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PIF Study: Young adult gambling behaviours and associated risk factors Auckland University of Technology, Gambling and Addictions Research Centre Final Report, 30 September 2024

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EXECUTIVE SUMMARY

Background and purpose

In the year 2000, a cohort of 1,398 Pacific infants, born in a South Auckland hospital, was recruited into the Pacific Islands Families (PIF) study. In this study, the PIF cohort, aged 22 years, was surveyed about their gambling behaviours. We had previously surveyed the youth about their gambling behaviours when they were aged 9, 14 and 17 years. This means that we can examine gambling behaviour data across time (called longitudinal analysis), which is not possible with most research that only collects data at one point in time (a cross-sectional study).

Study aims

The study aims were to:

- Assess gambling participation, problematic gambling and gambling-related harms among Pacific peoples who had recently become adults, with legal access² to all gambling activities.
- 2) Identify gender and ethnic differences, and assess co-existence with mental health, and cultural identity and engagement.
- 3) Assess help-seeking behaviours.
- 4) Examine changes in gambling behaviours and risky gambling over time, from age 14 years to 22 years, where possible.
- 5) Identify possible risk and protective factors for gambling and problematic gambling using data collected when the participants were younger.
- 6) Identify gambling behaviours of parents and negative effects.

Research design

Of the PIF cohort young adults who were contactable and who had not withdrawn from the study in 2022, 470 completed the survey. The survey included detailed questions relating to gambling behaviours and harms related to gambling, as well as questions on cultural identity and engagement, and mental health.

Results

About one-third of 22-year-old participants had gambled in the past year on an average of three activities but the gambling was generally infrequent. This was similar to when participants were aged 17 years, though at age 22 years a greater proportion bought Lotto tickets.

Overall, 154 participants (32.8%) had gambled on one or more activities in the past year, and 316 (67.2%) had not gambled. Bets with friends and family were the most common (39%), followed by casino gaming machines (33.1%), pub gaming machines (29.9%) and Lotto from a store (24.7). However, when land-based and online participation in Lotto were combined,

² There is no age restriction on informal gambling activities such as bets with family or friends, or to purchase Lotto, keno or raffle tickets. There is an 18-year age restriction to gamble on non-casino electronic gaming machines, TAB betting, housie (with total session prize value over \$1,000) and Instant Kiwi. The age restriction to enter a casino is 20 years.

this became the second most common activity (33.1%) along with casino gaming machines. The least popular gambling activities were betting on track (horse and dog racing) events, keno and online scratch cards. The percentage who gambled at age 22 years was similar to the percentage who gambled at age 17 years, and bets with friends and family were the most common at both ages.

The average number of gambling activities engaged in at age 22 years was three, although overall, over half of the gambler participants (57.8%) only engaged in one or two activities. The other 42.2% of gambler participants participated in between 3 and 13 activities. Gambler participants engaged with most of the gambling activities less than once a month, although for gambling on card games, sports betting, Lotto, keno, club gaming machines, mobile phone gambling games, and internet gambling, participation was more frequent. The highest frequency of engagement was keno with 40% participating at least weekly. A noticeable change from age 17 years was an increase in participants who bought Lotto tickets at least monthly, increasing from 41.6% to 55.3%.

Of the 154 participants who gambled, 59.7% were male and 40.3% female. This was a significant difference with males having more than twice the odds of gambling than females. The average number of gambling activities for males was three and for females was two.

The highest median monthly gambling expenditure was on casino gaming machines, club gaming machines and casino table games.

Of participants who gambled, the highest expenditure (median about \$75/month) was on casino gaming machines, club gaming machines, and casino table games. This was followed by internet gambling, online sports betting, pub gaming machines, and gambling on mobile games (median about \$39.5/month). The least amount of money was spent on scratch cards from a store (median about \$5/month).

Gambling with friends or family at age 22 years was the most common, which was similar to when participants were aged 14 and 17 years; however, there was an increase in gambling alone and with strangers at age 22 years.

Of participants who gambled, the highest percentages gambled with family³ (50%) or friends (46.7%). One-fifth gambled alone (21.3%), and 14.7% gambled with their spouse or partner (10.5%). A few gambled with other people they knew (4.7%) or with people they did not know (e.g. strangers met online, $2.0\%)^4$. Although gambling with family and friends was also the most common for participants when they were 14 and 17 years old, at age 22 years there was an increase in gambling alone (5.2% at 17 years, 21.3% at 22 years), and gambling with strangers slightly increased to two percent at age 22 years from 0.5% at age 17 years.

Males were more likely to gamble with friends, alone or with other known people and only males gambled with strangers. Females were more likely to gamble with family and spouse/ partner.

³ Parents, siblings, grandparents, aunts, uncles or cousins.

⁴ Participants could select more than one category of 'with whom they gambled'.

Slightly more than one-third of participants who gambled were worried about their gambling and two-fifths sought informal help from someone close to them. The percentage who had a lot of worry about their gambling doubled from age 17 years to age 22 years.

Of participants who gambled, slightly more than one-third (35.1%) were worried about the time or money they spent gambling. The percentage of gamblers who reported 'a lot' of worry about their gambling doubled from age 17 years (4.4%) to 8.6% at age 22 years.

Two-fifths of gamblers had sought help for their gambling, mostly informal advice from a close family member (19.2%), spouse/partner (16.7%), friend (12.8%) or other family member such as aunts and uncles (6.4%). Almost one in nine gamblers asked for help from two sources. Only two participants sought help from professional gambling treatment services.

Overall, at age 22 years, 13.2% of participants gambled in a risky manner and one-third of participants who gambled experienced harms from their gambling. The percentage of participants classified as problem gamblers increased with increasing age though results are not directly comparable due to different screens used in the surveys.

Overall, 13.2% of participants gambled in a risky manner - classified as low risk, moderate risk or problem gambler using the Problem Gambling Severity Index. Of participants who gambled, 37.7% gambled in a risky manner. At age 22 years, 6.8% of gamblers were classified as problem gamblers; this was a substantial increase from 3.7% at age 14 years and 4.7% at age 17 years, although different screens were used to measure problem gambling so the results cannot be directly compared. Female participants who gambled at age 22 years were significantly less likely to gamble in a risky manner than males.

One-third (32.9%) of gamblers experienced between one and eight different harms from their gambling. The highest proportion (11.2%) reported one harm. The most commonly reported harms were those that could be considered less severe such as feeling regret about gambling, having reduced spending money and less spending on recreational expenses. Severe harms from gambling such as increased credit card debt and selling personal items were only reported by a few participants. Tongan participants who gambled (n=24) had nearly three times the odds of experiencing gambling harm than Samoan gamblers (n=71).

Most participants (94%) of those who were risky gamblers also reported harms from their gambling.

Risky gambling was statistically associated with less perceived quality of life, and increased problematic behaviours such as aggression, intrusion and rule breaking. Gambling harms were statistically associated with rule breaking behaviour and depression.

Risky gambling was found to be statistically associated with less perceived quality of life due to physical health and because of one's environment. It was also associated with increased problematic behaviours such as aggression, intrusion (i.e. intrusive thoughts, feelings and imagery), and rule breaking. Harms from gambling were found to be statistically associated with rule breaking behaviour and depression, and were less likely to be associated with one's environment. However, only rule breaking behaviour⁵ significantly predicted both risky gambling and harms from gambling.

There were no associations between risky or harmful gambling and the cultural identity or engagement variables investigated in this study.

A few participants experienced negative consequences (mainly occasional worry) due to someone else's gambling, with more than half of the 'someone else' being parents.

Overall, 8.7% of the 22-year-old participants experienced negative consequences due to someone else's gambling, with the most reported concern being occasional worry about the other person's gambling (78% of those who reported concern). Generally, the 'someone else' was a parent (53.3%), though other family members were also reported. Other negative consequences were financial (26.8%), difficulty in talking to anyone about the other person's gambling (17.1%) and being concerned about safety (12.2%).

Online gaming, smoking cigarettes, gambling on multiple activities, feeling positive about being a Pacific person and/or drinking alcohol at age 14 and/or 17 years were associated with gambling behaviours at age 22 years

Daily online gaming at age 14 years significantly predicted gambling participation at age 22 years.

Smoking cigarettes and online gaming at age 14 years both predicted risky gambling at age 22 years. Engaging in multiple gambling activities and feeling positive about being a Pacific person at age 17 years also both predicted risky gambling at age 22 years.

Daily or weekly online gaming at age 14 years significantly predicted gambling harms at age 22 years. Engaging in multiple gambling activities and drinking alcohol at age 17 years also both predicted gambling harms at age 22 years.

Conclusion

Gambling participation by the 22-year-old PIF study participants was low and generally infrequent. The most popular activity was informal betting with family and friends, followed by gaming machines. However, the prevalence of risky gambling and experiencing gambling harms amongst the gamblers was high. Few gender or ethnic differences were noted and changes over time were as expected. Associations with mental health and risk factors for risky gambling and gambling harms were generally as would be expected among the general population.

One area identified for possible early intervention specific to Pacific peoples relates to supporting increased gambling harm literacy amongst Pacific families and communities on how to recognise signs of risky gambling behaviours or gambling harms and how to effectively support a person to change their gambling behaviours. This could be aligned with the Ministry

⁵ Rule breaking behaviour included actions that break social rules, engaging in illegal or risky behaviours, or showing a disregard for authority.

of Health's Te Mana Ola Pacific Health Strategy (2023), to reduce inequitable health outcomes for Pacific peoples. This will be best suited to a by 'Pacific, with Pacific, for Pacific' approach.

BACKGROUND

The Pacific Islands Families (PIF) study is a longitudinal birth cohort study investigating interactions and influences of family and the environment on behavioural development and health outcomes. The cohort comprised 1,398 infants recruited from births at Middlemore Hospital, South Auckland from March to December 2000. Each infant had at least one parent who identified with a Pacific ethnicity and who was also a New Zealand permanent resident or citizen. Full details regarding study design and methods are described in detail elsewhere (Paterson et al., 2002, 2004, 2006).

Pacific peoples are a fast-growing minority population in New Zealand (Stats NZ, 2023). Overall, Pacific peoples are less likely to participate in gambling behaviours than NZ European people (63% vs. 75% in 2020) yet have a higher prevalence of moderate risk/problem gambling (3.0% vs. 1.4% in 2020) (Te Hiringa Hauora & Kupe, 2020). This finding has been consistent over time (Abbott et al., 2014a, 2014b).

Most research on gambling-related harm and associated factors has been obtained from crosssectional studies, whereby levels of risk in a population, and risk and protective factors for that population, can only be identified at the time of investigation. In longitudinal studies such as the PIF study, where the same people are repeatedly interviewed over time, changes and factors predictive of change can be identified. Understanding risk and protective factors, including factors predictive of risk, is useful in informing public health responses to help reduce inequitable gambling-related harms. For Pacific peoples, the PIF study aligns with the Ola Manuia: Pacific Health and Wellbeing Action Plan 2020-2025, which aims to achieve equitable health outcomes for Pacific peoples in New Zealand (Ministry of Health, 2020). It also aligns with the Strategy to Prevent and Minimise Gambling Harm 2022/23 to 2024/25, which identifies Pacific people as a priority population and also aims to achieve equitable outcomes in relation to reducing gambling harms (Ministry of Health, 2022).

Previous gambling-related findings from the PIF study

Gambling-related data were collected from PIF participants in 2006, 2009, 2014 and 2017, when the cohort were aged 6, 9, 14 and 17 years, respectively. The results from those studies are presented elsewhere (Bellringer et al., 2008, 2012, 2014, 2017, 2019, 2022).

When the PIF cohort were nine years old, they were asked a few simple questions about gambling behaviours. The questions increased in number and complexity when the youth were interviewed at 14 years and then 17 years and included an adolescent problem gambling screen, the DSM-IV-MR-J (Fisher, 2000).

When aged nine years (pre-teen), almost all the children (96%) reported that they had ever participated in card games and 60% reported housie/bingo participation. However, whilst most <u>did not gamble with money</u>, boys were more likely to gamble with money than girls. Seventeen percent reported that they had been given scratch tickets (even though they were younger than the legal age of 18 years), and seven percent had bought Lotto, Big Wednesday and/or Keno tickets. The children usually gambled with family or friends. Gang involvement and low parental monitoring were associated with higher likelihood of gambling participation, whilst higher cognitive ability was associated with a slightly lower likelihood of gambling participation (Bellringer et al., 2012).

When aged 14 years (young teenager), 54% of the youth reported <u>ever gambling for money</u> on at least one activity, though 58% of these had not gambled in the past year. The three most

common gambling activities were betting with friends or family (37%), on card games (20%), and on sports matches (16%). Most of the youth reported gambling with family and friends although 12% reported gambling alone. Seven percent reported that they had ever been given scratch tickets⁶. Being bullied at school, playing computer/video games, watching television/video/DVDs, gang involvement, and having a mother who gambled were associated with a higher likelihood of gambling participation and expenditure. Cook Islands Māori youth were less likely to gamble on continuous activities⁷ than Samoan youth. Of the youth who gambled, 3.7% were problem gamblers and two-thirds of these reported some level of worry about the time or money they spent on gambling (Bellringer et al., 2017).

When aged 17 years (older teenager), almost one-third of youth had gambled for money in the prior year, with boys more likely to gamble on games of skill, and girls on games of chance. Although gambling was an infrequent activity, dice gambling and playing games for money on a mobile phone or tablet occurred at a higher intensity than for other gambling activities. As at earlier ages, most gambling took place with family and friends. One-in-40 boys (2.5%) scored as problem gamblers compared with one-in-167 (0.6%) girls. The prevalence of problem gambling had changed from age 14 years with some youth transitioning into or out of problem gambling, and with one-quarter of 14-year-old problem gamblers remaining at that risk level three years later. Friends were the main source of help and advice for gambling-related concerns. Buying (10.6% of the gamblers) and receiving (4.9% of the gamblers) Instant Kiwi tickets occurred despite being illegal. Gambling was common in the youths' households, with one-in-five youth worried about a family member's gambling and one-in-nine (10.7%) experiencing household problem/s from that gambling. Gambling was as common as cigarette and marijuana smoking by 17-year-old youth but less common than alcohol consumption. Male gender, attending secondary school, electronic cigarette smoking, gang involvement and having family members or friends as gang members were significantly associated with gambling at age 17 years (Bellringer et al., 2019).

This study

In 2022, the PIF cohort was 22 years old (young adult) and had experienced two years of legally being able to gamble in casinos and four years of legal ability to gamble on electronic gaming machines in pubs and clubs, gambling via a Totalisator Agency Board (TAB), and buying scratch tickets. A further extensive gambling component was, therefore, added to the 2022 data collection.

⁶ This was a reduction from the 17% reported by the children when aged 9 years, suggesting recall bias. ⁷ Continuous gambling is when the outcome between betting and knowing the outcome is fast and can be rapidly repeated (e.g. for the 14 year old PIF youth it could be betting on card games, sports matches, marbles and housie/bingo).

RESEARCH METHOD

Ethics

Ethical approval for the 2022 phase of the PIF study was granted by the Auckland University of Technology Ethics Committee on 28 March 2022 (Reference 22/39 Pacific Islands Families: Thriving Pacific Young Adults (PIF:TPYA).

An identification code was allocated to each participant to ensure anonymity, and no personal identifying information is reported. Participation was voluntary and participants could withdraw from the study at any time or decline to answer any questions.

Cultural safety

Cultural safety, integrity and appropriateness of the research were a core consideration achieved via the following, which ensured that this Pacific research study was led and conducted by Pacific researchers, with Pacific oversight:

- The PIF director is of Pacific ethnicity.
- The core research team comprises Pacific researchers fluent in different Pacific languages.
- An advisory board to the study comprises predominantly Pacific community and health sector representatives.
- Interviewers were ethnically matched, where possible, to the major ethnicities of the participants (i.e. Samoan, Tongan and Cook Islands Māori).

Study aims

There were six aims of the study:

- Assess gambling participation, risky gambling and gambling-related harms among Pacific peoples who had recently become adults, with legal access⁸ to all gambling activities.
- 2) Identify gender and ethnic differences, and assess co-existence with mental health, and cultural identity and engagement.
- 3) Assess help-seeking behaviours.
- 4) Examine changes in gambling behaviours and risky gambling over time, from age 14 years to 22 years.
- 5) Identify possible risk and protective factors for gambling and risky gambling using data collected when the participants were younger.
- 6) Identify gambling behaviours of parents and negative effects.

⁸ There is no age restriction on informal gambling activities such as bets with family or friends, or to purchase Lotto, keno or raffle tickets. There is an 18-year age restriction to gamble on non-casino electronic gaming machines, TAB betting, housie (with total session prize value over \$1,000) and Instant Kiwi. The age restriction to enter a casino is 20 years.

Research design

Recruitment

PIF cohort young adults were invited to participate in 2022 (including those who had missed participation in one or more previous data collection years), apart from those who were untraceable or who had permanently withdrawn from the study. Interviews were administered face-to-face on laptop computers in participants' homes (or a suitable location of their choice). On average, interviews took 47 minutes. Participants were offered a *mea'alofa* (small gift; \$50 gift card) in appreciation of their time. Data were collected from 7 June 2022 to 15 December 2023⁹ from 470 participants.

Survey instrument

To allow for comparative longitudinal analyses, where possible, the gambling items in the questionnaire were similar to those when the youth were 17 years old.

The gambling questions (Appendix 1) covered the following topics:

- 1) Past year gambling participation including frequency and expenditure.
- 2) Most preferred gambling activity.
- 3) With whom gambling takes place.
- 4) Concerns about gambling and help-seeking behaviour.
- 5) Gambling risk level (Problem Gambling Severity Index, PGSI).
- 6) Gambling harm (Short Gambling Harm Screen, SGHS).
- 7) Someone else's gambling, problems because of this, negative effects, and relationship to the other person.

The PGSI is a nine-item screen that measures current (past year) gambling risk level (Ferris & Wynne, 2001). It has been found to be robust and reliable when used in the New Zealand population (Devlin & Walton, 2012). There are five categories of: non-gambler, non-problem gambler (score 0; have not experienced any adverse consequences of gambling), low risk gambler (score 1 or 2, may be at risk but unlikely to have experienced severe adverse consequences), moderate risk gambler (score 3 to 7, may be at risk and may have experienced some adverse consequences), and problem gambler (score 8 to 27, have experienced severe adverse consequences) (Browne et al., 2021; Ferris & Wynne, 2001).

The SGHS is a 10-item screen that measures current (past year) experiences of gambling harm. The SGHS was adapted from a larger 72-item scale and measures financial, emotional/ psychological and relationship harms. Each item scores 1 if the harm is present; the higher the score, the more harm is experienced by a participant (Browne et al., 2018).

The other items in the 2022 questionnaire (Appendix 2) captured data on:

- Ethnicity
- Mental distress and wellbeing
 - General psychological distress (Kessler Psychological Distress Scale, K-10; Kessler et al., 2002).
 - General anxiety (Generalized Anxiety Disorder 7-item scale, GAD-7; Spitzer et al., 2006).
 - Depression (Beck Depression Inventory revised, BDI-II; Beck et al., 1996).

⁹ As data collection was extended to 18 months, some participants would have been 23 years old.

- Externalising problem behaviours (Adult Self-Report Behaviour Checklist aggression, rule breaking, and intrusive behaviour subscales; Achenbach & Rescoria, 2003).
- Mental wellbeing and positive psychosocial functioning (WHO-5 Well-being Index and WHOQOL-BREF; Skevington et al., 2004; Topp et al., 2015; World Health Organisation, 1998).
- Cultural identity and engagement
 - Pacific Identity and Wellbeing Scale-Revised (PIWBS-R; Manuela & Sibley, 2015). The following subscales were used: Group Membership Evaluation, Pacific Connectedness and Belonging, Religious Centrality and Embeddedness, and Cultural Efficacy.

Data analysis

A brief description of data analysis is presented in this section. The full data analysis methods are detailed in Appendix 3.

Data were analysed using SPSS version 28, and RStudio 2023.06.0. A p-value of 0.05 was used to denote statistical significance. Means, standard deviations, frequencies, percentages and 95% confidence intervals were used, where appropriate, to present descriptive detail of gambling participation; gambling-related behaviours; and social, health and environmental factors. Subgroup analyses were performed for participants who had gambled in the past year.

To identify factors associated with gambling, Chi-square test of independence/ association, Spearman's rank correlation, Pearson's phi coefficient, and multiple logistic regression analyses were performed. Bivariate correlations (using Chi-square test of independence/ association, Spearman's rank correlation or Pearson's phi coefficient) were used to identify factors individually associated with gambling in the past year. Standard binary logistic regression was then performed to test a predictive model with factors found to be associated with the outcome in the bivariate correlation results. If many predictor factors were involved, forwards stepwise regression was used to build a parsimonious model. Significant factors were included in the model if they provided statistically significant benefits above that already held within the model. Odds ratios and 95% confidence intervals showing the statistical strength of associations between the gambling and explanatory variables are presented.

To look at factors that might have influenced whether participants engaged in gambling, whether their gambling became risky or not, or whether they experienced harm from their gambling at age 22 years, these variables were first tested for possible bivariate relationships with the following factors using bivariate correlations (Spearman's rho):

- Engaging in smoking cigarettes, marijuana, drinking alcohol, and taking drugs aged 14 and 17 years.
- Engaged in any gang related activities aged 14 and 17 years.
- Relationship with mother, father and friends at age 17 years.
- Frequency of internet use aged 14 and 17 years.
- Computer activities (i.e. playing online games) aged 14 and 17 years.
- Mental health and physical health aged 14 and 17 years (e.g. depression, overall physical health).
- Factors related to suicidal ideation aged 14 and 17 years.
- Being a victim or perpetrator of bullying aged 14 and 17 years.
- Problem behaviour (i.e. behaviour that breaks rules and negative behaviour that is influenced by friends) aged 17 years.

• Pacific Identity and Wellbeing (PIWBR-R) subscales: Pacific Connectedness and Belonging, Religious Centrality and Embeddedness, Group Membership Evaluation, and Cultural Efficacy at age 17 years.

RESULTS

Gender and ethnicity

Table 1 details the gender and prioritised ethnicity¹⁰ of participants at age 22 years. There were slightly more females (53.8%) than males. Samoan ethnicity was the most prevalent (48.3%), followed by Tongan (23.8%), Cook Islands Māori (17.7%), Niuean (8.9%), and Tokelauan/Fijian (0.9%) ethnicities. 'Other' categories were also identified for gender and ethnicity.

Demographic variable	Ν	%
Gender		
Male	216	46.0
Female	253	53.8
Other	1	0.2
Ethnicity		
Samoan	227	48.3
Tongan	112	23.8
Cook Islands Māori	83	17.7
Niuean	42	8.9
Tokelauan/Fijian	4	0.9
Other	2	0.4
Total	470	100
N=470		

Table 1: Gender and ethnicity at age 22 years - all respond	lents
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Gambling participation

Gambling activities

Almost one-third (32.8%) of the 22-year-old participants indicated that they had engaged in one or more gambling activities in the past year, while 67.2% had not gambled. This is similar to when participants were 17 years old, when about one-third (31.7%) reported that they gambled for money on at least one gambling activity in the past year. It is a decrease from when participants were 14 years old, when more than half (54%) reported gambling for money on one or more activities; however, in that survey the question was phrased in a lifetime (ever) time frame rather than a past year time frame.

Ten percent of participants who were surveyed both at age 17 years and at age 22 years (n=48) had engaged in one or more gambling activities at both ages; in other words, continued gambling from late teen to early adulthood. Among these, 19% participated in card games and another 19% in bets with family and friends in both years. Another 15% (n=70) of participants engaged in one or more gambling activities aged 17 years but did not gamble aged 22 years, while 17% (n=78) engaged in one or more gambling activity aged 22 years but had not gambled aged 17 years. Seven percent (n=34) of participants engaged in one or more gambling activities at the ages of 14, 17 and 22 years.

¹⁰ See description in Appendix 3.

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When participants were aged 14 and 17 years, bets with friends and family were the most frequently reported gambling activity (37% and 44.9%, respectively). When aged 22 years, the proportion of participants engaging in bets with friends and family was 39%. It remained the most common reported gambling activity, followed by casino gaming machines (33.1%) and pub gaming machines (29.9%; Table 2). The latter two activities were not reported at 17 years as participants were below the legal age for participation at that time. However, when land-based or online participation in a gambling activity were combined, Lotto was the second most common activity (33.1%) along with casino gaming machines (Table 3).

Card gambling has consistently been a popular gambling activity among participants, starting from the age of 14 years (20%), increasing at age 17 years (26.1%), with a slight further increase at age 22 years (28.6%) when online and land-based card gambling was combined (Table 3).

The least popular activities, reported by fewer than 5% of participants at age 22 years were betting on track (horse and dog racing) events through the NZ TAB (in venue or remotely), keno and online Instant Kiwi, though Instant Kiwi overall (bought at a store or online) participation was 15.6% (Table 2 and Table 3).

Table 2 details gambling participation by activity at age 22 years for all respondents; online and land-based activities are detailed separately. Table 3 details gambling participation by activity at age 22 years for all respondents; online and land-based activities are combined. Figure 1 details activities across time for the 34 participants who gambled at all three timepoints.

		% of			% of
Gambling activity	Ν	responses	95%	CI	cases ¹¹
			Lower	Upper	
Bets with friends or family	60	7.7	5.3	10.1	39.0
Casino gaming machines	51	6.5	4.3	8.7	33.1
Pub gaming machines	46	5.9	3.8	8.0	29.9
Lotto from a store	38	4.8	2.9	6.7	24.7
Card games	32	4.1	2.3	5.9	20.8
Online Lotto	30	3.8	2.1	5.5	19.5
Mobile games	28	3.6	1.9	5.3	18.2
Casino table games	27	3.4	1.8	5.0	17.5
Online card games	23	2.9	1.4	4.4	14.9
Sports betting at NZ TAB online					
or TAB mobile app	23	2.9	1.4	4.4	14.9
Instant Kiwi from a store	19	2.4	1.0	3.8	12.3
Housie/bingo	18	2.3	0.9	3.7	11.7
Internet gambling	17	2.2	0.9	3.5	11.0
Sports betting at NZ TAB	16	2.0	0.7	3.3	10.4
Club gaming machines	12	1.5	0.4	2.6	7.8
Other gambling activity	8	1.0	0.1	1.9	5.2
Track gambling at NZ TAB					
online or TAB mobile app	7	0.9	0.0	1.8	4.5

 Table 2: Gambling participation by activity at age 22 years - all respondents

¹¹ Percentage of responses = distribution of all given answers and examine popularity of options relative to each other. Percentage of cases = proportion of participants selecting each option and shows prevalence of preferences in the overall sample.

		% of			% of
Gambling activity	Ν	responses	95%	CI	cases ¹¹
			Lower	Upper	
Keno	5	0.6	-0.1	1.3	3.2
Online Instant Kiwi	5	0.6	-0.1	1.3	3.2
Track gambling at NZ TAB	3	0.4	-0.2	1.0	1.9
None of the above	316	40.3	35.9	44.7	-
Total participants	468	100.0			303.9

N=470; Note: Multiple responses were allowed, thus can sum to more than the total.

Table 3: Gambling participation by activity at age 22 years (online and land-based activities combined) - all respondents

		% of			% of
Gambling activity	Ν	responses	95%	CI	cases ¹²
			Lower	Upper	
Bets with friends or family	60	7.7	5.3	10.1	39.0
Casino gaming machines	51	6.5	4.3	8.7	33.1
Lotto online and from a store	51	6.9	4.6	9.2	33.1
Pub gaming machines	46	5.9	3.8	8.0	29.9
Card games online and land-based	44	5.9	3.8	8.1	28.6
Mobile games	28	3.6	1.9	5.3	18.2
Sports betting online, app or TAB	28	3.8	2.0	5.5	18.2
Casino table games	27	3.4	1.8	5.0	17.5
Instant Kiwi online and from a store	24	3.2	1.6	4.8	15.6
Housie/bingo	18	2.3	0.9	3.7	11.7
Internet gambling	17	2.2	0.9	3.5	11.0
Club gaming machines	12	1.5	0.4	2.6	7.8
Other gambling activity	8	1.1	0.1	2.0	5.2
Track gambling online, app or TAB	7	0.9	0.1	1.8	4.5
Keno	5	0.6	-0.1	1.3	3.2
None of the above	316	40.3	35.9	44.7	-
Total participants	468	100.0			276.6

N=470; Note: Multiple responses were allowed, thus can sum to more than the total.

 $^{^{12}}$ Percentage of responses = distribution of all given answers and examine popularity of options relative to each other. Percentage of cases = proportion of participants selecting each option and shows prevalence of preferences in the overall sample.



Figure 1: Gambling participation - respondents who gambled at age 14, 17 and 22 years

n=34

Note: For 2022, some data were combined as they had not been separated in the earlier surveys. These included: card games and online card games, sports (match) betting and online sports betting, Lotto and online Lotto, Instant Kiwi and online Instant Kiwi.

Number of gambling activities

Of the 154 participants who gambled at age 22 years, the mean number of gambling activities was 3.04. However, almost one-third (31.8%) engaged in only one activity, and a further quarter (26%) engaged in two activities. Another 10.4% engaged in three activities, with the remainder of participants gambling on four to 13 different activities. Together, participants who engaged in either one or two activities account for 57.8% of all participants who gambled, while those who engaged in one to three activities account for 68.2% in total (Table 4).

Table 4: Number of gambing activities at age 22 years - gamblers only

	Mean		SD	Min.	Max.
	3.04		2.34	1	13
No. of gambling activities	Ν	%		Cu	nulative %
1	49	31.8			31.8
2	40	26.0			57.8
3	16	10.4			68.2
4	15	9.7			77.9
5	10	6.5			84.4
6	9	5.8			90.3
7	6	3.9			94.2
8	4	2.6			96.8
9	1	0.6			97.4
10	2	1.3			98.7
11	1	0.6			99.4
13	1	0.6			100.0
Total	154	100.0			

n=154

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Gender differences in gambling activity preferences

Overall, at age 22 years, 42.6% of the 216 males and 24.5% of the 253 females participated in gambling activities. However, of the 154 participants who engaged in gambling activities, 59.7% were male, and 40.3% were female. A Chi-square test of independence found a significant relationship between gender and participation in any gambling activities, $\chi 2 = 17.28$ (df = 1), p < 0.001. The odds ratio is 2.29, meaning that the odds of males gambling are about 2.29 times the odds of females gambling.

On average, male gamblers engaged in three gambling activities (M = 3.38, SD = 2.63) while female gamblers engaged in an average of two activities (M = 2.53, SD = 1.85).

Figure 2 shows that bets with friends or family was the most popular gambling activity for 22year-old males, as it had been when they were 17 years old (44% at both ages). However, at 22 years, this was closely followed by casino and pub electronic gaming machine (pokies) gambling (both 33%). For females, these same three activities were the most popular (32%, 34% and 26%, respectively). Buying Lotto from a store was the fourth most popular gambling activity for males (26%) and females (23%). A larger or similar percentage of males gambled on most gambling activities, compared with females, apart from online Lotto (17% male, 23% female), housie/bingo (6% male, 19% female), and club electronic gaming machines (5% male, 11% female).



Figure 2: Gambling participation by activity and gender at age 22 years - gamblers only

n=154

Ethnic differences in gambling activity preferences

Of the Samoan, Tongan, Cook Islands Māori and Niuean participants at age 22 years, about one-third from each group participated in gambling, with Niuean (35.7%) and Samoan (35.2%) participants showing the highest engagement rates, and Tongan participants (27.7%) the lowest (Table 5). However, a binary logistic regression found that ethnicity was not a significant predictor of engaging in gambling activities, $\chi 2 = 2.4$ (df = 3), p = 0.49.

	Ye	Yes		Total	
Ethnicity	n	%	N	%	
Samoan	80	35.2	227	100	
Cook Islands Māori	25	30.1	83	100	
Tongan	31	27.7	112	100	
Niuean	15	35.7	42	100	
Total	151	32.5	464	100	

 Table 5: Ethnic distribution of gambling activity engagement at age 22 years - all respondents

n=151; Note: Three participants who gambled did not identify with any of the four Pacific ethnic groups.

Gambling expenditure

Table 6 details median gambling expenditure on different gambling activities at age 22 years. Participants who gambled at age 22 years had the highest expenditure¹³ (median about \$75/month) on casino and club gaming machines and casino table games. This was followed by internet gambling, online sports betting, pub gaming machines, and gambling on mobile games (median about \$39.5/month). The least amount of money was on Instant Kiwi from a store (median about \$5/month). Gambling expenditure at age 22 years could not be compared with previous years as at 14- and 17-years participants were asked about expenditure per week.

Gambling activities	Ν	Mean	Median	Min.	Max.
Casino gaming machines	51	55.2	75	5	75
Club gaming machines	12	51.1	75	5	75
Casino table games	27	50.4	75	0	75
Internet gambling	16	47.2	39.5	14.5	75
Sports betting online	15	43.8	39.5	5	75
Pub gaming machines	46	42.8	39.5	0	75
Other gambling activity	8	38.5	24.5	5	75
Mobile games	28	39.2	39.5	5	75
Sports betting at NZ TAB	23	37.4	24.5	5	75
Track betting at NZ TAB	22	35.9	24.5	5	75
Online card games	3	34.8	24.5	5	75
Bets with friends or family	60	33.3	24.5	0	75
Card game	32	32.6	24.5	0	75
Online Lotto	29	25.5	24.5	5	75
Lotto from a store	38	22.6	24.5	5	75
Track betting online	6	22.3	14.5	0	75
Housie/bingo	18	18	19.5	5	39.5
Online Instant Kiwi	5	17.7	14.5	5	39.5
Keno	5	16.5	14.5	14.5	24.5
Instant Kiwi from a store	19	8.0	5	5	24.5

Table 6: Dollar monthly expenditure on gambling activities at age 22 years - gamblers only

n=154

¹³ Gambling expenditure was captured in dollar ranges. Values were assigned to each range category on a scale from 1 to 6. These categorical range data were then converted into midpoints. The mean average expenditure on activities was calculated using these midpoints to provide a best estimate of expenditure. Scale range: No expenditure = 0, Less than 10 = 10 = 10 to 19 = 14.5, 20 =

Gambling expenditure by gender and ethnicity

There were no statistically significant differences at age 22 years in gambling expenditure by gender (p = 0.20) or ethnicity (p = 0.77). For males and females, and the four main Pacific ethnicities (Samoan, Tongan, Cook Islands Māori and Niuean), the average monthly gambling expenditure ranged between \$30 and \$35.

Frequency of gambling

A majority participants at age 22 years reported engaging with most of the gambling activities less than once a month. However, exceptions included card games, sports betting, Lotto, Keno, club gaming machines (pokies), mobile phone gambling games, and internet gambling. For these activities, typical participation was more frequent. Keno was the activity with the highest frequency of engagement with 40% of keno gamblers participating at least weekly. The most common gambling activities, namely bets with family and friends and casino gaming machines, were relatively infrequently engaged in, with more than half (62.7% and 56.9%, respectively) participating less than monthly (Figure 3).

A similar pattern was observed at age 17 years with bets with family and friends being the most common gambling activity, with 67.1% participating less than monthly.

At age 17 years, betting on card games, housie/bingo and buying Lotto products were engaged in at least monthly to weekly at 41.9%, 45.2% and 41.6%, respectively. At age 22 years, there was an increase in the frequency of engagement in these activities:

- Card Games: An increase to 53% engaging at least monthly to weekly, indicating a rise in regular engagement.
- Housie/Bingo: Slight decrease to 44.4%.
- Lotto: Increased to 55.3%, showing that more participants engaged in buying Lotto tickets on a regular basis after they reached adulthood.



Figure 3: Frequency of gambling by activity at age 22 years - gamblers only

n=154

Note: Less than monthly = once or twice in the past 12 months / At least monthly = once in the last four weeks, and two or three times in the last four weeks / At least weekly = about once a week, several times a week, and most days

Frequency of gambling from age 17 years to age 22 years was examined using a Chi-square test of independence¹⁴. The results indicated no significant change in the frequency of gambling engagement over time, with a chi-square statistic of 25.18 (df = 25) and a p-value of 0.45. This suggests that the overall pattern of highest gambling frequency did not significantly differ between age 17 years and 22 years.

Frequency of gambling by gender and ethnicity

There were no differences in frequency of gambling by gender or ethnicity at age 22 years. The average time spent on gambling activities was at least monthly for both males and females, and the four main Pacific ethnicities.

Social context of gambling

At age 22 years, participants who gambled were asked with whom they usually gambled (multiple responses were allowed). The largest proportions gambled with family (50%) or friends (46.7%). One-fifth gambled alone (21.3%), and 14.7% gambled with their spouse or partner (10.5%). A minority gambled with other people they knew (4.7%) or with people they did not know (e.g. strangers met online, 2.0%) (Table 7).

Examination of data across ages 14, 17 and 22 years reveals that at each of these ages, the highest proportion of participants reported gambling primarily with family (57%, 49.2% and 50%, respectively), followed by friends (42%, 47.7% and 46.7%, respectively). There was an increase in participants gambling alone, rising from 5.2% at age 17 years to 21.3% at age 22 years, although 12% of participants reported gambling alone at age 14 years. Conversely, there was a decline in gambling with other known people, from 7% at age 14 and 17 years to 4.7% at age 22 years. Gambling with strangers slightly increased to two percent at age 22 years from 0.5% at age 17 years, although 2% of participants at age 14 years also reported gambling with strangers.

With whom gambled	Ν		95% CI	%	6 of cases	
		Lower	Upper	2020	2017	2014
Family	75	40.6	56.9	50.0	49.2	57.0
Friends	70	37.4	53.7	46.7	47.7	42.0
Alone	32	14.7	28.0	21.3	5.2	12.0
Spouse or partner	22	9.2	20.8	14.7		
Other known people	7	1.8	9.1	4.7	7.3	7.0
Strangers (e.g. people online)	3	0.4	5.6	2.0	0.5	2.0
Total	209			139.5	111.6	134.1

Table 7: With whom participants gambled at age 22 years - gamblers only

n=154

¹⁴ The frequency of gambling among participants at age 22 years was assessed by identifying the highest level of engagement reported across all gambling activities, measured on a scale from 1 to 6, where 1 indicates gambling once or twice in the past 12 months, and 6 represents gambling most days. The maximum frequency score from each participant at age 17 years and 22 years was used to analyse changes in frequency of gambling over time.

Gender differences in the social context of gambling

Figure 4 shows that compared with females, higher proportions of males at age 22 years gambled with friends (40% vs. 24%), alone (17% vs. 13%), and with other known people (5% vs. 1%). Only males gambled with strangers (2%). Females were more likely than males to gamble with family (45% vs. 30%) or with spouse/partner (17% vs. 6%).



Figure 4: With whom youth gambled by gender at age 22 years - gamblers only

n=154

Ethnic-specific differences in the social context of gambling

There were no major ethnic-specific differences in the social context of gambling at age 22 years. Although it may appear that there are some differences in Figure 5 below, this is due to some small sample sizes meaning that a single person may be represented by a relatively large percentage.

Figure 5: With whom youth gambled by ethnicity at age 22 years - gamblers only



n=154

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Worry over gambling, help-seeking and gambling harm

Worry over time or money spent gambling

Of the participants who gambled at age 22 years, slightly more than one-third (35.1%) reported some level of worry about the time or money that they spent gambling (Figure 6).

At age 14 years, 30% of gamblers reported some level of worry about the time and money spent on gambling. This was similar at age 17 years (27.8%) but increased slightly at age 22 years to 35%. The percentage of gamblers who reported 'a lot' of worry about their gambling doubled from age 17 years (4.4%) to 8.6% at age 22 years.



Figure 6: Worry over time or money spent on gambling at age 22 years - gamblers only

n=154

Help-seeking

From a list of nine options, gamblers at age 22 years were asked to indicate from whom they had sought help for their gambling in the prior year. Multiple responses were allowed.

Table 8 shows that overall, most participants (59.1%) had not sought help for their gambling. The most common sources of help for those who had sought it were informal such as a close family member (19.2%), spouse/partner (16.7%), friend (12.8%) or other family member such as a uncles (6.4%). Only two participants sought help from professional services, utilising the gambling helpline and a national face-to-face counselling service (Problem Gambling Foundation). Numbers of sources of help sought ranged from one to four, with 11.6% of gamblers accessing two or more sources.

At age 17 years, the most common source of help was friends (25.4%); at age 22 years, this had changed to close family member (19.2%).

Help seeking sources	Ν	% of responses	% of cases
Spouse or partner	13	11.8	16.7
Friend	10	9.1	12.8
Close family member	15	13.6	19.2
Other family members (e.g. aunts, uncles)	5	4.5	6.4
Gambling helpline	1	0.9	1.3
Problem Gambling Foundation	1	0.9	1.3
Salvation Army Oasis Centre	0	0.0	0.0
Gamblers Anonymous	0	0.0	0.0
Online services	0	0.0	0.0
Other support service	0	0.0	0.0
Wouldn't look for help	65	59.1	83.3
Total	110	100	141
n=154			

Table 8: Sources of help for gambling behaviours at age 22 years - gamblers only

Gambling harms (SGHS)

Gambling harms were measured using the 10-item Short Gambling Harms Screen (SGHS). Of the 152 respondents who engaged in gambling activities at age 22 years, 67.1% did not report any harm from their gambling. One-third (32.9%) of gamblers reported between one and eight Of these, 11.2% reported one harm, 11.8% reported two to three harms, and harms. 9.9% reported four to eight harms (Table 9). The three most common reported harms were: regrets about gambling (18.5%), reduction of available spending money (15.8%) and less recreational expenditure (15.8%). The severest harms such as having to sell personal items and increased credit card debt were only reported by a few participants (Table 10).

0	102		Lower	T
0	102		LUWU	Upper
0	102	67.1	59.6	74.6
1	17	11.2	6.2	16.2
2	9	5.9	2.2	9.7
3	9	5.9	2.2	9.7
4	5	3.3	0.5	6.1
5	4	2.6	0.1	5.2
6	1	0.7	0	1.9
7	2	1.3	0	3.1
8	3	2.0	0	4.2
Total	152	100		

Table 9. Gambling-related harms reported at age 22 years - gamblers only

n=154

Relationship between gambling frequency and expenditure with gambling harm

A binary logistic regression¹⁵ showed that average monthly gambling expenditure, and regular gambling (about once a week) are significant predictors of gambling harm. For every one unit increase in expenditure, the odds of experiencing gambling harm increased by about 2.0%, and participants who gambled about once a week had 3.3 times the odds of harm compared to participants who gambled once or twice in the last 12 months.

Distribution of gambling harms by gender and ethnicity

Examination of individual gambling harms by gender and ethnicity at age 22 years indicated that, overall, the most common harms, reported by between 11% and 19% of participants each were: regrets about gambling, reduced spending money, less recreational expenditure, shame, and reduction in savings. The least endorsed items reported by fewer than 5% of gamblers were increased credit card debt and selling of personal items because of gambling (Table 10).

0...1

Table 10: Gambling harm by	gender and ethn	icity at age 22 years	- gamblers only

SGHS Items	gan	All nblers		Male	F	'emale	Sa	amoan	Is	Cook slands Māori	Т	ongan	N	iuean
	Ν	%	n	%	n	%	n	%	n	%	n	%	n	%
Had regrets that made you feel sorry about your gambling Reduction of your available	27	18.5	18	22.2	9	13.8	11	17.2	3	14.3	7	20.6	6	18.8
spending money Less spending on recreational expenses such as eating out, going to the movies or other	23	15.8	14	17.3	9	13.8	9	14.1	2	9.5	7	20.6	5	15.6
entertainment	23	15.8	13	16.0	10	15.4	10	15.6	2	9.5	6	17.6	5	15.6
Felt ashamed of your gambling	18	12.3	11	13.6	7	10.8	8	12.5	2	9.5	5	14.7	3	9.4
Reduction of your savings	16	11.0	7	8.6	9	13.8	9	14.1	2	9.5	2	5.9	3	9.4
Felt like a failure	13	8.9	5	6.2	8	12.3	6	9.4	3	14.3	1	2.9	3	9.4
care about Felt distressed about your	11	7.5	7	8.6	4	6.2	5	7.8	2	9.5	3	8.8	1	3.1
gambling	11	7.5	5	6.2	6	9.2	3	4.7	3	14.3	1	2.9	4	12.5
Sold personal items	3	2.1	1	1.2	2	3.1	2	3.1	1	4.8	1	2.9	1	3.1
Increased credit card debit	1	0.7	0	0.0	1	1.5	1	1.6	1	4.8	1	2.9	1	3.1
Total	146		81		65		64		21		34		32	

n=154

Gender-specific differences in gambling harms

A Chi-square test of independence showed that there was no significant relationship between gender and harm from gambling at age 22 years, $\chi^2 = 0.77$, df = 1, p = 0.38. Twenty-seven percent of males reported some harm from their gambling, compared with 20.7% of females.

Ethnic-specific differences in gambling harms

Ethnicity was found to be significantly associated with harm from gambling, $\chi^2 = 8.4$, df = 3, p = 0.04 (Table 11). Tongan ethnicity was associated with 2.91 times the odds of experiencing some gambling harm, compared with Samoan ethnicity. Although not statistically significant,

¹⁵ Entering a binary of SGHS as outcome variable (0 = no harm, 1 = 1 + harms reported), and maximum gambling frequency indicated by each participant, and the monthly expenditure on gambling activities (using midpoints to calculate the average) as predictors.

the percentage of Niuean participants who scored 1 or more on the SHGS is substantially higher compared to Samoan participants; however, the lack of statistical significance is likely due to the smaller sample size within the Niuean group.

	Number of	% who scored	Odds	95% CI		
	gamblers	1+ on SGHS	ratio	Lower	Upper	p-value
Samoan	71	19.7	1.00			0.04
Cook Islands Māori	23	13.0	0.61	0.16	2.35	
Tongan	24	41.7	2.91	1.07	7.91	
Niuean	14	42.9	3.05	0.91	10.23	

Table 11. D!	. la minti a amal			
Table II: Binary	/ юуізпс япяг	vsis ot ethnicity	and gambung nari	n af age 22 vears
		,	and gamesting have	

Bold font indicates significance at the 0.05 level.

Gambling risk

Overall, at age 22 years, a majority of the 470 study participants (86.8%) did not gamble or did not gamble in a risky way. However, one in 38 (2.6%) scored as problem gamblers on the Problem Gambling Severity Index (PGSI), one in 22 (4.5%) scored as moderate risk gamblers and one-in-16 (6.1%) scored as low risk gamblers (Figure 7).

When examining the 154 gamblers only, the percentage who did not gamble in a risky way reduced to 62.5%, and one in 15 (6.8%) scored as problem gamblers, one in seven (13.8%) scored as moderate risk gamblers and one in six (17.1%) scored as low risk gamblers (Figure 7).

At age 14 and 17 years, a different, adolescent-specific, problem gambling screen was used due to the young age of participants; therefore, results are not directly comparable with participants aged 22 years. However, the percentage of gamblers scoring as problem gamblers substantially increased from 3.7% at age 14 years, and 4.7% at age 17 years to 6.8% at age 22 years.



Figure 7: Gambling risk level at age 22 years - all respondents and gamblers only

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Risky gambling by gender

Figure 8 shows data for participants who gambled, by gender at age 22 years. A higher percentage of females were non-problem gamblers compared with males, and lower percentages of females were low risk or moderate risk gamblers. The percentage of females who scored as problem gamblers was the same as for males (6.6%). A binary logistic regression analysis (where PGSI categories were collapsed into non-problem gambler and risky gambling [low risk, moderate risk and problem gambler combined]) indicated that gender is significantly associated with risky gambling (b = -0.76, SE = 0.28, df=1, p = 0.01, odds ratio = 0.46, 95% CI 0.27, 0.81). With an odds ratio of 0.46, females have about 54% lower odds of experiencing risk from gambling compared to males.



Figure 8: Gambling risk level by gender at age 22 years - gamblers only

Risky gambling by ethnicity

No significant relationship between ethnicity and risky gambling was found in gamblers at age 22 years, $\chi^2 = 4.3$, df = 3, p=0.26.

Relationship between gambling risk level and gambling harm

A Chi-square test of independence showed a strong relationship between risky gambling (PGSI score 1+) and harm from gambling (SGHS score 1+), $\chi^2 = 64.33$, df = 1, p < 0.001. Ninety-four percent of participants at age 22 years who reported harm from gambling also reported risky gambling (Figure 9). An odds ratio of 76.6 indicates that the odds of reporting both harm and risky gambling are much higher compared to not reporting either.



Figure 9: Gambling risk and gambling harm at age 22 years - gamblers only

n=154

Gambling transitions

There were five problem gamblers aged 14 years who were re-surveyed aged 17 and 22 years¹⁶. One remained a problem gambler at age 17 years but transitioned out of problem gambling at age 22 years. One transitioned out of problem gambling at age 17 years but relapsed to problem gambling at age 22 years. Three transitioned out of problem gambling after the age of 14 years.

Of the eight problem gamblers in 2022, who were surveyed in all three time periods, seven participants became problem gamblers for the first time.

These findings indicate fluctuations in gambling risk for some participants at different ages.

Coexisting issues and behaviours with risky gambling and gambling harm

Assessments were made of the coexistence of risky gambling (PGSI score 1+) and gambling harm (SGHS score 1+) with mental health (general psychological distress, depression and anxiety), wellbeing and quality of life, and externalising problem behaviours (i.e. behavioural and emotional problems).

Risky gambling and coexisting issues and behaviours

Using Spearman's rho, risky gambling was found to have a negative relationship with the physical health and environment subscales of the Quality-of-Life scale at age 22 years (Table 12).

Risky gambling had a positive correlation with externalising problem behaviours, and the three subscales of aggression, intrusion (i.e. intrusive thoughts, feelings and imagery), and rule breaking behaviour (Table 12).

¹⁶ The findings are indicative as different gambling screens were used for the earlier surveys, compared with when participants were 22 years old. There was also a proportion of missing data across the years.

	PGSI			
	Spearman's	95% CI	95% CI	
Co-existing variables	rho	Lower	Upper	
Mental wellbeing	-0.02	0.08	-0.11	
Anxiety	-0.01	0.08	-0.10	
General psychological distress	0.03	0.11	-0.06	
Depression	0.08	0.17	-0.01	
QOL Psychological health	-0.07	0.02	-0.16	
QOL Social Relationships	-0.02	0.06	-0.11	
QOL Physical health	-0.118*	-0.04	-0.20	
QOL Environment	-0.10*	-0.03	-0.19	
Externalisation	0.17**	0.25	0.08	
Aggressive behaviour	0.10*	0.19	0.01	
Intrusion	0.10*	0.19	0.02	
Rule breaking behaviour	0.25**	0.33	0.16	

Table 12: Risky gambling, coexisting issues and behaviours at age 22 years - gamblers only

n=458

**Significant at the 0.01 level, * Significant at the 0.05 level

A multiple logistic regression model entering variables significantly correlated with risky gambling in the bivariate correlation analysis found that when ASR Rule breaking behaviour, ASR Aggressive behaviour, ASR Intrusion, and QOL Physical health are entered into the model, then rule breaking behaviour¹⁷ is the only significant predictor. The odds ratio of 1.21 indicates that for each unit increase in rule-breaking behaviour, the odds of engaging in risky gambling increase by 21% (Table 13). This suggests that as rule-breaking behaviour increases, the likelihood of engaging in risky gambling also increases.

	95.0% CI							
	Odds ratio	Lower	Upper	p-value				
ASR Rule breaking behaviour	1.21	1.1	1.36	< 0.001				
ASR Aggressive behaviour scale	0.94	0.88	1.02	0.12				
ASR Intrusion scale	1.03	0.91	1.17	0.62				
QOL Physical Health	0.99	0.97	1.01	0.31				

Table 13: Multiple logistic	regression of risky	gambling and	coexisting issues	and behaviours

Bold font indicates significance.

Gambling harm and coexisting issues and behaviours

Using Spearman's rho, gambling harm was negatively correlated with the environment subscale of the Quality-of-Life scale (Table 14).

Gambling harm was found to have a positive correlation with the rule-breaking subscale of externalising problem behaviours at age 22 years. Harm from gambling was also positively correlated with depression (Table 14).

¹⁷ Due to multicollinearity, where the high correlation between predictors could adversely affect model estimation, only the three subscales of the Adult Self-Report (ASR) Externalisation scale were included as predictors, excluding the total ASR score that totals these subscales.

	SGHS		
	Spearman's	95% CI	95% CI
Co-existing variables	rho	Lower	Upper
Mental wellbeing	-0.02	0.17	-0.18
Anxiety	0.05	0.23	-0.13
General psychological distress	0.10	0.27	-0.09
Depression	0.18*	0.36	-0.01
QOL Psychological health	-0.06	0.12	-0.21
QOL Social Relationships	-0.02	0.21	-0.16
QOL Physical health	-0.15	0.03	-0.31
QOL Environment	-0.18*	0.00	-0.33
Externalisation	0.22*	0.37	0.03
Aggressive behaviour	0.13	0.30	-0.04
Intrusion	0.10	0.25	-0.11
Rule breaking behaviour	0.35**	0.48	0.20

Table 14: Gambling	harm, coexisting	issues and behaviours	at age 22 years -	gamblers only
9				

N=135

**Significant at the 0.01 level, * Significant at the 0.05 level

A multiple logistic regression model, entering variables significantly correlated with gambling harm in the bivariate correlation analysis found that when ASR Rule breaking behaviour, QOL Environment, and Depression are entered into the model, then rule breaking behaviour¹¹ is the only significant predictor (Table 15).

The odds ratio of 1.22 indicates that for each unit increase in rule-breaking behaviour, the odds of harm from gambling increase by 22%. This suggests that as rule-breaking behaviour increases, the likelihood of harm from gambling also increases.

Table 15: Multi	ole logistic i	regression of s	gambling harm.	. coexisting iss	ues and behaviours
				,	

	95.0% CI				
	Odds ratio	Lower	Upper	p-value	
ASR Rule breaking behaviour	1.22	1.07	1.39	< 0.001	
QOL Environment	0.97	0.87	1.08	0.54	
No depression (reference group)	1.00			0.80	
Mild depression	0.59	0.17	1.98		
Moderate depression	1.10	0.31	3.86		
Severe depression	0.79	0.15	4.21		

Bold font indicates significance.

Cultural identity and engagement, and risky gambling and gambling harm

Assessments were made of the coexistence of risky gambling (PGSI score 1+) and gambling harm (SGHS score 1+) with cultural identity and engagement at age 22 years, using the Pacific Identity and Wellbeing subscales of:

- Pacific Connectedness and Belonging
- Religious Centrality and Embeddedness
- Group Membership Evaluation
- Cultural Efficacy.

PIF Study: Young adult gambling behaviours and associated risk factors Auckland University of Technology, Gambling and Addictions Research Centre Final Report, 30 September 2024 The results indicated that there is no significant association between risky gambling or experiencing harm from gambling and the four subscales. In other words, there is no relationship with the cultural identity and engagement variables examined in this study.

Someone else's gambling and household problems

Overall, 8.7% of the 22-year-old participants reported that they had experienced problems (i.e. negative consequences) because of someone else's gambling in the past year. The most reported concern was sometimes worrying about the other person's gambling, endorsed by 78% of those who reported concern. This was followed by having to pay for it financially (26.8%), finding it hard to talk to anyone about the other person's gambling (17.1%) and being concerned about their or their family's safety (12.2%). Other concerns were reported by fewer than 5% of those experiencing negative consequences (Table 16). Mostly, the 'someone else' was a parent (53.3%), though other family members were also reported (Figure 10).

			95%	6 CI	% of
Effects of someone else's gambling [#]	n	%	Lower	Upper	cases
I worry about it sometimes	32	55.2	42.4	67.9	78.0
I am paying for it financially	11	19.0	8.8	29.1	26.8
It is hard to talk with anyone about it	7	12.1	3.7	20.5	17.1
I am concerned about my or my family's safety	5	8.6	1.4	15.8	12.2
It is affecting my health	2	3.4	0	8.1	4.9
Other effects	1	1.7	0	5.1	2.4
Total	58	100.0			141.5

Table 16: Effects of significant others' gambling on participants

[#]Multiple responses were allowed



Figure 10: Relationship to the significant other who gambled and caused problems

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Associations over time with gambling participation, risky gambling and gambling harm

Associations with gambling participation at age 22 years

Results of the bivariate correlation (Spearman's rho) found that participating in gambling activities at age 22 years had positive significant correlations with:

- Whether or not the participant engaged in gambling aged 17 years (rho = 0.18, p<0.001)
- Number of gambling activities participants engaged in aged 14 and 17 years (rho = 0.16, p <.001)
- Playing online games aged 14 years (rho = 0.13, p = 0.01).

The multiple logistic regression with imputed data found that playing online games at the age of 14 years showed indications (p = 0.06) of gambling engagement at age 22 years (χ^2 =24.28, df = 6, p < 0.001). Online gaming frequency overall did not predict gambling participation, but daily online gaming was a significant predictor (i.e. a risk factor) with an odds ratio of 2.24 (Table 17). Overall, daily online gaming stands out as a potential early indicator of future gambling engagement.

Engaging in gambling activities at age 17 years did not predict gambling at age 22 years, i.e. gambling at age 17 year was not a risk factor for gambling at age 22 years (Table 17).

	-				
	Odds	95% CI		p-	
	ratio	Lower	Upper	value	
Engaging in gambling activities (17 years)	1.57	0.85	2.90	0.15	
No. of gambling activities engaged in (17 years)	1.15	0.92	1.45	0.23	
Online games (14 years)				0.06	
Never (reference group)	1.00				
Monthly	1.18	0.63	2.22		
Weekly	1.65	0.90	3.02		
Several times a week	1.21	0.66	2.23		
Daily	2.24	1.28	3.93		

Table 17: Associations with gambling participation at age 22 years

Bold font indicates significance.

Associations with risky gambling at age 22 years

Results of the bivariate correlation (Spearman's rho) found that risky gambling at age 22 years had significant correlations with:

- Whether participants engaged in gambling activities at age 17 years (rho = 0.17, p < 0.001)
- Number of gambling activities the participants engaged in at age 17 years (rho = 0.18, p < 0.001)
- Trying e-cigarettes at age 17 years (rho = 0.12, p < 0.01)
- Smoking cigarettes at age 14 years (rho = 0.12, p < 0.01)
- Playing online games at age 14 and 17 years (rho = 0.14, p < 0.01)
- Chasing gambling losses at age 17 years (rho =0.15, p <0.001)
- Group Membership Evaluation subscale of the Pacific Identity and Wellbeing (PIWBR-R) scale at age 17 years (rho = 0.11, p = 0.02)
- Rule breaking behaviour at age 17 years (rho = 0.10, p = 0.04)
- Wearing gang colours at age 17 years (rho = 0.10, p = 0.03).

The multiple logistic regression with imputed data, using the forwards selection method, found that the model with the strongest predictors of risky gambling at age 22 years ($\chi^2 = 5.0$, df = 1, p = 0.02; Table 18) were:

- Number of gambling activities engaged in aged 17 years
- Smoking cigarettes at age 14 years
- Online gaming at age 14 years
- Group Membership Evaluation subscale of the PIWBR-R scale at age 17 years.

Engaging in multiple gambling activities at age 17 years increased the odds of gambling in a risky manner at age 22 years (odds ratio 1.43). This means that for each additional gambling activity engaged in at age 17 years, the odds of engaging in risky gambling at age 22 years increase by 43%.

Respondents who had smoked cigarettes at age 14 years had 2.53 times the odds of gambling in a risky manner at age 22 years, compared to non-smokers.

Weekly online gaming at age 14 years was associated with 3.06 times the odds of gambling in a risky manner at age 22 years, compared to non-online gamers. Those who gamed several times a week had 2.73 times the odds of risky gambling, while daily gamers had 3.45 times the odds.

A higher score on the Group Membership Evaluation subscale (i.e. feeling positive about being a Pacific person) at age 17 years was associated with 1.58 times the odds of gambling in a risky manner at age 22 years.

		95% CI		
	Odds ratio	Lower	Upper	p-value
Number of gambling activities (17 years)	1.43	1.18	1.72	<0.001
Smoking (14 years)	2.53	1.27	5.05	0.01
Online games (14 years)				0.04
Never	1.00			
Monthly	1.72	0.63	4.66	
Weekly	3.06	1.26	7.42	
Several times a week	2.73	1.11	6.73	
Daily	3.45	1.48	8.04	
(PIWBR-R) GME	1.58	1.02	2.44	0.04

Table 18: Associations with risky gambling aged 22 years

(PIWBR-R) GME: Pacific identity and wellbeing scale, Group Membership Evaluation subscale Bold font indicates significance.

Associations with gambling harm at age 22 years

Results of the bivariate correlation (Spearman's rho) found that experiencing one or more gambling-related harms at age 22 years had significant correlations with:

- Engaging in gambling activities at age 17 years (rho = 0.15, p < 0.001)
- Number of gambling activities engaged in at age 17 years (rho = 0.15, p < 0.001)
- Frequency of engagement in gambling activities at age 17 years (rho = 0.10, p = 0.03)
- Smoking cigarettes at age 14 and 17 years (14 years: rho = 0.11, p = 0.02, 17 years: rho = 0.10, p = 0.04)
- Drinking alcohol at age 17 years (rho = 0.11, p = 0.02)
- Wearing gang colours at age 17 years (rho = 0.10, p = 0.05)

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- Chasing gambling losses at age 17 years (rho = 0.10, p = 0.03)
- Lying to family about gambling at age 17 years (rho = 0.11, p = 0.01)
- Playing online games at age 14 and 17 years (14 years: rho = 0.14, p < 0.01, 17 years: rho = 0.13, p = 0.01)
- Bullying others online at age 14 years (rho = 0.10, p = 0.04)
- Exhibiting rule breaking behaviour at age 17 years (rho = 0.13, p = 0.01).

The multiple logistic regression with imputed data, using the forwards selection method, found that the model with the strongest predictors of experiencing harm from gambling at age 22 years ($\chi^2 = 4.6$, df = 1, p = 0.03; Table 19) were:

- Number of gambling activities engaged in at age 17 years
- Drinking alcohol at age 17 years
- Online gaming at age 14 years.

Engaging in more gambling activities at age 17 years increased the odds by 1.37 times of experiencing harm from gambling at age 22 years. This means that for each additional gambling activity engaged in at age 17 years, the odds of harm from gambling at age 22 years increase by 37%.

Participants who drank alcohol at age 17 years had 2.13 times the odds of experiencing harm from gambling at age 22 years, compared to non-drinkers.

Weekly online gaming at age 14 years had 3.18 times the odds of experiencing harm from gambling at age 22 years, compared to non-gamers. Daily gamers had 3.41 times the odds of experiencing harm from gambling.

		95% CI		
	Odds ratio	Lower	Upper	p-value
Number of gambling activities (17 years)	1.37	1.13	1.68	<0.001
Drinking alcohol (17 years)	2.13	1.03	4.39	0.04
Online games (14 years)				0.04
Never	1.00			
Monthly	1.18	0.37	3.80	
Weekly	3.18	1.19	8.46	
Several times a week	1.74	0.61	4.95	
Daily	3.41	1.36	8.52	

Table 19: Associations with gambling harm aged 22 years

Bold font indicates significance.

SUMMARY AND DISCUSSION

The longitudinal birth cohort Pacific Islands Families (PIF) study commenced in the year 2000 and, in 2022, the cohort was 22 years old. Data collection in 2022 provided the first opportunity to examine gambling behaviours of the young PIF study adults when they were legally able to participate in all gambling activities available in New Zealand. Due to the longitudinal nature of the study, it was also possible to investigate relationships between gambling and other behaviours when the participants were aged 14 and 17 years (when most commercial gambling activities were not legally available) to identify changes in behaviour over time and potential predictors for gambling behaviours and risky gambling as young adults.

This Discussion chapter has been framed around the six study aims.

- 1) Assess gambling participation, risky gambling and gambling-related harms among Pacific peoples who had recently become adults, with legal access to all gambling activities.
- 2) Identify gender and ethnic differences, and assess co-existence with mental health, and cultural identity and engagement.
- 3) Assess help-seeking behaviours.
- 4) Examine changes in gambling behaviours and risky gambling over time, from age 14 years to 22 years.
- 5) Identify possible risk and protective factors for gambling and risky gambling using data collected when the participants were younger.
- 6) Identify gambling behaviours of parents and negative effects.

Aims 1 and 2: Gambling participation, risky gambling and gambling-related harms including gender and ethnic differences, and changes over time

Overall, one-in-three (32.8%) of the young Pacific adults aged 22 years reported having gambled in the prior year. A greater proportion of males (42.6%) gambled compared with females (24.5%). When compared with the general Pacific population aged 16 to 24 years, the participation prevalence for males was similar (47.7%) but showed a substantial difference for females (43.9%) (Te Hiringa Hauora & Kupe, 2020). The reason for the lower gambling participation among females in the current study is unknown, but methodological differences in the studies is likely to be a contributing factor, as well as the wider age range in the general population study.

Informal betting with friends and family remained the most common reported gambling activity at age 22 years, as it had been at age 14 and 17 years when most commercial gambling activities were not legally available. However, at age 22 years, casino and pub gaming machines were the next most popular gambling activities, indicating that once such activities become legal, young Pacific adults accessed them, although informal betting remained the most popular gambling activity. The reason why is unknown but may relate to the social nature of this type of gambling. Of note is that when participation in Lotto tickets bought online or in store were combined, the percentage was the same as for casino gaming machine gambling. A larger or similar percentage of males compared with females gambled on most gambling activities, apart from a few chance-based activities such as online Lotto and housie/bingo, which were more preferred by females. Many studies have shown a preference for luck-based gambling among females compared with males who prefer games with elements of actual or perceived skill (e.g. Hing et al., 2014, 2016; Romild et al., 2016). However, of interest is that those studies usually also indicated a female preference for gaming machines, compared with males, yet this was not seen in the current study for casino and pub gaming machines. It was, however, noted for club gaming machines, perhaps due to clubs providing a

perceived safer or more family friendly space to gamble. Females in the current study were most likely to gamble with family members or spouse/ partner, whereas males were more likely to gamble with friends, alone or with other known people. No ethnic differences in gambling activities preferences were identified.

The highest median monthly expenditure was noted for casino and club gaming machines and casino table games, estimated at about \$75/month. This is not surprising given that these are fast paced gambling activities where high stakes can be placed rapidly and continuously. Of interest is that the median monthly expenditure on pub gaming machines was estimated at half the amount, \$39.50. It may be that other activities are also undertaken at pubs such as eating a meal or consuming alcohol, though this could also be true of a club or casino environment. No gender or ethnic differences in gambling expenditure were identified.

Gambling behaviours at 22 years were generally infrequent occurring less than monthly, and the median number of activities engaged in was three for males and two for females. Together with the low prevalence for gambling overall, this indicates that gambling is not a major pastime for most of the 22-year-old participants in this study. However, for those who gambled, some warning signs for potential or actual risky gambling behaviours included gambling alone (especially males) and gambling on high frequency activities such as casino tables and gaming machines. No gender or ethnic differences in gambling frequency were identified.

Overall, in the current study, about one-in-eight (13.2%) of the young adult Pacific participants were classified as risky gamblers, scoring as low risk, moderate risk or problem gambler on the PGSI. This was almost twice as high as the prevalence noted for Pacific peoples overall in the 2020 Health and Lifestyles Survey (7.4%; Te Hiringa Hauora & Kupe, 2020). However, a population level study that includes Pacific adults of all ages from 16 years is not directly comparable with a study examining young adults aged 22 years, who have only had two years of legal access to casinos and four years of legal access to community gaming machines. Edgerton et al. (2014), in a longitudinal study of young Canadian adults who were aged 18 to 20 years at the start of the study, identified that problem gambling appeared transitory, and postulated that this might be due to exposure and adaptation effects whereby young adults partake in gambling activities when they are legally able to do so because these activities have become available and accessible to them. Due to the novelty, they may initially gamble more but, over time, they transition to other pastimes. Edgerton et al. (2014) identified that males had higher levels of problem severity than females. This was also noted in the current study with females having about half the odds for risky gambling, compared with males.

Of the study participants who had gambled in the past year, the prevalence of risky gambling was about one-in-three (37.7%). A similar percentage (35.1%) reported being worried about their gambling with 8.6% being worried 'a lot'. This was double the percentage who were worried 'a lot' at age 17 years and may reflect the uptake in participation of electronic gaming machine gambling, which is known to be one of the most harmful gambling activities when undertaken regularly. Also similar was the percentage who reported harms from their gambling (32.9%). While respondents reported up to eight harms, the highest proportion (11.2%) only reported one harm. Most harms were those which could be considered more immediate in nature such as feelings of regret or shame (emotional or psychological harms), or reduced spending money for recreational purposes (financial harms). Fewer than 5% of gamblers reported serious financial harms such as having to sell personal items to gamble or increased credit card debt. There was a strong relationship between scoring as a risky gambler and reporting some level of gambling harm with a 94% correlation. This finding for the young Pacific adults in this study was similar to the results of an Australian population level study that identified that both the PGSI and the SGHS estimate similar levels of gambling harm (Browne et al., 2022). Although there were no gender differences in experiencing harm from gambling, Tongan ethnicity was associated with almost three times the odds for experiencing gamblingrelated harm compared with Samoan ethnicity.

Aim 2: Co-existence with mental health, and cultural identity and engagement

Risky gambling at age 22 years appeared to be associated with a lower perceived quality of life due to physical health and because of one's environment. Continuing to experience a low quality of life has previously been identified as being associated with becoming a risky gambler in the New Zealand population (Bellringer et al., 2024). Although that study did not look at ethnic differences, it appears that Pacific adults are similar to the general population in relation to low quality of life and risky gambling.

Risky gambling was also positively associated with externalising problem behaviours such as aggression, rule breaking and intrusion (i.e. intrusive thoughts, feelings and imagery). However, only **rule breaking behaviour predicted risky gambling. It also predicted harms from gambling, as did depression.** Rule breaking behaviour is one of a suite of emotion regulation behaviours. A recent systematic review found that lower emotion regulation (i.e. heightened externalised behaviours) was associated with greater symptomatology of gambling and gaming disorder (Marchica et al., 2019), again indicating that the finding in our study is not specific to Pacific peoples.

No relationship was found between risky gambling or experiencing harms from gambling and cultural identity or engagement.

Aim 3: Help-seeking behaviours

Whilst most of the 22-year-old gamblers had not sought any help for their gambling, the twofifths who had sought help mostly accessed informal sources of advice from a close family member, spouse or partner, or friend. This finding was similar to that found among these participants at age 17 years, although at that age, the most common source of help was friends. Only two participants had sought help from a gambling treatment professional. It is of note that both services accessed were national mainstream gambling services rather than a Pacificspecific service. Whilst the reason for this is unknown, it is possibly related to lower awareness of regional ethnic-specific services compared with national services. These findings also reflect the global phenomenon of low help seeking rates by gamblers accessing professional services (Loy et al., 2019).

Given the relatively small proportion of gambler participants in the problem gambling category, and that most of the reported harms were emotional/psychological in nature or immediate nonsevere financial harms, it is unsurprising that most help should be sought from trusted people known to the participants. This creates a public health opportunity to support increased gambling harm literacy amongst the general population (and particularly amongst Pacific peoples given the persistent inequitable experience of gambling harms by Pacific peoples), on how to recognise signs of risky gambling behaviours or gambling harms and how to effectively support a person to change their gambling behaviours. Bond et al. (2016) conducted a Delphi study with experts comprising people with lived experience, gambling treatment professionals and gambling researchers to identify how a non-professional could help someone with gambling problems. This led to the development of mental health first aid guidelines for gambling harm in Australia (Mental Health First Aid Australia website). There do not appear to be similar guidelines in New Zealand although Mental Health First Aid Aotearoa (website) offers a two-day course on how to assist someone with a mental health challenge or crisis. Gambling harm is among a list of six common mental health challenges (depression, anxiety, psychosis, eating disorders, gambling harm and problematic substance use). Particularly in a Pacific context, which is a collective rather than individualistic culture, a holistic approach to empowering communities to respond to harmful issues such as risky gambling is likely to be the best approach. An example could be Mana Pasifika, which is a collaborative wellbeing approach embedded in Pacific values and culture that enables and empowers Pacific peoples to find solutions to issues by Pacific peoples, for Pacific peoples, with Pacific peoples (Mapu Maia website). This would align with the Ministry of Health's Te Mana Ola Pacific Health Strategy (2023), which has five priority areas to reduce inequitable health outcomes for Pacific peoples including "population health, by working with communities to build, maintain and enable strong foundations for Pacific health and well-being" (Ministry of Health, 2023).

Aims 4 and 5: Risk factors for gambling, risky gambling and gambling harms

Daily online gaming at age 14 years was identified as a significant predictor for gambling participation at age 22 years, with more than twice the odds than never gaming online at age 14 years. Online gaming at age 14 years was also strongly predictive of risky gambling behaviours and experiencing gambling harms at age 22 years and not only included daily but weekly online gaming. This finding builds on recent research from Norway, which identified that problematic video gaming seemed to be a "gateway" to subsequent problematic gambling in adults aged 16 to 74 years (Molde et al., 2019). Subsequently, Delfabbro and King (2020), in a review of available evidence, suggested that there is a lack of "convincing evidence" for the gateway hypothesis as any correlations could be due to demographic and personality traits; they recommended further longitudinal research is conducted to understand the nature of the relationship.

Other factors predictive of risky gambling at age 22 years related to smoking cigarettes at age 14 years (but not at age 17 years), while drinking alcohol at age 17 years was predictive of experiencing gambling harm at age 22 years. These relationships may be related to factors such as a predilection for risk taking behaviours or to behave outside the social norm (Hayatbakhsh et al., 2012).

Feeling positive about being a Pacific person at age 17 years was also predictive of risky gambling at age 22 years. Although this finding requires further research to understand the implications, it could be related to some Pacific cultural practices inadvertently leading to risky gambling behaviours in order to be able to contribute to the collective/community. Examples include the practice of gift-giving and gambling based fund-raising and a relationship to commercial gambling to try to obtain additional income (Fehoko et al., 2023; Kolandai-Matchett et al., 2017; Urale et al., 2015) or to elevate status (Fehoko et al., 2023). Status elevation is of especial importance to Tongan males (Fehoko et al., 2023) and this may be part of the explanation for the higher odds for experiencing gambling harm noted for Tongan participants in this study compared with Samoan participants.

Gambling on multiple activities at age 17 years was also predictive of risky gambling and gambling harm at age 22 years. It is well known that risky gambling is associated with gambling on multiple activities (e.g. Abbott et al., 2014b) and that although gamblers transition between different levels of risk over time, many stay at relatively similar levels of risk (e.g. Abbott et al., 2018). It may be that in the current study, participants who gambled on multiple activities at age 17 years when many commercial gambling activities were not legally available, continued their behaviours at age 22 years when all gambling activities were available including more harmful activities such as those that are continuous or very rapid in

nature, for example gaming machines, leading to risky gambling behaviours and gambling harm.

No protective factors for risky gambling or gambling harms were identified in the current study.

Aim 6: Someone else's gambling and household problems

A substantial minority (about one-in-eleven; 8.7%) of the 22-year-old participants reported experiencing negative consequences due to someone else's gambling in their household. Generally, this was due to parental gambling though other family members were also the cause of the household gambling harms. The biggest concern for the study participants was worrying about the other person's gambling behaviour, though financial harms were also reported, affecting about one-quarter of those who had experienced negative consequences. This rate of experiencing household level harm from someone else's gambling was the same as that reported in 2020 for Pacific peoples in the nationally representative Health and Lifestyles Survey (Te Hiringa Hauora & Kupe, 2020) and almost double that reported for the general population (4.5%; Te Hiringa Hauora & Kupe, 2020) indicating inequitable distribution of household level gambling harms amongst Pacific families.

Strengths and limitations

A strength of this study is that all participants are of Pacific descent allowing sub-group analyses by the major Pacific ethnicities, something that is not usually possible with general population studies. A further strength is the longitudinal nature of the study and that participants have been asked gambling questions at several timepoints during adolescence as well as at age 22 years. However, this has led to an inherent limitation in that in the adolescent years, the gambling questions asked of participants were simpler and fewer than when they were 22 years old, and at age 14 and 17 years an adolescent gambling screen was used, whilst the PGSI was used at age 22 years. These methodological differences mean that longitudinal findings about gambling behaviour are indicative only and are not directly comparable. Nonetheless, trends in gambling behaviours are apparent and associations with early behaviours such as online gaming and risky gambling have been identified, which would not be possible from cross-sectional studies.

Conclusion

Gambling participation by the 22-year-old PIF study participants was low with only one in three having gambled in the past year, with the gambling generally being infrequent. The most popular activity was informal betting with family and friends, although gaming machines were the next most popular activities. Despite the low participation in gambling activities, the prevalence of risky gambling was high with one in eight in this category, and one in three gamblers reporting experiencing harms from their gambling. Few gender or ethnic differences were noted and changes over time were as expected given the increasing age of participants and increased access to commercial gambling activities. Associations with mental health and risk factors for risky gambling and gambling harms were generally as would be expected among general population samples and, thus, were not specific to Pacific young adults.

However, an area identified for possible early intervention specific to Pacific peoples relates to supporting increased gambling harm literacy on how to recognise signs of risky gambling behaviours or gambling harms and how to effectively support a person to change their gambling behaviours. This could be aligned with the Ministry of Health's Te Mana Ola Pacific Health Strategy (2023), to reduce inequitable health outcomes for Pacific peoples. How this can be understood and then addressed will be best suited to a by 'Pacific, with Pacific, for Pacific' approach.

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APPENDIX 1: GAMBLING-RELATED QUESTIONS

Gambling behaviour

- 1. In the <u>past 12 months</u> have you bet/spent money on....?
 - 1.1. Card game? (Yes/No) Do not include online card games
 - 1.1.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.1.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.2. <u>Online card game, e.g. via the internet through a PC, laptop, tablet, smartphone or other handheld device? (Yes/No)</u>
 - 1.2.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.2.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.3. Sporting event through the <u>New Zealand TAB or at a TAB at a sporting event</u>? (Yes/No)
 - 1.3.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.3.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.4. Sporting event through the <u>New Zealand TAB online or by using the TAB mobile</u> <u>app</u>? (Yes/No)
 - 1.4.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.4.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.5. Track event (e.g. horse or dog racing) through the <u>New Zealand TAB or at a TAB</u> <u>track event</u>? (Yes/No)
 - 1.5.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.5.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days

- 1.6. Track event (e.g. horse or dog racing) through the <u>New Zealand TAB online or by</u> <u>using the TAB mobile app</u>? (Yes/No)
 - 1.6.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.6.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.7. Housie/bingo? (Yes/No)
 - 1.7.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.7.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.8. Lotto (including Strike and Powerball) from a store? (Yes/No)
 - 1.8.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.8.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.9. Lotto (including Strike and Powerball) <u>online from the MyLotto website (e.g. using a laptop, tablet or smartphone</u>? (Yes/No)
 - 1.9.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.9.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.10. Keno? (Yes/No)
 - 1.10.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 1.10.2. How often do you take part in this activity?
 - (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.11. Instant Kiwi (scratchies) from a store? (Yes/No)
 - 1.11.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.11.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days

- 1.12. Instant Kiwi (scratchies) <u>online from the MyLotto website (e.g. using a laptop,</u> <u>tablet or smartphone</u>? (Yes/No)
 - 1.12.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.12.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.13. Casino table games at any of New Zealand's 6 casinos? (Yes/No)
 - 1.13.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.13.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.14. Casino pokies (electronic gaming machines) at any of New Zealand's 6 casinos? (Yes/No)
 - 1.14.1. If Yes, how much money would you usually spend each month?
 - (Nothing / Less than \$10 / \$10 \$19 / \$20 \$29 / \$30 \$49 / \$50 or more) 1.14.2. How often do you take part in this activity?
 - (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.15.3. On an average day when you play pokies at a New Zealand casino, how long do you play for? (less than 1 hour / 1-2 hours / 3 or more hours)
- 1.15. Pokie machines (electronic gaming machines) at a pub? (Yes/No)
 - 1.15.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.15.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.15.3. On an average day when you play pokies at a pub, how long do you play for? (less than 1 hour / 1-2 hours / 3 or more hours)
- 1.16. Pokie machines (electronic gaming machines) at a club? (Yes/No)
 - 1.16.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.16.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
 - 1.15.3. On an average day when you play pokies at a club, how long do you play for? (less than 1 hour / 1-2 hours / 3 or more hours)

- 1.17. Games for money on a mobile phone/tablet? (Yes/No)
 - 1.17.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.17.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.18. Internet gambling (e.g. internet casinos or poker)? (Yes/No) **Do not include MyLotto website or NZ Tab online gambling**
 - 1.18.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.18.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.19. Bets with friends or family? (Yes/No)
 - 1.19.1. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.19.2. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 1.20. Any other gambling activity? (Yes/No)
 - 1.20.1. Please say what this is.....
 - 1.20.2. If Yes, how much money would you usually spend each month? (Nothing / Less than \$10 / \$10 - \$19 / \$20 - \$29 / \$30 - \$49 / \$50 or more)
 - 1.20.3. How often do you take part in this activity? (Once or twice in the past 12 months / Once in the last 4 weeks / Two or three times in the last 4 weeks / About once a week / Several times a week / Most days
- 2. Thinking about the sorts of gambling activities just mentioned, which is the gambling activity that you most prefer? (Options as in 1.1 to 1.20)
- 3. When you do these activities or gamble, who do you usually do it with? (Choose as many as you need)
 - a) Friends
 - b) Family
 - c) Spouse or partner?
 - d) Other people I know
 - e) Other people I don't know (e.g. people online)
 - f) By myself
 - All YES/NO response

- 4. Are you worried about how much time or money you spend on these activities or gambling?
 - a) A lot
 - b) Some
 - c) A little
 - d) Not at all
- 5. Have you ever tried to cut down or give up gambling or any of these activities?

YES/NO response

- 6. In the past year have you been to any of these people for help because of your gambling? (Choose as many as you need)
 - a) Spouse or partner
 - b) Friend
 - c) Close family member
 - d) Other family members (e.g. grandparent, aunts, uncles, cousins)
 - e) Gambling helpline
 - f) Problem Gambling Foundation
 - g) Salvation Army Oasis Centres
 - h) Gamblers Anonymous
 - i) Online/internet based service
 - j) Other support service (please specify.....)
 - k) I wouldn't look for help

All YES/NO response

Problem Gambling Severity Index

- 7. Thinking about the past 12 months, please rate how often you exhibit or do the following behaviours (never / sometimes / most of the time / almost always)¹⁸.
 - a. How often have you bet more than you could really afford to lose?
 - b. How often have you needed to gamble with larger amounts of money to get the same feeling of excitement?
 - c. How often have you gone back another day to try to win back the money you lost?
 - d. How often have you borrowed money or sold anything to get money to gamble?
 - e. How often have you felt that you might have a problem with gambling?
 - f. How often have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
 - g. How often have you felt guilty about the way you gamble, or what happens when you gamble?

¹⁸ Scoring: Never = 0, Sometimes = 1, Most of the time = 2, Almost always = 3. A total score of 0 = non-problem gambler, 1-2 = low risk gambler, 3-7 = moderate risk gambler, 8+= problem gambler.

- h. How often has your gambling caused you any health problems, including stress or anxiety?
- i. How often has your gambling caused any financial problems for you or your household?
- j. How often have you wanted to stop betting money or gambling but didn't think you could?

Short Gambling Harm Screen

- These next questions are about how gambling can affect people in a negative way. In the last 12 months, have you experienced any of the following issues as a result of your gambling? (Yes/No)
 - a. Reduction of your available spending money?
 - b. Reduction of your savings?
 - c. Less spending on recreational expenses such as eating out, going to the movies or other entertainment?
 - d. Had regrets that made you feel sorry about your gambling?
 - e. Felt ashamed of your gambling?
 - f. Sold personal items?
 - g. Increased credit card debt?
 - h. Spent less time with people you care about?
 - i. Felt distressed about your gambling?
 - j. Felt like a failure?

Someone else's gambling

- 9. Have you had problems because of <u>someone else's</u> gambling in the last 12 months? (Yes/No)
 - k. If Yes to Q9, can you say what kind of gambling was involved? (Choose as many as you need)
 - Lotto (including Strike and Powerball) at a store or MyLotto
 - Keno (not in a casino)
 - Instant Kiwi (scratchies) at a store or MyLotto
 - Housie/bingo
 - Track event (horse or dog racing) at NZ TAB or online
 - Sporting event at NZ TAB or online
 - Gaming machines or pokies at the casino
 - Table games or any other games at the casino
 - Gaming machines or pokies in a pub (not the casino or clubs)
 - Gaming machines or pokies in a club (not the casino or pubs)
 - Internet-based gambling (<u>not</u> including MyLotto or NZ TAB online gambling)
 - Other gambling activity. *Please specify:*
 - Not sure/don't know

- 1. If Yes to Q9, how would you describe the effect of that person's gambling on you? (Choose as many as you need)
 - I worry about it sometimes
 - It is affecting my health
 - It is hard to talk with anyone about it
 - I am concerned about my or my family's safety
 - I am paying for it financially
 - Other. Please specify:
- m. If Yes to Q9, what relationship is that person to you? (Choose as many as you need)
 - Spouse or partner
 - Parent
 - Sibling (brother or sister)
 - Uncle or Aunt
 - Aiga or extended family member
 - Friend
 - Work colleague
 - Other. Specify:

APPENDIX 2: OTHER SURVEY QUESTIONS

Ethnicity

Mental distress and wellbeing

General psychological distress

The following questions are about any distressing feelings you may have had recently. In the past four weeks, about how often did you... (Response options for each item: None of the time / A little of the time / Some of the time / Most of the time /All of the time)

Feel tired out for no good reason? Feel nervous? Feel hopeless? Feel restless or fidgety? Feel so restless you could not sit still? Feel depressed? Feel that everything was an effort? Feel worthless? Feel so nervous that nothing could calm you down? Feel so depressed that nothing could cheer you up?

General anxiety

Over the last two weeks, how often have you been bothered by the following problems? (Response options for each item: Not at all / Several days / More than half the days / Nearly every day).

Feeling nervous, anxious or on edge

Not being able to stop or control worrying

Worrying too much about different things

Trouble relaxing

Being so restless that it is hard to sit still

Becoming easily annoyed or irritable

Feeling afraid as if something awful might happen

Depression

Which statement in each set best describes the way you have been feeling during the past two weeks, including today:

I do not feel sad I feel sad most of the time I am sad all the time I am so sad or unhappy that I can't stand it

I am not discouraged about my future I feel more discouraged about my future than I used to I do not expect things to work out for me I feel my future is hopeless and will only get worse

I do not feel like a failure I have failed more than I should have As I look back, I see a lot of failures I feel I am a total failure as a person

I get as much pleasure as I ever did from the things I enjoy I don't enjoy things as much as I used to I get very little pleasure from the things I used to enjoy I can't get any pleasure from the things I used to enjoy

I don't feel particularly guilty I feel guilty over many things I have done or should have done I feel quite guilty most of the time I feel guilty all of the time

I don't feel I am being punished I feel I may be punished I expect to be punished I feel I am being punished

I feel the same about myself as ever I have lost confidence in myself I am disappointed in myself I dislike myself

I don't criticise or blame myself more than usual I am more critical of myself than I used to be I criticize myself for all of my faults I blame myself for everything bad that happens I don't have any thoughts of killing myself I have thoughts of killing myself, but I would not carry them out I would like to kill myself I would kill myself if I had the chance

I don't cry any more than I used to I cry more than I used to I cry over every little thing I feel like crying, but I can't

I am no more restless or wound up than usual I feel more restless or wound up than usual I am so restless or agitated that it's hard to stay still I am so restless or agitated that I have to keep moving or doing something

I have not lost interest in other people or activities I am less interested in other people or things than before I have lost most of my interest in other people or things It's hard to get interested in anything

I make decisions about as well as ever I find it more difficult to make decisions than usual I have much greater difficulty in making decisions than I used to I have trouble making any decisions

I do not feel I am worthless I don't consider myself as worthwhile and useful as I used to I feel more worthless as compared to others I feel utterly worthless

I have as much energy as ever I have less energy than I used to have I don't have enough energy to do very much I don't have enough energy to do anything

I have not experienced any change in my sleeping patterns I sleep a lot more than usual I sleep somewhat more than usual I sleep somewhat less than usual I sleep a lot less than usual I sleep most of the day I wake up 1-2 hours early and can't get back to sleep I am not more irritable than usual I am more irritable than usual I am much more irritable than usual I am irritable all the time

I have not experienced any change in my appetite My appetite is much smaller than before My appetite is somewhat smaller than usual My appetite is somewhat greater than usual My appetite is much greater than usual I have no appetite at all I crave food all the time

I can concentrate as well as ever I can't concentrate as well as usual It's hard to keep my mind on anything for very long I find I can't concentrate on anything

I am no more tired or fatigued than usual I get more tired or fatigued more easily than usual I am too tired or fatigued to do a lot of the things I used to do I am too tired or fatigued to do most of the things I used to do

I have not noticed any recent change in my interest in sex I am less interested in sex than I used to be I am much less interested in sex now I have lost interest in sex completely

Externalising problem behaviours

Which answer best describes your behaviour over the past 6 months. (Response options for each item: Not true / Somewhat or sometimes true / Very true or often true)

Aggression

I argue a lot I blame others for my problems I am mean to others I get along badly with my family I get in many fights My moods swing between elation and depression I physically attack people I scream or yell a lot My behaviour is very changeable I am stubborn, sullen or irritable My moods or feelings change suddenly I have a hot temper I threaten to hurt people I get upset too easily I am too impatient

Rule breaking behaviour

I use drugs (other than alcohol and nicotine) for nonmedical purposes (describe below:) I damage or destroy my things I break rules at work or elsewhere I don't feel guilty after doing something I shouldn't I hang around people who get in trouble I am impulsive or act without thinking I lie or cheat My behaviour is irresponsible I steal I drink too much alcohol or get drunk I do things that may cause me trouble with the law (describe below:) I fail to pay my debts or meet other financial responsibilities I have trouble managing money or credit cards I have trouble keeping a job

Intrusive behaviour

I brag I try to get a lot of attention I show off or clown I talk too much I tease others a lot I am louder than others

Mental wellbeing and positive psychosocial functioning

Wellbeing

For each statement, please indicate which is closest to how you have been feeling over the last two weeks. (Response options for each item: At no time / Some of the time / Less than half the time / More than half the time / Most of the time / All of the time).

I have felt cheerful and in good spirits

I have felt calm and relaxed

I have felt active and vigorous

I woke up feeling fresh and rested

My daily life has been filled with things that interest me

Quality of life

How would you rate your quality of life?

Very poor Poor Neither poor nor good Good Very good

How satisfied are you with your health?

Very dissatisfied Dissatisfied Neither dissatisfied nor satisfied Satisfied Very satisfied

How much have you experienced the following things in the last two weeks? (Response options for each item: Not at all / A little / A moderate amount / Very much / An extreme amount)

To what extent do you feel that physical pain prevents you from doing what you need to do?

How much do you need any medical treatment to function in your daily life?

How much do you enjoy life?

To what extent do you feel your life to be meaningful?

How well are you able to concentrate?

How safe do you feel in your daily life?

How healthy is your physical environment?

Please rate your ability to do the following things in the last two weeks: (Response options for each item: Not at all / A little / Moderately / Mostly / Completely)

Do you have enough energy for everyday life?

Are you able to accept your bodily appearance?

Have you enough money to meet your needs?

How available to you is the information that you need in your day-to-day life?

To what extent do you have the opportunity for leisure activities?

How well are you able to get around?

Very poor Poor Neither poor nor good Good Very good How satisfied are you with the following things? (Response options for each item: Very dissatisfied / Dissatisfied / Neither dissatisfied nor satisfied / Satisfied / Very satisfied)

Your sleep? Your ability to perform your daily living activities? Your capacity for work? Yourself? Your personal relationships? Your sex life? The support you get from your friends? The conditions of your living place? Your access to health services? Your transport?

Cultural identity and engagement

Please rate how much you agree or disagree with each statement set: Likert scale from 1 to 7 where 1 = completely disagree and 7 = completely agree

Group Membership Evaluation

I feel at home around other Islanders, even if they are not from my island I feel connected to other Pacific peoples in general I feel connected to people from a different Pacific Island to myself I feel comfortable in places with lots of other Pacific peoples I feel most comfortable in Pacific communities I don't get along with other Island groups

Pacific Connectedness and Belonging

The fact that I am a Pacific Islander is an important part of my identity Being a Pacific Islander is an important part of how I see myself Being a Pacific Islander gives me a good feeling I am glad to be a Pacific Islander I am proud to be a Pacific Islander

Religious Centrality and Embeddedness

Going to church is part of my culture and religion God has a strong connection to my culture Religion is not important for my culture

Our religion is the centre of our culture as Pacific Islanders

Religion is the root of our Pasifika culture

Part of being a Pacific Islander is having a connection with God

Cultural Efficacy

I find it easy to participate in Pacific cultural events I feel I am easily able to express who I am as a Pacific person

I enjoy participating in Pacific cultural events

I find it difficult to express my Pacific culture

APPENDIX 3: DATA ANALYSIS

Data were analysed using SPSS version 28, and RStudio 2023.06.0. A p-value of 0.05 was used to denote statistical significance. Means, standard deviations, frequencies, percentages and 95% confidence intervals were used, where appropriate, to present descriptive detail of gambling participation; gambling-related behaviours; and social, health and environmental factors. Subgroup analyses were performed for participants who had gambled in the past year.

Participants could identify with multiple ethnicities. However, for inferential statistical analysis involving ethnicity groups it was necessary that each participant was independent of others, meaning that the characteristics of one observation could not influence another observation. Thus, for these analyses, ethnicity was prioritised, so that each participant was classified into a single ethnicity group. The process of prioritisation was as follows:

- 1. For participants with multiple ethnicities: If participants selected more than one Pacific ethnicity and indicated a primary identification towards one over the others, they were categorised exclusively into the ethnicity they most identified with.
- 2. For mixed Pacific and non-Pacific ethnicities: In cases where participants chose both Pacific and non-Pacific ethnicities but expressed a stronger identification with the non-Pacific group, they were nonetheless categorised under the Pacific ethnicity they had selected. This approach was taken to maintain the focus of the study on Pacific perspectives and experiences.
- 3. For multiple Pacific ethnicities without a clear identification: If participants selected multiple Pacific ethnicities but did not specify a primary ethnicity; their categorisation was determined based on a predefined hierarchy derived from the Ministry of Health's Ethnicity Data Protocols (2017). The order of priority was: Tokelauan (level 1), Fijian (level 2), Niuean (level 3), Tongan (level 4), Cook Islands Māori (level 5), Samoan (level 6). For instance, if a participant selected both Samoan and Niuean but did not indicate a preference, they were classified as Niuean.

For analyses of expenditure data, using the range of dollars spent per month as a proxy, values were assigned to a category on a scale from 1 to 6. These categorical range data were then converted into midpoints. The mean average expenditure on gambling activities was subsequently calculated using these midpoints to provide a more accurate estimate of expenditure.

Scale range	Midpoint
No expenditure	\$0
Less than \$10	\$5
\$10 to \$19	\$14.5
\$20 to \$29	\$24.5
\$30 to 49	\$39.5
\$50 or more	\$75 "best guess midpoint"

To identify factors associated with gambling, Chi-square test of independence/ association, Spearman's rank correlation, Pearson's phi coefficient, and multiple logistic regression analyses were performed. Bivariate correlations were used to identify factors individually associated with gambling in the past year. Standard binary logistic regression was then performed to test a predictive model with factors found to be associated with the outcome in the bivariate correlation results. If many predictor factors were involved, forwards stepwise regression was used to build a parsimonious model. Significant factors were included in the model if they provided statistically significant benefits above that already held within the model. Odds ratios and 95% confidence intervals showing the statistical strength of associations between the gambling and explanatory variables are presented.

To investigate factors that influenced gambling behaviour at age 22 years from the surveys when participants were aged 14 or 17 years, the missing data were examined to determine if they were missing at random or showed any structured patterns. If data were missing at random, multiple imputation using chained equations was used, performing 25 imputations to handle missing data appropriately.

To look at factors that might have influenced whether participants engaged in gambling, whether their gambling became risky or not, or whether they experienced harm from their gambling at age 22 years, these variables were first tested for possible bivariate relationships with the following factors using bivariate correlations (Spearman's rho):

- Engaging in smoking cigarettes, marijuana, drinking alcohol, and taking drugs aged 14 and 17 years.
- Engaging in any gang related activities aged 14 and 17 years.
- Relationship with mother, father and friends at age 17 years.
- Frequency of internet use aged 14 and 17 years.
- Computer activities (i.e. playing online games) aged 14 and 17 years.
- Mental health and physical health aged 14 and 17 years (e.g. depression, overall physical health).
- Factors related to suicidal ideation aged 14 and 17 years.
- Being a victim of, or perpetrator of, bullying aged 14 and 17 years.
- Problem behaviour (i.e. behaviour that breaks rules and behaviour that is influenced by friends) aged 17 years.
- Pacific Identity and Wellbeing (PIWBR-R) subscales: Pacific Connectedness and Belonging, Religious Centrality and Embeddedness, Group Membership Evaluation, and Cultural Efficacy at age 17 years.

Note on missing data: After studying the pattern of missing data, it seems probable that the data are MCAR (missing at random) and that the missing data are not systematic. Therefore, disregarding cases with missing data should not introduce bias in parameter estimates. However, this approach often leads to a loss in statistical power due to reduced sample size and, because there is a large amount of missing data (between 25% to 40% for each variable) in the dataset, the results of imputed data have been reported to increase statistical power. Only 31 cases have no missing data over all three time points.

To deal with missing data, multiple imputation by chained equations was used to impute data missing at 14- and 17-years of the 470 participants who completed the data aged 22 years. The imputation was conducted 25 times. The results of each regression model using imputed data were compared to the results from models using a complete-case analysis (where only the cases with no missing data are included in the analysis).