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Erroneous beliefs among frequent fruit-machine gamblers

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### Abstract

The present studies investigated the extent to which fruit-machine gamblers held erroneous beliefs, specifically the illusion of control and gambler's fallacy. In Study 1, 9 participants were interviewed and their audiotaped responses submitted to a thematic analysis, which suggested that the 4 frequent gamblers were more likely to express beliefs and statements consistent with the cognitive biases of illusion of control and the gambler's fallacy than the 5 infrequent gamblers. This observation was confirmed in the second study when the Gamblers' Beliefs Questionnaire (GBQ) was completed by 37 participants (10 frequent gamblers, 11 infrequent gamblers and 16 non-gamblers). Frequent fruit machine gamblers were more inclined than infrequent fruit machine gamblers to express beliefs consistent with the cognitive biases, the illusion of control and the gambler's fallacy.

Key words: Fruit machine gambling, Gambler's fallacy, Illusion of control.

Frequent gamblers display a number of erroneous beliefs about their abilities, such as attributing winning to personal skill rather than luck, which may make them susceptible to engaging in practices which will increase their risk of heavy gambling losses (e.g., Gilovich, 1983; Steenbergh, Meyers, May & Whelan, 2002). The *illusion of control* has been defined as holding an unrealistic belief about ones' ability to positively influence an outcome, and therefore win in a chance situation (e.g., Coventry & Norman, 1998; Langer, 1975; Langer & Roth, 1975). The *gambler's fallacy* (Winefield, 1966) is a belief that future wins or losses can be predicted on the basis of past events. When gamblers are faced with uncontrollable and chance events these erroneous beliefs can lead to the use of irrational behaviours and verbalizations characterized by references to factors other than chance (Griffiths, 1990).

The illusion of control has been found to characterise individuals in a number of gambling situations. Henslin (1967) observed that craps players would throw the dice softly for low numbers and hard for higher numbers. The strength of players' belief that winning was not purely governed by chance was exemplified by some of the players who refused to talk to Henslin or stayed away from him, blaming his presence for a lack of wins. Craps players have also been known to report the belief that bad luck was transferable between people or objects (Davis, Sundahl & Lesbo, 2000). Strickland, Lewiki and Katz (1966) reported that dice players bet less money and were less confident about the outcome of their throw if the dice had previously been thrown by someone other than themselves. Similar displays of irrational behaviour have also been observed in roulette players (e.g., Ladouceur & Gadbury, 1988) and in fruit-machine (also known as poker or electronic gaming machines) gamblers (Griffiths, 1994). It would appear that many regular players of games of chance are under the illusion that their behaviour can influence the outcomes of chance-governed situations.

Belief in the gambler's fallacy leads to behaviours such as watching others gamble,

counting wins across sessions and the formation of strategies of play. Tversky and Kahneman (1974) noted that chance is often treated as if it were “self-correcting”, such that if the local probability of an event deviates from the expected global probability of that event then this will precipitate events which would bring the local probability into line with the expected global probability. Gamblers may thus expect that a run of losses is likely to increase the probability of a win occurring. Behaviour consistent with such a belief has been observed in the context of coin tossing, the effect of the timing of wins and losses on the frequency of gambling and to the manner in which people play the lottery (e.g., Clotfelter & Cook, 1993; Langer & Roth, 1975; Roney & Trick, 2003), and has been linked to an individual’s gambling history (Hardoon, Baboushkin, Derevensky, & Gupta, 2001). For example, the reliance on past events when gambling may lead an individual to expect more wins than is realistic and to misconceive the reliability of their observations (e.g., Keren & Lewis, 1994). Winefield (1966) identified the false belief that it is possible to predict future events based on previous events (for a review, see Walker, 1992).

Erroneous beliefs about gambling are clearly implicated in the development of pathological gambling, however, there are numerous other influences that serve to maintain fruit or slot machine gambling, such as physiological arousal (e.g., Coventry & Constable, 1999; Coventry & Norman, 1998; Diskin & Hodgins, 2003), the effects of near misses (e.g. Kassinove & Schare, 2001), as well as the character of the peripheral stimuli associated with fruit machines such as music and lights (e.g., Griffiths, 1993). There are numerous other factors in addition to cognitive biases that are related to pathological gambling such as alcohol abuse and socioeconomic status (e.g., Welte, Barnes, Wiczorek, Tidwell, & Parker, 2004) that are important when one considers appropriate treatments for pathological gambling (for review see Toneatto & Ladouceur, 2000).

Small amounts of skill may be involved in winning on fruit machines, since players

are given opportunities to make decisions about some aspects of the bet (holding reels, for example). However, many studies have demonstrated that players attribute wins to personal skill more than is warranted (e.g., Gilovich, 1983; Steenbergh, et al., 2002). Dickerson, Hinchy, England, Fabre, and Cunningham (1992) found that in ten frequent fruit-machine gamblers, small wins increased the rate of play, while large wins decreased the rate of play, suggesting the presence of tactical playing. Delfabbro and Winefield (1999) confirmed the conclusions of Dickerson et al. (1992) who observed that gambling responses are sensitive to machine events. Large wins on the fruit machines tended to decrease the amount of play in which the participants engaged, and smaller wins tended to maintain play which was taken as being consistent with the gambler's fallacy. Other research has also implicated "near misses" and "big wins" as consequences that will mediate the duration of fruit or slot machine play (e.g., Kassinove & Schare, 2001; Wohl & Enzle, 2003).

Recently, Boynton (2003) has also shown that the gambler's fallacy effect is subject to control by wins and losses, such that losses tended to make people less confident and more prone to the gambler's fallacy. Langer (1975) identified a number of factors believed to increase illusion of control. Among them were familiarity and experience, both of which are high in frequent gamblers. This goes some way to explaining the causal relationship between erroneous beliefs and frequency of gambling - that increasing familiarity with the gambling situation increases erroneous beliefs. However, experience is not the only controlling factor. Dixon (2002) has more recently demonstrated that illusion of control can be manipulated in a controlled experimental setting.

The two most frequently employed methods for the measurement of erroneous beliefs are the think-aloud method where gamblers are required to verbalize their thoughts whilst gambling (e.g., Gadbury), and the focus discussion group (e.g., Griffiths, 1994).

Gadbury and Ladouceur (1988) used the think-aloud method with roulette players and found

that several erroneous beliefs could be identified, including references to skill, personal levels of control, personification of the machine and predictions of winning. This method has also provided useful information regarding the beliefs of fruit-machine gamblers (Griffiths, 1994).

### *The Current Research*

Fruit machine gambling is one of the most accessible forms of gambling, and that this is perhaps why it is frequently played by problem gamblers (Delfabbro & Winefield, 1999). Previously Griffiths (1990) has explored the presence of erroneous beliefs concerning levels of skill in a discussion group of self-confessed addicted fruit-machine gamblers. All participants commented on the skilful aspects of gambling on fruit machines, although they typically recognised that chance could have a part to play. The current research consists of two studies designed to identify the extent to which frequent and infrequent fruit-machine gamblers exhibit an illusion of control and the gambler's fallacy. The first study employed semi-structured interviews while the second utilised the Gambler's Beliefs Questionnaire (*GBQ*) (Steenbergh et al., 2002). In the first study gamblers were categorised using the cut-off points defined by Delfabbro and Winefield (1999) and Griffiths (1994): *Frequent gamblers* are defined as those who gamble on fruit machines at least once per week, whereas *infrequent gamblers* are those who gamble less often. The interviews were expected to reveal frequent gamblers to have higher levels of erroneous beliefs concerning fruit-machine gambling than infrequent gamblers and more importantly help validate a previously published questionnaire measure of gambler's beliefs with fruit machine gamblers.

*Study 1 – Open-ended Interview*

## Method

*Participants*

Participants were seven males and two females, with a mean age of 23 years ( $SD = 5.1$  years; age range of 20 to 32 years). Posters advertising the opportunity to earn £5 for being interviewed were placed in local gambling venues (one pub and two arcades that were close to the main campus of the University of Southampton). The posters stated that participants had to have at least a basic knowledge of fruit-machine gambling. Four frequent (Participants 1, 2, 5 & 9) and five infrequent (Participants 3, 6, 7 & 8) gamblers were recruited.

*Interview*

A demographic questionnaire consisting of 9 items was issued prior to the interview taking place. This included questions referring to age, gender, the frequency of gambling on fruit machines, the average amount gambled per session, the average gambling session duration, the participants' largest win, the amount gambled to earn that largest win, what other forms of gambling they engaged in and where they usually gambled.

A semi-structured interview was constructed around 21 core questions drawn from items on the GBQ (Steenbergh, et al., 2002) which was originally designed as a closed-ended questionnaire (see Table 1). For the purpose of the interviews it was therefore necessary to ask open-ended questions and to encourage participants to elaborate on their answers to the core questions if one word answers were originally given. Participants were asked to restrict their answers to their beliefs and behaviour when gambling on fruit machines. Additional follow-up questions such as, "Do you stick with these strategies even if they appear not to be working?", "How did you first come to develop these strategies?", and "Do you ever pick up strategies from other people?", were asked to get participants to expand their original responses.

<<Insert Table 1 about here>>

### *Procedure*

Participants were interviewed at a gambling venue that was familiar to them in the presence of two researchers associated with this project, although only one researcher conducted any given interview. The venues were a pub and two arcades that were close to the main campus of the University of Southampton. Interviews were conducted with the consent of the proprietors. Participants were told the interview would be recorded and that no identifying characteristics would be included in the research. Participants were reminded that the interview referred to fruit-machine gambling only. The set of demographic questions were then given to the participants, before the interview commenced. The interviews lasted for an average of 11 minutes.

### *Thematic Analysis*

A thematic analysis was carried out on the transcribed interviews to discover whether certain phrases or words indicated the presence of cognitive distortions concerning fruit-machine gambling (see Table 2 for examples of themes searched for). The text was divided into turns taken to speak between the *Interviewer (I)* and the *Participant (P)*. Contrasts were made between the frequent and infrequent gamblers using deductive coding, and the interviews were coded to allow instances of illusion of control and gambler's fallacy to be examined.

<<Insert Table 2 about here>>

## Results & Discussion

There were differences between the responses given by the frequent and infrequent

gamblers in reference to the themes searched for, and also in the types of responses. Frequent gamblers often gave more detailed and elaborate answers to the questions than did infrequent gamblers. This was particularly noticeable in the interviews of Participants 7 and 8, who described situations they had encountered and their knowledge about the workings of fruit machines in detail. In contrast, infrequent gamblers often gave very short responses and many were just one word answers. Furthermore, when infrequent gamblers were asked why they gambled, they tended to give reasons such as boredom and socialization with friends. Frequent gamblers cited the chance to win money as a primary reason for playing. It is worth nothing that the largest wins reported by participants on fruit machines ranged from £5 to £249.

### *Illusion of Control*

Frequent players made more statements in their interviews that were consistent with an illusion of control than did infrequent players. Reference to perceived levels of control was stated by Participant 7, who stated, “I only play fruit machines that I know”. Participant 8 stated, with reference to whether they had a favourite machine, “I’ve got about five or six machines in [*name of gambling establishment*] the others I don’t touch cos they’re too complicated to learn or I just don’t understand them.” This implies that the player thought they could increase their chances of winning by actively choosing a familiar machine they have previously played, perhaps because that machine had been associated with winning in the past.

Examples of illusion of control in frequent gamblers were also noted in individuals who sought to demonstrate their knowledge of fruit machines. Two participants, in particular, offered extensive information as to the nature of fruit-machine gambling. This information, however, was frequently based on irrational beliefs. This was illustrated by the statement “some machines will only pay out if you play to win the maximum win every time”

(Participant 7), and “if somebody’s never played a fruit machine before... they’re not going to know how to play it, are they?” (Participant 6). Both statements imply a level of acquired skill, only attained by those who invest time and money in gambling.

References to illusion of control made by infrequent gamblers were very different from those made by frequent gamblers: They tended to refer to luck and chance as more important factors than skill. When asked about the degree of skill involved in fruit-machine gambling, Participant 5 stated, “there’s a certain amount that you’ve got to know what to press at the right time or whatever, but it’s not really down to skill”. Participant 4 also referred to their level of skill as “just hit and hope”. Such verbalizations tend to suggest that infrequent players accept that there is a level of knowledge involved in gambling, which may lead to a greater chance of winning. There seems to be a general acceptance, however, that “a lot of luck is involved” (Participant 9), and that winning is therefore not necessarily evidence of being skilful at fruit-machine gambling.

### *The Gambler’s Fallacy*

The second main theme investigated was the gambler’s fallacy. As expected, the interviews from the frequent gamblers, rather than the infrequent gambler, revealed more statements consistent with the gambler’s fallacy, with several participants suggesting that they could accurately predict when a win would occur. Participant 6 commented that, in his experience, when the wheels spin really quickly, “that normally means it isn’t going to pay out...but if they come in slower, then 95% it will”. Participant 7 stated, “You can usually tell within ten or twelve pounds whether a fruit machine is going to pay out”. These cognitive distortions are possibly the result of previous experiences playing fruit machines, however, these beliefs were often upheld regardless of whether they were proven correct in every instance.

The interviews of the frequent gamblers also revealed some extreme examples of the

gambler's fallacy, which influenced strategies used by players. Participant 8 explained in detail his strategy for playing:

P8, "... on smaller machines, my philosophy is if a machine is full, and you know that by whether the money is dropping into the bottom, so it means the pay out reels are full, so it's obviously been played a lot, and it's ready to pay out...then the cycle should go on where you're going to win three or four jackpots in the space of three or four quid."

This participant also referred to "signs" and "cheats" involved in fruit-machine gambling, and subsequently how they looked "for a sign...say one of the lights that keeps flashing that doesn't normally flash, which means it's going to guarantee a jackpot."

Participant 7 also commented in a similar way, "there's a logical set of sequences and if you can pick them all up and if you know that happens and that flashes, this will spin next time."

Such verbalizations suggest that the frequent players view the process of fruit-machine gambling as more of a challenge and a way to earn money, rather than something to do to pass the time. As a result of this they develop the belief that their experience has enabled them to understand the workings of the machines and hence to predict the likelihood of a win.

Many of the references made by infrequent players that conformed to the gambler's fallacy suggested that it occurred to a much lesser extent, if at all, in those who play less than once a week. Infrequent gamblers responded in the negative to the questions regarding whether they used a particular strategy when gambling on fruit machines, and whether they were accurate in predicting the likelihood of a win. For example, Participant 2 stated that they were unable to predict when a win was due:

I: "Do you think you can predict when a win's going to happen?"

P2: "No, I'm not very good at finding out...I often think it's just down to luck."

Such responses tend to suggest that less experienced players were less prone to the gambler's fallacy. References to skill and luck during the interviews characterized the two major themes of illusion of control and gambler's fallacy. All players suggested that success on fruit machines required some degree of skill to understand the various features of the machines. Estimates of the role skill played ranged from 10% to 50%. However, three of the four regular gamblers stated that they were personally skilled at fruit-machine gambling. The only frequent player who believed that they had no skill at fruit-machine gambling was on the borderline for being placed in the infrequent group. In contrast, none of the infrequent gamblers felt they had any level of skill at this form of gambling. They therefore attributed their wins to luck and other factors, viewed as being out of their control. All players believed that there was a level of luck involved in gambling. Consistent with Griffiths (1990) the frequent gamblers believed that they were skilful and that skill was needed to win whilst gambling on fruit machines. Griffiths (1994) noted that many gambling situations are designed to appear as if they are games of skill, and therefore, it is reasonable to expect that illusion of control is more likely to be believed if the outcomes on a game of chance "appear" to be controlled by skill.

Previous research has implicated "near misses" and "big wins" as factors that can mediate fruit or slot machine play and several of the frequent gamblers did state that after a big win they were more likely to stop gambling. None, however, mentioned near misses so it is unclear if a near miss prolonged gambling sessions for these participants as one might anticipate. The effect of consequences on gambling session duration would make for an interesting observational study that might be expected to confirm results from controlled laboratory experiments.

### *Study 2 – Questionnaire*

The results of Study 1 suggest that frequent gamblers display more cognitive distortions in semi-structured interviews than do infrequent gamblers. The structured interview methodology, however, is a time-consuming methodology for investigating erroneous beliefs. The interviews from Study 1 can, however, inform the application of the *GBQ* (Steenbergh et al., 2002) to the study of gambling beliefs among fruit-machine gamblers. Although the *GBQ* has high internal consistency, good temporal stability, and discriminated well between problem and non-problem gamblers (Steenbergh, et al., 2002) in other gambling settings, it has yet to be tested specifically with a fruit-machine gambling population. In Study 2 the *GBQ* (Steenbergh, et al, 2002) was used to ascertain the extent to which frequent, infrequent and non-gamblers hold erroneous beliefs about their abilities and levels of skill when playing on fruit machines. It is expected that as a result of previous studies examining the effects of these phenomena on fruit machine gamblers, that the *GBQ* will reveal that frequent players hold more erroneous beliefs about the nature of their gambling behaviour than infrequent or non fruit machine gamblers. The same criterion for frequent and infrequent gambling status was used as in Study 1 and non-gamblers were classed as those who did not gamble on fruit machines, but may have been experienced in other forms of gambling.

## Method

### *Participants*

Of the 37 participants, 10 were frequent gamblers, 11 were infrequent gamblers and 16 were non-gamblers. There were 21 males and 16 females. The participants had a mean age of 24.3 years ( $SD = 3.8$  years ages ranged from 18 to 32 years).

### *Questionnaire*

The questionnaire was in two parts. The demographic questionnaire as used in Experiment 1 was issued to all participants. Participants were informed that, the remainder of questionnaire referred only to their experiences with, or beliefs concerning, fruit-machine gambling, as the original GBQ, a 21 item self-report measure of gambling-related cognitive distortions, was generic to all types of gambling.. The reliability of the original 21-item questionnaire was measured at a Cronbach's alpha of 0.92. The participants were required to rate the extent to which they agreed with the statements on a Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). A low GBQ score indicated a high level of cognitive distortions, with scores able to range from 21 to 147.

### *Procedure*

Posters were displayed within the gambling venues, advertising the opportunity to take part in the research. Informed consent was gained before participants completed the questionnaire. Participants were informed that the questionnaire only concerned their gambling on fruit machines. Of the 80 questionnaires distributed, 37 were completed and returned. A criterion for statistical significance was set at  $p < 0.05$  for all statistical tests.

### Results & Discussion

Scores from the questionnaire responses were added to give an overall GBQ score for each participant and it was used as a measure of overall cognitive distortions. Participants' scores on the GBQ ranged from 55 to 147, with a mean of 110.22 ( $SD = 21.07$ ), Cronbach's alpha = 0.91. Pearson's correlations coefficients revealed no significant correlations between participant age and their GBQ score ( $r = 0.11, p > .05$ ) or their frequency of fruit-machine gambling ( $r = 0.09, p > .05$ ). Males gambled on fruit machines more frequently per week ( $M = 1.38, SD = 2.1$ ) than females ( $M = 0.44, SD = 0.89$ ), however, this difference was not significant ( $t(35) = 1.66, p > 0.05$ ). The GBQ scores for males ( $M = 107.8, SD = 22.7$ ) were

not significantly different from those of females ( $M = 113.3$ ,  $SD = 19.0$ ), ( $t(35) = 0.78$ ,  $p > 0.05$ ).

GBQ scores were significantly correlated with frequency of fruit-machine gambling ( $r = -.604$ ,  $p < 0.05$ ). Participants were classified as either frequent, infrequent or non-gamblers, using the same criterion as in Study 1 and mean GBQ scores for each of these groups are plotted in Figure 1. The highest scores on the GBQ were found in the non-gamblers (empty circles) and the lowest scores were found with frequent gamblers (filled diamonds). A one-way analysis of variance (ANOVA) revealed a significant difference between these groups' scores on the overall GBQ ( $F(2, 34) = 8.46$ ,  $p < .05$ ). Post hoc Scheffe's tests revealed that frequent gamblers ( $M = 90.90$ ,  $SD = 19.39$ ) were significantly different from both infrequent gamblers ( $M = 114.09$ ,  $SD = 15.99$ ) and non-gamblers ( $M = 119.63$ ,  $SD = 17.76$ ) with respect to their overall GBQ score ( $p < .05$ ). Infrequent and non-gamblers' GBQ scores did not differ significantly.

<<Insert Figure 1 about here>>

The GBQ scores were further broken down into the two factors identified by Steenbergh et al., resulting in a mean score called *luck/perseverance* ( $M = 72.43$ ,  $SD = 12.82$ ) and a mean score for *illusion of control* ( $M = 37.78$ ,  $SD = 10.17$ ). Coefficient alphas for the two factors were 0.85 (luck/perseverance) and 0.88 (illusion of control). Pearson's correlations coefficients revealed no significant correlations between participant age or gender with scores on the GBQ items that loaded on the factors of luck/perseverance ( $r = 0.18$ ,  $p > .05$ ; and  $r = -0.14$ ,  $p > .05$ , respectively) or illusion of control ( $r = 0.01$ ,  $p > .05$ ; and  $r = -0.10$ ,  $p > .05$ , respectively). However, scores on these factors of the GBQ were significantly correlated with frequency of fruit-machine gambling (luck/perseverance,  $r = -$

.517,  $p < .05$ ; illusion of control,  $r = -.598$ ,  $p < .05$ ). The scores for these two factors were compared separately using an ANOVA on the grouped variable of frequency of gambling. There was a significant effect of gambling status on both. Scores on the *factor of luck/perseverance* differed significantly across the groups of gamblers ( $F(2, 34) = 6.68$ ,  $p < .05$ ) and *illusion of control* ( $F(2, 34) = 6.62$ ,  $p < .05$ ). Post hoc Scheffe's tests revealed that in both cases this was due to the difference between frequent gamblers and both infrequent gamblers and non-gamblers, and infrequent and non-gamblers' scores did not differ significantly.

### General Discussion

The hypothesis that a high frequency of fruit machine gambling would be associated with high levels of erroneous beliefs was supported by participants' responses during the interview and participants' responses on the GBQ (Steenbergh, et al, 2002). Frequent gamblers displayed significantly higher levels of overall erroneous beliefs than did both infrequent and non-gamblers.

As yet, a clear description of the progression of the relationship between frequency of gambling and erroneous beliefs has not been made. Thus the question arises, do people with high erroneous beliefs start gambling more frequently, or do erroneous beliefs develop as frequency, and therefore experience, of fruit-machine gambling increases? The present studies did not answer this question. Although it would not be surprising if individuals that hold erroneous beliefs about chance events and their ability to control them might be drawn toward gambling activities more strongly individuals that do not, and that once individuals begin to gamble that their levels of erroneous beliefs are affected by their gambling experiences. Boyton's (2003) finding that the gambler's fallacy is prone to control by wins and losses would support our assertion.

As with any research into gambling, it is important to note the social perception of the activity. The problems with researching such individuals have been highlighted in a recent paper by Parke and Griffiths (2002). They state how important it is to remember that fruit-machine gambling can be an addiction. Some gamblers may not be truthful or forthcoming about their gambling activity, due to the risk of social disapproval (Parke & Griffiths, 2002). It is worth noting then that guilt or embarrassment about their gambling behaviour may motivate some participants to mis-report the frequency with which they gamble or distort their reporting of beliefs about gambling. This could potentially harm the reliability and validity of any data, and needs to be considered when working with very frequent gamblers.

In Study 1, although all players believed that there was a level of luck involved in gambling the majority of regular gamblers stated that they had skill at fruit-machine gambling, whereas infrequent gamblers did not and attributed their wins to luck. The role of “luck”, which can be viewed as a quality personal to an individual (e.g., Wohl & Enzle, 2002), differed between frequent and infrequent gamblers. Interestingly frequent gamblers did not view themselves as lucky, rather they displayed an attributional bias preferring to describe themselves as skilful rather than lucky. In a game of pure chance, frequency of play will not increase ones chances on winning (Langer, 1975), however, it is clear that the frequent gamblers here did believe they had some control. The tendency is to suggest that they are prone to displays of erroneous beliefs. As their claims were not tested, it would be interesting to see if they were more skilful.

The results of the questionnaire served to strengthen and quantitatively validate the results of the interviews carried out in Study 1. Evidence of both the gambler’s fallacy and the illusion of control was more prevalent in statements given by frequent gamblers than in the statements offered by infrequent and non-gamblers. This supported the primary hypotheses that a higher presence of erroneous beliefs would be associated with more

frequent fruit-machine gambling.

While the results from the analysis of the GBQ and its various components supported the hypotheses that frequent gamblers would display higher degrees of erroneous beliefs about gambling than less frequent gamblers, there are still issues that need to be considered. There was considerable spread in the degree of erroneous beliefs held by fruit-machine gamblers and non-gamblers alike. It was further noted that while participants' scores on the GBQ ranged from 55 to 147, interestingly the minimum score was not as low as might be expected considering that the participant concerned gambled on fruit machines as often as six times per week.

In conclusion, our research that has shown that frequent fruit-machine gamblers demonstrated higher erroneous beliefs than did infrequent gamblers. The questionnaire study demonstrated the utility of the GBQ as a useful research tool for investigating the gambling beliefs of fruit machine gamblers. The GBQ is a short reliable and easily administered questionnaire that discriminates well between the gambling beliefs of frequent and infrequent gamblers.

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Authors' Note

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Table 1. *Core questions for semi-structured interview.*

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1. Why do you gamble?
  2. Do you see gambling as a social activity?
  3. When you're gambling on a fruit machine how do you decide when to stop?
  4. Do you have a particular strategy or plan that you use when you are gambling?
  5. How do the sequence of wins or losses on a machine affect the way you play?
  6. After a series of losses on a machine would you believe the machine is more likely to pay out?
  7. Do you keep track of previous wins or losses?
  8. Do you think you can accurately predict when a win is going to occur?
  9. Are you inclined to watch other people gambling so that you know a sequence of wins or losses before you start gambling a particular machine?
  10. Will you keep playing after you've had a large win?
  11. Will a large win at the start of session change how long you keep playing that machine?
  12. Will a win late in a session prompt you to stop gambling?
  13. How much do you think winning is down to pure luck?
  14. Do you have any lucky techniques you use when you're gambling?
  15. How do you choose which machines to play?
  16. Do you have any favorite machines?
  17. Do you think any one machine can be luckier than another?
  18. Do you think there is skill involved in gambling?
  19. Do you think you personally have skill in gambling?
  20. Do you think having skill will increase your chances of winning money?
  21. Do you think winning is evidence of being skillful at gambling?
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Table 2. *Examples of themes searched for during the thematic analysis.*

Code name	Description	Examples
Illusion of control	Having control in a chance situation	“Winning is completely down to what you do on the machine”
Gamblers’ fallacy	Future wins can be predicted on the basis of past events	“I was lucky on this machine a while ago, so I always use this one”
Luck references	Wins are a result of luck	“When I win, I know its down to my good luck”
Skill references	Wins are a result of skill	“You have to be skilful at gambling to win”

## Figure Captions

*Figure 1.* GBQ score plotted as a function of frequency of fruit-machine gambling as a function of GBQ score. Participants were classified into three groups: Non-gamblers (empty circle), infrequent gamblers (filled circle) and frequent gamblers (filled diamond). Note the error bars are standard errors of the mean.

Figure 1

