

Linking Decision-Making Styles to Problem Gambling: The Moderating Effect of Cognitive Distortions in a Tertiary Student Population in Ibadan, Nigeria

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Abstract: Problem gambling is a maladaptive behaviour characterized by persistent gambling despite adverse psychosocial and financial consequences. Among Nigerian tertiary students, the increasing accessibility of online betting platforms has heightened vulnerability, yet the psychological mechanisms underlying gambling remain underexplored. This study investigated the predictive role of decision-making styles and the moderating effect of cognitive distortions on problem gambling. A correlational survey design adopting purposive and simple random technique to select tertiary institutions and chain-referral gatekeepers and convenience technique to select the study participants, and data were collected from 1,282 students across universities, polytechnics, and monotechnics in Ibadan, Nigeria, using standardized instruments, General Decision-Making Styles Scale, Gambling-Related Cognitions Scale, and Problem Gambling Severity Index. Moderated multiple regression analyses, were conducted, to test, six hypotheses. Findings revealed that cognitive distortions significantly moderated the relationship between decision-making styles and problem gambling behaviour {Avoidant decision-making style [$R^2 = 0.043$, $F(3, 1278) = 19.032$, $p < 0.05$]; Dependents decision-making style [$R^2 = 0.040$, $F(3, 1278) = 17.727$, $p < 0.05$], Intuitive decision-making style [$R^2 = 0.062$, $F(3, 1278) = 28.113$, $p < 0.05$], Rational decision-making style [$R^2 = 0.110$, $F(3, 1278) = 52.701$, $p < 0.05$], Spontaneous decision-making style [$R^2 = 0.022$, $F(3, 1278) = 9.380$, $p < 0.05$]}. Avoidant and dependent styles demonstrated conditional effects, serving as protective factors at low distortion but reversing into risk factors at high distortion. Intuitive and rational decision-making were generally protective; however, their benefits diminished or reversed under high cognitive distortions. Spontaneous decision-making was negatively associated with gambling at low distortion but became positively predictive at higher levels. The study underscores the pivotal role of cognitive distortions in shaping the influence of decision-making styles on gambling behaviour. Interventions should incorporate cognitive restructuring alongside decision-making training to mitigate problem gambling among tertiary students.

Keywords: Problem gambling, Decision-Making Styles, Cognitive Distortions, Tertiary Students Population, Ibadan, Nigeria.

Introduction

Gambling has evolved into a prominent leisure activity across the globe, with increasing participation among young adults, particularly tertiary students. Gambling involves risking something valuable on uncertain outcomes with the expectation of winning (Glimne, 2025). While often perceived as recreational, gambling can become problematic when it escalates into compulsive behaviour that interferes with academic, social, and psychological functioning (Deverensky & Gupta, 2007). Problem gambling is a condition characterized by persistent and dysfunctional gambling behaviour that causes psychological distress, academic setbacks, and financial problems. It is referred to as a gambling disorder, a behavioural addiction that can lead to social impairment (American Psychiatric Association, 2013). In Nigeria, the rapid expansion of internet access, mobile betting platforms, and youth-targeted advertising has contributed to a significant rise in gambling engagement among students in higher institutions (Gbadegesin & Akintunde, 2025). Among tertiary students, this behaviour has become increasingly prevalent, particularly in developing countries like Nigeria, where online sports betting platforms are easily accessible (Aina & Olorunshola, 2021). Previous studies have linked problem gambling with poor academic performance, financial hardship, and mental health challenges (Derevensky & Gupta, 2007).

Decision-making styles are consistent patterns that individuals use when making choices. Scott and Bruce (1995) proposed five styles: rational, intuitive, dependent, avoidant, and spontaneous. Rational decision-makers rely on logical analysis, while spontaneous or avoidant individuals may engage in impulsive or evasive decision-making. Research has shown that spontaneous decision-makers are more likely to engage in risky behaviours, including gambling, due to lower risk evaluation and self-regulation (Yi et al., 2023; Hoven et al., 2023).

Research on decision-making presumes that, like cognitive style, an individual's approach to decision-making remains remarkably consistent across different times and situations (Davids, *et al.*, 2016; Geisler and Allwood, 2017). Decision styles are so closely linked to cognitive styles that, in numerous reviews of gender differences in decision-making, the two terms are often used interchangeably. This highlights the common influence of general cognitive patterns, decision styles, and personality on decision behaviour (Dewberry *et al.*, 2013).

Cognitive distortions are among the psychological factors commonly associated with problem gambling behaviour (Orlowski et al., 2020). These distortions reinforce gambling behaviour by fostering false beliefs about the likelihood of winning or the ability to control chance

outcomes. Importantly, such distortions are not only correlated with gambling frequency but may also mediate and moderate the influence of other psychological traits on gambling outcomes. Cognitive distortions are irrational or biased thinking patterns that distort reality. In gambling, these include illusions of control, predictive control, interpretative bias, and inflated gambling expectancies (Ladouceur & Walker, 2003). These distortions reinforce gambling behaviour by creating faulty expectations and misattributing outcomes to skill rather than chance. Studies consistently show that the intensity of cognitive distortions is positively correlated with gambling severity (Goodie & Fortune, 2013).

Despite the established roles of both decision-making styles and cognitive distortions, limited research has examined how these two constructs interact to influence problem gambling behaviour, particularly among African student populations. There is also the possibility that cognitive distortions may serve as a moderator, strengthening or weakening the relationship between decision-making styles and problem gambling behaviour. Moderation refers to a variable that influences the strength or direction of a relationship between two other variables (Baron & Kenny, 1986). Cognitive distortions may act as moderators, strengthening the link between non-rational decision-making styles and problem gambling behaviour.

This study, therefore, aims to fill this gap by examining the moderating role of cognitive distortions in the relationship between decision-making styles and problem gambling behaviour among tertiary students in Ibadan, Oyo State, Nigeria. The findings are expected to contribute to a more nuanced understanding of the cognitive mechanisms underlying gambling behaviour and to inform evidence-based interventions for at-risk student populations.

Specifically, the study seeks to determine the extent to which decision-making styles predict problem gambling, and whether cognitive distortions moderate this relationship.

Related Literature Review

Six hypotheses were tested in this study:

- 1) Cognitive distortions will significantly moderate the relationship between decision-making styles (avoidant, dependent, intuitive, rational, and spontaneous) and problem gambling behaviour of tertiary students in Ibadan.
- 2) The effect of avoidant decision-making style on problem gambling behaviour will be stronger at higher levels of cognitive distortions than at lower levels.
- 3) The effect of dependent decision-making style on problem gambling behaviour will be significant when cognitive distortion is high.
- 4) The effect of intuitive decision-making style on problem gambling behaviour will not be significant at higher levels of cognitive distortions.

- 5) The effect of rational decision-making style on problem gambling behaviour is weaker at higher levels of cognitive distortions compared to lower levels.
- 6) The effect of spontaneous decision-making style on problem gambling behaviour will be stronger at higher levels of cognitive distortion than at lower levels.

Methodology

Research Design

This study adopts a quantitative correlational survey design. The design is appropriate for examining the predictive and moderating relationships among variables without manipulating any of them.

Population and Sample

The target population comprises undergraduate students enrolled in tertiary institutions in Ibadan, Oyo State, Nigeria. A multiple-stage sampling technique was employed. In the first stage, eight institutions were purposively selected to reflect diversity in ownership (public/private) and academic focus. At stage two, gatekeepers, including class representatives and student leaders who are close to these students, were chosen purposively to help in the administration of the questionnaire. At stage three, the eligible and consenting students were chosen through a purposive, non-probability, chain-referral sampling method that uses gatekeeper-mediated entry to access specific clusters of gamblers. Non-probability sample size was determined based on Yamane's (1967:886) sample size formula.

Data and Instruments

Data for the study were collected using a structured questionnaire to assess all variables, including 529 from universities, 783 from polytechnics, and monotechnics, both public and private. In all, one thousand three hundred and forty-two thousand questionnaires were administered (1,342), and one thousand two hundred and eighty-two (1,282) were retrieved from the respondents. Sixty (60) attritions were recorded. The structured questionnaire is divided into three sections. Decision-making styles were measured using the General Decision-Making Scale (GDMS) developed by Scott and Bruce (1995). The scale measures five decision-making preferences. It is 25 items, scored on a five-point Likert-type scale, with five items identified for each style: 1) avoidant, 2) dependent, 3) intuitive, 4) rational, and 5) spontaneous. Reported Cronbach's alpha for subscales ranges between 0.68 and 0.94. Cronbach's alpha for this study is 0.91.

Gambling-related cognitive distortions were measured using the Gambling Related Cognition Scale (GRCS) by Raylu & Oei (2004). This scale consists of 23-item that has good psychometric properties and thus is a useful instrument for identifying GRC among non-clinical gamblers. Exploratory factor analysis performed using some samples indicated five

factors, which included interpretative control/bias (GRCS-IB), illusion of control (GRCS-IC), predictive control (GRCS-PC), gambling-related expectancies (GRCS-GE), and a perceived inability to stop gambling (GRCS-IS). The response format was a seven-point Likert scale (1 = strongly disagree, 2 = moderately disagree, 3 = mildly disagree, 4 = neither agree nor disagree, 5 = mildly agree, 6 = moderately agree, 7 = strongly agree) to indicate the extent to which they agreed with the value expressed in each statement. The total score consisted of adding the values gained from each of the 23 items. The higher the total score, the higher the number of GRC displayed. Reported Cronbach's alpha coefficients for the factors ranged from 0.77 to 0.91, and 0.93 for the overall scale (Raylu & Oei, 2004). The study reported a Cronbach's alpha of 0.95 for the Cognitive Distortion Scale.

Problem gambling severity was measured with the Canadian Gambling Severity Index (PGSI) scale developed by Ferris and Wynne (2001). The scale measured problem gambling behaviour. The scale comprises 9 items, each rated on a 4-point Likert scale from "Never" to "Almost Always". Each item assesses the frequency of gambling-related problems or behaviours over the past 12 months. Scores range from 0 to 27. A total score of 0 is classified as non-problem gambling, a total score of between 1 and 2.5 is classified as low-risk gambling, a total score between 3 and 7.5 is classified as moderate-risk gambling, and a total score of 8 or greater is classified as problem gambling. High scores indicate more severe gambling problems, potentially leading to negative consequences and loss of control. The original development study reported Cronbach's alpha between 0.84 and 0.92 (Ferris & Wayne, 2001). The scale had adequate internal consistency, with a Cronbach's α of .96.

Procedure

Approval code UI/SSHREC/2021/0014 was granted by the Social Science and Humanities Research Ethics Committee (SSHREC) of the University of Ibadan. All participants provided informed consent, with assurances of confidentiality and the right to withdraw at any time, in line with ethical standards for research involving sensitive psychological data. The research instruments were administered in person, and it took 15 to 20 minutes for participants to complete them. The completed questionnaires were retrieved and coded for data analysis.

Statistical Analysis

Statistical analyses were conducted using IBM SPSS Statistics version 27 and the PROCESS macro (Hayes, 2018) for preliminary analyses, while Amos version 11 was employed for Structural Equation Modeling (SEM). Descriptive statistics (means, standard deviations, frequencies, and percentages) were first computed to summarize respondents' demographic characteristics and the distribution of the study variables. Preliminary checks, including tests for missing values, normality,

linearity, and multicollinearity, were carried out to ensure that assumptions for multivariate analysis were met.

Study Participants

The study was conducted among 1,282 students at tertiary institutions in Ibadan, Oyo State, Nigeria. Specifically, 529 (41.3%) were from the University, 369 (28.8%) from the Polytechnic, and 384 (30.0%) from the Monotechnic. Most participants were male (68.5%), and 31.5% were female. In the sample, 59.9% were Christians, 35.1% were Muslims, and 5.9% practiced other, unidentified religions (Table 1). Descriptive statistics, reliability, and correlations of our variables are presented in Table 2.

Table 1. *Distribution of sociodemographic data of participants*

Item	Frequency	Percentage
Gender		
Male	878	68.5
Female	404	31.5
Religion		
Christianity	768	59.9
Islam	450	35.1
Others	64	5.9
Type of Institution		
University	529	41.3
Polytechnic	369	28.8
Monotechnic	384	30.0
Level of Education		
100 – 400 level	529	41.3
HND or OND	753	58.7

Table 2. *Descriptive statistics, scale reliability, and correlations of the studied variables*

Variable	1	2	3	Mean	SD	SK	KU	α
PGB				18.45	5.358	.526	4.363	.77
CD	-.045			90.87	29.903	-.072	-.249	.95
DMS	.129**	-.192**		72.02	6.704	-.329	-.129	.91

PGB = problem gambling behaviour, CD = cognitive distortions, DMS = decision-making styles, SD = standard deviation, Sk skewness, KU = kurtosis, α = Cronbach's alpha

The results of the data analysis focused on cognitive distortions as a moderator between decision-making styles and problem gambling behavior among tertiary students in Ibadan, Oyo State.

Hypothesis one: Cognitive distortions will significantly moderate the relationship between decision-making styles (avoidant, dependent, intuitive, rational, and spontaneous) and problem gambling behaviour

among tertiary students in Ibadan. This hypothesis was tested using Structural Equation Modelling, and the results are presented in Table 3.

Table 3. *Moderating Effect of Cognitive Distortions between Decision-making Styles and Problem Gambling Behaviour*

Predictors	β	Std. Error	t	Sig.	Confidence Intervals Lower Limit Upper Limit
Avoidant decision-making style (P)	0.666	0.091	7.347	0.001	0.488 0.844
Cognitive distortions (M)	0.087	0.014	6.175	0.001	0.059 0.114
PXM	-0.007	0.001	7.049	0.001	-0.009 -0.005
Dependent decision-making style (P)	-1.184	0.195	6.069	0.001	-1.567 -0.801
Cognitive distortions (M)	-0.214	0.03	7.052	0.001	-0.274 -0.155
PXM	0.014	0.002	6.879	0.001	0.010 0.018
Intuitive decision -making style (P)	-1.498	0.209	7.159	0.001	-1.909 -1.088
Cognitive distortions (M)	-1.498	0.209	7.159	0.001	-0.349 -0.220
PXM	0.019	0.002	8.523	0.001	0.015 0.023
Rational decision-making style (P)	-0.842	0.082	10.321	0.001	-1.002 -0.682
Cognitive distortions (M)	-0.149	0.013	10.321	0.001	-1.002 -0.682
PXM	0.01	0.001	12.21	0.001	0.009 0.012
Spontaneous decision-making style (P)	-0.896	0.191	4.682	0.001	-1.272 -0.521
Cognitive distortions (M)	-0.156	0.03	5.239	0.001	-0.214 -0.098
PXM	0.01	0.002	5.04	0.001	0.006 0.014

Model statistics: ADMS [$R^2 = 0.043$, $F(3, 1278) = 19.032$, $p < 0.001$], DDMS [$R^2 = 0.040$, $F(3, 1278) = 17.727$, $p < 0.001$], IDMS [$R^2 = 0.062$, $F(3, 1278) = 28.113$, $p < 0.001$], RDMS [$R^2 = 0.110$, $F(3, 1278) = 52.701$, $p < 0.001$], SDMS [$R^2 = 0.022$, $F(3, 1278) = 9.380$, $p < 0.001$]

Dependent variable: Problem-gambling behaviour

The model statistics, as presented in Table 3, show that avoidant decision-making style and cognitive distortions significantly explained 4.3% of problem-gambling behaviour, and the data fit the model [$F(3, 1278) = 19.03$, $p < 0.05$]. Additionally, the avoidant decision-making style was a significant positive predictor of problem-gambling behaviour [$\beta = 0.67$, $t = 7.35$, $p < 0.05$]. Cognitive distortions positively predicted problem-gambling behaviour [$\beta = 0.09$, $t = 6.18$, $p < 0.05$]. The interaction term showed that cognitive distortions inversely moderated the effects of avoidant decision-making style on problem gambling behaviour [$\beta = -0.01$, $t = 7.05$, $p < 0.01$].

The table also shows that dependent decision-making style and cognitive distortions explained 4% of problem-gambling behaviour, and the data fit the model [$F(3, 1278) = 17.63$, $p < 0.05$]. Dependent decision-making style inversely predicted problem-gambling behaviour [$\beta = -1.18$, $t = 6.069$, $p < 0.05$]. Cognitive distortions inversely predicted problem-gambling behaviour [$\beta = -0.21$, $t = 7.05$, $p < 0.05$]. The interaction term

showed that cognitive distortions significantly positively moderated the effects of dependent decision-making style on problem gambling behaviour [$\beta = 0.014$, $t = 6.89$, $p < 0.05$].

In the same vein, intuitive decision-making style and cognitive distortions explained 6.2% of problem-gambling behaviour, and the data fit the model [$F(3, 1278) = 28.11$, $p < 0.05$]. Intuitive decision-making style significantly inversely predicted problem-gambling behaviour [$\beta = -1.50$, $t = 8.65$, $p < 0.05$]. Cognitive distortions inversely predicted problem-gambling behaviour [$\beta = -0.28$, $t = 8.65$, $p < 0.05$]. The interaction term showed that cognitive distortions positively moderated the effects of intuitive decision-making style on problem gambling behaviour [$\beta = 0.02$, $t = 8.52$, $p < 0.05$]. Furthermore, the model table shows rational decision-making style and cognitive distortions significantly explained 11% of problem-gambling behaviour, and the data fit the model [$F(3, 1278) = 57.70$, $p < 0.005$]. Rational decision-making style inversely predicted problem-gambling behaviour [$\beta = -0.84$, $t = 10.32$, $p < 0.05$]. Cognitive distortions inversely predicted problem-gambling behaviour [$\beta = -0.13$, $t = 11.90$, $p < 0.05$]. The interaction term showed that cognitive distortions positively moderated the effects of rational decision-making style on problem gambling behaviour [$\beta = 0.01$, $t = 12.21$, $p < 0.05$].

The model statistics table also explained spontaneous decision-making style and cognitive distortions accounted for 2.2% of problem-gambling behaviour, and the data fit the model [$F(3, 1278) = 9.38$, $p < 0.05$]. Spontaneous decision-making style inversely predicted problem-gambling behaviour [$\beta = -0.90$, $t = 4.68$, $p < 0.05$]. Cognitive distortions inversely predicted problem-gambling behaviour [$\beta = -0.16$, $t = 5.24$, $p < 0.05$]. The interaction term showed that cognitive distortions positively moderated the effects of spontaneous decision-making style on problem gambling behaviour [$\beta = 0.10$, $t = 5.04$, $p < 0.05$].

Hypothesis two: The effect of avoidant decision-making style on problem gambling behaviour is stronger at higher levels of cognitive distortions than at lower levels. Table 4 shows that when cognitive distortion is low, avoidant decision-making style predicted an increase in problem-gambling behaviour [$\beta = 0.25$, $t = 5.90$, $p < 0.01$]. When cognitive distortion is moderate, the avoidant decision-making style showed no significant effect [$\beta = 0.07$, $t = 1.94$, $p > 0.05$]. However, when cognitive distortion was high, avoidant decision-making style predicted a decrease in problem-gambling behaviour [$\beta = 0.05$, $t = 3.50$, $p < 0.05$]. The hypothesis is rejected. Figure 1 shows the graphical representation of the interactions.

Table 4: Conditional effects of the Avoidant Decision-making Style at values of the Cognitive Distortions

Cognitive distortions	β	Std. Error	t	p	Confidence Intervals	
					Lower Limit	Upper Limit
Low	0.251	0.043	5.897	0.001	0.167	0.334
Moderate	0.067	0.034	1.937	0.053	-0.001	0.135
High	-0.172	0.049	3.502	0.001	-0.268	-0.076

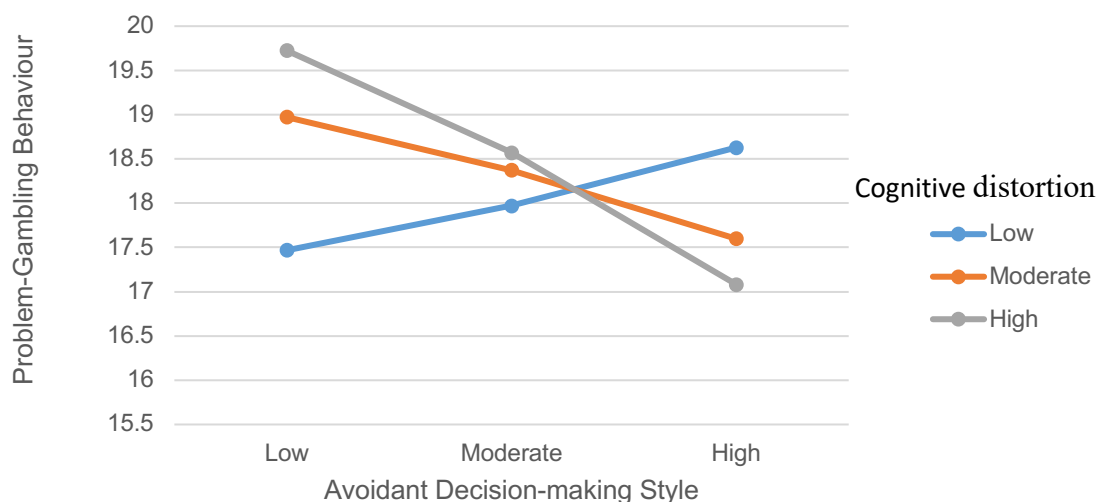
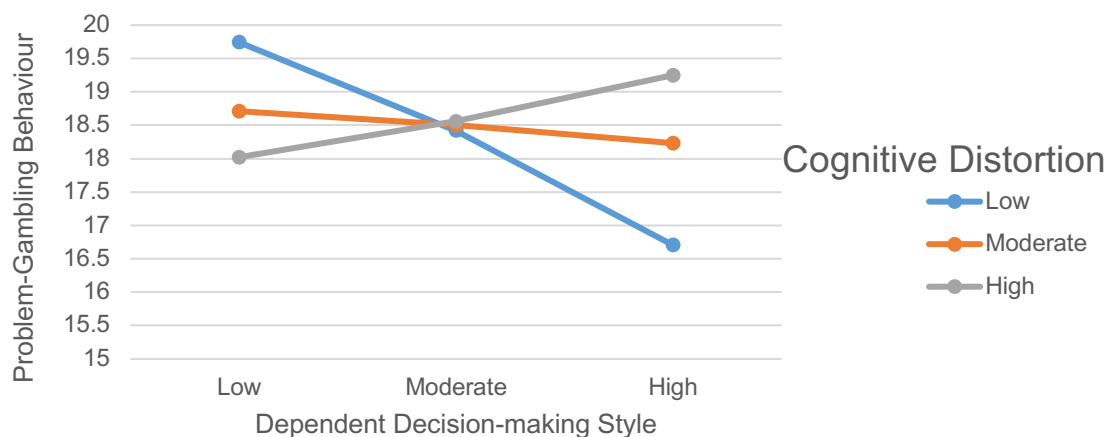


Figure 1: Moderation Effect of Cognitive Distortion on Avoidant Decision-Making Style

Hypothesis three: The effect of dependent decision-making style on problem gambling behaviour will be significant when cognitive distortion is high. As presented in Table 5, when cognitive distortions are low, a dependent decision-making style will predict a decrease in problem gambling behaviour [$\beta = 0.34$, $t = 3.98$, $p < 0.05$]. A moderate cognitive distortion resulted in a dependent decision-making style not showing a significant effect [$\beta = 0.06$, $t = 0.47$, $p > 0.05$]. However, when cognitive distortion was high, dependent decision-making style predicted an increase in problem-gambling behaviour [$\beta = 0.08$, $t = 6.13$, $p < 0.05$]. Figure 2 shows the graphical representation of the interactions.

Table 5. *Conditional effects of the Dependent Decision-making Style at values of the Cognitive Distortions*

Cognitive distortions	β	Std. Error	t	p	Confidence Intervals	
					Lower Limit	Upper Limit
Low	-0.344	0.086	3.984	0.001	-0.514	-0.175
Moderate	0.028	0.059	0.473	0.636	-0.087	0.143
High	0.510	0.083	6.133	0.001	0.347	0.673

**Figure 2:** *Moderation Effect of Cognitive Distortion on Dependent Decision-Making Style*

Hypothesis 4. The effect of intuitive decision-making style on problem gambling behaviour will not be significant at higher levels of cognitive distortions. Table 6 presents the conditional effects of the intuitive decision-making style at values of the cognitive distortions, and it shows that when cognitive distortion is low, the intuitive decision-making style predicted a decrease in problem-gambling behaviour [$\beta = 0.34$, $t = 3.72$, $p < 0.05$]. When cognitive distortion is moderate, an intuitive decision-making style predicted an increase in problem gambling behaviour [$\beta = 0.18$, $t = 2.70$, $p < 0.05$]. However, when cognitive distortion was high, intuitive decision-making style predicted an increase in problem gambling behaviour [$\beta = 0.84$, $t = 8.41$, $p < 0.05$]. The hypothesis is rejected. Figure 3 shows the graphical representation of the interactions.

Table 6. Conditional effects of the Intuitive Decision-making Style at values of the Cognitive Distortions

Cognitive distortions	β	Std. Error	t	p	Confidence Intervals	
					Lower Limit	Upper Limit
Low	-0.337	0.091	3.723	0.001	-0.515	-0.159
Moderate	0.177	0.065	2.702	0.007	0.048	0.305
High	0.843	0.100	8.411	0.001	0.646	1.040

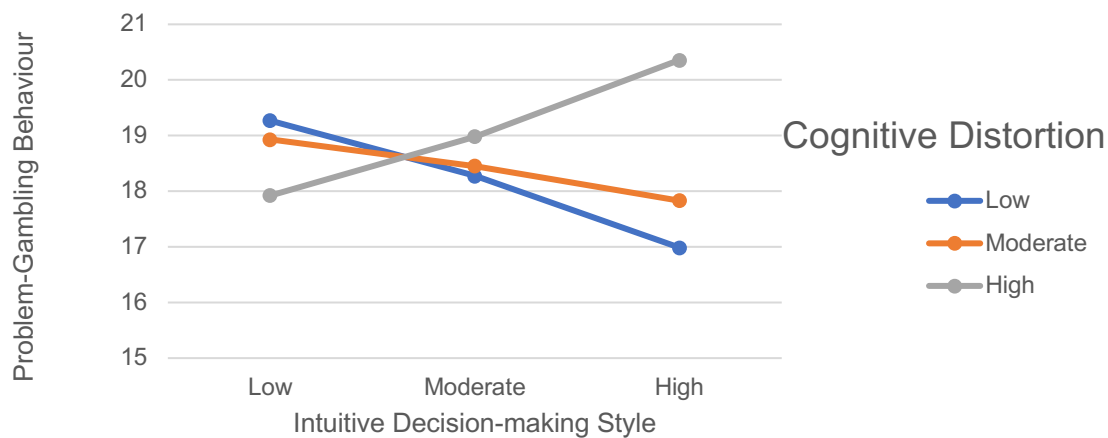


Figure 3: Moderation Effect of Cognitive Distortion on Intuitive Decision-Making Style

Hypothesis 5: The effect of rational decision-making style on problem gambling behaviour is weaker at higher levels of cognitive distortions compared to lower levels. Table 7 revealed that people with a rational decision-making style but low cognitive distortion will manifest a decrease in problem gambling behaviour [$\beta = 0.04$, $t = 5.49$, $p < 0.05$]. When cognitive distortion is moderate, a rational decision-making style did not predict gambling behaviour [$\beta = 0.06$, $t = 1.89$, $p > 0.05$]. When cognitive distortion was high, rational decision-making style predicted an increase in problem-gambling behaviour [$\beta = 0.42$, $t = 9.96$, $p < 0.05$]. Figure 4 shows the graphical representation of the interactions.

Table 7 *Conditional effects of the Rational Decision-making Style at values of the Cognitive Distortions*

Cognitive distortions	β	Std. Error	t	p	Confidence Intervals	
					Lower Limit	Upper Limit
Low	-0.217	0.040	5.492	0.001	-0.295	-0.140
Moderate	0.059	0.031	1.885	0.060	-0.002	0.121
High	0.417	0.042	9.961	0.001	0.335	0.500

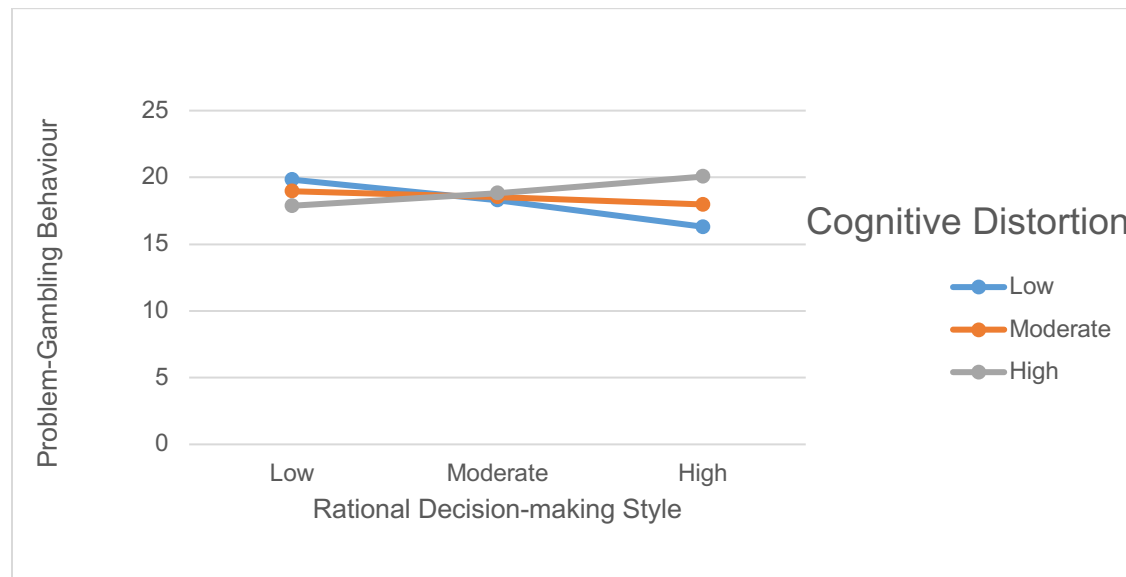


Figure 4: *Moderation Effect of Cognitive Distortion on Rational Decision-Making Style*

Hypothesis six: The effect of spontaneous decision-making style on problem gambling behaviour will be stronger at higher levels of cognitive distortion than at lower levels.

It can be deduced from the Table 8 that when cognitive distortion is low, spontaneous decision-making style predicted a decrease in problem gambling behaviour [$\beta = 0.27$, $t = 3.28$, $p < 0.01$]. When cognitive distortion is moderate, spontaneous decision-making style did not predict problem gambling behaviour [$\beta = 0.002$, $t = 0.04$, $p > 0.05$]. When cognitive distortion was high, spontaneous decision-making style predicted an increase in problem-gambling behaviour [$\beta = 0.36$, $t = 4.00$, $p < 0.01$]. Figure 5 shows the graphical representation of the interaction.

Table 8. Conditional effects of the Spontaneous Decision-making Style at values of the Cognitive Distortions

Cognitive distortions	β	Std. Error	t	p	Confidence Intervals	
					Lower Limit	Upper Limit
Low	-0.274	0.083	3.280	0.001	-0.437	-0.110
Moderate	0.002	0.060	0.035	0.972	-0.115	0.119
High	0.359	0.090	3.999	0.001	0.183	0.536

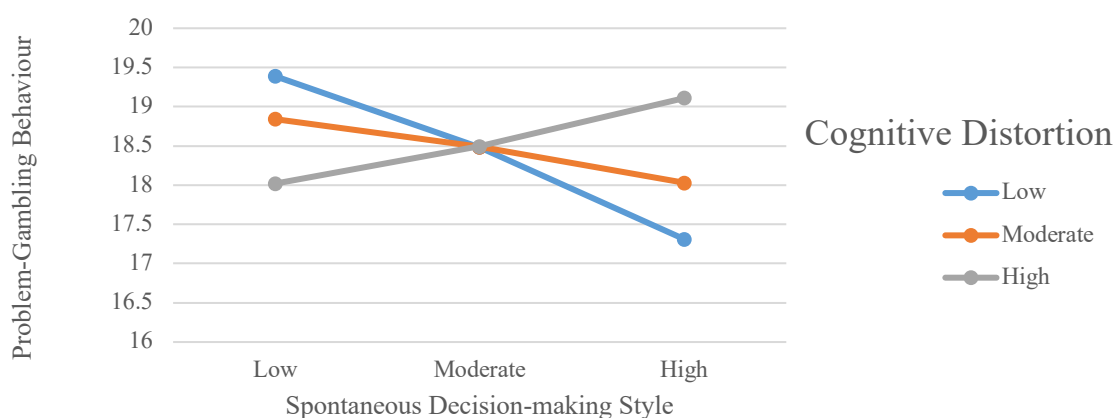


Figure 5: Moderation Effect of Cognitive Distortion on Spontaneous Decision-Making Style

Discussion

The statistical models examined the extent to which different decision-making styles, along with cognitive distortions, predict problem-gambling behaviour, and whether cognitive distortions moderate these relationships. The results reveal distinct patterns across decision-making styles, offering meaningful insights into behavioural and cognitive vulnerabilities in gambling contexts.

The hypothesis one proposed that cognitive distortions would significantly moderate the relationship between decision-making styles and problem gambling behaviour among tertiary students in Ibadan. Findings from the Structural Equation Modelling supported this hypothesis, showing that distorted gambling-related beliefs significantly influenced how different decision-making styles contributed to problem gambling behaviour.

The results indicate that decision-making styles, collectively, form a crucial psychological framework for understanding gambling behaviour among tertiary students. These styles reflect consistent ways individuals evaluate situations, process information, and respond to uncertainty (Scott & Bruce, 1995; Cristofaro et al., 2022). Recent studies have further shown

that maladaptive decision-making patterns, such as impulsive, avoidant, and emotionally driven styles, are associated with increased gambling severity and poor behavioural regulation among young adults and students (Donati et al., 2022; Ciccarelli et al., 2021; Mallorquí-Bagué et al., 2021). In contrast, more analytical, rational, and reflective decision-making styles appear to serve as protective factors against excessive gambling involvement and gambling-related harm (Yakovenko & Hodgins, 2020; Turner et al., 2023). Moreover, the findings show that the impact of decision-making tendencies is greatly amplified when cognitive distortions are present. Empirical evidence suggests that irrational gambling cognitions, including illusion of control, predictive control, and interpretative biases, strengthen risky gambling decisions and maintain persistent gambling behaviour despite negative consequences (Goodie & Fortune, 2021; Ciccarelli et al., 2021; Buen & Flack, 2022). This suggests that gambling issues in tertiary students arise not only from poor decision-making but also from irrational cognitive interpretations that influence gambling experiences and reinforce risky behaviours. Overall, the results support cognitive-behavioural theories by demonstrating that irrational gambling beliefs interact with decision-making tendencies to increase gambling-related vulnerability (Toneatto & Millar, 2021; Cowie et al., 2022). Hypothesis one is hereby accepted.

Hypothesis two, which proposed that the effect of avoidant decision-making style on problem gambling behaviour would become stronger at higher levels of cognitive distortions, was not supported, as avoidant decision-making significantly increased gambling behaviour at low cognitive distortions, became non-significant at moderate levels, and unexpectedly reduced gambling behaviour at high levels of cognitive distortions (Ciccarelli et al., 2021; Buen & Flack, 2022). Avoidant decision-making style was associated with increased gambling, aligning with the theory that avoidance behaviours often reflect attempts to escape distress through risk-taking and emotionally avoidant coping strategies (Blażczynski & Nower, 2002; Donati et al., 2018). However, cognitive distortions appeared to weaken this relationship, possibly because irrational gambling beliefs gradually take precedence over avoidance tendencies in influencing gambling behaviour, thereby shifting motivation toward more impulsive and emotionally driven gambling patterns (Ciccarelli et al., 2021; Toneatto, Li, & Wan, 2019; Mallorquí-Bagué et al., 2021). This finding partially contradicts cognitive-behavioural models which generally assume that maladaptive cognitions consistently intensify risky gambling tendencies, suggesting instead that cognitive distortions may interact differently across specific decision-making styles (Sharpe, 2002; Toneatto & Millar, 2021).

Avoidant decision-making style was associated with increased gambling, aligning with the theory that avoidance behaviours often reflect attempts to escape distress through risk-taking. However, cognitive distortions diminished this association, possibly because distorted beliefs

take precedence over avoidance in influencing gambling behaviour (Ciccarelli et al., 2021; Toneatto, Li, & Wan, 2019).

Hypothesis three stated that the effect of dependent decision-making style on problem gambling behaviour would become significant when cognitive distortions are high. The findings supported this hypothesis. The results revealed that a dependent decision-making style predicted lower problem gambling behaviour when cognitive distortions were low, became non-significant at moderate levels, and significantly predicted increased gambling problems when cognitive distortions were high. This progression demonstrates the important role cognitive distortions play in transforming dependent decision-making from a relatively protective tendency into a significant vulnerability factor for problem gambling behaviour, corroborating findings by Griffiths (Griffiths, 2019).

Cognitive distortions, therefore, appear to amplify the susceptibility of dependent individuals to gambling-related misinformation and social persuasion.

This finding connects strongly with the broader conclusions drawn from the first hypothesis, which emphasised that cognitive distortions interact with decision-making tendencies to shape gambling vulnerability. In this case, distorted cognitions transformed dependency from a potentially stabilising tendency into a significant risk factor. The result supports previous research showing that social influence and irrational gambling beliefs jointly contribute to gambling persistence and risky gambling behaviour (Goodie & Fortune, 2013).

Hypothesis four proposed that an intuitive decision-making style would not significantly predict problem gambling behaviour at higher levels of cognitive distortions. The findings, however, contradicted this expectation and led to the rejection of the hypothesis. The results demonstrated that an intuitive decision-making style predicted lower gambling behaviour when cognitive distortions were low but significantly predicted increased gambling behaviour at both moderate and high levels of cognitive distortions, with the strongest effect occurring at high levels. Intuitive decision-makers were generally less likely to engage in problem gambling, possibly due to adaptive gut-level reactions. However, under cognitive distortion, even intuitive thinkers became more vulnerable, supporting dual-process theories (Myrseth, Brunborg, & Eidem, 2010).

This finding reinforces the central argument established in the first hypothesis that cognitive distortions serve as a psychological catalyst that intensifies maladaptive decision-making tendencies. It also supports dual-process theories of cognition, which suggest that emotionally driven and intuitive processing may dominate behaviour when analytical reasoning is weakened (Kahneman, 2011). Within gambling environments specifically designed to stimulate excitement and emotional engagement, intuitive decision-making combined with cognitive distortions may create particularly strong vulnerability to gambling-related harm.

Hypothesis five proposed that the effect of rational decision-making style on problem gambling behaviour would become weaker at higher levels of cognitive distortions compared to lower levels. The findings supported this hypothesis in part, although the pattern observed was more complex than expected. Rational decision-making predicted lower problem gambling behaviour at low levels of cognitive distortions, became non-significant at moderate levels, and unexpectedly predicted increased gambling behaviour at high levels of cognitive distortions. Rational decision-making style offered the most robust protection, likely due to enhanced analytical thinking (Dewberry, Juanchich, & Narendran, 2013). Still, its efficacy declined when paired with distorted beliefs, indicating that even logical decision-makers can be undermined by flawed cognitive schemas (Goodie & Fortune, 2013).

This finding extends the discussion from the first hypothesis by showing that cognitive distortions are capable not only of amplifying maladaptive decision-making styles but also of weakening the protective influence of adaptive styles. The result supports cognitive theories suggesting that distorted beliefs can fundamentally alter judgment processes and interfere with reflective decision-making (Toneatto & Millar, 2021; Ciccarelli et al., 2021; Buen & Flack, 2022). Thus, even rational thinkers may become vulnerable to gambling problems when irrational cognitions dominate their interpretation of gambling experiences.

Finally, hypothesis six proposed that the effect of spontaneous decision-making style on problem gambling behaviour would become stronger at higher levels of cognitive distortions than at lower levels. The findings supported this hypothesis. The results indicated that spontaneous decision-making style predicted lower gambling behaviour when cognitive distortions were low, became non-significant at moderate levels, and significantly predicted increased gambling behaviour when cognitive distortions were high. This supports research suggesting that impulsivity and irrational thinking are a dangerous combination.

This finding strongly complements the earlier hypotheses and reinforces the broader conclusion established in hypothesis one that cognitive distortions play a central moderating role in gambling behaviour among tertiary students. Across the various decision-making styles examined, cognitive distortions consistently altered the direction or strength of their relationship with problem gambling behaviour. However, the nature of these moderating effects differed across styles, suggesting that cognitive distortions interact uniquely with specific psychological tendencies.

Collectively, the findings from hypotheses two to six demonstrate that gambling vulnerability among tertiary students is not determined by decision-making styles alone but by the interaction between these styles and distorted gambling-related beliefs. While some decision-making tendencies became increasingly maladaptive under high cognitive distortions, others showed weakened or reversed effects, highlighting the complexity of gambling behaviour among emerging adults. These findings therefore

provide further support for the overarching conclusion of the first hypothesis that cognitive distortions are a critical psychological mechanism by which decision-making tendencies influence problem gambling behaviour.

Conclusion

This study underscores the nuanced interplay between decision-making styles and cognitive distortions in influencing problem-gambling behaviour. While styles, such as rational and intuitive, serve as protective factors, their efficacy diminishes under the weight of distorted thinking.

Contribution to knowledge

Moderation analyses provide strong evidence that cognitive distortions play a critical moderating role in the decision-making–gambling nexus.

This research adds to existing knowledge by showing that cognitive distortions play a significant role in influencing the link between decision-making styles and problem gambling among tertiary students. Unlike earlier studies that looked at these factors separately, this work offers a combined explanation that distorted gambling beliefs impact how decision-making tendencies affect gambling behaviour. It also broadens cognitive-behavioural theories of gambling by indicating that cognitive distortions can reinforce harmful decision-making styles like dependence, intuition, and spontaneity, while undermining the protective effect of rational decision-making. This underscores the active influence of irrational gambling beliefs on risky behaviours. Additionally, the study provides empirical data from a Nigerian setting, focusing on tertiary students in Ibadan, thereby filling a gap in African research on gambling behaviours. The findings deliver culturally relevant insights into the psychological factors influencing gambling among young adults in developing nations. Methodologically, employing Structural Equation Modeling, the research captures both direct and moderating relationships, offering a clearer picture of how decision-making styles, cognitive distortions, and problem gambling interact. Ultimately, the results suggest that prevention programs should address both maladaptive decision-making and distorted gambling beliefs for greater effectiveness.

Recommendations

Based on the findings of the study, the following recommendations were made to address the issues influencing problem gambling behaviour among tertiary students in Ibadan through possible psychological intervention.

The significant interaction effect emphasizes the necessity of addressing cognitive distortions within therapeutic contexts for individuals with impulsive decision-making styles. Cognitive-behavioural therapy (CBT), which helps individuals recognize and modify cognitive distortions,

may be particularly beneficial. By targeting both impulsivity and cognitive distortions, interventions can be more effective in reducing the risk of problem gambling.

Given that cognitive distortions amplify impulsive tendencies, educational interventions designed to enhance cognitive skills and decision-making processes may reduce vulnerability to problem gambling. Programs that teach individuals about cognitive biases specific to gambling, such as the illusion of control and gambler's fallacy, can help mitigate impulsive decision-making.

Mental health professionals could utilize these findings to develop comprehensive risk assessments that account for both impulsive decision-making styles and cognitive distortions when evaluating individuals for problematic gambling behaviour. This dual approach may allow for earlier intervention and prevention strategies targeted at vulnerable populations.

Programs aimed at reducing problem gambling should consider the cognitive distortions present in individuals. Cognitive-behavioural strategies that address these biases might help decrease their impact on decision-making styles, ultimately reducing gambling harm and incorporation of cognitive restructuring techniques can effectively mitigate the adverse effects of cognitive distortions on gambling behaviour.

Understanding the interplay between DMS, CD, and PGB allows for better risk assessments in clinical and therapeutic settings. Clinicians could use decision-making style as a framework for assessing an individual's vulnerability to problem gambling, specifically evaluating their cognitive distortions to tailor risk management strategies.

Given their unexpected protective role when interacting with avoidant decision-making styles, cognitive distortions should be taken into consideration when treating problem gamblers. Identifying the specific cognitive distortions that may dampen the impact of ADMS on PGB could lead to new therapeutic interventions that leverage these distortions positively.

The results suggest that treatment plans for individuals with avoidant decision-making styles might benefit from targeting cognitive distortions. Interventions that help individuals recognize and reframe their cognitive distortions may decrease the likelihood of engaging in gambling behaviours. Cognitive-behavioural therapy (CBT) could play a crucial role in this regard by allowing individuals to challenge and change their cognitive distortions while also addressing avoidant decision-making strategies.

Limitations of the study

This study is not without limitations. First, the study employed a cross-sectional design, which captures data at a single point in time. While this allows for identifying associations among variables, it does not permit causal inferences. A longitudinal study should be considered in future studies.

Second, the use of self-report instruments introduces potential for social desirability bias and recall bias, which can compromise the validity of the data; hence, a mixed method of both qualitative and quantitative methods should be employed in future studies.

Third, the study focused solely on tertiary students within a specific region, potentially limiting the generalizability of the findings to broader populations. Tertiary students often experience unique pressures-such as academic stress, financial dependency, and peer influences – that may not apply to non-student populations or working young adults. In future studies, therefore, the population type should be extended to other categories of participants.

Fourthly, future studies could explore which specific cognitive distortions (e.g., overconfidence, discounting future consequences) most significantly influence the impulsive decision-making-gambling relationship, allowing for more precise interventions.

Also, future research should focus on exploring the mechanisms behind the negative moderating effect of cognitive distortions on the ADMS-PGB relationship. Longitudinal studies could investigate how cognitive distortions evolve with changes in decision-making styles and the impact of these changes on gambling behaviour over time.

STATEMENT OF COMPETING INTERESTS

None declared.

ETHICS APPROVAL

Social Science and Humanities Research Ethics Committee (SSHREC) approved “Decision-Making Styles, Subjective Wellbeing and Cognitive Distortions as Predictors of Problem Gambling of Students from Selected Tertiary Institutions in Ibadan”, on 28/07/2022, (approval #UI/SSHREC/2021/0014)

RELATIVE CONTRIBUTIONS

OOO: conceptualization, formal analysis, methodology, writing original draft. POO: conceptualization, editing, writing review, supervision. AE: conceptualization, writing original draft, supervision.

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Not Applicable

RESEARCH PROMOTION

This study examined how decision-making styles contribute to problem gambling among tertiary students in Ibadan, Nigeria, and whether cognitive distortions moderate these relationships. Using Structural Equation Modeling, the research found that decision-making styles collectively form a crucial psychological framework for understanding gambling, but their impact is significantly altered and amplified when paired with cognitive distortions. Ultimately, the findings revealed that while adaptive styles like rational thinking offer protection at low levels of cognitive distortion, high cognitive distortions can transform relatively stable or protective decision-making tendencies into significant risk factors for problem gambling.

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