

Validating the GMQ-F in a Canadian Sample of University Students

Jason Pchajek,¹ Jason D. Edgerton,¹ & Lance W. Roberts¹

¹ Department of Sociology and Criminology, University of Manitoba, Winnipeg, Manitoba, Canada

Abstract

This study assesses the psychometric properties of the Gambling Motivation Questionnaire for Financial Motivations (GMQ-F) in a Canadian sample of emerging adult university students. Confirmatory factor analysis was first used to test a 16-item GMQ-F for model fit, and then multiple regression analysis was used to test the predictive utility of the four subscales/factors. Results confirmed that the GMQ-F is a valid and reliable measure of university student gambling motivations, in accordance with the four-factor structure proposed by Dechant (2014) despite poor initial results. Regression results were mixed: Three of the four subscales (enhancement, social, and coping) were significant predictors of problem gambling and gambling variety, only the enhancement and coping subscales were significant predictors of gambling frequency, and none of the subscales significantly predicted average monthly expenditure on gambling. The implications of this study support further refinement of the GMQ-F, as differing results from the current study and from prior work on normative samples point to a different reliance on motivational categories or different motivational categories entirely.

Keywords: problem gambling, emerging adults, gambling motivations, university students

Résumé

Cette étude évalue les propriétés psychométriques de l'échelle de motivations financières relatives aux jeux de hasard et d'argent (GMQ-F) auprès d'un échantillon canadien d'étudiants universitaires jeunes adultes. La première analyse factorielle confirmatoire (AFC) a été utilisée pour tester l'ajustement du modèle du GMQ-F à 16 éléments, puis une régression multiple a été utilisée pour tester l'utilité prédictive des quatre sous-échelles/facteurs. Les résultats ont confirmé que le GMQ-F est une mesure valide et fiable des motivations au jeu des étudiants universitaires, suivant la structure à quatre facteurs proposée par Dechant (2014), malgré de faibles résultats

initiaux. Les résultats de la régression étaient mitigés : trois des quatre sous-échelles (amélioration, aspect social et adaptation) étaient des prédicteurs significatifs du jeu problématique et de la variété de jeu; tandis que seules l'amélioration et l'adaptation étaient des prédicteurs significatifs de la fréquence du jeu. Aucune des sous-échelles n'a prédit de manière significative les dépenses mensuelles moyennes consacrées aux jeux de hasard. Ce projet a pour effet d'encourager une amélioration du GMQ-F, car la différence des résultats entre l'étude actuelle et des travaux antérieurs sur des échantillons normatifs indique une dépendance différente à l'égard des catégories de motivation, voire différentes catégories de motivation entièrement.

Introduction

The Gambling Motivations Questionnaire (GMQ) was initially proposed in 2008 by Stewart and Zack from an adaptation of the Drinking Motivations Questionnaire (DMQ), quantifying in a three-factor model what gambling researchers have been suggesting about gambling motivations for the better part of 60 years. Since the 1960s, both qualitative and quantitative accounts of gambling motivations have generally fallen into three distinct categories. There are individuals who gamble for fun/excitement (Breen et al., 2010; C.-K. Lee et al., 2006; Liu et al., 2009; Neighbors et al., 2002; Quilty et al., 2017; Smith & Preston, 1984; Trevorrow & Moore, 1998), those who gamble as a coping method (C.-K. Lee et al., 2006; Neighbors et al., 2002; Quilty et al., 2017; Smith & Preston, 1984), and those who gamble for social interaction or to remain embedded in a distinct gambling milieu (Breen et al., 2010; C.-K. Lee et al., 2006; Liu et al., 2009; Neighbors et al., 2002; Quilty et al., 2017; Smith & Preston, 1984; Zola, 1963). Although some investigators have offered less salient motivations for gambling, such as that gambling fulfils a hedonistic desire for punishment (Cotte, 1997), the most important omission in the whole of gambling motivations research for many years was that of financial motivations, argued to be so intrinsic to the activity as to be impossible to separate out as a distinct motivation (Cotte, 1997). Despite this, further motivation research has shown financial benefit to be an extremely important motivator, one that is distinct from those previously mentioned (Breen et al., 2010; C.-K. Lee et al., 2006; Liu et al., 2009; Neighbors et al., 2002; Smith & Preston, 1984; Trevorrow & Moore, 1998).

Another important consideration is the difference between the terms *problem gambling* and *pathological gambling*, as the two are sometimes used interchangeably. As noted by Jazaeri and Bin Habil (2012), pathological gambling concerns persistent and maladaptive gambling behaviour that meets at least five criteria described in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association [APA]; 1994 [now *DSM-5*; APA, 2013]). Among these criteria are preoccupation with gambling, chasing of gambling losses, gambling withdrawal, lying about losses or behaviour, loss of control, and risking of significant relationships (Jazaeri & Bin Habil, 2012). From an extensive review of the literature,

Neal et al. (2005, p. 125) define problem gambling as “characterised by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community.” They note that this definition implies that problem gambling is situated along a continuum of behaviour, which, as suggested by Shaffer and Hall (1996), ranges from non-gamblers to non-problem gamblers to problem gamblers with subclinical levels of gambling problems (given labels such as “at-risk,” “in transition,” and “potential pathological” gamblers) who are experiencing various adverse effects from gambling, but who do not meet the diagnostic criteria for the most severe category—pathological gambling. In this study, we focus on problem gambling as operationalized by the Problem Gambling Severity Index (PGSI; Wynne, 2003).

History of the GMQ and GMQ-F

A large body of research has focused on understanding and mitigating problematic and pathological gambling. The PGSI has been one of the most effective tools for identifying problem and at-risk gamblers within populations (Williams & Volberg, 2010). Related to measurement of the severity of problem gambling risk is measurement of the nature and extent of various motivations underlying gambling behaviour. The GMQ for Financial Motivations (GMQ-F) and its forerunner, the GMQ, are two such measures. The GMQ and GMQ-F have been the subject of several studies that assessed their validity, functionality, and reliability in various populations.

The current study is the next in a series of works devoted to validating the GMQ-F as defined by Dechant (2014), falling within an even broader body of literature that aims to validate and extend the GMQ that was initially proposed and tested by Stewart and Zack (2008). The motivational categories enjoyment, coping, and social interaction became the backbone of the GMQ, owing to its adaptation from the DMQ, which featured the same three subscales, and subsequent analyses performed on normative samples showing strong evidence for the measure’s internal and external validity (Dechant & Ellery, 2011; Lambe et al., 2015; Stewart & Zack, 2008). Despite this early promise, concerns were raised: Because it was based on a measure of drinking motivation, the GMQ did not include financial motivation questions, leading Hodgins (2008) to conclude his critique with the caveat that “while Stewart and colleagues provide a validated scale to measure some aspects of motives for gambling, other important aspects of this fascinating disorder are also deserving of our attention” (p. 1119).

In an attempt to address this limitation, Dechant and Ellery (2011) added a single financial motivation item. Factor analysis of the revised measure revealed significant improvement in terms of internal consistency and the amount of variance explained and suggested the presence of a fourth factor. In a follow-up study, Dechant (2014) added more financial items, factor analysis revealing evidence of a financial motives factor. After adding three more financial items beyond the “to win money” item (trimmed from nine financial items initially), she retained four factors with eigenvalues of 5.452, 1.819, 1.730, and 1.328, accounting for 54.36% of the variance

in responses (Dechant, 2014). This revised measure—the GMQ-F—contains four factors: enhancement, coping, social, and financial motivations.

In the current study, we aimed to extend the validation of the GMQ-F as proposed by Dechant by using confirmatory factor analysis (CFA) to explore its validity and its psychometric properties in a sample of emerging adult university students. Further, the current study is an extension of the work done by Lambe et al. (2015), who used CFA to provide validation of the GMQ within a population of emerging adult gamblers in Manitoba. By using the same method and population, but an expanded GMQ-F, we aimed in the current study to provide an improved understanding and validation of the prior work.

Emerging Adulthood and Increased Risk

Current research on the emerging adult age category has found that gambling (as well as drinking and drug use) peaks between the ages of 18 and 24 years, the height and timing of said change depending on the number of life transitions that an individual undergoes in this period (Schulenberg et al., 2005). Although these individuals are in an experimental period of their lives, research indicates a greater propensity for emerging adults to engage in risky behaviour as a means to make friends or impress peers (Obedzinski et al., 2019), which, along with evidence of the co-occurrence of multiple risky behaviours in young adults (Labrie et al., 2003), suggests that they may be at elevated risk for problematic gambling behaviour. Further, binge drinking, which has also been found to peak during the emerging adult years, has been strongly associated with problem gambling (LaBrie et al., 2003); both binge drinking and problem gambling can create strain in other areas of an emerging adult's life (Lesieur et al., 1991), which can exacerbate the desire for avoidance of negative affect or its temporary displacement with positive feelings.

With this in mind, understanding the nuances in gambling motivations among this population could be more important than those in a normative population, as these years of an individual's life can provide the bedrock for future behaviour. By knowing how and why individuals at this stage of their lives engage in gambling behaviour, along with how these motivations relate to markers of risk, downstream impacts can be better prepared for or predicted.

In addition, validating the GMQ-F with a non-normative sample provides an important theoretical benefit. In their research on gambling motivations, C.-K. Lee et al. (2006) demonstrated that there can be considerable differences in the strength of motivational categories that are based on demographic characteristics. In their study of Korean casino gamblers, a 30-item measurement instrument was used that included a variety of gambling motivations drawn from the literature, which resulted in a four-factor structure after factor analysis (C.-K. Lee et al., 2006). The four categories varied wildly from prior work in a Western context, comprising “socialization and learning,” “challenge,” “escape,” and “winning” motivations (C.-K. Lee et al., 2006, p. 860). In both studies, learning was the most prevalent

motivation, with the authors remarking “that among Korean gamblers, socialization/learning represents a central distinguishing motivational theme for the casino visit” (C.-K. Lee et al., 2006, p. 860). With this in mind, application of the GMQ-F to different populations, even among subsets of a normative population, can provide important knowledge about gaps and of over-reliance in motivational categories.

Also of note is that such an analysis can provide insight into the boundary conditions related to the utility of particular instruments such as the GMQ-F. While not invalidating prior findings, this analysis does provide an understanding about how applicable particular factor structures are when populations differ from those in which the initial measure was developed. Each sample has unique characteristics. It is therefore important to test how well a measure’s structure does or does not align with a new and different population in order to address its overall applicability.

Hypotheses

Our intent in the current study was to validate the 16-item GMQ-F among a sample of emerging adult gamblers by attempting to address both the internal and the external validity of the model. In prior work, Lambe et al. (2015) used CFA techniques to test the psychometric properties of the three-factor GMQ in a sample of emerging adults. To our knowledge, however, there has been no similar work in the application of the GMQ-F that accounts for the inclusion of distinct financial motivations. This study thus represents an extension of the previous work, filling a gap in our current understanding of gambling motivations and their measurement among individuals aged 18 to 25 years. The current study also used a sample of Canadian emerging adults who were demographically representative of the general population, similar to the previously mentioned work. Our three hypotheses were as follows:

Hypothesis 1. Through the use of CFA, we expect to achieve an acceptable model fit within a four-factor GMQ-F, as proposed by Dechant (2014).

Hypothesis 2. Through the use of Cronbach’s alpha, we expect all four factors of the GMQ-F to demonstrate acceptable levels of internal consistency.

Hypothesis 3. Through the use of multiple regression, we expect factors of the GMQ-F to be significant predictors of problem gambling, as measured through the PGSI, as well as gambling variety, frequency, and expenditure.

Method

Participants

Data were collected as part of the Attitudes, Alcohol and Gambling Experience Survey (AAGE), conducted at the University of Manitoba in various sections of Introductory Sociology in the Fall of 2017. Participation was voluntary, and the study was approved by the university’s Psychology/Sociology Research Ethics

Board. The sample for this study included respondents aged 18–24 who indicated that they gambled. This emerging adult gambler subsample ($n = 391$) was predominantly female (59.6%, 39.9% male, 0.5% non-binary), employed part-time (67.5%, 26.9% unemployed, 3.3% employed full-time, 2% on leave), and attending university full-time (92.3%, 6.4% part-time).

Materials

GMQ-F. Consistent with the aims of the current study, a 16-item version of the GMQ-F was included in the AAGE based on the measure proposed by Dechant (2014). The measure consists of four separate subscales, enhancement items tapping motivations aimed at increasing positive feelings, coping motivations aimed at reducing negative feelings, social motivations aimed at providing social interaction and cohesion, and financial motivations aimed at financial gain. Each subscale contains four items, measured on a 4-point Likert scale (0 = never/almost never, 1 = sometimes, 2 = often, 3 = almost always/always). Consistent with the study by Lambe et al. (2015), items can be summed within subscales to provide a measure of reliance on a particular subset of motivations. In the current sample, respondents slightly favoured financial motivations overall ($\bar{x} = 7.97$, $\sigma = 3.27$), with enhancement motivations falling slightly behind ($\bar{x} = 7.73$, $\sigma = 3.07$), followed by social motivations ($\bar{x} = 6.07$, $\sigma = 2.41$) and coping motivations ($\bar{x} = 4.64$, $\sigma = 1.61$).

Problem Gambling Severity Index (PGSI). The PGSI is a nine-item index with responses based on a 4-point scale (0 = never, 1 = sometimes, 2 = most of the time, 3 = almost always). Scores range from 0 to 27 and can be recoded into four problem gambling risk levels. The current study used Currie et al.'s (2013) revised risk-level cut-offs: PGSI raw scores of 0 = non-problem gambler, 1–4 = low-risk gambler, 5–7 = moderate-risk gambler, and 8+ = high-risk gambler. As the distribution of raw PGSI scores was highly non-normal, the four-category risk-level variable was used instead, and, given its approximately normal distribution, was treated as continuous in the regression analysis.¹ Of the respondents in the sample, 72% scored as non-problem gamblers, 20.6% as low-risk gamblers, 2.6% as moderate-risk gamblers, and 4.8% as high-risk gamblers (Table 1).

Gambling Variety Questions. Respondents were also asked to complete a set of questions that pertained to their involvement with various gambling activities. The 14-item list comprises questions in which a respondent is asked to indicate their level of involvement with a particular type of gambling activity, measured on an 8-point scale (0 = never, 1 = between 1 and 5 times a year, 2 = between 6 and 11 times a year, 3 = once a month, 4 = 2–3 times a month, 5 = about once a week, 6 = 2–6 times a week, 7 = daily). This set of questions closely mirrors the South Oaks Gambling Screen used by Stewart and Zach (2008) in their initial testing of the GMQ. The 14-item variety

¹Bentler and Chou (1987) argued that categorical variables that have at least four categories and are approximately normally distributed can be treated as continuous with little concern.

Table 1
Univariate Descriptive Statistics

Variable	Mean	SD
PGSI	.9876	2.646
Gambling variety	6.86	7.6
Gambling frequency	2.13	.428
Average monthly expenditure	38.29	322.859
Enhancement motivations	7.73	3.07
Coping motivations	4.64	1.61
Social motivations	6.07	2.41
Financial motivations	7.97	3.27

Note. PGSI = Problem Gambling Severity Index.

measure has been included in previous GMQ-F validation studies (Dechant, 2014; Dechant & Ellery, 2011; Schellenberg et al., 2015). Responses on the 14-item list were summed such that higher totals reflected higher involvement in a greater variety of gambling activities, with potential scores ranging from 0 to 74. The average variety score for the study sample was 6.86.

Gambling Frequency Question. The AAGE also contained a question related to time spent gambling, which operates as a gambling frequency variable. The question asked was, “On average, how often do you gamble?” with respondents able to indicate their gambling frequency in one of five different categories (1 = I have never gambled, 2 = once a month or less, 3 = 2–4 times a month, 4 = 2 to 3 times a week, and 5 = 4 to 5 times a week). The most common response was once a month or less ($N = 348$ or 89%) followed by 2 to 4 times a month ($N = 31$ or 8%) and then 2 to 3 times a week ($N = 9$ or 2.3%) and 4 to 5 times a week ($N = 1$ or 0.3%).

Average Monthly Expenditure. Also contained in the AAGE was a question pertaining to the average monthly expenditure by a respondent on gambling activities. The question asked was, “How much money do you typically spend per month on gambling?” with respondents instructed to write a dollar amount in the space provided.

Data Analysis

Data cleaning and descriptive statistics were run through SPSS (Version 25), with all subsequent analysis being conducted by using MPlus.

We considered only two incremental fit indices in this analysis, the Tucker-Lewis index (TLI) and the comparative fit index (CFI), along with one residual-based index, the root-mean-square error of approximation (RMSEA) and the standardized root-mean-square residual (SRMR). Some investigators have suggested that values above .90 for the CFI and the TLI represent acceptable model fit, whereas values greater than .95 show excellent fit (Marsh et al., 2010). For the RMSEA and SRMR,

some investigators have suggested .06 or .05 and below as representing close fit, whereas others have argued a more modest figure of .08 for reasonable fit (Marsh et al., 2010). In the current study, we considered values of .90 on the CFI and TLI and .08 on the RMSEA and SRMR to be acceptable fit for the model in its current state.

Analysis proceeded in two phases. First, a CFA was run on the data by using Mplus to examine the factor structure and model fit within a sample of emerging adults, in an attempt to validate the model's structure and internal validity. Second, regression analyses were run by using averaged scores on each GMQ-F subscale as derived from Dechant (2014) to test the external validity of the model and its capabilities in predicting various gambling variables.

Results

Model 1

Data were entered into Mplus and a CFA of the proposed model was run, showing promising fit on available fit indices. In the current study, our model remained well below excellent fit, but came close to acceptable fit with both the CFI (.888) and the TLI (.862) falling below the more modest .90 cut-off. The RMSEA (.095) fell above the .08 cut-off recommended by Marsh et al. (2010) for acceptable fit, whereas the SRMR (.078) fell just below it, showing acceptable fit. Almost all variables within the model loaded strongly onto their proposed latent factors, with only "It's something you do on special occasions" in the social motivations subscale showing a standardized loading lower than the .5 cut-off suggested by Meyers et al. (2016).

Model 2

Modification indices were added to the model in an attempt to further improve model fit. Items were allowed to covary only within a set subscale, as recommended by Meyers et al. (2016). Further, latent variables were not allowed to covary with each other, and no items were added to different subscales or removed from the model, as path coefficients showed strong loadings in all cases. In the financial subscale, the items "Because you enjoy thinking about what you would do if you won a jackpot" and "Because winning would change your lifestyle" were allowed to covary, as were "To earn money" and "To win money"; in the coping subscale, the items "Because it helps you feel more self-confident or sure of yourself" and "To forget your worries" were allowed to covary, as were the items "Because it's fun" and "Because it's exciting" in the enhancement subscale. With the addition of modification indices, there was improvement among all fit indices. The CFI (.942) and TLI (.926) both fell above the .90 cut-off for acceptable fit, with the CFI approaching the .95 cut-off for excellent fit. Both the RMSEA (.069) and the SRMR (.057) remained below the .08 cut-off for reasonable fit, with the SRMR even falling below the .06 cut-off for close fit. Examination of the path coefficients showed significant change across all subscales; however, all items surpassed the .5 benchmark. Further addition of modification indices did not produce significant improvement

Table 2
Internal Consistency of Subscales

Subscale	Cronbach's alpha
ENH	.875
COP	.839
SOC	.841
FIN	.823

Note. ENH = enhancement motivations; COP = coping motivations; SOC = social motivations; FIN = financial motivations.

in model fit or path coefficients; therefore, analysis was discontinued and Phase 2 was undertaken.

Regression Analysis

Following the CFA, a series of multiple regressions were run to test the strength of the GMQ-F subscales as predictors of gambling behaviour. As with the logistic regressions performed by Lambe et al. (2015), responses were summed along the GMQ-F subscales for use as predictors. Alpha levels showed that all four GMQ-F subscales had acceptable levels of internal consistency (Table 2). Coping motivations were found to be a strong predictor of problem gambling ($\beta = .482, p < .001$), whereas enhancement motivations were found to be a moderate predictor ($\beta = .115, p < .05$) and social motivations a moderate negative predictor ($\beta = -.125, p < .05$). Enhancement motivations ($\beta = .179, p < .05$), coping motivations ($\beta = .149, p < .05$), and social motivations ($\beta = .179, p < .05$) were all found to be moderate predictors of gambling variety. Financial motivations were not significant predictors of either problem gambling or gambling variety. No subscales were found to be significant predictors of average monthly expenditure, but enhancement motivations were found to be a moderate predictor of gambling frequency ($\beta = .293, p < .001$) and coping motivations a weak predictor of gambling frequency ($\beta = .146, p < .05$). All beta weights and measures of significance are reported in Table 3.

Discussion

In the current study, we tested the psychometric properties of the GMQ-F in an attempt to validate the previous findings of Dechant (2014) and extend those of Lambe et al. (2015). Although initial tests of the measure's factor structure showed less than optimal model fit, falling outside the accepted and expected parameters, the inclusion of modification indices improved fit significantly, moving the model firmly into acceptable fit. Upon achieving acceptable model fit, we used regression analysis to test the external construct validity of the GMQ-F measure, in line with previous work by Lambe et al. (2015) and Dechant (2014), finding mixed results.

As with the results reported by Lambe et al. (2015), the enhancement subscale was both reliable and valid among the emerging adult population used in the current

Table 3
Subscale Means as Predictors

Measure	Subscale	Beta weight	Significance
PGSI scores	ENH	.115	.046
	COP	.482	.000
	SOC	-.125	.022
	FIN	.091	.076
Gambling variety	ENH	.179	.004
	COP	.149	.009
	SOC	.179	.002
	FIN	.062	.261
Average monthly expenditure	ENH	.085	.194
	COP	.085	.164
	SOC	.065	.299
	FIN	.010	.865
Gambling frequency	ENH	.293	.000
	COP	.146	.010
	SOC	.055	.342
	FIN	-.018	.745

Note. PGSI = Problem Gambling Severity Index; ENH = enhancement motivations; COP = coping motivations; SOC = social motivations; FIN = financial motivations.

study. Enhancement motivations were significant and strong predictors of gambling variety, in line with the literature, although, unlike that shown in prior research, enhancement motivations were found to be a significant predictor of problem gambling among emerging adults. Such motivations have been shown to be a significant predictor of problem gambling among normative adult samples (Stewart & Zack, 2008); however, among emerging adult samples, such motivations were found to be non-significant (Lambe et al., 2015). Although enhancement motivations were statistically significant in the current study, the strength of association between problem gambling and enhancement motivations was weak when compared with coping motivations, which were by far the more robust and significant predictor of problem gambling. The current results are consistent with previous research that suggests that maladaptive coping strategies, such as escape-avoidance, are associated with an increased risk of problem (Edgerton et al., 2015) and pathological (Platz & Millar, 2001) gambling. Individuals who use escape-avoidance strategies tend to turn to maladaptive and potentially harmful behaviour to cope with problems, as opposed to solving them through careful planning.

The strength of the enhancement subscale was also observed from its significance in predicting gambling frequency. This finding is in line with previous regression analyses performed by using GMQ subscale means, which showed that the enhancement subscale was a significant predictor of respondents' gambling frequency (Lambe et al., 2015). Consistent with the present results, the findings of Dechant (2014) showed both the enhancement and the financial subscales of the GMQ-F to be significant predictors of variety. The findings from the present analysis, combined

with those of previous research, indicate that there is an association between the positive feelings expressed in the enhancement subscale and more frequent and diverse gambling activity (Stewart & Zack, 2008). These findings were further enhanced by results showing enhancement motivations as a significant—albeit weak—predictor of the gambling variety of respondents, although, unlike the results reported in prior work, financial motivations remained non-significant for predicting gambling frequency in the current study.

Conclusions

The intention of this study was to extend the previous works by Lambe et al. (2015) and Dechant (2014). In one case, we applied a similar use of CFA and regression analysis to an emerging adult sample by using the modified GMQ-F, whereas Lambe et al. (2015) had used only the three-factor GMQ. In the other case, we extended the work of Dechant (2014) after validation of the four-factor GMQ by using CFA and applying it to a different sample. In their original study of the GMQ, Stewart and Zack (2008) called for the application of their measure on different populations to expand knowledge of its validity, something the current study fulfils. The GMQ-F is a valid measure for tracking the motivations of emerging adults, with satisfactory results in both internal and external validity. Although we did not initially find model fit by using the chosen fit indices, the inclusion of modification indices brought the model firmly into acceptable fit, achieving good fit in some cases. These results provide evidence to accept Hypothesis 1, which states that the GMQ-F would achieve model fit through CFA. Cronbach's alpha results also give support to Hypothesis 2, as all four subscales showed acceptable levels of internal consistency. Finally, results from the regression analyses provide adequate support to accept Hypothesis 3, that the GMQ-F would show external validity through its role as a significant predictor of problem gambling and gambling frequency. Overall, enhancement motivations were proven to be the most salient motivational category, in accordance with the findings of Lambe et al. (2015), and suggest that within the developmental emerging adult period, gambling is primarily used as a means of fun and recreation, instead of as a method to cope with negative affect, to provide social stimulation, or to provide financial gains. The 16-item GMQ-F, as it stands, is a valid and reliable tool for both academics and treatment professionals in understanding why emerging adults choose to gamble.

Limitations and Recommendations

Like the works stemming from Stewart and Zack's (2008) initial proposal of the GMQ and Dechant's (2014) proposal of the GMQ-F, the current study is another step toward creating a robust and accurate measure of gambling motivations. With this in mind, although the current study provides evidence for the GMQ-F being a valid measure in an emerging adult population in its current four-factor structure, there are still motivational categories to be discovered, further expanding the measure's scope. A potential avenue for expanding the GMQ-F items may arise from risk motivations, previously reported in high numbers among university and

college gambling samples (Neighbors et al., 2002; Platz & Millar, 2001). Risk was also highly reported among Korean casino gamblers, who also provide a second avenue for expansion, learning motivations (C.-K. Lee et al., 2006; H.-P. Lee et al., 2007). Learning motivations were also found among American college gamblers (Neighbors et al., 2002) and normative gamblers (Smith & Preston, 1984). Gambling for the sake of learning puts the activity of gambling itself at centre stage, with those engaged in it often trying to figure out the “best” way to gamble (Cotte, 1997). Older works on gambling motivations explored a more diverse range of motivational categories, and although arguments such as gambling being the result of masochism or self-guilt (Smith & Preston, 1984) can be ignored, other arguments may still be valid avenues for exploring motivational categories.

It will also be necessary to extend the application of the GMQ-F and potential future versions of the questionnaire to differing populations. Follow-up applications of the measure to a university sample, as well as applications to normative samples, problem gamblers, non-problem gamblers, and gamblers from various ethnic and gendered backgrounds, will allow a better understanding of the measure’s scope. One that would be of great interest is validating the GMQ-F in a Korean gambling sample such as that used by H.-P. Lee et al. (2007). Their analyses uncovered a five-factor model, with subscales of social, amusement, excitement, avoidance, and monetary motivations (H.-P. Lee et al., 2007). The different value systems and cultural understandings of gambling behaviour may provide different perspectives on the issue, not only providing new motivational categories to expand the GMQ-F, but also giving researchers a better understanding of the strengths and weaknesses of the measure based on different demographic characteristics. As we have seen with Canadian university gamblers, some motivational categories are relied on more heavily to explain behaviour, and so further application to differing groups will provide a broader understanding of what motivates gambling activity.

A limitation of note is the fact that respondents in the study were, for the most part, infrequent gamblers who did not spend much when they did gamble. Another limitation of note is the fact that respondents in the study were, for the most part, infrequent gamblers who did not spend much when they did gamble. The average monthly expenditure was low ($\bar{x} = \$38.29$ while there was large deviations in scores ($\sigma = \$322.86$).

This is likely a function of the chosen sample, as the majority were full-time students, working part-time or unemployed, with little by way of disposable income to devote to gambling activity. Future works on emerging adults should include more emerging adults outside of the university setting, especially those working full-time. As emerging adults are part of a high-risk cohort for future addictive behaviour (Labrie et al., 2003), it will be important to understand how these emerging adults with money choose to spend it.

The limitations notwithstanding, the current analysis suggests that the GMQ-F is a useful tool for measuring gambling motivations among emerging adult university

students. Although evidence for the utility of the GMQ-F is considerable (Dechant, 2014; Stewart & Zack, 2008), continued refinement is also warranted. Adaptation of the measure for use in a clinical setting, especially when paired with other measures such as the PGSI and the South Oaks Gambling Screen, could be helpful in tailoring prevention and treatment efforts. More generally, having a good measure of gambling motivations will allow for testing of linkages between motivations and different gambling behaviours, of how prominent motivations vary across or between populations, and of how these motivations relate to other recreational behaviours outside of gambling.

References

- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).
- Breen, H. M., Hing, N., & Gordon, A. (2011). Indigenous gambling motivations, behaviour and consequences in Northern New South Wales, Australia. *International Journal of Mental Health and Addiction*, 9, 723–739.
- Cotte, J. (1997). Chances, trances, and lots of slots: Gambling motives and consumption experiences. *Journal of Leisure Research*, 29(4), 380–406.
- Currie, S. R., Hodgins, D. C., & Casey, D. M. (2013). Validity of the Problem Gambling Severity Index interpretive categories. *Journal of Gambling Studies*, 29(2), 311–327.
- Dechant, K. (2014). Show me the money: Incorporating financial motives into the Gambling Motives Questionnaire. *Journal of Gambling Studies*, 30(4), 949–965.
- Dechant, K., & Ellery, M. (2011). The effect of including a monetary motive item on the Gambling Motives Questionnaire in a sample of moderate gamblers. *Journal of Gambling Studies*, 27(2), 331–344.
- Edgerton, J. D., Melnyk, T. S., & Roberts, L. W. (2015). An exploratory study of multiple distinct gambling trajectories in emerging adults. *Journal of Youth Studies*, 18(6), 743–762.
- Hodgins, D. C. (2008). What we see depends mainly on what we look for (John Lubbock, British anthropologist, 1834–1913). *Addiction*, 103(7), 1118–1119.
- Jazaeri, S. A., & Bin Habil, M. H. (2012). Reviewing two types of addiction: Pathological gambling and substance use. *Indian Journal of Psychological Medicine*, 34(1), 5–1

- Labrie, R. A., Shaffer, H. J., LaPlante, D. A., & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52*(2), 53–62.
- Lambe, L., Mackinnon, S. P., & Stewart, S. H. (2015). Validation of the Gambling Motives Questionnaire in emerging adults. *Journal of Gambling Studies, 31*(3), 867–885.
- Lee, C.-K., Lee, Y.-K., Bernhard, B. J., & Yoon, Y.-S. (2006). Segmenting casino gamblers by motivation: A cluster analysis of Korean gamblers. *Tourism Management, 27*(5), 856–866.
- Lee, H.-P., Chae, P. K., Lee, H.-S., & Kim, Y.-K. (2007). The five-factor gambling motivation model. *Psychiatry Research, 150*(1), 21–32.
- Lesieur, H. R., Cross, J., Frank, M., Welch, M., White, C. M., Rubenstein, G., Moseley, K., & Mark, M. (1991). Gambling and pathological gambling among university students. *Addictive Behaviors, 16*(6), 517–527.
- Liu, T., Maciejewski, P. K., & Potenza, M. N. (2009). The relationship between recreational gambling and substance abuse/dependence: Data from a nationally representative sample. *Drug and Alcohol Dependence, 10*(1–2), 164–168.
- Marsh, H., Martin, A., & Jackson, S. (2010). Introducing a short version of the Physical Self Description Questionnaire: New strategies, short-form evaluation criteria, and application of factor analyses. *Journal of Sport and Exercise Psychology, 32*(4), 438–482.
- Meyers, L. S., Gamst, G., & Guarino, A. (2016). *Applied multivariate research: Design and interpretation* (3rd ed.). Sage Publication
- Neal, P., Delfabbro, P., & O’Neil, M. (2005). *Problem gambling and harm: Towards a national definition*. Office of Gaming and Racing, Victorian Government Department of Justice. <https://www.gamblingresearch.org.au/publications/problem-gambling-and-harm-towards-national-definition>
- Neighbors, C., Lostutter, T. W., Crouce, J. M., & Larimer, M. E. (2002). Exploring college student gambling motivation. *Journal of Gambling Studies, 18*(4), 361–369.
- Obedzinski, K., Edgerton, J., & Roberts, L. (2019). Problem gambling risk in a sample of Canadian university students: Understanding motives and associated ‘risky’ behaviors. *College Student Journal, 53*(2), 199–21
- Platz, L., & Millar, M. (2001). Gambling in the context of other recreation activity: A quantitative comparison of casual and pathological student gamblers. *Journal of Leisure Research, 33*(4), 383–395.

- Quilty, L. C., Watson, C., Toneatto, T., & Bagby, R. M. (2017). A prospective investigation of affect, the desire to gamble, gambling motivations and gambling behaviour in the mood disorders. *Journal of Gambling Studies*, 33(1), 115–129.
- Schellenberg, B. J., McGrath, D. S., & Dechant, K. (2016). The Gambling Motives Questionnaire financial: Factor structure, measurement invariance, and relationships with gambling behaviour. *International Gambling Studies*, 16(1), 1–16.
- Schulenberg, J., O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (2005). Early adult transitions and their relation to well-being and substance use. In R. A. Settersten Jr, F. F. Furstenburg, & R. G. Rumbaut (Eds.), *On the frontier of adulthood: Theory, research, and public policy* (pp. 417–453). University of Chicago Press.
- Shaffer, H. J., & Hall, M. N. (1996). Estimating the prevalence of adolescent gambling disorders: A quantitative synthesis and guide toward standard gambling nomenclature. *Journal of Gambling Studies*, 12(2), 193–214.
- Smith, R. W., & Preston, F. W. (1984). Vocabularies of motives for gambling behaviour. *Sociological Perspectives*, 27(3), 325–348.
- Stewart, S. H., & Zack, M. (2008). Development and psychometric evaluation of a three-dimensional Gambling Motives Questionnaire. *Addiction*, 103(7), 1110–1117.
- Trevorrow, K., & Moore, S. (1998). The association between loneliness, social isolation and women's electronic gaming machine gambling. *Journal of Gambling Studies*, 14(3), 263–284.
- Williams, R. J., & Volberg, R. A. (2010). *Best practices in the population assessment of problem gambling*. Ontario Problem Gambling Research Centre.
- Wynne, H. J. 2003. *Introducing the Canadian Problem Gambling Index*. Wynne Resources.
- Zola, I. K. (1963). Observations on gambling in a lower-class setting. *Social Problems*, 10(4), 353–361.

Submitted February 24, 2020; accepted March 6, 2020. This article was peer reviewed. All URLs were available at the time of submission.

For correspondence: Jason D. Edgerton, Ph.D., Department of Sociology and Criminology, University of Manitoba, 318 -183 Dafoe Road, Isbister Building, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2.
E-mail: J.Edgerton@umanitoba.ca

Competing interests: None declared (all authors).

Ethics approval: The Psychology-Sociology Research Ethics Board of the University of Manitoba approved on September 12, 2017, the research project “Investigating Beliefs, Alcohol Use, and Gambling Experiences in Undergraduate University Students” - Protocol #P2017:097 (HS21146).

Acknowledgements: This project was funded by a grant (MGRP-SM-16-18) from Manitoba Liquor and Lotteries' Manitoba Gambling Research Program.