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REVIEW

The Association between Gambling Motives and Problem Gambling Severity: A Systematic Review and Meta-analysis

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Abstract

Purpose of review This systematic review and meta-analysis examined the strength of associations between gambling motives and problem gambling severity.

Recent findings Despite previous reviews highlighting the importance of gambling motives, none have synthesized evidence across all validated measures and sample types.

Summary A systematic search of peer-reviewed literature (1993-2025) identified 63 studies (66 articles), with 53 studies (54 articles) included in meta-analyses of 15 validated motives subscales. With the exception of the Intrinsic-Motivation Toward Knowledge subscale of the Gambling Motivation Scale, all motive subscales demonstrated significant positive associations with problem gambling severity, with effect sizes ranging from small (r=0.21) to large (r=0.53). Overlapping confidence intervals across subscales indicate that gambling motives should be viewed as interrelated contributors to problem gambling severity. Findings were generally consistent when analyses were restricted to studies using unadjusted data and those rated as strong-moderate for risk of bias. While there were insufficient estimates to conduct subgroup analyses for several study and sample characteristics (i.e., sample gender, study design, sample type, and sampling type), exploratory meta-regressions suggested that sample size contributed to heterogeneity for specific motives, whereas problem gambling severity measure did not. These findings have implications for the development of targeted, motivation informed prevention and intervention efforts.

Keywords Gambling · Motives · Systematic · Heterogeneity · Intervention

Introduction

Gambling Disorder is defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) [1] as persistent and recurrent problematic gambling behaviour leading to impairment and disruption in many areas of life. Public health frameworks, used to inform prevention and intervention policy, conceptualise gambling behaviour across a continuum of risk from 'no risk gambling' to 'problem gambling' [2]. In this context, 'problem gambling' refers to difficulties limiting money and time spent gambling that results in adverse consequences for individuals, families, and communities. Such adverse consequences span financial, relationship, emotional, health, occupational, and cultural domains, rendering problem gambling a serious public health concern [3]. While some stakeholders prefer the term 'gambling harm' to reduce stigma and acknowledge various determinants, references to 'problem gambling' in this manuscript relate to the assessment of problem gambling severity, capturing both indicators of behavioural dependence (behavioural, emotional, and cognitive symptoms) and adverse consequences from gambling. Global prevalence rates indicate that 1.4% of adults display problem gambling, while an additional 10.1% gamble at lower levels of risk [4].

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Gambling Motives

Problem gambling has consistently been described as a heterogeneous condition, whereby individuals differ on various characteristics, including motives to gamble [5]. Gambling motives are the reasons that individuals gamble. Gambling motives described in the literature include enhancement motives (gambling to increase pleasant emotions), coping motives (gambling to reduce or avoid unpleasant emotions), social motives (gambling to increase social affiliation), financial motives (gambling for monetary gain), recreation motives (gambling for a hobby or fun), intrinsic motives (gambling for personal growth, such as developing a skill), extrinsic motives (gambling due to external influences), and passion motives (gambling due to a strong desire) [6–9]. There are several commonly employed measures developed to assess these motives, which are primarily grounded in two theoretical models: operant conditioning and self-determination theory.

Measures Grounded in Operant Conditioning Models

Operant conditioning is the theoretical basis of several commonly utilised measures of gambling motives, including the Gambling Motives Questionnaire (GMQ) [10], the GMQ-Financial (GMQ-F) [9], the Gambling Functional Assessment (GFA) [11], and the GFA-Revised (GFA-R) [12]. This framework posits that gambling behaviours are shaped by their consequences, including positive reinforcement (whereby a rewarding stimulus follows gambling behaviour) and negative reinforcement (whereby an aversive stimulus is removed following gambling behaviour), both of which increase the likelihood of subsequent gambling behaviour [13]. Using the GMQ-F as an example, enhancement, financial, and social motives reflect positive reinforcement (e.g., gambling to gain enjoyable or rewarding experiences), whereas coping motives reflect negative reinforcement (e.g., gambling to reduce or escape unpleasant emotions) [9].

The most commonly employed measure of gambling motives is the GMQ and its adaptations. The GMQ is a 15-item questionnaire that assesses enhancement, coping, and social motives, with each motive measured by a 5-item subscale. The GMQ has been adapted several times, including a 9-item short-form (3 items per subscale) [14], a 14-item version with four subscales (Enhancement, Coping, Social, and Self-Gratification; GMQ-Revised) [15], and a 16-item version that includes an additional financial motives subscale (4 items per subscale; GMQ-F) [9]. Both the GMQ and the GMQ-F have been translated into multiple languages [16–18] and employed internationally across community samples [16, 17, 19–25] and clinical samples [10, 26–28].

The GFA is a 20-item measure of contingencies maintaining gambling behaviour, including sensory experiences (gambling is maintained by thrill or excitement), social attention (gambling is maintained by the attention of others), tangible outcomes (gambling is maintained by access to the tangible items associated with gambling, such as money or complementary perks), and escape (gambling is maintained by escapism) [11]. The GFA was revised to create a 16-item revised version (GFA-Revised; GFA-R), which includes an 8-item positive reinforcement subscale (i.e., sensory experience, social attention, and tangible outcomes) and 8-item negative reinforcement subscale (i.e., escape) [12].

Measures Grounded in Self-Determination Theory

Self-determination theory underpins several other commonly employed measures of gambling motives, including the Gambling Motivation Scale (GMS) [29], the Modified GMS (MGMS) [30] and the Passion for Gambling Scale (GPS) [31]. Self-determination theory proposes that individuals are motivated to act based on their fundamental need for autonomy (need to behave in a way that is consistent with personal growth), competence (need to control outcomes and achieve mastery), and relatedness (need for companionship and acceptance) [32, 33]. These needs can generate intrinsic motivation (an internal desire to engage in an activity) or extrinsic motivation (a need to engage in an activity because of external influences), with a lack of intention to act described as amotivation.

Originally developed in French [29], the GMS is a 28-item measure of intrinsic motivation, extrinsic motivation, and amotivation. The GMS comprises seven subscales across these three categories, each with 4 items. Intrinsic motivation subscales include: intrinsic motivation toward knowledge (to experience the pleasure of acquiring new game knowledge); accomplishment (to improve one's gambling skills); and stimulation (to experience sheer excitement or thrill). Extrinsic motivation subscales include: introjected regulation (gambling regulation by self-imposed pressures, such as guilt or pressure); identified regulation (gambling is valued for certain purposes, such as socialising with friends); and external regulation (gambling for external reward). Finally, the amotivation subscale measures gambling without a sense of purpose. In 2018, a modified version of the GMS (MGMS) was developed by rephrasing some items and modifying some anchors [30]. The MGMS has a six-factor structure, including: intellectual challenge (8 items), excitement (4 items), socialization (4 items), social (4 items), monetary (4 items), and amotivation (4 items) [30] with only amotivation comparable to the GMS

subscales. The GMS and MGMS have been employed in community samples internationally [30, 34–50]. The GMS has been translated into English [36, 37] and Mandarin [51].

To measure passion as a gambling motive, Rousseau and colleagues [31] developed the GPS, a gambling version of the 14-item Passion Scale [52]. Vallerand et al. [52] posited that individuals engage in an activity due to harmonious passion (a strong but controllable desire to engage in the activity) or obsessive passion (an internal pressure which forces individuals to perform an activity). A recent scoping review of the GPS (k = 17) [53] found a positive association between obsessive passion and gambling problems, but an inconsistent relationship between harmonious passion and gambling problems. Nonetheless, the GPS been employed in many community samples internationally [31, 52–65].

Study Rationale and Aims

Recent systematic reviews have emerged to clarify the relationships between gambling motives and problem gambling severity. In a meta-analysis of 44 cross-sectional student, community, and clinical studies focusing on financial motives measured using validated instruments, Tabri et al. [66] found a moderate association with problem gambling severity. Heterogeneity was high, but sample age, sample gender, publication status, gambling motives measure, and geographical region did not moderate this association. Similarly, in a meta-analysis of 27 quantitative studies examining escape motives using validated measures of gambling motives, reasons, or expectancies, Alaba-Ekpo et al. [67] found a moderate association with problem gambling severity, which remained after adjusting for financial motives. Heterogeneity was high, with subgroup analyses revealing that effect size estimates were higher for studies using motives scales than those using expectancies scales. Finally, in a meta-analysis of 26 population-representative studies that reported gambling motives (including those measured with non-validated measures) as a correlate of problem gambling severity, Allami et al. [68] identified 14 unique motives, with coping motives associated with large effect sizes, enhancement motives with medium effect sizes, and all other motives with small or nil effect sizes. Again, the review revealed high heterogeneity, with sensitivity analyses revealing the effects varied according to jurisdiction (e.g., Canadian studies had a smaller effect size for "to win money" and a larger effect size for "entertainment/fun"), problem gambling assessment measure (e.g., studies using a measure other than the Problem Gambling Severity Index yielded a smaller effect size for "socialising with friends/family"), and base group composition (e.g., higher effect sizes when comparing "socialising with family/friends" among those with past-year gambling than the whole population). While these reviews underscore the importance of gambling motives, none have synthesised findings across all validated gambling motive measures and sample types. Moreover, although they consistently find high heterogeneity, subgroup analyses have revealed inconsistent findings.

A comprehensive systematic review and meta-analysis is therefore needed to clarify these patterns and inform the development of more targeted, functionally informed interventions. This systematic review and meta-analysis aims to explore the strength of the relationship between gambling motives and problem gambling severity using validated measures. Secondary aims are to: (1) examine the degree to which the heterogeneity in these estimates are explained by study quality using sensitivity analyses; and (2) explore the degree to which participant and study characteristics (sample gender, study design, problem gambling severity measure, sample type, sampling type, and sample size) influence these estimates using subgroup analyses.

Methods

A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [69] and the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines [70]. The protocol details were registered with the International Prospective Register of Systematic Reviews (PROSPERO) (CRD42021287074). Minor deviations from the protocol are described in Appendix A.

Eligibility Criteria

Studies were eligible for inclusion if they: (1) were quantitative research of any study design (e.g., cross-sectional, longitudinal) and any sample (e.g., clinical, general population) that included a multi-item validated measure of gambling motives (e.g., GMQ, GMQ-F, GFA, GFA-R, GMS, MGMS, GPS) and problem gambling severity (e.g., Problem Gambling Severity Index [PGSI], South Oaks Gambling Screen [SOGS]) with established reliability (defined as internal consistency) and validity (defined as construct validity in the form of structural, convergent, or discriminant validity); (2) included a predominately adult sample (mean or median > 18 years); (3) provided an estimate of the association between a gambling motive and a measure of problem gambling severity appropriate for inclusion in the meta-analysis (correlation, odds ratio, *t*-value, Cohen's *d* and chi-square estimates); (4) were published in the English language; and (5) were peer-reviewed, original research (as grey literature is unlikely to impact review conclusions) [71]. Studies were ineligible if they: (1) were a literature review (e.g.,

systematic, narrative) or a study using a qualitative design; (2) were a letter, thesis, commentary, abstract, or non-peer-reviewed article or book chapter/section; (3) did not provide sufficient methodological or statistical information to derive an estimate for inclusion in the meta-analysis exploring the association between a gambling motive and problem gambling severity (including when only a composite measure of gambling motives was examined in relation to problem gambling severity); (4) evaluated the relationship between gambling motives and gambling behaviour (e.g., participation, frequency or expenditure) only but not problem gambling severity; and (5) measured only other distinct but related constructs, such as gambling cognitions, outcome expectancies, or readiness/motivation to change.

Search Strategy

The systematic search strategy (Appendix B) included an electronic literature search of Medline, Embase, and PsycInfo databases, and a hand-search of *Gambling Research* (2002–2014) and *International Gambling Studies* (2001–2004), as they were not indexed in these databases. The electronic search covered January 1993 and February 2025, consistent with the first validated motives measure [29]. The search terms included keywords and wildcards related to gambling (gambl*) and motives (motiv* OR reason* OR experien* OR passion). The search terms were limited to title and abstract. Full texts from related scoping and systematic reviews [53, 66–68] were also screened. Finally, the reference lists of all included articles were manually cross-checked for further articles for inclusion.

Data Screening and Extraction

Title and abstract screening were conducted by the primary author, with a second investigator independently screening a randomly selected one-third of these articles (k = 1,080). Data were extracted into a standardised, pilot-tested extraction sheet including study descriptive information (year of publication, country of recruitment, sample size, sample age (*M*, *Median*, *SD*), sample gender (% male), study design, sample type, instrument-related information (gambling motive measure, subscales, and number of items; problem gambling severity measure), and statistical and methodological data (correlation or other estimates, type of analysis, adjusting for covariates). Gender-specific associations were extracted as separate independent samples, where available. Two authors independently extracted all data with inter-rater agreement estimates of 98% for title and abstract screening and 99% for data extraction restricted to core variables (sample size, study design, sample type, motive measure, and correlation estimate). Discrepancies were resolved through discussions between the investigators, with a separate investigator as arbiter. The decision rules regarding data extraction for the meta-analyses are provided in Appendix C.

Risk of Bias Assessment

The methodological quality of included studies was independently assessed by the primary author during data extraction using the Quality Assessment Tool for Quantitative Studies, developed by the Effective Public Health Practice Project (EPHPP) [72]. This tool, recommended for use in systematic reviews and meta-analyses, has demonstrated content and construct validity [73]. The tool assesses quality across six domains (selection bias, study design, confounders, blinding, data collection methods, and withdrawals and dropouts) contributing to a global rating. Given the relationship between gambling motives and problem gambling severity may not have been a specific research question in the included studies, ratings for the selection bias, study design, and confounders components were deemed most relevant and therefore included in the current review. The methodological quality of each of these components was classified as 'strong', 'moderate', or 'weak', as per the assessment dictionary (See Appendix D). These component ratings served as the basis for the sensitivity analyses. A third of included articles (k = 16) were then independently assessed by a second investigator to ensure accuracy, with interrater agreement of 94% for selection bias, 100% for study design, and 81% for confounders. Discrepancies in ratings were resolved through discussion with the research team, with a separate investigator as arbiter.

Meta-Analyses

A meta-analysis was conducted for motives with at least four estimates, with the remaining studies narratively summarised. Meta-analyses with the remaining correlation coefficients (r) were employed to examine the relationships between gambling motives and problem gambling severity. Separate analyses were conducted for each subscale measured by each of the validated gambling motives instruments. Where correlation coefficients were not available, other estimates (i.e., odds ratios, *t*-values, Cohen's *d* or chi-square estimates) were converted to correlations using widely employed formulas [74]. The meta-analyses were conducted in R ('metafor' package), converting correlations (r) to Fisher's Z via the ZCOR function, and back to r for reporting [75]. Cohen's guidelines [76] informed interpretation of mean correlation effect sizes (0.1 small, 0.3 medium, 0.5 large). Random-effects models were used given expected heterogeneity, providing an estimate of the weighted mean effect and a 95% confidence interval that

indicates the accuracy of this estimate. Heterogeneity was explored using the I^2 statistic, which indicates the proportion of the total observed variance across articles due to systematic influence (25% low, 50% moderate, 75% high) [77].

Sensitivity Analyses

Sensitivity analyses were conducted by restricting meta-analyses to studies employing unadjusted data. Additional sensitivity analyses examined whether findings were robust (i.e., consistent in direction and magnitude) when analyses were limited to studies rated as 'strong' or 'moderate' for selection bias, study design, and confounders using the EPHPP tool [72]. Sensitivity analyses were conducted when a minimum of four estimates were available.

Subgroup Analyses

Subgroup analyses explored the influence of participant and study characteristics that could explain the observations of heterogeneity in estimates across included studies. A minimum of four estimates in each subgroup were required for a subgroup analysis to be conducted. Due to an insufficient estimates for sample gender (male cf. female), study design (cross-sectional cf. longitudinal), sample type (clinical cf. community), and sampling type (convenience cf. population-representative), subgroup analyses were only conducted to explore the influence of problem gambling severity measure (PGSI cf. SOGS cf. Canadian Adolescent Gambling Inventory [CAGI], with the CAGI included because there were enough estimates available from one included study [18], and a meta-regression was conducted to explore the influence of sample size.

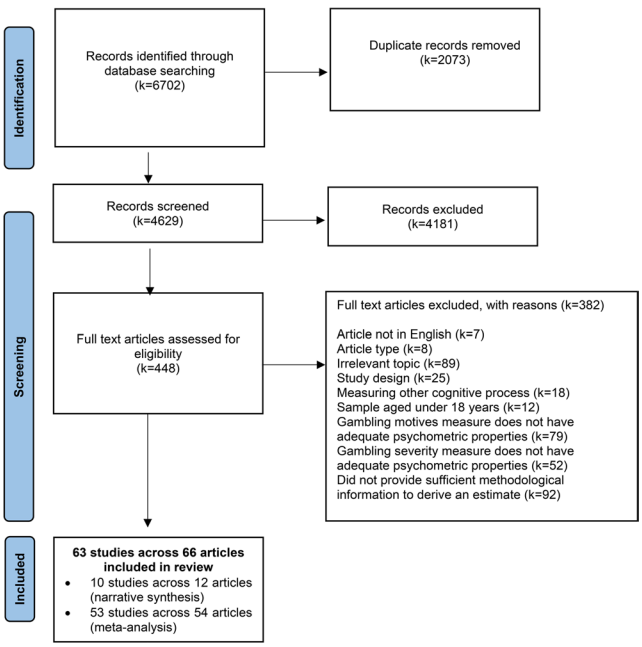

Fig. 1 PRISMA flow diagram

Results

Search Results

A PRISMA flow diagram of the literature search results is displayed in Fig. 1. After duplicates were removed, 4,629 unique articles were identified. After title/abstract screening, 448 full texts were assessed. Sixty-three studies (across 66 articles) met inclusion criteria. Of these, 53 studies (across 54 articles) were included in the meta-analysis and 10 studies (across 12 articles) in the narrative synthesis. Excluded full texts are listed in Appendix E.

Characteristics of Included Studies

The characteristics of the 63 studies included in the review are presented in Appendices F-I. Articles were published from 2004 onwards, with most samples recruited from Canada (k=19) and the United States of America (k=17). Sample sizes ranged from 48 to 2185 (M=460.03, SD=399.44). Where reported, mean age ranged from 19 to 74 years (M=32.92 years, SD=12.16), and males comprised 0%−100% (M=56.57%, SD=19.77). Most studies were cross-sectional (k=58); five were longitudinal (k=5). Samples were community (k=57), clinical (k=2), or combined (k=4) populations; all used convenience sampling except one population-representative sample. Sixteen gambling motives measures were used: the GMQ (k=21) was most frequent, followed by GMQ-F (k=12), GPS (k=6), GMS (k=5), and GFA-R (k=5). Five problem gambling severity measures were used, most commonly the PGSI (k=37) and SOGS (k=21).

Articles Not Included in the Meta-Analyses

Ten studies (across 12 articles) were not included in the meta-analysis because they contributed data to measures that had fewer than four estimates per subscale. An overview of these studies is provided in Appendices F and G. Although they could not be included in the meta-analyses, these studies provide complementary insights by examining gambling motives using alternative measures, activity-specific samples, and longitudinal designs.

Six studies explored gambling motives in broad samples not restricted to specific gambling activities, using motive measures not included in the meta-analyses [78–83]. Across these studies, motives related to coping or escape, enhancement, financial gain, and social factors were generally positively associated with problem

gambling severity (PGSI or SOGS), although the relative salience of specific motives varied by sample and subgroup. For example, using the Five Factor Gambling Motivation Scale, Marmurek et al. [81] found higher amusement, avoidance, and money motives among people with moderate-risk/problem gambling, while Wardell et al. [83] and Keough et al. [8, 80] reported positive associations between the Reasons for Gambling Scale [84] subscales of social, enhancement, and coping motives and problem gambling severity. Two Australian studies using the Reasons for Gambling Questionnaire (RGQ) [85] highlighted subgroup differences, with positive feeling motives most salient for international students and internal state regulation motives most salient for domestic students [78, 82]. Notably, a three-wave longitudinal study by Jouhki et al. [79] showed that within-person increases in escape motives (assessed via the Motivation to Play in Online Games-Revised questionnaire) [86] predicted higher problem gambling severity over time. Four additional studies focused on specific gambling activities, highlighting context-dependent motives [87–91]. Studies of electronic gaming machines and online gambling identified escape, excitement, financial, and social/environmental motives as relevant to problem gambling severity [87–89]. In contrast, studies of daily fantasy sports and sports betting emphasised competition, social interaction, financial incentives, and sport-related engagement as salient motives [90, 91].

Together, these studies suggest that important motivational processes, particularly activity-specific and dynamic motives, may not be fully captured by existing validated measures suitable for meta-analysis. As such, they provide important context for interpreting the quantitative findings and identify areas for future research and measure development.

Meta-Analyses

Fifty-three studies across 54 articles were meta-analysed. All subscales of each motive measure (GMQ/GMQ-F, GFA/GFA-R, GMS, and GPS) were significantly associated with problem gambling severity, with the only exception being the GMS Intrinsic-Motivation Toward Knowledge subscale (Table 1). Effect sizes ranged from small ($r = 0.21$ for GMS Toward Accomplishment) to large ($r = 0.53$ for GFA/GFA-R Negative Reinforcement), with high heterogeneity. Forest plots are displayed in Appendix J.

Sensitivity analyses

Unadjusted estimates Table 2 displays the results of the sensitivity analyses for unadjusted estimates by motive measure. Findings were robust when adjusted estimates were removed but heterogeneity across most motive subscales remained high.

Risk of bias Table 3 provides the findings of the sensitivity analyses based on the risk of bias. The findings suggested that most motive subscales were robust when restricted to

Table 1 Meta-analytic estimates of gambling motives and problem gambling severity

Scale/subscale	k	No. of estimates	Estimate		*p*	Heterogeneity	
			r	95%CI		I^2 (%)	95% CI
GMQ/GMQ-F							
Enhancement	27	30	0.35	0.27, 0.43	<0.001	95.47	92.83, 97.72
Coping	33	36	0.47	0.39, 0.54	<0.001	96.05	94.03, 97.87
Social	27	30	0.23	0.17, 0.29	<0.001	89.11	83.24, 95.22
Financial	14	14	0.29	0.23, 0.35	<0.001	83.53	67.42, 93.89
GFA/GFA-R							
Positive Reinforcement	4	6	0.38	0.25, 0.51	<0.001	92.13	78.92, 98.61
Negative Reinforcement	6	8	0.53	0.47, 0.60	<0.001	79.08	53.47, 97.86
GMS							
Intrinsic motivation							
Toward Knowledge	4	4	0.22	−0.04, 0.45	0.101	96.13	87.71, 99.72
Toward Accomplishment	4	4	0.21	0.05, 0.36	0.010	89.51	67.65, 99.13
Toward Stimulation	4	4	0.37	0.33, 0.41	<0.001	0.04	0.00, 95.30
Extrinsic motivation							
Introjected Regulation	4	4	0.27	0.01, 0.50	0.039	96.16	87.72, 99.72
Identified Regulation	5	5	0.29	0.23, 0.35	<0.001	28.59	0.00, 96.77
External Regulation	5	5	0.23	0.13, 0.32	<0.001	66.99	11.28, 95.57
Amotivation[a]	7	7	0.39	0.25, 0.51	<0.001	93.26	82.25, 98.96
GPS							
Harmonious Passion	5	5	0.29	0.13, 0.43	<0.001	86.98	64.24, 98.27
Obsessive Passion	6	6	0.52	0.40, 0.63	<0.001	88.17	68.75, 98.08

[a] Derived from Gambling Motivation Scale (GMS) and Modified Gambling Motivation Scale (MGMS)GMQ/GMQ-F: Gambling Motives Questionnaire/Gambling Motives Questionnaire-Financial; GFA/GFA-R: Gambling Functional Assessment/Gambling Functional Assessment-Revised; GMS: Gambling Motivation Scale; GPS: Gambling Passion Scale

Table 2 Sensitivity analyses for unadjusted estimates by motive measure

Scale/subscale	k	No. of estimates	Estimate		*p*	Heterogeneity	
			r	95%CI		I^2 (%)	95% CI
GMQ/GMQ-F							
Enhancement	25	25	0.39	0.30, 0.47	<0.001	95.72	92.89, 97.81
Coping	31	31	0.49	0.41, 0.56	<0.001	96.45	94.39, 98.03
Social	25	25	0.24	0.18, 0.30	<0.001	89.79	82.83, 94.85
GMS							
Identified Regulation	4	4	0.32	0.27, 0.37	<0.001	0.11	0.00, 97.70
External Regulation	4	4	0.28	0.22, 0.33	<0.001	0.00	0.00, 76.66
Amotivation[a]	6	6	0.43	0.32, 0.53	<0.001	88.21	64.91, 98.88
GPS							
Harmonious Passion	4	4	0.37	0.30, 0.43	<0.001	0.00	0.00, 86.54
Obsessive Passion	4	4	0.57	0.44, 0.67	<0.001	79.60	36.36, 98.52

[a] Derived from Gambling Motivation Scale (GMS) and Modified Gambling Motivation Scale (MGMS)
GMQ/GMQ-F: Gambling Motives Questionnaire/Gambling Motives Questionnaire-Financial; GMS: Gambling Motivation Scale; GPS: Gambling Passion Scale

Table 3 Risk of Bias Sensitivity Analyses

Scale/subscale	Risk of bias component	k	No. estimates	Estimate		*p*	Heterogeneity	
				r	95%CI		I^2 (%)	95% CI
GMQ/GMQ-F								
Enhancement	Selection bias	17	20	0.38	0.29, 0.46	<0.001	92.69	87.43, 97.34
	Study design	4	4	0.36	0.19, 0.52	<0.001	86.16	57.79, 98.94
	Confounders	16	19	0.37	0.26, 0.46	<0.001	94.88	90.93, 98.06
Coping	Selection bias	22	25	0.44	0.35, 0.52	<0.001	95.40	92.40, 97.88
	Study design	6	6	0.43	0.36, 0.50	<0.001	73.17	25.83, 95.48
	Confounders	19	22	0.47	0.35, 0.57	<0.001	96.89	94.68, 98.61
Social	Selection bias	17	20	0.23	0.17, 0.29	<0.001	80.40	68.07, 94.86
	Study design	4	4	0.11	−0.04, 0.25	0.158	77.48	29.84, 98.33
	Confounders	16	19	0.22	0.15, 0.28	<0.001	81.67	69.11, 95.18
Financial	Selection bias	8	8	0.32	0.26, 0.37	<0.001	74.54	36.51, 94.41
	Confounders	7	7	0.32	0.23, 0.40	<0.001	85.08	62.46, 96.95
GFA/GFA-R								
Positive Reinforcement	Selection bias	3	5	0.43	0.39, 0.47	<0.001	0.10	0.00, 91.36
Negative Reinforcement	Selection bias	5	7	0.53	0.44, 0.61	<0.001	80.77	51.91, 97.87
GMS								
Amotivation[a]	Selection bias	4	4	0.48	0.36, 0.59	<0.001	89.59	60.21, 99.58
	Confounders	4	4	0.35	0.17, 0.51	<0.001	92.17	73.17, 99.38
GPS								
Harmonious Passion	Confounders	4	4	0.27	0.07, 0.45	0.009	89.84	68.64, 99.23
Obsessive Passion	Confounders	5	5	0.55	0.41, 0.66	<0.001	89.19	68.66, 98.73

[a] Derived from Gambling Motivation Scale (GMS) and Modified Gambling Motivation Scale (MGMS). GMQ/GMQ-F: Gambling Motives Questionnaire/Gambling Motives Questionnaire-Financial; GFA/GFA-R: Gambling Functional Assessment/Gambling Functional Assessment-Revised; GMS: Gambling Motivation Scale; GPS: Gambling Passion Scale

studies rated as strong or moderate on selection bias, study design, and confounders. The only non-significant finding was for the GMQ Social motives subscale for study design.

Subgroup and Meta-Regression Analyses

There were insufficient estimates to conduct subgroup analyses for several planned study- and participant-level characteristics, including sample gender (male cf. female), study design (cross-sectional cf. longitudinal), sample type (clinical cf. community), and sampling type (convenience cf. population-representative). As a result, subgroup analyses were conducted only to examine the influence of the problem gambling severity measure used (PGSI cf. SOGS cf. CAGI; Table 4), and meta-regression analyses were conducted to examine the influence of sample size (Table 5).

Subgroup analyses indicated that problem gambling severity measure did not significantly moderate effect size estimates for GMQ/GMQ-F Enhancement, Coping, or Social motives (all $p < 0.05$).

Table 4 Subgroup analysis for problem gambling severity measure

Characteristic	Gambling motive subscale	k	No. of estimates	*p*
Problem gambling severity measure (PGSI cf. SOGS cf. CAGI)	GMQ/GMQ-F Enhancement	27	30	0.389
	GMQ/GMQ-F Coping	33	36	0.265
	GMQ/GMQ-F Social	27	30	0.824

GMQ/GMQ-F: Gambling Motives Questionnaire/Gambling Motives Questionnaire-Financial; PGSI: Problem Gambling Severity Index; SOGS: South Oaks Gambling Screen; CAGI: Canadian Adolescent Gambling Inventory

Meta-regression analyses indicated that larger sample sizes were associated with stronger effect size estimates for GMQ/GMQ-F Social motives ($p = 0.043$). In contrast, larger sample sizes were associated with smaller effect size estimates for GFA/GFA-R Positive Reinforcement motives ($p < 0.001$). No significant associations between sample size and effect size estimates were observed for other motive subscales.

Discussion

This is the first systematic review and meta-analysis to quantify the strength of associations between all validated gambling motive subscales and measures of problem gambling severity, while also examining the influence of participant- and study-level characteristics on these estimates. With the exception of the GMS-Intrinsic-Toward-Knowledge subscale, all gambling motives subscale scores were significantly associated with problem gambling severity scores, yielding effect sizes that ranged from small ($r = 0.21$) to large ($r = 0.53$), with considerable overlap in confidence intervals across motive subscales. All gambling motives, except for gambling for the pleasure of acquiring new game knowledge, were therefore significantly associated with problem gambling severity.

The GMQ and the GMQ-F were by far the most frequently used validated measures of gambling motives, with fewer studies using other validated measures. Although this review aimed to systematically synthesise findings across each subscale of each measure, some subscales appear to measure multiple motives and there is clearly overlap between some subscales from different measures. While it is beyond the scope of this review, future research attempting to synthesise the relationships between gambling motives and problem gambling severity would benefit from first examining the content validity of each measure using appropriate tools, such as the Consensus-Based Standards for the Selection of Health Measurement Instruments (COSMIN) checklist [92].

Table 5 Meta-regression analyses for sample size by gambling motive measure

Scale/subscale	k	No. of estimates	β	*p*
GMQ/GMQ-F				
Enhancement	27	30	0.00	0.837
Coping	33	36	0.00	0.158
Social	27	30	0.00	0.043
Financial	14	14	0.00	0.654
GFA/GFA-R				
Positive Reinforcement	4	6	−0.00	< 0.001
Negative Reinforcement	6	8	−0.00	0.913
GMS				
Intrinsic motivation				
Toward Knowledge	4	4	−0.00	0.981
Toward Accomplishment	4	4	0.00	0.277
Toward Stimulation	4	4	−0.00	0.343
Extrinsic motivation				
Introjected Regulation	4	4	−0.00	0.811
Identified Regulation	5	5	0.00	0.227
External Regulation	5	5	0.00	0.995
Amotivation[a]	7	7	0.00	0.665
GPS				
Harmonious Passion	5	5	−0.00	0.387
Obsessive Passion	6	6	0.00	0.281

[a] Derived from Gambling Motivation Scale (GMS) and Modified Gambling Motivation Scale (MGMS)GMQ/GMQ-F: Gambling Motives Questionnaire/Gambling Motives Questionnaire-Financial; GFA/GFA-R: Gambling Functional Assessment/Gambling Functional Assessment-Revised; GMS: Gambling Motivation Scale; GPS: Gambling Passion Scale

Relationships between Gambling Motives and Problem Gambling Severity

Several measures grounded in operant conditioning frameworks were included in the meta-analyses, including the GMQ/GMQ-F (34 studies with 110 estimates) and the GFA/GFA-R (7 studies with 14 estimates). Across these measures, motives of a similar nature showed relatively consistent associations with problem gambling severity. For example, subscales measuring negative reinforcement - primarily coping-related motives (GMQ/GMQ-F Coping Motives subscale, GFA/GFA-R Negative Reinforcement subscale) – showed medium to large effect sizes (r = 0.47–0.53). These findings reinforce prior systematic review evidence of coping motives yielding the largest effect sizes in population-representative research [68] and that escape-related motives, reasons, and expectancies are moderately associated with problem gambling severity [67]. Taken together, these findings suggest that negative reinforcement, whereby an aversive stimulus is removed after gambling behaviour [13], particularly gambling to reduce or avoid unpleasant emotions, is strongly linked to gambling problems.

In addition, positive reinforcement motives, particularly enhancement (GMQ/GMQ-F Enhancement subscale, GFA/GFA-R Positive Reinforcement subscale) and financial (GMQ/GMQ-F Financial subscale) motives, showed small to medium associations with problem gambling severity (r = 0.29–0.38). Although these estimates were numerically smaller than those observed for coping-related motives, their 95% confidence intervals overlapped, indicating that differences in effect magnitude should be interpreted cautiously. These findings are consistent with prior systematic review evidence showing medium effects for enhancement motives in population-representative samples [68] and moderate associations between financial motives and problem gambling severity in cross-sectional studies [66]. Overall, these findings suggest that positive reinforcement motives, whereby a rewarding stimulus follows gambling behaviour [13], including gambling to increase pleasant emotions or for monetary gain, are consistently associated with gambling problems.

The social motives subscale (GMQ/GMQ-F Social subscale), which captures positive reinforcement in the form of social affiliation, showed small but still statistically significant associations with problem gambling severity (r = 0.23). Confidence intervals overlapped with several other motive subscales with stronger associations, however, suggesting differences in effect magnitude should be interpreted cautiously. One explanation is that social motives may be particularly salient for a subgroup of people who gamble, diluting associations when examined across broader samples [93]. Hence, some studies have questioned their relevance and have excluded social motives from analyses [78, 94], citing non-significant associations in prior work [5, 7]. Nonetheless, a key implication of the present findings is the importance of including social motives in future research to clarify their role in the development and maintenance of gambling problems.

The two remaining motives measures included in the meta-analysis were the GMS (7 studies with 33 estimates) and the GPS (6 studies with 11 estimates), both of which are grounded in self-determination theory. For the GMS, all subscales except the Intrinsic-Toward-Knowledge subscale, were positively associated with problem gambling severity. Although this subscale was non-significant overall, its relevance may vary by gambling activity; for example, knowledge acquisition is often more salient in horse racing due to its complexity and long-term involvement [37]. Both intrinsic (r = 0.21–0.37) and extrinsic (r = 0.23–0.29) motivation subscales showed small to medium effect, suggesting that problem gambling is driven by a combination of internal desires and external influences. The Amotivation subscale showed the largest effect (r = 0.39), suggesting that at higher levels of problem severity, gambling may become increasingly detached from intention or purpose, reflecting more automatic or habitual play. This interpretation aligns with accounts describing gambling problems as occurring in the absence of enjoyment or deliberate choice [95] and warrants further investigation.

For the GPS, obsessive passion motives showed one of the strongest associations with problem gambling severity (r = 0.52), while harmonious passion had a weaker but still significant effect (r = 0.29). These findings suggest that internal pressures may play a more influential role than strong but controllable desires. These findings are consistent with prior scoping review evidence of consistent, positive associations for obsessive passion but inconsistent associations for harmonious passion [53], while extending this work by quantifying the variability in harmonious passion effects.

When considered together, the findings suggest meaningful convergence across gambling motives rather than a strict hierarchy of effects. Motives reflecting negative reinforcement and internal pressure (e.g., coping, escape, amotivation, obsessive passion) consistently showed moderate to large associations with problem gambling severity, whereas motives reflecting positive reinforcement or external rewards (e.g., enhancement, financial, and social motives) generally showed small to moderate associations. However, overlapping confidence intervals across most subscales indicate that differences in magnitude should be interpreted cautiously. Taken together, these patterns suggest that problem gambling is associated with multiple motivational pathways, with affect regulation and internally driven motives appearing particularly salient across theoretical frameworks.

Heterogeneity Across Estimates: Sensitivity and Subgroup Analyses

Heterogeneity was high across most effect size estimates (I^2 = 79.08%–96.16%), consistent with previous systematic reviews examining associations between gambling motives (e.g., financial and escape motives) and problem gambling severity [66–68]. Sensitivity analyses indicated that findings were generally robust – consistent in direction and magnitude - when analyses were restricted to studies employing unadjusted estimates and to those rated as 'strong' or 'moderate' for selection bias, study design, and confounders. The exception was the GMQ/GMQ-F Social Motives subscale when analyses were restricted to studies rated as strong or moderate on study design. In this sensitivity analysis, the association between social motives and problem gambling severity was attenuated and no longer statistically significant. This finding should be interpreted cautiously, as it was based on a small number of higher-quality studies (k = 4), resulting in wider confidence intervals and reduced statistical power. Importantly, the direction of the effect remained positive and consistent with the overall meta-analytic estimate, suggesting attenuation rather than a substantive reversal of the association.

Several subgroup analyses were planned to further explore potential sources of heterogeneity; however, there were insufficient estimates to examine moderation by sample gender (male cf. female), study design (cross-sectional cf. longitudinal), sample type (clinical cf. community), or sampling type (convenience cf. population-representative). The only subgroup analysis that could be conducted examined problem gambling severity measure used, which did not significantly moderate effect size estimates for GMQ/GMQ-F Enhancement, Coping, or Social motives. These findings contrasts with findings from Allami et al. [68], who reported smaller effect sizes for socialising motives in studies using measures other than the PGSI. Differences between reviews likely reflect substantial methodological variation, as Allami et al. [68] included only population-representative samples and did not apply eligibility criteria related to the psychometric properties of gambling motive measures.

Meta-regression analyses suggested that sample size contributed to heterogeneity for specific gambling motives. Larger sample sizes were associated with stronger effect size estimates for GMQ/GMQ-F Social motives, indicating that associations between social motives and problem gambling severity were more pronounced in larger samples. The positive association between sample size and effect size for social motives suggests that smaller studies may have underestimated this relationship, potentially due to limited statistical power or sampling variability. However, sensitivity analyses based on study quality did not indicate systematically stronger effects among higher-quality studies, suggesting that sample size is unlikely to be a simple proxy for methodological rigour. Instead, larger samples may better capture subgroups for whom social motives are particularly salient, which could contribute to stronger observed associations in these studies. In contrast, larger sample sizes were associated with smaller effect size estimates for GFA/GFA-R Positive Reinforcement motives. This finding should be interpreted with caution given the small number of studies and wide confidence intervals. This negative association may reflect small-study effects, selective reporting, or heterogeneity in study design and measurement. With only four contributing studies, it was not possible to formally examine whether methodological quality or other study characteristics accounted for this pattern. Sensitivity analyses restricting to studies rated as strong or moderate on selection bias, study design, and confounders did not indicate systematic increases in effect sizes for larger samples, suggesting that sample size was not consistently associated with higher methodological quality. Given the limited number of estimates included in these meta-regressions, these findings should be interpreted as exploratory.

Taken together, the findings of this review extend previous systematic reviews [66–68] by identifying sample size as a potential moderator for specific gambling motives, while also highlighting considerable inconsistency across reviews regarding which study- or sample-level characteristics explain heterogeneity. The subgroup and meta-regression findings based on sample size are best viewed as exploratory and underscore the need for larger, methodologically rigorous studies to clarify the conditions under which specific gambling motives are most strongly associated with problem gambling severity. Across prior reviews, some findings suggest that sample type, sample size, problem gambling severity measure, gambling motives measure, jurisdiction, and base group comparison may contribute to heterogeneity in effect size estimates for certain gambling motives, whereas other findings suggest that sample age, sample gender, publication status, problem gambling severity measure, gambling motives measure, and geographic region do not explain this heterogeneity [66–68]. This pattern suggests that additional unmeasured factors may be contributing to variability in effect size estimates. Future research should therefore aim to clarify the conditions under which specific gambling motives relate to problem gambling severity by examining additional individual-level moderators (e.g., primary gambling activity, level of gambling activity, cultural background) and study-level factors (e.g., analytic approach and inclusion of key covariates).

Limitations of the Evidence Base

The evidence base examined in this systematic review had several limitations. First, most included studies were cross-sectional, with only a small number employing longitudinal study designs (k = 5), prohibiting subgroup analyses and limiting causal inference. Further research is therefore required to predict changes in the relationship between gambling motives and problem gambling severity over time. It is also very likely, however, that each individual may experience different motives, dependent on their emotions, thoughts, and social environment [96]. Future research should therefore examine these relationships using longitudinal event-level study designs, such as Ecological Momentary Assessment (EMA), to explore the influence of such factors on the associations between momentary motives and gambling behaviour. Second, the risk of bias assessment revealed that a considerable proportion of the included studies were rated as weak on selection bias (33.33%), study design (82.54%), and confounders (42.86%), indicating that the current review findings are based on a relatively methodologically inferior evidence base and highlighting the need for enhanced methodological rigour in future studies. Enhanced rigour could be achieved through more representative sampling, larger and more diverse samples, preregistered analyses, validated measurement tools, and longitudinal or experimental designs to test directionality and underlying mechanisms. Finally, the small number of studies per motive measure precluded exploration of many of the available gambling motives measures, as well as subgroup analyses that could have explained the high heterogeneity in effect size estimates. As more studies become available over time, future updates of this review should employ other measures of gambling motives and consider exploring the influence of other sample characteristics or methodological considerations. Furthermore, future studies could consider additional variables which may influence the relationship between gambling motives and problem gambling severity, such as potential mediating [97] or moderating [98, 99] factors.

Clinical Implications

The findings of this meta-analysis highlight the potential importance of targeted gambling interventions based on individual gambling motives, particularly in relation to the GMQ/GMQ-F subscales, which have the largest evidence base. For example, interventions for people endorsing coping motives could incorporate adaptive coping techniques, such as mindfulness and relaxation strategies for individuals, while interventions for people endorsing enhancement motives could incorporate cognitive-behavioural techniques, such as problem-solving training and expectancy challenging [6]. Tailored interventions, such as those piloted by Stewart et al. [100], have shown promise in reducing gambling severity by providing motivation-matched treatment, whereby techniques based on distress tolerance were used for those motivated by escape, and urge surfing was used for those motivated by action. Moreover, a recently developed Just-In-Time Adaptive Intervention incorporating tailored interventions for those who endorse momentary coping, enhancement, and financial outcome expectancies has demonstrated promising findings [101].

Conclusion

This systematic review and meta-analysis synthesised evidence from 63 studies (66 articles), including 53 studies (54 articles) in the meta-analysis, to examine the strength of associations between gambling motives and problem gambling severity using validated, multi-item measures. Across studies, effect sizes ranged from small (r=0.21) to large (r=0.53). Importantly, overlapping confidence intervals across motive subscales suggest that gambling motives should be viewed as interrelated contributors to problem gambling severity rather than as discrete or rank-ordered factors.

The GMQ/GMQ-F was the most frequently used measure, followed by the GPS, GMS, and GFA/GFA-R. Across these measures, all gambling motives were significantly associated with problem gambling severity, except for the GMS-Intrinsic-Toward-Knowledge subscale, which measures gambling for the pleasure of acquiring new knowledge. Motives reflecting negative reinforcement and internal pressure, such as coping, amotivation, and obsessive passion, tended to show the largest effect size estimates, although confidence intervals were wide. Motives reflecting intrinsic and extrinsic motivation and specific positive reinforcement (e.g., enhancement and financial motives) showed moderate associations, while social motives showed smaller but still statistically significant associations.

Most effect size estimates were characterised by substantial heterogeneity, which was not adequately explained by study quality or examined study-level characteristics. Taken together, these findings underscore the importance of considering gambling motives in understanding gambling-related harm and support the development of prevention and intervention strategies that are tailored to the underlying reasons individuals gamble.

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  ○This meta-analytic review examines associations between gambling motives and problem gambling severity across 26 population-representative studies, with no requirement that motives were measured with validated instruments.

- Alaba-Ekpo O, Caudwell KM, Flack M. Examining the strength of the association between problem gambling and gambling to escape. A systematic review and meta-analysis. International Journal of Mental Health and Addiction. 2024. doi: https://doi.org/10.1007/s11469-024-01354-5.

  ○This meta-analytic review examines associations between escape motives using validated measures of gambling motives, reasons, or expectancies and problem gambling severity across 27 quantitative studies.

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  ○This meta-analytic review examines associations between financial gambling motives using validated measures and problem gambling severity across 44 cross-sectional student, community, and clinical studies.

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