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Tabri, N., Xuereb, S., Cringle, N., & Clark, L. (in press). Associations between financial gambling motives, gambling frequency, and level of problem gambling: A meta-analytic review. *Addiction*.
<https://doi.org/10.1111/add.15642>

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Revisiting the role of financial motives in disordered gambling: A meta-analytic review

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Competing interests and constraints:

All authors report no constraints on publishing and no competing interests.

Word count = 3469/3500 (excludes Abstract, Tables, Figures, and References)

Abstract

Aims: Money is central to psychological definitions of gambling, but contemporary accounts of disordered gambling are ambiguous regarding the role of financial motives for gambling. The aims of the current research were to obtain meta-analytic weighted effect sizes for zero-order associations of financial motives against disordered gambling and gambling frequency, as well as partial associations after controlling for other motives (e.g. coping).

Design: A meta-analysis of the available literature through October 2019 was undertaken. Studies were identified from multiple sources (e.g., database search, consulting other researchers). PRISMA standards were followed when screening identified records and extracting relevant data. The data analytic plan was pre-registered.

Setting: Cross-sectional studies that involved student, community, and clinical samples of people who gamble.

Participants: Forty-one studies were included with 32,997 participants from different countries.

Measurements: Validated self-report measures of financial motives for gambling alongside measures of either problem gambling and/or gambling frequency.

Findings: Financial motives for gambling were positively associated with both disordered gambling, $r = .34$, $[\text{.30}, \text{.38}]$, $p = 1.04 \times 10^{-61}$, and gambling frequency, $r = .29$, $[\text{.20}, \text{.37}]$, $p = 1.70 \times 10^{-13}$, with moderate effect sizes. The partial associations after controlling for overlapping variance with other gambling motives were also positive (disordered gambling: $\beta = .18$, $[\text{.14}, \text{.23}]$, $p = 2.53 \times 10^{-15}$; gambling frequency: $\beta = .16$, $[\text{.08}, \text{.24}]$, $p = 9.45 \times 10^{-5}$), with small-to-moderate effect sizes. The effect sizes were heterogeneous and the extent of heterogeneity was high. Moderator analyses of the zero-order association involving gambling frequency indicated that effect sizes were larger for studies that used the Gambling Motives Questionnaire-Financial relative to studies that developed their own gambling motives measure. No further moderators were statistically significant.

Conclusions: Financial motives are reliably and positively associated with both disordered gambling and gambling involvement and should be incorporated into etiological models of gambling disorder.

Word count = 296/300

Keywords: Meta-analysis; gambling motives; financial motives for gambling; disordered gambling; gambling involvement;

Revisiting the role of financial motives in disordered gambling: A meta-analytic review

Definitions of gambling—both legal and psychological—center around money both in the wager and prize (1). To a layperson, the question “Why do people gamble?” might trigger an obvious answer “To win money”. Indeed, in studies asking gamblers about their motives for gambling, winning money was typically the most endorsed item, among both regular gamblers and in people with gambling problems (2,3). However, contemporary etiological theories either disregard or underspecify the role of financial motives in disordered gambling. Likewise, mixed results characterize the empirical literature on financial motives in relation to disordered gambling. The reason may be due, at least in part, to historical overlap between research on disordered gambling and substance use disorders. Early interest in gambling motives (4) was inspired by an analogy to social (e.g., to spend time with friends), enhancement (e.g., for excitement), and coping (e.g., to escape negative affect) motives for using alcohol (e.g., 5,6). In this research, disordered gambling and alcohol use have each been shown to be especially associated with coping motives (4,7,8), which in turn points to negative reinforcement as a key process in addiction (e.g., 9,10).

The three-factor formulation of gambling motives measured using the Gambling Motives Questionnaire (GMQ; 11) was subsequently extended to include financial motives (GMQ-F; 8). Other widely used scales for assessing gambling motives also include a financial component, including the Gambling Motives Scale (GMS; 12) grounded in self-determination theory, the Gambling Outcomes Expectancies Scale (GOES; 13), and the Reasons for Gambling Questionnaire (RGQ; 14). Nevertheless, financial motives are often considered secondary compared to social, enhancement, and coping motives for gambling (13). Financial motives have also yet to be meaningfully incorporated into etiological models of disordered gambling. For example, what is arguably the most influential contemporary

biopsychosocial framework of disordered gambling—the Pathways Model (15)—is entirely silent about the roles of either money or financial attitudes.

Other accounts acknowledge that financial motives may be inextricably linked to other gambling motives. Walker, Schellink, and Anjou (16) noted that the prospect of winning money may be a prerequisite for gambling's other effects, including its social purpose, making it fun and exciting (i.e., enhancement), and offering a source of escape (i.e., coping). In turn, financial motives may amplify these other sources of reinforcement: winning provides more enhancement or escape for a gambler with high financial motives (e.g., 8,17). By these accounts, the “chance to win money” may actually be the core motive underlying gambling, from which other motives originate (16,18).

These ambiguities around the fundamental role of financial motives persist in recent empirical work. Across different study populations and including large sample sizes, some studies have reported positive correlations between financial motives and disordered gambling severity, which remained after statistically controlling for multiple covariates including the shared variance with other gambling motives (e.g., 19–21). However, other studies reported that a positive bivariate association was attenuated when the shared variance with other motives was partialled out (e.g., 22–24), and some other studies have failed to detect basic differences in financial motives between groups with and without gambling problems (25,26). In one study (27), the proportion of people who endorsed a single item ‘to win money’ was *lower* among those with gambling problems compared to those who gamble without problems. It is possible that some of the inconsistencies may reflect psychometric issues with the measurement of financial motives, such as the potential for ceiling effects, or the possibility that financial motives may change over the transition from recreational to disordered gambling (e.g., as a consequence of rising debts). Accordingly, it is informative to

examine financial motives in relation to both disordered gambling severity and basic gambling frequency.

In the current research, we used meta-analysis to examine the magnitude of the zero-order association between financial motives and disordered gambling severity. We also explored sources of heterogeneity across studies. Moderators were sample characteristics and the questionnaire used to measure financial motives. In addition, we used meta-analysis to examine the magnitude of the partial association between financial motives and disordered gambling severity after statistically controlling for shared variance with other motives. Furthermore, parallel analyses were conducted for the zero-order and partial associations between financial motives and gambling frequency. The analyses were pre-registered: <https://osf.io/mrmdq>.

Method

Inclusion and exclusion criteria

Studies were included if they were (a) empirical, (b) measured financial motives for gambling, (c) measured disordered gambling severity, gambling frequency, or both, and (d) written in English or French. Studies were excluded if they were a) experimental or qualitative, (b) measured gambling motives with a single item or an open-ended question, (c) published before 1980 (the year pathological gambling was recognized as a diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, 3rd edition), or (d) the data were included in another study that was included in our review. Studies meeting all the inclusion criteria and none of the exclusion criteria were retained for further inspection.

Selection of studies

Studies were located via three sources. First, a comprehensive database search was conducted in October 2019 to identify relevant records using PsycINFO, PubMed and ProQuest Dissertations and Theses databases (in order to capture relevant grey academic

literature). We identified search terms for financial motives and gambling to search the title and abstract of records in each database. For example, in PsycINFO, the boolean phrase for financial motives was (ab(Motiv*) OR ab(Reason*) OR ab(Expectan*) OR ti(Motiv*) OR ti(Reason*) OR ti(Expectan*)) AND (ab(finan*) OR ab(mone*) OR ti(finan*) OR ti(mone*)). The PsychINFO boolean phrase for gambling was (ab(gambling) OR ab(Pathological Gambl*) OR ab(Disordered Gambl*) OR ti(gambling) OR ti(Pathological Gambl*) OR ti(Disordered Gambl*)). Critically, both phrases were combined using the AND operator. The boolean phrases for the remaining databases are available on OSF (https://osf.io/atc2v/?view_only=bc66a47aaa3541bbb0fb28484a4cbf57). The comprehensive database search identified 373 records.

Second, records were located based on the expert knowledge of the research team (e.g., recently accepted or in press records as well as unpublished data) from which 44 potential records were identified. Third, three records were located by requesting unpublished and in press studies from experts in the field via the Gambling Issues International listserv as well as on Twitter.

As described in the PRISMA diagram (see Figure 1), a total of 420 records were located from the three sources. After removing duplicates, 388 unique records remained. For the database search results, two independent coders coded the abstracts according to the inclusion and exclusion criteria. The agreement rate between the two coders was 95.9% and their inter-rater reliability was moderate-to-high, Kappa = .83, $p < .01$. When the coders' ratings diverged, they were discussed until consensus was achieved. One of the coders also coded the abstracts of remaining studies. This process resulted in a set of 104 records that were eligible for full-text screening.

We excluded 26 papers through full-text review. Of the remaining papers, 63 did not have all the required data needed to obtain the effect sizes for the meta-analyses. As such, our

team contacted the corresponding authors of 60 eligible records (contact information could not be obtained for three records) to request additional data that would be required. The requested data were means and *SDs* of study variables and their intercorrelations. In total, we obtained relevant data from 41 records for the meta-analysis of the zero-order associations between financial motives and disordered gambling severity (see Table 1). These 41 records yielded 44 effect sizes; 34 effect sizes were available for the partial association after controlling for shared variance with other gambling motives (i.e., social, coping and enhancement). Of note, for the zero-order and partial associations, 17 and 13 effect sizes, respectively, were calculated based on additional information requested from the authors.

For financial motives and gambling frequency, we identified 17 effect sizes for the zero-order association, and 10 effect sizes for the partial association controlling for shared variance with other gambling motives. Of note, for the zero-order and partial associations, respectively, 11 and 7 effect sizes were derived from additional information requested from the authors.

Effect size information

We used the Pearson correlation coefficient (r) as the effect size to index the zero-order association between financial motives and disordered gambling severity. The r s were extracted from each study. We used the standardized regression coefficient (β) as the effect size to index the relation between financial motives and disordered gambling severity after statistically controlling for other gambling motives (i.e., social, coping, and enhancement). The β s were calculated from more detailed information (i.e., descriptive statistics and correlations) directly obtained from the authors of each study—this was necessary because many studies did not report the information needed to calculate the partial relations. The

same effect sizes were used to index the zero-order association and partial association between financial motives and gambling frequency.

Meta-analytic procedure

In line with recommendations (see 28), r was transformed to Fisher's r (Z_r) in the meta-analyses and results were back transformed to Pearson r for interpretation. In the analyses, Z_r effect sizes were pooled and weighted by their inverse-variance ($1/SE^2$). The SE of each Z_r was calculated using the formula provided by:

$$SE_{Z_r} = \sqrt{(N - 3)}$$

where N is the sample size.

We examined the variability between the effect sizes using the test of heterogeneity (Q -statistic). When there was evidence of variability among the effect sizes, the I^2 statistic was used to quantify the extent of variability. We examined publication bias by testing whether there were significant differences between published and unpublished effect sizes using the meta-analysis analogue to ANOVA, along with Funnel Plots and Egger's Test. The funnel plots are available on OSF:

https://osf.io/atc2v/?view_only=bc66a47aaa3541bbb0fb28484a4cbf57

Moderator analyses were conducted using the meta-analysis analogue to regression (i.e., meta-regression) to examine predictors of between-study variability among the effect sizes. In the meta-regression, moderators were examined simultaneously to control for their overlapping variance. Mean age of the sample, and percentage of women in each sample, were included as continuous moderators. Country of origin was re-coded as geographical region and included as a categorical moderator using dummy codes in which the reference group was North America ($k = 22$). The remaining categories were Australasia ($k=9$), Europe ($k = 8$), Asia ($k = 4$), and South America (Argentina; $k = 1$). Publication status was included as a categorical moderator with two levels (published vs. unpublished). The measure of

financial motives was included as a categorical moderator using dummy codes with the GMQ-F ($k = 22$) as the reference category. The remaining categories were for author-developed measures ($k = 6$), the Gambling Outcomes Expectancies Scale ($k = 5$), and Other ($k=11$). The Other category included effect sizes that used Lee et al.'s (2007) gambling motivation scale ($k = 3$), the Gambling Motives Attitudes and Behaviors scale ($k = 2$), Chantal et al.'s (12) Gambling Motivation Scale ($k = 2$), the Reasons for Gambling Questionnaire ($k = 2$), the Gambling Expectancy Questionnaire ($k = 1$), and the Motivational Scale for Fantasy Football Participation ($k = 1$). We also sought to examine sample type (e.g., clinical vs. community) as a moderator, but most studies involved community samples of people who gamble whereas one involved a clinical sample of disordered gamblers and one other involved a vulnerable population (see Table 1), which precluded examining sample type as a moderator.

For meta-analyses that pooled β s, they were also each weighted by their inverse-variance. The SE of each β was calculated using the formula provided by Cohen, Cohen, West, & Aiken (29):

$$SE_{\beta i} = \sqrt{\frac{1 - R_y^2}{n - k - 1}} \sqrt{\frac{1}{1 - R_i^2}}$$

where R_y^2 is the variance explained in the dependent variable by the independent variables in the regression model, R_i^2 is the variance explained in the independent variable of interest by the remaining independent variables in the regression model, n is the sample size, and k is the number of independent variables in the regression model.

We interpreted the magnitude of each effect (r and β) size according to Cohen's (30) conventions for correlation coefficients, where .10 is small, .30 is moderate, and .50 is large.

To allow us to generalize our results beyond the current sample, a random-effects model was used in the meta-analyses. All meta-analyses were conducted using JASP (31).

Results

Descriptive information for each effect size

Table 1 includes sample demographic information (age, gender composition, and country) associated with each effect size. Mean age and gender (% female) in each sample were recorded as continuous variables. Country was recorded as a categorical variable, and 50% of the effect sizes were drawn from North America ($k = 22$; i.e., Canada and USA).

Table 1 also includes study-level information, including publication status (81.8% were published; $k = 36$) and the key measures used to assess financial gambling motives and disordered gambling severity. The most common measures were the GMQ-F (50%, $k = 22$) and the Problem Gambling Severity Index (68%, $k = 30$). A smaller subset of effect sizes included a measure of gambling frequency ($k = 17$) and most (88.2%; $k = 15$) assessed gambling frequency using an author-developed self-report questionnaire.

Financial motives and disordered gambling severity

Mean weighted zero-order association. Financial motives for gambling were positively associated with disordered gambling severity, $r = .34$, $[\text{.30}, \text{.38}]$, $p = 1.04 \times 10^{-61}$, $k = 44$. The mean effect size was *moderate* (see Figure 1 for forest plot).

Publication bias. There was no difference between published ($k = 36$) and unpublished ($k = 8$) effect sizes, $Q(1) = .09$, $p = .77$, and Egger's test of funnel plot asymmetry was not statistically significant, $z = .72$ and $p = .74$. Thus, there was no evidence of publication bias.

Moderator analysis. The effect sizes were heterogeneous, $Q(43) = 837.70$, $p = 6.69 \times 10^{-148}$, and the extent of heterogeneity was high, $I^2 = 92.39\%$. Results of the moderator analysis are reported in Table 2. The omnibus test of the meta-regression model was not statistically

significant, $Q(10) = 9.77$, $p = .46$, and none of the tested moderators were statistically significant. Thus, our included moderators did not explain variation between the effect sizes.

Mean weighted partial association. For the partial association after controlling for shared variance with other motives, financial motives for gambling was positively associated with disordered gambling severity, $\beta = .18$, $[.14, .23]$, $p = 2.53 \times 10^{-15}$, $k = 34$. The mean effect size was *small-to-moderate* (see Figure 3 for forest plot). The effect sizes were heterogeneous, $Q(33) = 505.46$, $p = 6.24 \times 10^{-86}$, and the extent of heterogeneity was high, $I^2 = 90.89\%$.

Financial motives and gambling frequency

Mean weighted zero-order association. Financial motives for gambling were positively associated with gambling frequency, $r = .29$, $[.20, .37]$, $p = 1.70 \times 10^{-13}$, $k = 19$. The mean effect size was *moderate* (see Figure 4 for forest plot).

Publication bias. Because all effect sizes were drawn from published research, we could not test the difference between published and unpublished effect sizes. Nevertheless, Egger's test of funnel plot asymmetry was not statistically significant, $z = 1.01$ and $p = .31$. Thus, we find no evidence of publication bias.

Moderator analysis. The effect sizes were heterogeneous, $Q(16) = 434.04$, $p = 2.61 \times 10^{-82}$, and the extent of heterogeneity was high, $I^2 = 96.91\%$. Results of the moderator analysis are reported in Table 2. Of note, the omnibus test of the meta-regression model was statistically significant, $Q(7) = 19.75$, $p = .006$. There was a statistically significant difference between studies that used the GMQ-F and studies that used an author-developed measure of financial gambling motives (see Table 2) such that GMQ-F effect sizes were larger. None of the remaining moderators were statistically significant.

Mean weighted partial association. For the partial association, financial motives for gambling were positively associated with gambling frequency, $\beta = .16$, $[.08, .24]$, $p = 9.45 \times 10^{-5}$,

$k = 10$. The mean effect size was *small-to-moderate* (see Figure 5 for forest plot). The effect sizes were heterogeneous, $Q(9) = 78.39$, $p = 3.37 \times 10^{-13}$, and the extent of heterogeneity was high, $I^2 = 92.14\%$.

Discussion

Our systematic search identified 44 effect sizes for the association between financial motives and disordered gambling severity. Meta-analysis of these effect sizes indicated a reliable association of moderate effect size. We ruled out the possibility that the zero-order association was due to shared variance between financial and other motives (social, enhancement, and coping) using a meta-analysis of partial associations. We identified 19 effect sizes for the association between financial motives and gambling frequency, and meta-analysis indicated a reliable association of moderate effect size that could not be explained by covariation with other motives. We observed no evidence of publication bias but a high level of heterogeneity in the primary research, which corroborated our impression of a mixed literature. Thus, the results highlight the unique contribution of financial motives for understanding disordered gambling and gambling involvement. Our findings refute the mainstream idea, inspired partly by research on alcohol and the original GMQ, that it is coping motives that are dominant in gambling addiction.

Of note, none of the tested moderators (age, gender, geographical region, and financial motives questionnaire) for the relationship with disordered gambling accounted for a substantial portion of heterogeneity between the effect sizes. The only moderator was the type of financial motives questionnaire for the association involving gambling frequency. More specifically, effect sizes were larger for studies of gambling frequency using the GMQ-F relative to studies using an author-developed motives measure. Because the heterogeneity reflected differences in the magnitude of positive associations (see Figures 2 and 4), it is possible that unexamined substantive factors, such as individual differences in attitudes

towards money and objective financial success in each sample, may help explain differences between the effect sizes. For instance, there is some evidence that people who view money as an important indicator of success, prestige, and power are more likely to gamble and to have gambling problems (15,65). Although the link between money attitudes and gambling motives is yet to be examined, the magnitude of the positive association between financial motives and disordered gambling and gambling involvement may be larger in samples of people who view money as an indicator of success, prestige, and power.

Likewise, another factor that may help explain the heterogeneity is the extent to which gamblers have a financially focused self-concept (i.e., they place overriding importance on financial success for self-definition and self-worth). Gamblers high (relative to low) in financial focus are more likely to feel financially deprived, to gamble for financial gain, and to have gambling problems (58). Furthermore, across both non-disordered (66) and disordered (67) gamblers, those who are more financially focused tend to have more etiological risk factors (from the Pathways Model) compared to their less financially focused counterparts. Moreover, in a related line of research on personal relative deprivation (68), there is emerging evidence that people who feel financially deprived are more likely to gamble for financial gain and to develop gambling problems because feeling financially deprived increases delay-discounting of monetary rewards (i.e., preference for immediate smaller rewards relative to delayed larger rewards; 69). This relation has been shown to be stronger among gamblers who believe they have a low capacity for economic mobility via conventional means (57) as well as among gamblers who have a financially focused self-concept (70). Accordingly, effect sizes may be larger in samples of gamblers who are more financially focused and who feel more financially deprived.

Importantly, however, attitudes towards money and financial success have received little attention among the included studies as well as in gambling research more broadly, and

so we could not examine whether they explain heterogeneity between the effect sizes. Critically, the little attention to attitudes towards money and financial success in prior research corresponds with the neglect of financial gambling motives in theories of gambling addiction. Therefore, we call for more research on the factors that place people at greater risk to gamble for financial gain and to incorporate these factors into contemporary etiological models of gambling addiction.

Our review also identified two further limitations of the literature examining financial motives. First, most studies in the financial gambling motives literature involved general community samples. We found few data in treatment-seeking gamblers, or in vulnerable populations such as ethnic minorities and youths (e.g., 32). This is a critical gap in the literature as some evidence, for instance, indicates that members of ethnic and racial minorities are more likely to gamble for financial gain (e.g., 33). Second, extant research on financial gambling motives is almost exclusively based on cross-sectional research designs, which limits causal inferences. To our knowledge, there is only one published longitudinal study, which showed that financial motives do not prospectively predict gambling involvement and disordered gambling severity among community gamblers when shared variance with other motives was partialled out (34). Thus, we call for more longitudinal research that examines the gambling-related consequences of financial motives.

In sum, our meta-analytic review showed robust concurrent positive associations of moderate effect size between financial motives on the one hand and disordered gambling and gambling involvement on the other hand.

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Table 1. Study characteristics and effect size information

Sample and Study characteristics									Effect size information				
Demographic information						Measures		Zero-order associations			Partial associations		
Label	Pub	Country	N	Age (yrs)	% WO	Sample	F-Motives	GD	Zr GD	Zr GF	SE Zr	$\beta(SE)$ GD	$\beta(SE)$ GF
<i>Barrada et al. 2019 (35)</i>	Yes	Spain	203	33.8	34	ComClin	GMQ-F	SOGS	.34	.45	.07	.23(.05)	.37(.07)
<i>Barrault et al., 2019 (19)</i>	Yes	France	287	24.1	0	Gamb	GMQ-F	SOGS	.37	–	.06	.3(.05)	–
<i>Browne et al., 2019 (36)</i>	Yes	Canada	1174	45.4	60.1	Com	GOES	PGSI	.33	.31	.03	.21(.03)	.19(.03)
<i>Clarke, 2008 (37)</i>	Yes	New Zealand	209	48.5	70.8	Com	Other	SOGS	.24	.11	.07	–	–

<i>Devos et al 2017 (1) (38)</i>	No	France, Belgium	22	41.3	18.2	Clin	GMQ-F	PGSI	.35	–	.23	.09(.26)	–
<i>Devos et al 2017 (2) (38)</i>	Yes	France	278	35.4	52.5	Com	GMQ-F	PGSI	.16	–	.06	-.09(.05)	–
<i>Dodig, 2013 (39)</i>	Yes	Croatia	1948	16.6	53	Student	AD	Other	.66	.60	.02	.47(.02)	–
<i>Dowling et al., 2018 (40)</i>	Yes	Australia	823	21.2	43.5	Student	Other	PGSI	.31	–	.03	–	–
<i>Dwyer et al., 2018 (41)</i>	Yes	USA	546	37.7	10	Com	Other	PGSI	.33	.16	.04	–	–
<i>Flack & Morris, 2015 (13)</i>	Yes	Australia	1982	43.3	56	Com	GOES	PGSI	.22	.31	.02	.06(.03)	.13(.02)
<i>Flack & Stevens, 2019 (18)</i>	Yes	Australia	1207	42.5	47.4	Com	GOES	PGSI	.2	.12	.03	.05(.03)	0(.03)
<i>Francis et al., 2015 (42)</i>	Yes	Australia	2796	54.5	39	Com	Other	PGSI	.11	.17	.02	–	–
<i>Hing & Russell, 2020 (43)</i>	Yes	Australia	1932	41.8	46.9	Com	GOES	PGSI	.65	.38	.02	.26(.03)	.18(.03)

<i>Hing et al., 2014 (32)</i>	Yes	Australia	1259	38	58.4	Indig	AD	PGSI	.16	.14	.03	.09(.03)	-.01(.03)
<i>Hing et al., 2017 (44)</i>	Yes	Australia	860	49.5	32	Gamb	AD	PGSI	.15	–	.03	.11(.03)	–
<i>Hodgins & Racicot, 2013 (45)</i>	Yes	Canada	122	21	69.4	Student	GMQ-F	Other	.52	.81	.09	.12(.10)	.43(.11)
<i>Hollingshead et al., 2016 (46)</i>	No	USA	271	31.6	67	Com	GMQ-F	PGSI	.29	–	.06	.20(.06)	–
<i>Hollingshead et al., 2019 (1) (47)</i>	No	Canada	124	57.5	53.2	Gamb	GMQ-F	PGSI	.33	–	.09	.17(.09)	–
<i>Hollingshead et al., 2019 (2)</i>	No	Canada	109	59.1	56.6	Gamb	GMQ-F	PGSI	.23	–	.10	.20(.09)	–
<i>Hollingshead, Amar et al., 2019 (48)</i>	No	Canada	98	50.3	57.1	Gamb	GMQ-F	PGSI	.4	–	.10	.25(.09)	–
<i>Hollingshead, n.d. (49)</i>	No	USA	253	35	45.8	Com	GMQ-F	PGSI	.4	–	.06	.14(.07)	–
<i>Huic et al., 2017 (50)</i>	Yes	Croatia	1372	16.5	100	Student	AD	Other	.38	.38	.03	–	–

<i>Kim et al., 2018 (23)</i>	Yes	USA	205	33.2	39.2	Com	GMQ-F	PGSI	.22	–	.07	-.04(.07)	–
<i>Kim et al., 2019 (24)</i>	Yes	USA	564	36.1	52.1	Com	GMQ-F	PGSI	.30	–	.04	.05(.04)	–
<i>Lee et al., 2014 (51)</i>	Yes	South Korea	288	45.6	24	Gamb	Other	Other	.48	–	.06	–	–
<i>MacLaren et al., 2015 (52)</i>	Yes	Canada	273	34	45.7	Com	GMQ-F	PGSI	.44	–	.06	.20(.06)	–
<i>Marmurek et al., 2014 (1) (20)</i>	Yes	Canada	123	23	48	Student	Other	PGSI	.44	–	.09	.31(.06)	–
<i>Marmurek et al., 2014 (2)</i>	Yes	Canada	113	46	54.9	Com	Other	PGSI	.66	–	.10	.47(.09)	–
<i>McGrath et al., 2018 (2)</i>	Yes	Canada	177	21	48.1	Student	GMQ-F	PGSI	.48	–	.08	.22(.07)	–
<i>Pilatti & Tuzinkievich, 2015 (53)</i>	Yes	Argentina	270	29.4	70.7	Com	GMQ-F	PGSI	.39	–	.06	.22(.05)	–
<i>Ricijas et al., 2016 (54)</i>	Yes	Croatia	1330	16.6	0	Student	AD	Other	.39	.46	.03	–	–

<i>Rodriguez et al., 2015 (55)</i>	Yes	USA	252	23.1	40.5	Student	AD	SOGS	.3	.22	.06	.28(.05)	.24(.06)
<i>Russell et al., 2019 (56)</i>	Yes	Australia	1147	41.2	33.5	Com	GOES	PGSI	.51	.16	.03	.26(.03)	.05(.04)
<i>Schellenberg et al., 2016 (7)</i>	Yes	Canada	939	51.9	62	Com	GMQ-F	PGSI	.45	.40	.03	.08(.03)	.18(.03)
<i>Smith et al., 2012 (57)</i>	Yes	USA	194	39.5	2.6	Com	GMQ-F	Other	.24	.29	.07	–	–
<i>Sundqvist et al., 2016 (58)</i>	Yes	Sweden	257	49	30	Com	Other	Other	.26	–	.06	.13(.05)	–
<i>Tabri et al., 2015 (59)</i>	Yes	USA	196	37.9	48.5	Com	GMQ-F	PGSI	.29	–	.07	.11(.07)	–
<i>Tabri et al., 2017 (60)</i>	Yes	USA	220	36	46	Com	GMQ-F	PGSI	.33	–	.07	.17(.06)	–
<i>Tabri et al., 2019 (61)</i>	No	Canada	86	55.1	54.5	Gamb	GMQ-F	PGSI	.56	–	.11	.07(.09)	–
<i>Tabri et al., 2020 (62)</i>	Yes	Canada	5666	47.6	51.6	Com	GMQ-F	PGSI	.27	–	.01	.07(.01)	–

<i>Tao et al., 2011 (63)</i>	Yes	China	791	38.7	42.2	Com	Other	Other	.42	–	.04	–	–
<i>Wohl, n.d. (64)</i>	No	Canada	405	58.7	56.9	Gamb	GMQ-F	PGSI	.42	–	.05	.29(.05)	–
<i>Wu & Tang, 2011 (65)</i>	Yes	China	932	20.6	50.4	Student	Other	SOGS	.29	–	.03	–	–
<i>Wu et al., 2012 (66)</i>	Yes	China	694	36.3	42.7	Com	Other	Other	.58	–	.04	.41(.04)	–

Note. PUB = Publication Status; AD = Author-developed; GD = Gambling Disorder; GF = Gambling Frequency; Com = Community; Clin = Clinical; Indig = Indigenous; WO = Women; Gambesta = Gambling Establishment; PGSI = Problem Gambling Severity Index; GOES = Gambling Outcomes Expectancies Scale; GMQ-F = Gambling Motives Questionnaire – Financial; SOGS = South Oaks Gambling Scale.

Table 2. Results of moderator meta-regression analyses.

	Disordered gambling severity	Gambling Frequency
Moderator variable	<i>B(SE)</i>	<i>B(SE)</i>
Mean age of the sample	-.003(.002)	-.01(.01)
Gender (% female)	.0003(001)	.001(.001)
Publication status	-.06(.08)	-
<i>Gambling motives measure</i>		
GMQ-F vs. author-developed	.03(.08)	-.30(.13)*
GMQ-F vs. GOES	.18(.09)	-.14(.12)
GMQ-F vs. Other	.06(.08)	-.19(.12)
<i>Geographical region</i>		
North America vs. Australasia	-.15(.08)	-.03(.10)
North America vs. Europe	-.01(.07)	-.07(.10)
North America vs. Asia	.04(.10)	-
North America vs. Argentina	.02(.15)	-
<i>Note.</i> GMQ-F = Gambling Motives Questionnaire - Financial; GOES = Gambling Outcome Expectancies Scale. * $p < .05$.		

Figure 1. PRISMA Chart

Figure 2. Forest plot of Fisher Z_r effect sizes indexing the zero-order association between financial motivation for gambling and disordered gambling severity.

Figure 3. Forest plot of the standardized regression coefficients indexing the unique association between financial motivation for gambling and disordered gambling severity controlling for social, coping, and enhancement gambling motives.

Figure 4. Forest plot of Fisher Z_r effect sizes indexing the zero-order association between financial motivation for gambling and gambling frequency.

Figure 5. Forest plot of the standardized regression coefficients indexing the unique association between financial motivation for gambling and gambling frequency controlling for social, coping, and enhancement gambling motives.