approach.⁹ In contrast, Belgium has regulated the purchase of loot boxes and China has legislated that gaming companies disclose the probabilities of winning loot box prizes so as to inform consumers.¹⁰

Underpinning the loot boxes' reward structure is variable ratio reinforcement⁷ which keeps gamers buying the loot boxes by stringing them along. The buying of loot boxes are part of a class of microtransactions that have crept into games as publishers have strived to maximise profits. Microtransactions which include buying "skins" (cosmetic changes to items), guns, armour, clothes, crafting materials, experience points and "buffs" (in-game temporary enhanced powers) are overall, unwanted by gamers who have paid for a full-priced game. On the other hand, a case can be made for having microtransactions within games that are "free to play" so that developers can recoup money on the developmental costs that can run into the millions. The new business model of "free to play" but with microtransactions has been used by Epic Games¹¹ the developer and publisher of Fortnite to attract over 200 million players.¹²

Our aim was to find out whether buying a loot box was associated with gambling in Pacific young people. But we also wanted to find approximations for the contours (frequency of playing, time in one session, money spent) on gaming and gambling in NZ.

METHODS

Study Design

We used an online survey which was advertised on Facebook where gamers could fill it out online and could enter a draw to win a prize.

Our target sample would be: Pacific people aged between 16-30 years inclusive of who play video games at least once a month. However, we were able to recruit many non-Māori, non-Pacific as a comparison group. A few months before the online survey went live, focus groups of young Pacific gamers were also consulted for their opinions and solutions on gaming and gambling. What we can say is that the focus groups informed some of the questions asked in the survey and combined with the survey created a mixed methods study.

Questionnaire

The questionnaire asked participants about their age, gender, ethnicity, occupation and income and which games they played and how often, and whether they bought loot boxes or not. Further questions were asked about whether they gambled by using slot machines, horse racing, Lotto, scratch kiwi tickets, casino, or online sports betting.

Sample size calculations

Sample size was determined to be approximately 600 persons, with significance level = 0.05, statistical power=0.8 and a margin of error of $\pm 3\%$.

Statistical Analysis

We used simple proportions or percentages and frequencies, for single variables and chi-square tests of independence for contingency tables. The variables investigated included: types of gambling done by gamers in the last six months, frequency of playing games, time spent playing online games in one session, income, and occupation.

To determine any association between buying a lootbox and gambling we crossed buying a lootbox with a gambler variable in a two-by-two table. A gambler was defined as a participant who had done any sort of gambling in the last six months such as buying a Lotto ticket, scratch ticket, betting on the horses or other type of gambling. We also used logistic regression for more complicated models. Data analysis was carried out using Jamovi software (v1.6).¹³

Ethical Approval

Ethical approval (ref: 19/NTB/149) was given by the New Zealand Health and Disability Ethics Committees on 13 December 2019.

RESULTS

The study included 828 participants with the Pacific group (n=402) being older on average by two years than their (nMnP) non-Māori, non-Pacific counterparts (n=426) and had a higher proportion of females (25.4%) compared to males (14.1%) (**Table 1**). The groups also differed by occupation with the Pacific group having a lower proportion of students but a higher proportion of those in employment than the non-Māori, non-Pacific group. However, there were similar proportions of NZ born participants among both groups.

Table 1: Pacific vs non-Māori, non-Pacific (nMnP) characteristics showing number and percentage

	Pacific	nMnP	p-value
Demographics	N (%)	N (%)	
Median age in years (IQR)	21 (18-26)	19 (17-24)	NA
Gender			
Male	292 (72.6%)	361 (84.7%)	
Female	102 (25.4%)	60 (14.1%)	
Prefer not to say/other	8 (2.0%)	5 (1.2%)	<0.0001
NZ born			
Yes	326 (81.1%)	328 (77.0%)	
No	76 (18.9%)	98 (23.0%)	0.148
Occupation			
Student	165 (42.0%)	232 (55.4%)	
Full-time employed	141 (35.9%)	109 (26.0%)	
Part-time employed	49 (12.5%)	39 (9.3%)	
On a benefit	14 (3.6%)	19 (4.5%)	
Unemployed	18 (4.6%)	12 (2.9%)	
Business owner	6 (1.5%)	8 (1.9%)	0.003
Total	402 (48.6%)	426 (51.4%)	0.404

Notes :

IQR= interquartile range=75% percentile-25% percentile
 NA=not applicable, p-value comparison is between Pacific vs non-Māori, non-Pacific

Which games were popular and what platform were used?

Call of Duty and Fortnite were the most popular games among gamers (Table 2) and that consoles were the most popular platform with PC gaming the least popular (Figure 1).

Table 2: Most popular games played

Rank	Pacific	nMnP	Total
1	Call of Duty (27.9%)	Call of Duty (21.6%)	Call of Duty (24.6%)
2	Fortnite (22.6%)	Fortnite (11.5%)	Fortnite (16.9%)
3	NBA 2K (7.5%)	GTA (7.3%)	GTA (6.2%)
4	GTA (5.0%)	Rainbow Six Siege (4.5%)	NBA 2K (4.6%)
5	PUBG (3.5%)	Apex Legends (3.3%)	Apex Legends (3.0%)

Frequency of playing games and session time

Just over 40% of gamers played every day, regardless of ethnicity, while another 30% played four or five times a week (Table 3). One session of playing games was typically two to five hours long (65%), with a small proportion Notes: IQR= inter-quartile range=75% percentile-25% percentile

Figure 1: Platform by ethnicity

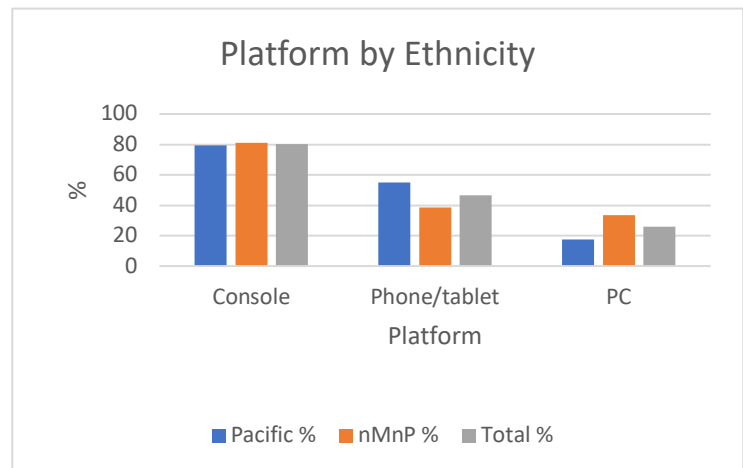


Table 3: Frequency of playing games.

	Pacific (n=319)	nMnP (n=346)	Total (n=665)
Frequency of playing games	col% (n)	col% (n)	col% (n)
Every day	43.3% (138)	45.1% (156)	44.2% (294)
4 or 5 times a week	30.4% (97)	31.8% (110)	31.1% (207)
2 or 3 times a week	19.4% (62)	16.5% (57)	17.9% (119)
Once a week	3.8% (12)	1.7% (6)	2.7% (18)
Less than once a week	3.1% (10)	4.9% (17)	4.1% (27)

Table 4: Time spent playing online games in one session

	Pacific (n=352)	nMnP (n=373)	Total (n=725)
Time spent playing at one session	col% (n)	col% (n)	col% (n)
15+ hours	2.8% (10)	1.9% (7)	2.3% (17)
11 - 15 hours	2.8% (10)	2.7% (10)	2.8% (20)
6 - 10 hours	17.9% (63)	11.8% (44)	14.8% (107)
2 - 5 hours	65.1% (229)	74.5% (278)	69.9% (507)
Less than 1 hour	11.4% (40)	9.1% (34)	10.2% (74)

Loot box buying behaviour

Only 66.2% of Pacific knew what a loot box was compared to 80.5% of non-Māori, non-Pacific. Of those who knew what loot boxes were, around 27% of Pacific gamers bought them, though higher than non-Māori, non-Pacific (of 22%) -it was not statistically significant (Table 5).

Table 5: Bought loot box by ethnicity

Bought lootbox	Pacific* n (%)	nMnP n (%)	Total n (%)
Yes	72 (27.1%)	77 (22.4%)	149 (24.5%)
No	194 (72.9%)	266 (77.6%)	460 (75.5%)
Total	266 (100%)	343 (100%)	609 (100%)

*Chi-square $p=0.188$ for difference between Pacific and non-Māori, non-Pacific.

Also, around 22% of Pacific gamers spent more than \$20 per month on loot boxes- significantly more than non-Māori, non-Pacific (10%)-Table 6.

Table 6: Money spent per month on loot boxes

	Pacific n (col%)	nMnP n (col%)	Total n (col%)
\$0	19 (26.4%)	27 (35.1%)	46 (30.9%)
\$1 - \$5	6 (8.3%)	11 (14.3%)	17 (11.4%)
\$5 - \$10	9 (12.5%)	16 (20.8%)	25 (16.8%)
\$10 - \$15	13 (18.1%)	8 (10.4%)	21 (14.1%)
\$15 - \$20	9 (12.5%)	7 (9.1%)	16 (10.7%)
More than \$20	16 (22.2%)	8 (10.4%)	24 (16.1%)
Total	72 (100%)	77 (100%)	149 (100%)

Why did gamers buy loot boxes?

Around two-thirds of gamers reported they bought a loot box because they wanted a rare game item with about 25% saying “it seemed like fun” and 22% reporting it would help them advance further through the game (Table 7).

Table 7: Reasons for buying a loot box

	Pacific (n=72)	nMnP (n=77)	Total (n=149)
	%* (n)	% (n)	% (n)
Because I wanted a rare item in the game e.g. a weapon, skin, XP	65.3% (47)	70.1% (54)	67.8% (101)
Because it seemed like fun	25.0% (18)	24.7% (19)	24.8% (37)
Because it would help me get further through the game	22.2% (16)	23.4% (18)	22.8% (34)
Because it would give me an advantage in the game	20.8% (15)	16.9% (13)	18.8% (28)
No reason, I just wanted to win something	16.7% (12)	11.7% (9)	14.1% (21)
Other	2.8% (2)	1.3% (1)	2.0% (3)

**Note: Percentages in a column will total more than 100% because respondents could choose more than one reason for buying a loot box.*

Gambling

About two-thirds of gamers did not gamble but if they did, then Lotto (26.6%) and Instant scratch tickets (13.4%) were the most popular form among Pacific (Table 8).

Table 8: Types of gambling done by gamers in the last six months

	Pacific (n=402)	nMnP (n=426)	Total (n=828)
Type of gambling	%* (n)	% (n)	% (n)

Lotto	26.6% (107)	21.8% (93)	24.2% (200)
Instant scratch ticket	13.4% (54)	10.8% (46)	12.1% (100)
The horses	1.7% (7)	3.8% (16)	2.8% (23)
Sports betting	5.7% (23)	7.0% (30)	6.4% (53)
Pokies	6.7% (27)	3.1% (13)	4.8% (40)
Casino- in person	4.5% (18)	3.1% (13)	3.7% (31)
Bet online	4.0% (16)	3.3% (14)	3.6% (30)
Bet online on a gambling site	3.0% (12)	1.9% (8)	2.4% (20)
None-I do not gamble	65.2% (262)	69.7% (297)	67.5% (559)

**Note: Percentages in a column will total more than 100% because respondents could choose more than one type of gambling.*

Approximately, half of gamers who did gamble spent up to \$20 per week (Table 9).

Table 9: Money spent weekly on gambling activity

	Pacific (n=140)	nMnP (n=129)	Total (n=269)
	col% (n)	col% (n)	col% (n)
\$1 - \$10	25.0% (35)	26.4% (34)	25.7% (69)
\$10 - \$20	25.7% (36)	20.2% (26)	23.0% (62)
\$20 - \$30	12.9% (18)	4.7% (6)	8.9% (24)
\$30 - \$40	4.3% (6)	2.3% (3)	3.3% (9)
\$40 - \$50	3.6% (5)	4.7% (6)	4.1% (11)
\$50+	3.6% (5)	0.8% (1)	2.2% (6)
lotto huge jackpot only	25.0% (35)	41.1% (53)	32.7% (88)

Buying a loot box and gambling

For both Pacific and non-Māori, non-Pacific, there was no association between buying a loot box and gambling (Tables 10 and 11). For Pacific (Table 10), of those that bought a loot box, 36.1% were also gambling, which was a similar proportion to those who hadn’t bought a loot box

(34.5%), which explains the high p-value of 0.811. We can only conclude that gambling and buying a loot box are independent of each other. The same argument can be made for non-Māori, non-Pacific (Table 11).

Table 10: Pacific: Buying a loot box and gambling- 2x2 contingency table

Bought loot box	Gambler		Total n (row %)
	Yes n (row %)	No n (row %)	
Yes	26 (36.1%)	46 (63.9%)	72 (100%)
No	67 (34.5%)	127 (65.5%)	194 (100%)
Total	93 (35.0%)	173 (65%)	266 (100%)

Chi-square p=0.811

Table 11: Non-Māori, non-Pacific: Buying a loot box and gambling- 2x2 contingency table

Bought loot box	Gambler		Total N (row %)
	Yes N (row %)	No N (row %)	
Yes	21 (27.3%)	56 (72.7%)	77 (100%)
No	78 (29.3%)	188 (70.7%)	266 (100%)
Total	99 (28.9%)	244 (71.1%)	343 (100%)

Chi-square p=0.727

Logistic Regression

We formulated logistic regression models, with gambling as the binary outcome and the regressors or covariates as “bought loot box” (yes or no), age (continuous variable in years), gender (female vs male) and ethnic group (Pacific vs non-Māori, non-Pacific) – see Table 12. In the model there were no statistically significant variables except age. As age increases by a year then the odds ratio increases by 27% increasing the person’s likelihood to gamble. We note that for buying a loot box the odds ratio is less than one (OR=0.79) indicating a negative or protective association with gambling (Table 12) though not statistically significant.

Table 12: Multiple logistic regression of gambler (yes vs no) as the binary outcome

Variable	Beta**	Odds Ratio	95% CI	p-value
Intercept	-5.681	0.003	(0.00-0.01)	<0.001
Bought loot box	-0.235	0.79	(0.50-1.25)	0.311
Ethnic group (Pacific vs nonMnP*)	-0.038	0.96	(0.65-1.43)	0.853
Gender (female vs male)	0.223	1.25	(0.76-2.05)	0.376
Age (years)	0.239	1.27	(1.21-1.33)	<0.001

* non-Māori, non-Pacific

**Beta coefficients and the intercept have been included for completeness. McFadden’s Pseudo-R²=0.174.

Discussion

Our finding indicates no association between buying video game loot boxes and gambling by Pacific or non-Māori, non-Pacific.

Strengths and Limitations

This study had several strengths. The survey was anonymous, leading to less social desirability bias among participants answering the questions. Another strength was the comparison group in non-Māori, non-Pacific where we could gauge if Pacific gamers’ behaviours were much different from other gamers.

However, our study also had some limitations. The study design was cross-sectional so causality cannot be inferred also we were unable to determine reverse causation. That is: does gambling cause gamers to buy loot boxes rather than the other way round? Furthermore, the survey was delivered online and so confined only to those who had internet access. Also, participants were self-selected, meaning it was a non-random selection leading to bias in the statistical analysis. Consequently, interpretations of the data are exploratory in nature and cannot be generalised to the wider population. Additionally, we fell just short of our target sample size, so this meant that detecting any effects would be harder than originally planned. Finally, those who chose not to complete the survey (i.e., non-respondents) posed a mystery, as we don’t know about their gaming or gambling habits.

Comparison of study with local studies

Findings from our study contrasted with previous NZ studies. A NZ study found that playing video games was a risk factor for gambling among Pacific youth.¹⁴ Another recent New Zealand study looked at the effects of self-isolation on quarantine and loot box spending and reported that social isolation during the pandemic may inflate the effect size of some media psychology and gaming effects but cautioned against generalising any effects during the Covid-19 pandemic.¹⁵

Comparison of study with international studies

A systematic review of gamers who buy loot boxes and gambling found that 14 out of 20 studies reported a positive correlation between loot boxes and gambling¹⁶ which our study is inconsistent with. Moreover, the review found, the more severe the gamers' gambling problem- the more they spent on loot boxes.¹⁶

A large online study of mainly North American gamers (n=7,422) provided empirical evidence of a relationship between loot box use and problem gambling.² They advocate "regulation of loot boxes is appropriate and necessary".² A large British study (n=3,549) among young people aged 16-24 found a strong association between buying loot boxes and gambling after adjustment for socio-demographics and personality traits.¹⁷

Age is a predictor of gambling

We found in the multiple logistic model that increasing age was the only predictor of gambling. We speculate that as gamers get older, they also get jobs and begin to earn more money and so can spend on gambling and loot boxes as well.

A Typical Gamer

From our survey we were able to say that a typical Pacific gamer plays every day for between three to five hours in a session. They spend \$10-\$15 on loot boxes per month in the hope of winning rare in-game items. Around a third of gamers also participate in some form of gambling. Many spend up to \$20 a week on gambling typically buying a Lotto or Instant scratch tickets.

Are Female gamers different?

In our regression model, female gamers were 1.25 times more likely than males to game and gamble though not statistically significant, it could be a disturbing trend. A partial explanation for this observation could be that the females in our study were older and had more disposable income than their younger male counterparts.

Possible reasons for no association

It was unexpected to find no association between loot box buying and gambling and may be because: (1) no association exists, (2) the association exists but will appear some years down the track, (3) the association exists but we got a biased sample from our survey, or finally, (4) our sample size was too small to detect an association. The second explanation can only be answered by a longitudinal survey tracking the original participants behaviours. This is costly and time-consuming so was ruled out for this project but could be considered for a future one if the resources are available.

Recommendation

We recommend that the probabilities of winning items for loot boxes be disclosed to gamers- so they can make a more informed decision. This has been done by Instant Kiwi tickets online- where the odds of winning prizes can be found on the mylotto website,¹⁸ though you must thoroughly search the website to find them.

CONCLUSION

There was no association between buying loot boxes and gambling among young Pacific people. A longitudinal study would be a better method for discovering whether an association exists.

REFERENCES

1. Drummond, A., Sauer, J. D., Hall, L. C., Zendle, D. & Loudon, M. R. Why loot boxes could be regulated as gambling. *Nat. Hum. Behav.* **4**, 986–988 (2020).
2. Zendle, D. & Cairns, P. Video game loot boxes are linked to problem gambling: Results of a large-scale survey. *PLOS ONE* **13**, e0206767 (2018).
3. Brooks, G. A. & Clark, L. Associations between loot box use, problematic gaming and gambling, and gambling-related cognitions. *Addict. Behav.* **96**, 26–34 (2019).
4. King, D. L. & Delfabbro, P. H. Predatory monetization schemes in video games (e.g. 'loot boxes') and internet gaming disorder. *Addict. Abingdon Engl.* **113**, 1967–1969 (2018).
5. Steam Store. <https://store.steampowered.com/>
6. Most Expensive CSGO skin sold for a record \$150K USD. *TalkEsport* <https://www.talkesport.com/news/csgo/most-expensive-csgo-skin-sold-for-a-record-150k-usd/>(2021).

7. Drummond, A. & Sauer, J. D. Video game loot boxes are psychologically akin to gambling. *Nat. Hum. Behav.* **2**, 530 (2018).
8. Molde, H. et al. Are Video Games a Gateway to Gambling? A Longitudinal Study Based on a Representative Norwegian Sample. *J. Gambl. Stud.* (2018) doi:10.1007/s10899-018-9781-z.
9. Cross, K. New Zealand says lootboxes 'do not meet the legal definition for gambling'. https://www.gamasutra.com/view/news/311463/New_Zealand_says_lootboxes_do_not_meet_the_legal_definition_for_gambling.php (2017).
10. Xiao, L. Y., Henderson, L. L., Yang, Y. & Newall, P. W. S. Gaming the system: suboptimal compliance with loot box probability disclosure regulations in China. *Behav. Public Policy* 1–27 (2021) doi:10.1017/bpp.2021.23.
11. Epic Games Store | Download & Play PC Games, Mods, DLC & More – Epic Games. *Epic Games Store* <https://www.epicgames.com/store/en-US/>.
12. Tassi, P. The 'Fortnite' Monster: 200 Million Players, 8.3 Million Concurrents. *Forbes* <https://www.forbes.com/sites/insertcoin/2018/11/28/the-fortnite-monster-200-million-players-8-3-million-concurrents/>.
13. The Jamovi Project. Jamovi. <https://www.jamovi.org/>
14. Bellringer, M., Kolandai-Matchett, K., Taylor, K. & Abbott, M. Pacific Islands Families Study 2014: Mother and Youth Gambling. *Auckl. Univ. Technol. Gambl. Addict. Res. Cent.* (2016).
15. Hall, L. C., Drummond, A., Sauer, J. D. & Ferguson, C. J. Effects of self-isolation and quarantine on loot box spending and excessive gaming-results of a natural experiment. *PeerJ* **9**, e10705 (2021).
16. Yokomitsu, K., Irie, T., Shinkawa, H. & Tanaka, M. Characteristics of Gamers who Purchase Loot Box: a Systematic Literature Review. *Curr. Addict. Rep.* 1–13 (2021) doi:10.1007/s40429-021-00386-4.
17. Wardle, H. & Zendle, D. Loot Boxes, Gambling, and Problem Gambling Among Young People: Results from a Cross-Sectional Online Survey. *Cyberpsychology Behav. Soc. Netw.* **24**, 267–274 (2021).
18. Lotto New Zealand. Official Lotto NZ website. <https://mylotto.co.nz/>