

# Sports Betting: Problem Gambling Correlates among Problem Gambling Severity Index Sub-Types of University Students

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## Abstract

Students who participate in sports betting often display Problem Gambling Correlates. Thus, the purpose of this study was to seek problem gambling correlates among problem gambling severity index sub-types of university students who engage in sports betting. The descriptive survey design was adopted for the study. A sample size of 351 was used from four colleges of the University of Cape Coast. The sample was made up of both males and females who were at least 20 years old. The researchers further used a disproportionate stratified sampling technique to draw from each college the number required for the study. Means, standard deviation, and one-way multivariate analysis of variance (MANOVA) were used in the data analysis. It was found that some of the major gambling correlates experienced were those captured under faulty cognitions, first-time experiences, family problems, co-morbidity and stress. Also, there was a significant difference between these correlates and gambler subtypes. It was recommended among other things that a proposed “Gaming Research Unit” under the auspices of the Department of Education and Psychology, should be established to ensure the screening of students who are low-risk, moderate-risk or problem gamblers and refer them for guidance and counselling.

## Keywords

Problem Gambling Correlates, PGSI Subtypes, Problem Gambling, University Students

## 1. Introduction

Multiple terms, such as “Problem”, “Pathological” and “Compulsive” have been interchangeably used to describe excessive and persistent gambling according to McCormack and Griffiths (2011: p. 17). There are still controversies about the use of these terms in the definition of problem gambling. Nonetheless, the harmful outcome that results from the compulsion to gamble could be described as problem gambling (McCormack & Griffiths, 2011: p. 17). They added that problem gambling was used to describe less serious gambling problems without differentiating between the various gravities or to cover every level of problem gambling.

In this study, the term “problem gambling” refers to the adverse effects on the gambler or other individuals, his/her social life or even on the community as a result of the individual’s excessive gambling behaviour, i.e. sports betting. For this study, problem gambling was solely considered in the context of sports betting. Problem gambling correlates domain according to Ferris and Wynne (2001: p. 4), may be the experiences or behaviours exhibited before gambling or exhibited after some past months of gambling. The variables of problem gambling correlates explicitly determine whether a gambler has had any suicide ideation, suicide attempts, or feelings of depression. The correlates also point out if a gambler has been treated for stress, has undergone self-medication either with gambling or alcohol or even indulged in the use of drugs and alcohol in the course of his/her gambling activities. Also, the “correlates” assess the individual’s family history of alcohol, drug and gambling problems. The individual developing a winning system or strategy to minimise losses and maximise wins is reckoned as part of the correlates of problem gambling. The Problem Gambling Severity Index (PGSI) is a subsection of the Canadian Problem Gambling Index (CPGI). The CPGI was adopted for this study because it is more theory-based, and better to discriminate between problem gambler sub-types in general population surveys. Depending on a respondent’s score of the PGSI items, he or she may be classified as being in one of four gambler sub-types, namely: (a) non-problem gambler, (b) low-risk gambler, (c) moderate risk gambler, and (4) problem gambler.

For this study, as stated earlier, gambling was exclusive to sports betting. That is, problem gamblers and non-gamblers were exclusively captured in the context of sports betting, and no other forms of gambling were considered. It should also be noted that “non-problem gamblers” does not mean that the individual does not engage in sports betting at all rather non-problem gamblers in this study are participants who will have responded “never” to all of the indicators of behavioural problems, although there may well be a frequent gambler with heavy involvement in terms of time and money. The “professional” gambler would fit into this category. It must be emphasised that non-gamblers form a component or share similar characteristics with non-problem gamblers. Non-gamblers unlike non-problem gamblers have not gambled at all in the past 12 months and would have skipped through the majority of the questionnaire, except the corre-

lates section. Non-gamblers may have some of the correlates of problem gambling. Non-problem gamblers probably will not have experienced any adverse consequences of gambling. Again, the information on correlates here is important for comparative purposes and would be particularly useful in long-term tracking. Likewise, the researchers would like to urge the Department of Education and Psychology to further use this information and results of this study as a basis for further research into students' gambling activities and to consider setting up a "unit" if possible, which will devotedly commit to the issues of students' sport betting and gambling at large within the university campus.

## 2. Empirical Review

Problem gambling is shown to negatively impact a person's health, employment, finances, and interpersonal relationships (Salonen, Hellman, & Castr, 2018). The risk and negative consequences of problem gambling in sports betting (Temitope, 2019; Koross, 2016); the mental health and prevalence rate of problem gambling among students have been established (Okechukwu, 2022; van der Maas et al., 2018; Mwadime, 2017).

In Ghana, the Ghana Gaming Commission (GGC) is fully legal and regulated. The GGC is responsible for the registration of casinos and operators for sports betting (Sewor, 2019). After sports betting legislation was introduced in 2006, several licenced operators throughout the country began offering online sports betting, as well as their brick-and-mortar corner shops. Sportsbooks in Ghana include, amongst other items, Safaribet, Premier Betting, Eurobet, Alphabet, Soccerbet, Betway Ghana, and MyBet. In Ghana, a higher frequency of gambling is linked to riskier gambling behaviours, particularly among students and sports bettors (Glozah, Tolchard, & Pevalin, 2019). Studies conducted in Ghana have established that gambling was prevalent among students of various age groups and genders (Adu-Akoh & Kwarteng-Nantwi, 2023; Yeboah et al., 2022; Opoku & Yeboah, 2021) and that the motivational trigger behind student gambling was mainly financial benefit or financial freedom (Adjei & Mensah, 2023; Kyei-Gyamfi et al., 2022; Odame et al., 2021; Ofose, & Kotey, 2020; Tagoe et al., 2018). Though most student-gamblers believe that gambling is not "immoral" (Adjei & Mensah, 2023), they held a positive attitude towards it but also stated that gambling could also lead to other negative behaviours in and among student-gamblers (Kwarteng-Nantwi et al., 2022; Glozah et al., 2019; Appiah & Awuah, 2016). Some of the studies also found that students could not focus on their studies as a result of the related pressures and activities of student gambling (Acheampong et al., 2022; Kwarteng-Nantwi et al., 2022). These studies reported that students lost concentration in class, strained relationships, and increased exclusion or rejection from study groups. As a result of the above findings; these studies called upon stakeholders, agencies and concerned individuals to put in place measures to handle student gambling and its related activities on and off campuses. Similarly, we suggest that every educational institution in the country should set up a

“Gaming Unit” which would seek student-gambler protection, harm minimization and awareness creation from higher-level institutions and school authorities.

The story is not different from other African countries such as Kenya, South Africa and Nigeria. In Nigeria, gambling is a nationally legalised business and its activities are regulated by a government agency known as the National Lottery Regulatory Commission. Like Ghana, some of the gambling activities found within university environments in Nigeria include but are not limited to draft, casino, sports betting, lottery, Baba Ijebu, online gaming, and card games among others (Adesina, 2019; Ede et al., 2020). They reported that gambling was done both online and offline, and most young people see gambling as a way to get money quickly. According to Aguocha et al. (2019), a study in Nigeria found that “there was an increased rate of gambling among those with at least one parent, sibling or friend that gambled.” Gambling is a prevalent problem behaviour among Nigerian adolescents and young adults (Temitope, 2019; Adebisi et al., 2021; Amazue et al., 2021). Like Ghana, gamblers’ behaviour has been identified as having serious consequences on their health and habits and has been associated with some criminal behaviours such as stealing (Oyebisi et al., 2012; Lavojo et al., 2020). Yet gambling activities have become part and parcel of the normal culture that is practised among different age groups, genders, and socio-economic statuses (Omanchi & Okpamen, 2018; Temitope, 2019). As reported in Ghana, gambling behaviour among Nigerian students in universities has been highlighted to be a major public health hazard. According to studies conducted in Nigeria (Temitope, 2019; Lavojo et al., 2020), the primary drivers of this behaviour among students include economic hardship, personality factors, unemployment, peer pressure, greed and financial stress. Similar reports were made in Kenya and other African countries (Mbiriri, 2023; Barsulai, 2022; Ogachi, Muchiri Karega, & Mvungu, 2020; Bitanihirwe & Ssewanyana, 2021).

Concerning gambler sub-types and their correlated behaviours; Krébesz et al. (2023), found that non-problem gamblers show the same cognitive distortions while playing slot machines as problem gamblers. According to Lopez-Gonzalez, Griffiths, and Estévez (2020), “alcoholic beverages and consumption of junk food were found to be significantly highly associated with problem gambling severity”. Emond, Griffiths and Hollén (2020) added that problem gamblers at the age of 20 years had a history of hyperactivity and conduct problems in adolescence, high sensation seeking, and an external locus of control. These individuals were more likely to have mothers who had problems with gambling, reported less parental supervision, and had higher social media usage. Moderate-risk/problem gambling at the age of 20 years was associated with regular cigarette smoking, high levels of illicit drug use, and problematic use of alcohol at the age of 24 years. The greatest intensity of problem gambling is observed among gamblers in the 18 - 24 age group (up to 27%), and the lowest in the 55 - 64 age group (5.8%). It is worth noting that, among gamblers in the 65+ age group, the severity of gambling problems is 10.7%, indicating an upward trend (Lelonek-Kuleta

& Bartczuk, 2021). Emond et al. (2020) added that a significant minority of young adults (mainly males) showed problem gambling behaviours which appeared to be established by the age of 20 years and were associated with other potentially addictive behaviours. In addition, Griffiths earlier reported that “there are significant comorbidities with problem gambling, including depression, alcoholism, and obsessive-compulsive behaviours.” These co-morbidities may worsen, or be worsened by problem gambling.

Problematic gambling was similarly identified by Giralt et al. (2018), to be associated with the “increased psychopathological strain and that problem gambling has been strongly linked to a variety of health-related problems”. Ciccarelli et al. (2022) indicated that along with gambling-related cognitive distortions, uncertainty about mental states, and difficulties remaining in control of one’s behaviour when experiencing negative emotions contributed significantly to problematic gambling among adolescents. A review by Calado et al. (2017) on adolescent gambling concluded that a small but significant minority (range .2% - 12%) of adolescents have gambling-related problems. Caldeira et al. (2017), established that there are “highly significant differences between problem gamblers and the remaining sub-types and also between non-problem gamblers and any other at-risk group in terms of problem gambling correlates”. Shen et al. (2015), found that problem gamblers massively engage in varied locations and more diversely in gambling activities, than moderate-risk or even non-problem gamblers. It was also observed that moderate-risk have lower expenditures and accumulated debts than problem gamblers. With regards to the associated problems, compared to moderate-risk gamblers, problem gamblers had an increased reported psychological distress, daily smoking, and possible alcohol dependence. The severity of gambling and associated problems found in problem gamblers was significantly different from moderate-risk gamblers (Shen, Kairouz, Nadeau, & Robillard, 2015). Dennison et al. (2021), found that on the surface, there seems to be a positive and significant relationship between problem gambling and a range of criminal behaviours. However, after statistically balancing differences in several background measures between problem gamblers and non-problem gamblers, such as low self-control, past substance use, and juvenile delinquency, they found no significant relationship between problem gambling and crime.

The above reports highlight the reality of students engaging in gambling at various levels of problem gambling and thus appropriate measures need to be taken to handle its activities in Ghanaian universities and beyond. This study is seeking to create a wide empirical base of correlates of problem gambling of students across universities and also investigate and articulate the need to develop a measure/policy to manage students problem gambling and its correlate behaviours.

### **3. Theoretical Framework: Blaszczynski and Nower (2002) of Problem and Pathological Gambling**

The Pathways Model (Blaszczynski & Nower, 2002), is a theoretical framework

that proposes three pathways for identifying subtypes of problem gamblers. The model asserts that all individuals with gambling disorder share common ecological factors of availability, accessibility, and acceptability of gambling, combined with cognitive distortions and habituation, resulting from operant conditioning that occurs in the gambling environment. The model shows the different characteristics that could be exhibited by a problem gambler as a result of nature and nurture experiences by the individual.

#### **Pathway 1: Behaviourally Conditioned (BC)**

Pathway 1 gamblers are characterized by an absence of specific pre-morbid features of psychopathology, and their gambling results largely from the effects of conditioning, distorted cognitions surrounding probability of winning and disregard for the notion of independence of events, and/or a series of bad judgments/poor decision-making rather than because of impaired control. Gamblers fitting of this typology are differentiated by the absence of any pre-existing clinically significant psychopathology (Blaszczynski & Nower, 2002). However, it is suggested that BC gamblers can develop co-morbid correlate behaviours such as depression and anxiety, but such disorders are a consequence of problematic gambling rather than being contributing factors. It is also suggested that “BC gamblers may demonstrate instability, fluctuating between heavy gambling and pathological gambling” (Nower & Blaszczynski, 2017). Moreover, gamblers typically receive wins in highly variable patterns (Browne et al., 2015), and it has been theorized that variable reinforcement schedules are a powerful environmental factor that maintains gambling behaviour. It is proposed that “counseling and minimal intervention programmes benefit this subgroup” (Nower & Blaszczynski, 2017).

#### **Pathway 2: Emotionally Vulnerable**

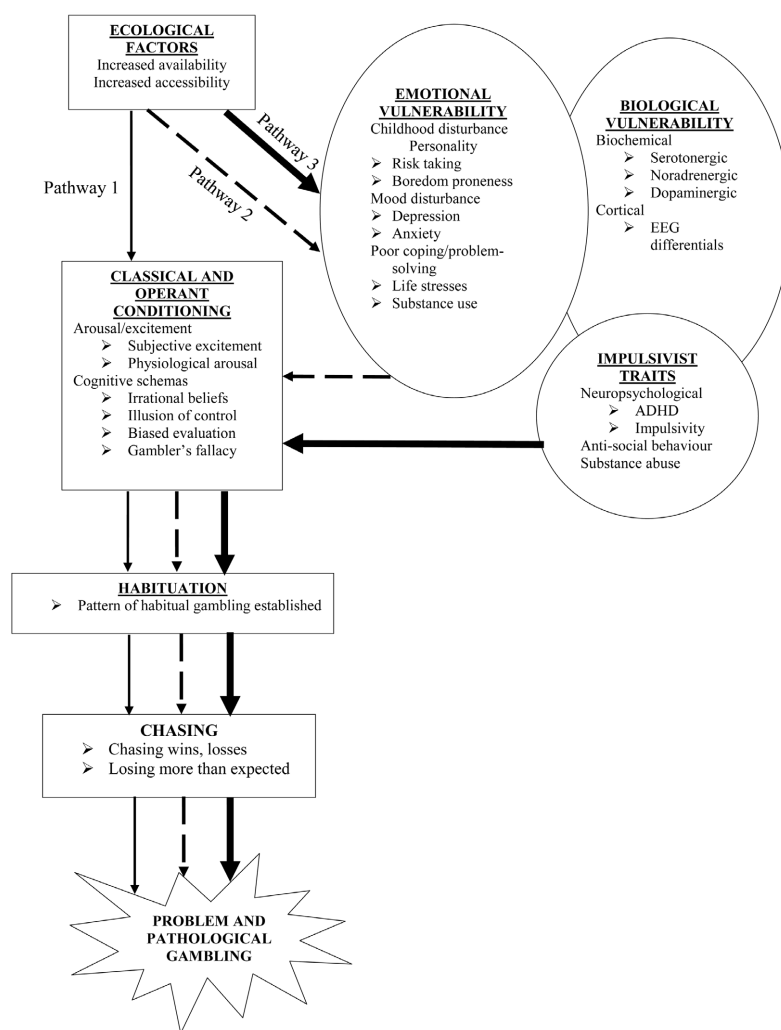
Pathway 2 gamblers share similar ecological determinants, conditioning processes, and cognitive schemas; however, these individuals are present with pre-morbid drug abuse, anxiety, and/or depression, a history of poor coping and problem-solving skills, problematic family background experiences, and major traumatic life events that fuel gambling participation motivated by a desire to modulate affective states and/or meet specific psychological needs. This subgroup of gamblers displays “higher levels of psychopathology, in depression, anxiety and alcohol dependence” (Blaszczynski & Nower). In contrast, Pathway 2 gamblers are emotionally vulnerable as a result of psychosocial and biological factors, utilizing gambling primarily to relieve aversive affective states by providing escape or arousal. Once initiated, a habitual pattern of gambling fosters behavioural conditioning and dependence in both pathways. However, psychological dysfunction in Pathway 2 gamblers makes this group more resistant to change and necessitates treatment that “addresses the underlying vulnerabilities as well as the gambling behaviour” (Blaszczynski & Nower).

#### **Pathway 3: Biologically-Based Impulsive**

Finally, Pathway 3 gamblers possess psychosocial and biologically-based vulnerabilities similar to Pathway 2 but are distinguished by a high degree of impulsivi-

ty, antisocial personality and attention deficit disorders, manifesting in severe multiple maladaptive behaviours. clinically, gamblers with a background history of impulsivity engage in a wider array of behavioural problems independent of their gambling, including substance abuse, suicidality, irritability, low tolerance for boredom and criminal behaviours. In an interactive process, the effect of impulsivity is aggravated under pressure and in the presence of negative emotions. Poor interpersonal relationships, excessive alcohol and poly drug experimentation, non-gambling-related criminality and a family history of antisocial and alcohol problems are characteristic of this group. Gambling starts at an early age, rapidly escalates in intensity and severity, may occur in binge episodes and is associated with early entry into gambling-related criminal behaviours. These gamblers are less motivated to seek treatment in the first instance, have poor compliance rates and respond poorly to any form of intervention. *Blaszczynski, Steel and McCornaghy (1997)*, have labelled these gamblers the antisocial impulsivist sub-type.

The diagram below in **Figure 1** shows Problem and Pathological Gambling Model of *Blaszczynski and Nower (2002)*.



**Figure 1.** Problem and pathological gambling model of *Blaszczynski and Nower (2002)*.

## Research Question and Hypothesis

Thus, this paper sought to answer a quantitative research problem and analyses an hypothesis:

- i) What is the problem gambling correlates exhibited by students' sports bettors?
- ii) Determine whether there is a significant difference in the means of problem gambling correlates among the PGSI gambler sub-types of students' sports bettors.

## 4. Method

### 4.1. Research Design

The descriptive survey design was used in this study. In descriptive design research, the nature of a certain phenomenon is defined and events are determined and reported the way they exist. Descriptive survey design involves collecting data to test hypotheses or answer research questions concerning the current status of the subject of the study. The adoption of descriptive survey design was to ensure high objective standards in the analysis and answering of the research hypothesis and the research questions respectively. However, [Fraenkel and Wallen \(2012\)](#), assert that “descriptive studies are characterised by two-fold difficulties which consist of how to ensure clarity and unambiguity in the questions that are to be answered, and getting a return of the completed questionnaires so that meaningful analysis can make of the data.” The researchers concentrated on quantifying the data to numerical values in a quantitative research approach. Similarly, the researchers aim to generalise the sample to a population so that the conclusions on some features, attitudes or behaviours of the population can be made ([Wiersma & Jures, 2009](#)).

### 4.2. Participants

The accessible participants were all undergraduate students of level 400 of four Colleges of the University of Cape Coast (UCC), Ghana. There were 4172 level 400 students enrolled. The level 400s were chosen for the study because they had spent 4 years on the university's campus and were well acquainted with the university's environment and its activities. Brief demographic information such as gender, age range (at least 20 years), PGSI sub-types and involvement of students in sports betting were required to aid the demographic analysis of participants.

Ethical clearance was obtained from the Institutional Review Board of the University of Cape Coast to be able to carry out the study. The participants were informed of the study so that they knew exactly what they would be asked to do. This was done by providing the consent information on the first page of the questionnaire. Participants' autonomy was ensured so the participants were not forced to answer the questionnaire in a way desired by the researchers. Consideration was given to anonymity and confidentiality in the questionnaire. With anonymity, the questionnaire did not require the names of participants. With



confidentiality, privacy of the data collected was ensured. In addition, the information that was provided by the participants was not to be shared with other people but was used solely for academic purposes.

### 4.3. Instrument

The Canadian Problem Gambling Index (CPGI) questionnaire was adopted for data collection. Thus, no part of the instrument or its scoring format was altered. The Canadian Problem Gambling Index on a whole recorded a Cronbach alpha value of .81. As part of the development of the CPGI, Ferris and Wynne (2001) carried out pilot testing in a population sample ( $n = 143$ ). These tests revealed good internal reliability ( $\alpha = .84$ ) and an acceptable test-retest reliability correlation coefficient ( $r = .78$ ) (Ferris & Wynne, 2001). The CPGI version reviews 18 variables in 4 domains and specific measurable indicators (including 33 items). The domains are gambling involvement, problem gambling assessment (problem gambling behaviour and consequences of that behaviour for the individual or others), and problem gambling correlates. For each of the items in the CPGI questionnaire, respondents are asked to respond to “the past twelve (12) months”. However, the past time frame does not apply to all the items in the CPGI instrument.

For this study, problem gambling assessment and problem gambling correlates were heavily reported. The domain of gambling involvement together with other variables was reported as the demographics of participants. The gambling involvement dimension explored 4 variables; 1) type of gambling activity, 2) the frequency of play, 3) duration of play, and 4) expenditure.

#### 4.3.1. Problem Gambling Assessment

The second dimension of the CPGI assesses two domains of problem gambling, namely; “problem gambling behaviour” and “consequences of that behaviour for the individual or others”. With this, 9 items out of the 12 items in the domains were scored to determine the “Problem Gambling Severity Index” of participants. The Problem Gambling Severity Index (PGSI), consists of nine items with a scoring algorithm. The 9 - items are scored between 0 - 27. There are four classification categories based on cut-off points for PGSI scores: 0 = non-problem gambler, 1 - 2 = low-risk gambler, 3 - 7 = moderate-risk gambler 8+ = problem gambler. Depending on a respondent’s score on these nine PGSI items, he or she may be classified as being in one of the four gambler sub-types, namely: “(a) non-problem gambler, (b) low-risk gambler, (c) moderate risk gambler, and (4) problem gambler.” Scoring the 9-item PGSI is key hence no item was altered in any way. The alpha coefficient for the PGSI was .84. In terms of re-test reliability, the PGSI had an index of .78 (Ferris & Wynne, 2001).

#### 4.3.2. Problem Gambling Correlates

These may be experiences or behaviours exhibited before gambling or exhibited after some past months of gambling. The problem gambling correlates domain includes variables that further develop the profiles of gambler sub-types. Problem gambling correlates domain includes variables that assess the behaviours of

gambling. These variables included; “faulty cognition”, “first experiences”, “family problems”, “co-morbidity”, “problem recognition”, “relieve pain”, “stress”, “depression”, and “suicide”. 16 items were assigned to measure these variables. The first 2 items were on a 6-Likert type scale (“Strongly agree” through to “strongly disagree” and “don’t know”, “refused”). The remaining items were on a 4-Likert type scale (“Yes”, “No”, “Don’t know” and “refused”). The scoring manual as stipulated in the Canadian Problem Gambling Index (CPGI) instrument was keenly followed by the researchers. It must be noted that the researchers did not fail to follow the scoring manual hence the analysis and interpretation of the results in this study followed the CPGI manual.

#### 4.4. Data Collection Technique

A fair representative sample size was determined through the Krejcie and Morgan (1970) minimum sample size determinant. According to Krejcie and Morgan, a fair representation of a population of 4172 is 351. The researchers further used a disproportionate stratified sampling technique to draw from each college the number required for the study. With disproportionate sampling, different strata (colleges) have different sampling characteristics and hence different percentages to be surveyed. For this study, colleges with a larger number of students had a relatively large sample size to form the total sample of 351. However, from the College of Agriculture and Natural Science, the sample drawn was lower because most of their level 400 students were engaged in fieldwork outside the university campus (See **Table 1**).

Disproportionate stratified sampling is a stratified sampling procedure in which the number of elements sampled from each stratum is not proportional to their representation in the total population. Population elements are not given an equal chance to be included in the sample. The same sampling fraction is not applied to each stratum. On the other hand, the strata have different sampling fractions, and as such, this sampling procedure is not an Equal Probability Selection Method (EPSEM) sampling procedure. To estimate population parameters, the population composition was used as weights to compensate for the disproportionality in the sample. Thus, disproportionate stratified sampling was more appropriate for this study.

The precision of the design was highly dependent on the sampling percentage/fraction allocation of the researchers. The disadvantage of this technique was that some sample was overrepresented or underrepresented. Nonetheless, the researchers were able to increase the likelihood of fair representation and virtually ensured that any key characteristics of individuals in the population were included in the sample (Fraenkel & Wallen, 2012). Because of the high strata population ratio, disproportional sampling also allowed the researchers to give a larger representation to one or more subgroups to avoid underrepresentation of the said strata. Lastly, individual participants from the sample were randomly selected to attend the questionnaires. Six weeks were used to collect the data. To get a high rate of returns, participants were given ample time to attend to the questionnaire.

**Table 1.** The total number of level 400 s sampled for the study.

Colleges	No. of level 400 students in a college/Per (%) sampled.	Expected no. of samples from each college
College of Education Studies	1064 (11.8%)	126
College of Health and Allied Sciences	666 (6.3%)	42
College of Humanities and Legal Studies	1704 (8.8%)	150
College of Agric. and Natural Science	738 (4.5%)	33
Total		351

Source: Student Record Section of UCC (2019); Field survey (2020).

#### 4.5. Data Analysis

Data collected was processed using the Statistical Product and Services Solution (SPSS) version 22 software. Means, standard deviation, and one-way multivariate analysis of variance (MANOVA) were used in the data analysis. The tool was used because the researchers sought to compare the difference in the group means scores of problem gambling correlates with the four various PGSI sub-types. The statistical significance for the constructs was determined at a probability value ( $p$ -value) of .05. The  $p$ -value was adjusted to .005 in the MANOVA test results. The research hypothesis was analysed using the one-way multivariate analysis of variance (MANOVA). The researchers determined the difference between gambling correlates of the four various PGSI gambler sub-types. To determine differences, a Multivariate analysis of variance (MANOVA) was deemed appropriate for the analysis. MANOVA was utilised in the analysis because of the number of dependent variables (nine variables) and also to help the researchers maintain control over the experiment-wide error rate and detect the combined difference among group variables. The dependent variable was the gambling correlates and the independent variable was the PGSI gambler sub-types.

The data transformation (winsorising) allowed the researchers to set extreme outliers equal to less extreme values. This made the dataset more robust against outliers which had no interesting edge cases. The transformation also provided a better insight to the analysis of the data and hence gave a more statistical accuracy to the interpretation of the findings of the results. However, other robust MANOVA methods which are less sensitive to assumptions could be used in the data analysis. These may include univariate ANOVAs for each dependent variable. However, this approach does not account for interdependencies among dependent variables. The Minimum Covariance Determinant (MCD) estimator and the S-estimator could also be considered.

## 5. Results

### 5.1. Demographic Information of Students

A tabular representation of the demographic data of students was analysed using

frequency counts and percentages.

Based on gender, the majority of the students who participated in the study were males ( $n = 247$ , 74.5%) while the females were less ( $n = 104$ , 29.6%). The difference in number could be attributed to the fact that most colleges under study were male-dominated. The age range recorded 289 (82.3%) for those in the age range of 20 - 25 years whilst the remaining 62 (17.7%) were reported for those within 26 years and above. This was speculatively right because the participants for the study were all level 400 students—in their final year. Thus, most of them were speculated to be early and mid-twenties (See **Table 2**).

From **Table 3**, it was realised that most of the participants were classified as non-problem gamblers ( $n = 189$ , 53.8%). More than one-fourth of the participants were problem gamblers ( $n = 101$ , 28.8%). Also, 14.5% (51) were found to be moderate-risk gamblers with low-risk gamblers recording the least ( $n = 10$ , 2.8%) among the participants. The result showed that all four levels of gambling classification were identified by the Canadian Problem Gambling Index instrument.

**Table 4** shows students' involvement in sports betting in the past 12 months. From the first section of **Table 4**, the results show that most sports bettors bet on weekly bases; 2 - 6 times a week ( $n = 52$ , 14.8%) and once a week ( $n = 44$ , 12.5%). Those who bet 2 - 3 times per month recorded the second highest number ( $n = 27$ , 7.5%). Only Seventeen (4.8%) of the student's sports bettors bet daily and 53.0% of the participant did not respond to the question because they do not bet. The second section revealed that 79 (22.5%) spend 25 minutes or less on sports betting. Those who used between 30 - 60 minutes ( $n = 49$ , 14%) and 37 (10.5%) used 1 hour or more hours to sports bets. 53.0% of the participants did not respond to the item. From the last section of **Table 4**, the participants ( $n = 65$ , 18.5%) were the highest to spend GHc1 - GHc20 within a month on sports betting, followed by ( $n = 44$ , 12.5%) who spend GHc30 - GHc50, 26 (7.4%) spend GHc60 - GHc100, 23 (6.6%) spend GHc101 - GHc500 within a month. Only 6 (1.7%) and 1 (0.3%) participant spend between GHc600 - GHc1000 and GHc1000 and more respectively within a month on sports bets. The results show the various gambling activities among students who engage in sports betting.

**Table 2.** Distribution of participants based on their gender and age range.

Items	Sub-scale	Frequency	Percentages (%)
Gender	Females	104	29.6
	Males	247	70.4
Age in years	20 - 25 years	289	82.3
	26 years and above	62	17.7

Source: Field survey (2020),  $N = 351$ .

**Table 3.** PGSI gambler sub-type.

Gambler sub-type	Freq.	Per (%)
Non-Problem Gambler	189	53.8
Low-risk Gambler	10	2.8
Moderate risk Gambler	51	14.5
Problem Gambler	101	28.8
Total	351	100.0

Source: Field Data (2020).

**Table 4.** Gambling involvement of students' sport bettors.

Section	Items	Sub-scale	Freq.	Per (%)
Sect. 1	No. of times you have bet on sports betting	"5 - 10 times/year"	14	4.0
		"2 - 3 times/month"	27	7.5
		"Once/month"	12	3.4
		"2 - 6 times/week"	52	14.8
		"Once/week"	44	12.5
		Daily	17	4.8
		No response	186	53.0
Sect. 2	No. mins. /hrs. do you spend on sports betting	1 hour and more	37	10.5
		b/n 30 mins - 60 mins	49	14.0
		25mins and less	79	22.5
		No response	186	53.0
Sect. 3	Money spent on sports betting in a month	more than GH¢1000	1	0.3
		GH¢600 - GH¢1000	6	1.7
		GH¢101 - GH¢500	23	6.6
		GH¢60 - GH¢100	26	7.4
		GH¢30 - GH¢50	44	12.5
		GH¢1 - GH¢20	65	18.5
No response	186	53.0		

Source: Field Data (2020).

## 5.2. What Are the Problem Gambling Correlates Exhibited by Students' Sports Bettors?

Problem Gambling Correlates may be the experiences or behaviours exhibited

before gambling or exhibited after some past months of gambling. To confirm these correlates from students, they were requested to respond to a “yes” or “no” item of problem gambling correlates on the CPGI instrument. The results are presented in the tables below.

From the results in **Table 5**, as ranked, those who gambled faced some problem gambling correlates. Some of the major correlates experienced by the students who gambled included the fact that they believe that there is a system of winning more bets and that one is likely to win after several losses in sports betting. This was captured as their faulty cognition ( $M = 2.34$ ,  $SD = 1.00$ ). Most of them expressed that, for the first-time experiences ( $M = 1.45$ ,  $SD = .498$ ), students who gamble still remember their first big win or loss. Similarly, most of them have family members who engage in gambling, alcohol and drugs ( $M = 1.34$ ,  $SD = .475$ ). Others affirmed that there were times when they felt depressed for two weeks or more in a row ( $M = 1.18$ ,  $SD = .384$ ). For co-morbidity ( $M = 1.15$ ,  $SD = .356$ ); that is, the use of drugs and alcohol alongside gambling was also reported among students’ sports bettors. Likewise, issues of stress ( $M = 1.14$ ,  $SD = .347$ ) and self-medication (using gambling, drugs or alcohol) to relieve pains ( $M = 1.11$ ,  $SD = .315$ ) were also recounted among students who gamble at the University of Cape Coast. On the least side of the ranks in terms of means, some also reported that there were times when students who engage in sports betting could recognise that they have alcohol or drug problem ( $M = 1.09$ ,  $SD = .292$ ). Also, suicidal thoughts and attempts are related to sports betting ( $M = 1.11$ ,  $SD = .315$ ). These correlated domains further help to develop the profiles of gambler sub-types.

**Table 5.** Means, standard deviations and ranks of problem gambling correlates of students’ sports bettors.

Problem Gambling Correlates	M	SD	MR
Faulty Cognition	2.34	1.00	1 <sup>st</sup>
First Experience	1.45	.498	2 <sup>nd</sup>
Family Problems	1.34	.475	3 <sup>rd</sup>
Depression	1.18	.384	4 <sup>th</sup>
Co-Morbidity	1.15	.356	5 <sup>th</sup>
Stress	1.14	.347	6 <sup>th</sup>
Relieve Pain	1.11	.318	7 <sup>th</sup>
Suicide	1.11	.315	7 <sup>th</sup>
Problem Recognition	1.09	.292	9 <sup>th</sup>
Mean of means/Standard Deviation	1.32	.267	

Source: Field Data (2020) ( $n = 351$ ).

### 5.3. There Is a Significant Difference in the Means of Problem Gambling Correlates among the PGSI Gambler Sub-Types of Students' Sports Bettors

The following MANOVA assumptions were determined for the study:

#### 5.3.1. Sample Size and Normality

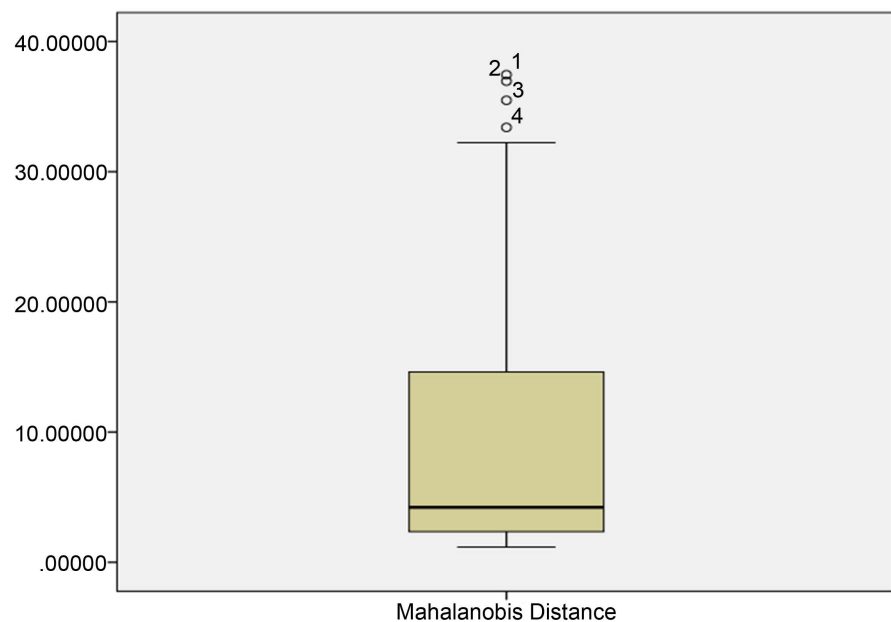
Both the univariate and multivariate normality were determined for the dependent variables. The univariate normality for all the dependent variables recorded a Shapiro-Wilk sig. value of .000. For the multivariate normality, the Mahalanobis distances were determined with a maximum value of 37.45 and Shapiro-Wilk sig. value of .000 was also recorded which was less than the  $p$ -value of .05 (See **Table 6** and **Figure 2**).

The results show that the data were not normally distributed. "The violations of the univariate and multivariate normality have little impact with larger or moderate sample sizes as long as the differences are due to skewness and not outliers" (Hair, Black, Babin, Anderson, & Tatham, 2014). The impact will be on the Box's M test which the researchers should make adjustments for their effects in the interpretation of the significance levels of both main and interaction effects (Hair et al., 2014).

**Table 6.** Test of multivariate normality of the dependent variables (gambling correlates).

	Shapiro-Wilk			Max. value	Skewness
	Statistic	Df	Sig.		
Mahalanobis Distance	.252	351	.0000	37.451	1.173

Source: Field Data (2020) (n = 351).



**Figure 2.** Multivariate normality boxplot of gambling correlates (dependent variables).

### 5.3.2. Outliers

The univariate outliers of the various dependent variables were determined and transformed (winsorised). For the multivariate outliers as determined by the Mahalanobis distance (shown in **Figure 3**), cases of outliers were selected and excluded from the analysis. The multivariate outliers were determined using a  $p < .001$  and the corresponding  $\chi^2$  value with the degrees of freedom equal to the number of variables.

Upon transforming the data and eliminating the multivariate outliers, the skewness recorded was .254 (less than 1/.8) which will be appropriate for Multivariate analysis of variance (Tabachnick & Fidell, 1996).

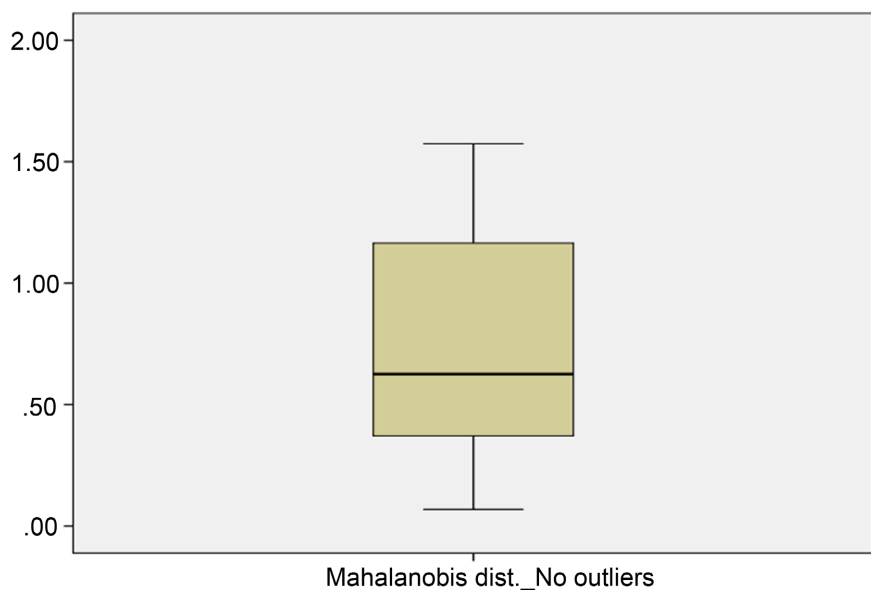
### 5.3.3. Linearity and Multicollinearity

The above dependent variables have two levels of responses, and according to Tabachnick, Fidell, and Ullman (2007), variables with two levels have a linear relationship and one only has to check for low/moderate multicollinearity among the variables to run a Multivariate analysis of variance. For low/moderate multicollinearity the Tolerance values must be greater than 0.2 and the VIF (Variance Inflation Factor) should be less than 5 or 10 (See **Table 7**).

The results show a low to moderate multicollinearity among the variables. The Tolerance of each variable is greater than 0.2 and the VIF is less than 5 indicating low/moderate multicollinearity.

### 5.3.4. Homogeneity of Variance-Covariance Matrices

Homogeneity of variance-covariance matrices is determined by the Box's M Test of Equality of Covariance Matrices which is part of the output of MANOVA. Violation of this assumption means the researchers have to make adjustments for their effects in the interpretation of the significance levels of both main and interaction effects.



**Figure 3.** Multivariate normality boxplot of problem gambling correlates without outliers.



**Table 7.** Test for Multicollinearity of problem gambling correlates (dependent variables).

Dependent Variables	Collinearity Statistics	
	<u>Tolerance</u>	<u>VIF</u>
Faulty Cognition	.765	1.308
First Experience	.695	1.440
Family Problems	.802	1.246
Comorbidity	.532	1.881
Problem Recognition	.620	1.613
Relieve Pain	.673	1.487
Stress	.787	1.271
Depression	.743	1.346
Suicide	.559	1.789

Source: Field Data (2020).

### 5.3.5. Results of Multivariate Analysis of Variance (MANOVA) Comparing the Difference in Problem Gambling Correlates among PGSI Gambler Sub-Types (Problem Gambling Severity) Who Engage in Sports Betting at the University of Cape Coast

From **Table 8**, the test of equality of covariance shows a non-significant value of .000 ( $p < .001$ ). This shows a violation of the equality of covariance of group variables in the Multivariate analysis of variance. Hence Pillai's Trace had to be interpreted in the Multivariate test. Similarly, the equality/homogeneity of variance of the individual variables all showed a non-significant value ( $p < .05$ ), thus, violating the homogeneity of individual variance in the univariate test. In this case, the Welch statistic was further used in the univariate analysis and the  $p$ -value was further adjusted.

From **Table 9**, Pillai's Trace was interpreted because of the above violations. Pillai's Trace has a value of .808 and a sig. value of .000 ( $p < .05$ ). Since the sig. value is less than .05, there is a statistically significant difference between the PGSI gambler sub-types (Non-Problem Gambler, Low-risk Gambler, Moderate risk Gambler, Problem Gambler) in terms of the overall problem gambling correlates.

Since there is a statistically significant difference between the PGSI gambler sub-types (Non-Problem Gambler, Low-risk Gambler, Moderate risk Gambler, Problem Gambler) in terms of the overall problem gambling correlates, the univariate test has to be examined to see if the difference in the PGSI gambler sub-types exist in all the individual problem gambling correlates or the difference only existed in some of the variables of problem gambling correlates.

To do this, a Bonferroni adjustment of the  $p$ -value has to be adjusted to prevent a type I error (Tabachnick & Fidell, 2013). Therefore, the Bonferroni ad-

justment *p*-value was calculated by dividing the previous *p*-value, .05 by the number of dependent variables which is 9 in this case. Thus; the Bonferroni adjusted *p*-value = (.05 ÷ 9 = .005) was used in the univariate F-test.

In **Table 10**, the sig values of all the variables recorded a sig. value of less than the adjusted *p*-value of .005 except stress which recorded a sig. value of .211 greater than the adjusted *p*-value (*p* > .005). Hence, the results show a statistically significant difference between PGSI gambler sub-types (Non-Problem Gambler, Low-risk Gambler, Moderate Risk Gambler, Problem Gambler) and all the dependent variables except stress. A post hoc test had to be run on the dependent variables that recorded a statistically significant difference with the independent variable.

From the results, the effect size as shown by the Partial Eta Squared represents the proportion of the variance in the dependent variable (problem gambling correlate) that can be explained by the independent variable (PGSI gambler sub-types). All the variables recorded a small effect size (Cohen, 1988) except “First Experiences” which recorded 66% of variance explained by the PGSI gambler sub-types.

**Table 8.** Test of Equality of Covariance and Variance of problem gambling correlates (dependent variable).

	F	df1	df2	Sig.
Box’s Test of Equality of Covariance Matrices	6.275	90	74214.430	.000
Levene’s Test of Equality of Error Variances				
Faulty Cognition	4.728	3	347	.003
First Experience	5.621	3	347	.001
Family Problems	12.696	3	347	.000
Comorbidity	63.808	3	347	.000
Problem Recognition	21.255	3	347	.000
Relieve Pain	48.791	3	347	.000
Stress	6.074	3	347	.000
Depression	29.163	3	347	.000
Suicide	79.846	3	347	.000

Source: Field Data (2020).

**Table 9.** Multivariate tests of the PGSI gambles sub-types (Independent variable).

	Value	F	Hyp. df	Error df	Sig.	Partial Eta Squared	
PGSI gambler sub-types	Pillai’s Trace	.808	13.966	27	1023.00	.000	.269
	Wilks’ Lambda	.263	21.258	27	990.69	.000	.359

Source: Field Data (2020).

**Table 10.** Univariate tests of problem gambling correlates (dependent variable).

Univariate Test					Dependent Variables	Non-Problem Gambler		Low-risk Gambler		Moderate Gambler		Problem Gambler	
F	df	Error df	Sig.	Partial Eta Squared		M	SD	M	SD	M	SD	M	SD
44.73	3	347	.000	.279	Faulty Cognition	1.86	.914	2.80	.919	3.00	.800	2.88	.752
226.11	3	347	.000	.662	First Experience	1.07	.263	1.70	.483	1.88	.325	1.90	.300
5.66	3	347	.001	.047	Family Problems	1.30	.460	1.20	.422	1.22	.415	1.50	.502
14.89	3	347	.000	.114	Comorbidity	1.06	.235	1.00	.000	1.14	.348	1.33	.471
5.20	3	347	.002	.043	Problem Recognition	1.06	.235	1.00	.000	1.06	.238	1.19	.393
10.42	3	347	.000	.083	Relieve Pain	1.04	.202	1.00	.000	1.14	.348	1.25	.434
1.51	3	347	.211	.013	Stress	1.11	.308	1.10	.316	1.20	.401	1.18	.385
6.80	3	347	.000	.056	Depression	1.10	.302	1.10	.316	1.27	.451	1.29	.455
16.94	3	347	.000	.128	Suicide	1.04	.189	1.00	.000	1.06	.238	1.29	.455

Source: Field survey (2020), Bonferroni adjusted  $p$ -value = .005.

#### 5.4. Post Hoc/Follow-Up Tests

Since the univariate Levene's equality of variance was violated, and there was a statistical significance difference among some of the dependent and independent variables on the univariate test, a Welch and Games Howell in a one-way ANOVA with an adjusted  $p$ -value of .005 was carried out.

From **Table 11**, the Welch statistic for the variables produced a sig. values which were less than .05. This means that there is a significant difference among the means. A follow-up test of Games Howell analysis was performed to find out which pairs of means are statistically different.

In **Table 12**, a sig. value of less than the adjusted  $p$ -value of .005 implies a statistically significant difference between the means. In the results above, considering Faulty Cognition, there was a significant difference between the means of non-problem gamblers ( $M = 1.86$ ) and moderate gamblers ( $M = 3.00$ ); non-problem gamblers ( $M = 1.86$ ) and problem gamblers ( $M = 2.88$ ). With First Experiences, there was a significant difference between Non-problem gamblers ( $M = 1.07$ ) and moderate gamblers ( $M = 1.70$ ); non-problem gamblers ( $M = 1.07$ ) and problem gamblers ( $M = 1.90$ ). Under Family Problem; there was a significant difference between non-problem gambler ( $M = 1.30$ ) and problem gambler ( $M = 1.50$ ); moderate gambler ( $M = 1.22$ ) and problem gambler ( $M = 1.50$ ). Co-morbidity recorded a significant difference between non-problem gambler ( $M = 1.06$ ) and low-risk gambler ( $M = 1.00$ ); non-problem gambler ( $M = 1.06$ ) and problem gambler ( $M = 1.33$ ); low-risk gambler ( $M = 1.00$ ) and problem gambler ( $M = 1.33$ ). Problem Recognition recorded a significant difference between non-problem gamblers ( $M = 1.06$ ) and low-risk gamblers ( $M = 1.00$ ). Under the mode of relieving pains, there

was a significant difference between non-problem gambler (M = 1.04) and problem gambler (M = 1.25); low-risk gambler (M = 1.00) and problem gambler (M = 1.25). With depression, there was a significant difference between non-problem gamblers (M = 1.10) and problem gamblers (M = 1.29). Lastly, on suicide, there was a significant difference between non-problem gamblers (M = 1.04) and problem gamblers (M = 1.29); low-risk gamblers (M = 1.00) and problem gamblers (M = 1.29), moderate gamblers (M = 1.06) and problem gamblers (M = 1.29). Hence, the research hypothesis for the study was retained.

**Table 11.** Robust tests of equality of means of problem gambling correlates (dependent variable).

Dependent variables	Welch Statistic <sup>a</sup>	df1	df2	Sig.
Faulty Cognition	44.527	3	39.797	.000
First Experience	221.184	3	38.142	.000
Family Problems	5.302	3	40.344	.004
Comorbidity	--	--	--	--
Problem Recognition	--	--	--	--
Relieve Pain	--	--	--	--
Depression	5.927	3	39.152	.002
Suicide	--	--	--	--

<sup>a</sup>Asymptotically F distributed, Source: Field data (2020), -- at least one group has 0 variances.

**Table 12.** Post Hoc of Games Howell analysis of means of problem gambling correlates (dependent variable).

Dependent Variable	(I) PGSI9a	(J) PGSI9a	Sig. values							
			1	2	3	4	5	6	7	8
1) Faulty Cognition	Non-Problem Gambler	Low-risk Gambler	.043	.012	.879	.004	.004	.023	1.000	.039
		Moderate Gambler	.000	.000	.578	.424	1.000	.253	.054	.930
		Problem Gambler	.000	.000	.008	.000	.015	.000	.002	.000
2) First Experience	Non-Problem Gambler	Low-risk Gambler	.043	.012	.879	.004	.004	.023	1.000	.039
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.993	.589	.218	.000	.000	.000	.360	.000
3) Family Problems	Low-risk Gambler	Non-Problem Gambler	.000	.000	.578	.424	1.000	.253	.054	.930
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000
4) Co-morbidity	Moderate Gambler	Low-risk Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000
5) Problem Recognition	Problem Gambler	Low-risk Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000
6) Relieve Pain	Problem Gambler	Low-risk Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000
7) Depression	Problem Gambler	Low-risk Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000
8) Suicide	Problem Gambler	Low-risk Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Moderate Gambler	.916	.672	1.000	.034	.301	.034	.473	.301
		Problem Gambler	.814	.986	.002	.029	.061	.331	.998	.000

Source: Field Data (2020). The mean difference is significant at the .005 level.

In sum, the one-way between-groups multivariate analysis of variance was performed to examine the differences in problem gambling correlates among PGSI gambler sub-types (problem gambling severity). Nine dependent variables were used: Faulty Cognition, First Experience, Family Problems, Co-morbidity, Problem Recognition, Relieve Pain, Stress, Depression and Suicide. The independent variable was PGSI gambler sub-types (Non-Problem Gambler, Low-risk Gambler, Moderate Gambler, Problem Gambler). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with some violations noted. There was a statistically significant difference between the PGSI gambler sub-types (Non-Problem Gambler, Low-risk Gambler, Moderate risk Gambler, Problem Gambler) on the combined dependent variables of problem gambling correlates,  $F(27, 1023) = 13.966$ ,  $p = .000$ ; Pillai's Trace = .808; partial eta squared = .269. When the results for the dependent variables were considered separately, the difference reached statistical significance, using a Bonferroni adjusted alpha level of .005, were Faulty Cognition,  $F(3, 347) = 44.73$ ,  $p = .000$ , partial eta squared = .279, First Experience,  $F(3, 347) = 226.11$ ,  $p = .000$ , partial eta squared = .662, Family Problems,  $F(3, 347) = 5.66$ ,  $p = .001$ , partial eta squared = .047, Co-morbidity,  $F(3, 347) = 14.89$ ,  $p = .000$ , partial eta squared = .114, Problem Recognition,  $F(3, 347) = 5.20$ ,  $p = .002$ , partial eta squared = .043, Relieve Pain,  $F(3, 347) = 10.42$ ,  $p = .000$ , partial eta squared = .083, Depression  $F(3, 347) = 6.80$ ,  $p = .000$ , partial eta squared = .056 and Suicide,  $F(3, 347) = 16.94$ ,  $p = .000$ , partial eta squared = .128. A post hoc Games Howell analysis of means of problem gambling correlates was run to indicate where the difference exists among the PGSI sub-types. An inspection of the mean scores indicated that problem gamblers reported a significant difference in problem gambling correlates than non-problem, low-risk and moderate-risk gamblers.

## 6. Discussions

The study sought to determine the problem gambling correlates exhibited by students who exclusively engage in sports betting. Likewise, the researchers also tested the hypothesis of whether there is a significant difference in problem gambling correlates among PGSI gambler sub-types of students who engage solely in sports betting.

The results from the study indicated that students who bet could be categorized into gambling sub-types. In determining the gambling sub-type, the PGSI outlined items that surveyed the specific behavioural intention of students towards sports gambling. The findings reported that most students bet weekly at varying frequency counts. Similarly, "more than one weekly bets were the most common frequency of betting followed by a weekly bets". In support of the study's finding, [Caldeira et al \(2017\)](#), reported that frequent or daily gambling was rare and that gambling weekly or gambling more than once within a week was relatively high.

With problem gambling correlates, it was evident that individual's obsession with gambling, depression, stress, drug and alcohol usage, attempted suicides and suicidal thoughts, history of family engagement in drugs, gambling and alcohol intake reported by students who engaged in sports betting were also confirmed by some studies. Thus, a bit detailed findings by [Salonen, Hellman, and Castr \(2018\)](#), recounted that “negative consequences of gambling include financial crisis; relationship disruption, conflict, or breakdown; emotional or psychological harm, and decrements in health; cultural harm; reduced performance at work or in the study; and criminal activity”. In the African context, “problem gambling correlates were associated with substance use, risky sexual behaviour and psychological distress” ([Anyanwu, Bajunirwe, & Tamwesigire, 2020](#); [Koross 2016](#)). They opined that “the results could be due to the increasing availability and accessibility to gambling activities”. Similarly, there was an increased rate of gambling among those with at least one parent, sibling or friend who gambled ([Aguocha et al., 2019](#)). In similar works, it also found that problem gamblers are also at a higher risk of developing many psychological issues: depression, anxiety, alcoholism and antisocial personality disorder. Accordingly, suicidal tendencies were also noted to accompany problem gambling, along with depression. It was discovered that low-risk gamblers through to problem gamblers are prone to problem gambling correlates ranging from psychological, emotional and physiological disorders. High gambling participation has been found to correlate to later problem gambling correlates. Thus, generally, more problem gambling correlates are associated with higher frequency gambling ([Glozah, Tolchard, & Pevalin, 2019](#)).

On the issue of the difference between problem gambling correlates of PGSI gambler sub-types, the results established that “problem gamblers engage in varied locations massively and more diversely in gambling activities than moderate-risk or even non-problem gamblers”. The severity of gambling and its associated problem gambling correlates were found in problem gamblers to be significantly different from moderate-risk or non-problem gamblers ([Shen, Kairouz, Nadeau, & Robillard, 2015](#)). Similarly, there were highly significant differences between problem gamblers and the remaining groups of gamblers, and it also revealed that there were highly significant differences between non-problem gamblers and any other at-risk group in terms of problem gambling correlates. This was also reported by [Anyanwu, Bajunirwe, and Tamwesigire \(2020\)](#).

These studies support the assertions that there is a relationship between problem gambling severity and problem gambling correlates among gamblers. Thus, gambling correlates exhibited by students who were problem gamblers were higher as compared to the other gambler sub-types.

### **Limitation to the Conclusion**

This study just like any other study has its limitations and weakness. The researchers used a disproportionate stratified probability sampling technique; the

disadvantage of this technique was that some samples were overrepresented or underrepresented which resulted in skewed results. Thus, appropriate statistical tools were used to check skewness and appropriately interpret the results. Secondly, the findings are limited to self-report instruments, which can bring about the problem of external validity and reliability issues. However, to improve the reliability of the self-report, anonymity was assured for the participants. This may not entirely warrant honesty on the part of the participant self-reporting his gambling behaviours and may intentionally or unintentionally give false information about the variables under study. Lastly, it is worth noting that the study's data are indicators and not absolute measures of behaviour, attitudes and beliefs. Thus, this study is a tentative first step in examining the effects of these indicators on the participants.

## 7. Conclusion and Recommendations

Based on the findings, it was concluded that students' sports bettors within the range of low-risk gamblers through to problem gamblers are prone to psychological, emotional and physiological maladies. It was established that these malfunctions could be threatening in various facets of the student's life.

There was a statistically significant difference in the problem gambling correlates of problem gambling severity index sub-types. In other words, the means of gambling correlates exhibited by students who were problem gamblers were higher as compared to students of the other gambler sub-types. It was also observed that problem gambling severity and problem gambling correlates were related. This was inferred from the study that, as one's pattern of problem gambling correlates increases, he moves higher along the problem gambling severity index.

The implication of the above is that problem gambling correlates could ruin relationships, interfere with academic work, and lead to financial constraints. If educators, counsellors and psychologists lay this bare to beginners of gambling, it may serve as a preventive measure before it becomes a crisis situation. There must be occasional outreach guidance programmes organised by the units of the various universities to sensitise the students about sports betting and how problem gambling correlates could truncate their life if nothing is done to this phenomenon.

Thus, it was recommended that gambling educational programmes and awareness seminars should be embarked on by the University of Cape Coast. To effectively and consistently achieve and execute this on the university's campus, the Department of Psychology and Education should consider creating a "Gaming Research Unit" which will focus on designing and evaluating gambling products. The unit could also ensure screening students (based on the PGSI) and refer them for guidance and counselling. This unit could also liaise with other universities in the country to work together with the gambling companies under the auspices of the Gaming Commission of Ghana to put in protective measures to minimise the harm from gambling. The leadership and stakeholders in the university community could also be involved in creating awareness of gambling-related issues.

## Informed Consent

Informed consent was obtained from all participants of the study.

## Data Availability

Full data of the study will be made available upon request.

## Conflicts of Interest

The authors declare no conflicts of interest.

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