

Tolin Criteria Report Submission Checklist

Checklist Item	Required Content	Reported on Page(s)	Reviewer 1	Reviewer 2	Consensus/Comments
Step 1. Treatment Nomination and Committee Formation					
1	Submit letter of intent to the Committee on Science and Practice (CSP)	4			
2	Document selection process of workgroup members	4			
3	Include a conflict of interest declaration from each member, noting the relationship, financial or otherwise, with the treatment being evaluated	4-5			
Step 2. Locating and Screening Reviews for Inclusion					
4	Document search terms	5			
5	Document databases searched	5			
6	Document inclusion and exclusion criteria	5			
7	Document the rationale and decision regarding restricting the search based on publication date if applicable	N/A			
8	Flow diagram (or comparable) documenting screening and selection of final reviews	6			
9	PICOTS table	7			
Step 3. Assessment of Review Quality					
10	Describe critical domains	8			
11	AMSTAR 2 (or comparable) table	8-9			
12	AMSTAR 2 (or comparable) text including description of how “low” or “critically low” studies will be handled	8			
Step 4. Evaluating Outcomes and Judging Quality of the Evidence					
13	Compile effect size values	10-12			
14	If relevant, statistically combine effect sizes and report accompanying measures of central tendency	10-12			
15	Forest plot (or comparable) diagram	10-12			
16	Narrative description of results	10-11			
17	Details of sensitivity analysis	11			
18	Complete “Quality of the Evidence” table	13			
Step 5. Consideration of Additional Contextual Factors					
19	Table documenting presence or absence of contextual factors	13-14			
Step 6. Overall Treatment Recommendation					
20	GRADE table with rating	15			
21	Narrative treatment recommendation, including what would be needed to improve the recommendation in the future	16-17			
IN THE CASE OF AN AMENDED REPORT					

22	Summary statement of updates	N/A			
----	------------------------------	-----	--	--	--

**An Evaluation of Cognitive-Behavioral Treatment for Gambling Disorder:
An Application of Tolin's Criteria for Empirically Supported Treatments**

Evaluation of Cognitive-Behavioral Treatment (CBT) for Gambling Disorder

Reviewers: Rory A. Pfund, Cassandra L. Boness, Hyoun S. Kim, Meredith K. Ginley, & James P. Whelan

Dates of Review: September 19, 2021 to May 18, 2023

Online Recommendation: Strong

Recommended Citation: Pfund, R. A., Boness, C. L., Kim, H.S., Ginley, M. K., & Whelan, J. P. (2023, May). *An evaluation of cognitive-behavioral treatment for gambling disorder: An application of Tolin's criteria for empirically supported treatments.*

The following report outlines the evaluation of cognitive-behavioral treatment (CBT) for gambling disorder according to the Tolin et al. (2015) criteria. This evaluation is part of a larger effort to revise and update ratings on the strength of evidence for psychological treatments for given diagnoses.

1. Treatment Nomination and Committee Formation

1.1 Nomination and Letter of Intent

The authors of the present evaluation submitted a letter of interest to the Division 12 Committee on Science and Practice to evaluate CBT for gambling disorder on September 9, 2021. The letter of interest was approved on September 19, 2021.

1.2 Selection Process for Treatment Evaluation Committee

When forming our committee, we considered individuals with expertise in cognitive-behavioral treatments, gambling disorder, and systematic review and meta-analysis.

The committee was formed of six members:

Rory A. Pfund, PhD (University of Memphis)

Cassandra L. Boness, PhD (University of New Mexico)

Hyoun S. Kim, PhD (Toronto Metropolitan University)

Meredith K. Ginley, PhD (East Tennessee State University)

James P. Whelan, PhD (University of Memphis)

All authors had expertise in cognitive-behavioral treatments. RAP, HSK, MKG, and JPW had expertise in gambling disorder. All authors had expertise in systematic review and meta-analysis.

1.3 Conflict of Interest Declaration

Rory Pfund, Meredith Ginley, and James Whelan: Drs. Pfund, Ginley, and Whelan were authors on two of the meta-analyses reviewed:

Pfund, R. A., Forman, D. P., Whalen, S. K., Zech, J. M., Ginley, M. K., Peter, S. C., McAfee, N. W., & Whelan, J. P. (2023). Efficacy of cognitive-behavioral techniques for problem gambling and gambling disorder: A systematic review and meta-analysis. *Addiction*. <https://doi.org/10.1111/add.16221>

Pfund, R. A., King, S. A., Forman, D. P., Zech, J. M., Ginley, M. K., Peter, S. C., McAfee, N. W., Witkiewitz, K., & Whelan, J. P. (2023). Effects of cognitive-behavioral techniques for gambling on recovery defined by gambling, psychological functioning, and quality of life: A systematic review and meta-analysis. *Psychology of Addictive Behaviors*. <https://doi.org/10.1037/adb0000910>

To mitigate any potential conflicts of interest, Drs. Pfund, Ginley, and Whelan did not rate the methodological rigor of these meta-analysis using AMSTAR-2. Instead, Drs. Boness and Kim rated these meta-analyses.

Cassandra Boness: Dr. Boness is a member of the Division 12 Committee on Science and Practice and played a key role in the development of the “Tolin Criteria” manual. To mitigate this conflict, Dr. Boness was not involved in the evaluation or discussion of this evaluation report by Division 12.

Hyoun Kim: No conflicts of interest to declare.

2. Locating and Screening Reviews for Inclusion

2.1 Search Terms

Search terms included the following: ("cognitive behavior*" OR "cognitive behaviour*" OR "cognitive-behavior*" OR "cognitive-behaviour*" OR "CBT" OR "exposure") AND ("gamb*" OR "gambling") AND ("review" OR "systematic review" OR "quantitative review" OR "meta analysis" OR "meta-analysis") NOT ("qualitative review" OR "narrative review").

2.2 Databases

The Cochrane Database of Systematic Reviews, PubMed, and PsycINFO were searched.

2.3 Inclusion and Exclusion Criteria

Consistent with Tolin et al. (2015), eligible reviews were limited to meta-analyses. Meta-analyses were included if they focused on CBT for gambling harm among persons aged 18 years or older. CBT was defined as a treatment that engaged individuals in cognitive restructuring, imaginal desensitization, relapse prevention, and/or stimulus control (e.g., limiting gambling expenditures). Gambling harm was defined as meeting diagnostic criteria for gambling disorder based on a clinical interview, screening positive for gambling disorder based on a validated assessment measure, or experiencing subclinical symptoms of gambling disorder based on a validated assessment measure. There were no other inclusion or exclusion criteria.

2.4 Gray Literature, Language, and Dates of Publication

Articles from the gray literature were eligible for inclusion in the present evaluation. There were no restrictions on language or year of publication.

2.5 Selection of Reviews to Include in the Evaluation

Two coders (RAP, MKG) independently screened records at the title/abstract and full-text levels using codebooks. An initial search was conducted on September 19, 2021, and an updated search was conducted on May 18, 2023 to identify records that may have been published since September 2021.

A total of 38 records were identified, with 35 yielded from the initial search and three from the updated search. After eliminating duplicates, 37 records were eligible for screening at the title and abstract level. Of these 37 records, 18 were deemed ineligible for not being a meta-analysis or not focusing on gambling harm. The remaining 19 records were screened at the full-text level, and five of these records were deemed eligible for inclusion in the present evaluation (see Figure 1). Discrepancies in codes were resolved by consensus between RAP and MKG.

For each of the five eligible meta-analyses, two committee members (RAP, MKG) double coded the PICOTS (population, intervention, comparison, outcomes, timeline, setting) criteria (Schardt et al., 2007). PICOTS allows for a full consideration of review characteristics (see Table 1) and assists the reader in evaluating the appropriateness of the eligible reviews included for answering the clinical question of interest. Discrepancies in codes were resolved by consensus between RAP and MKG.

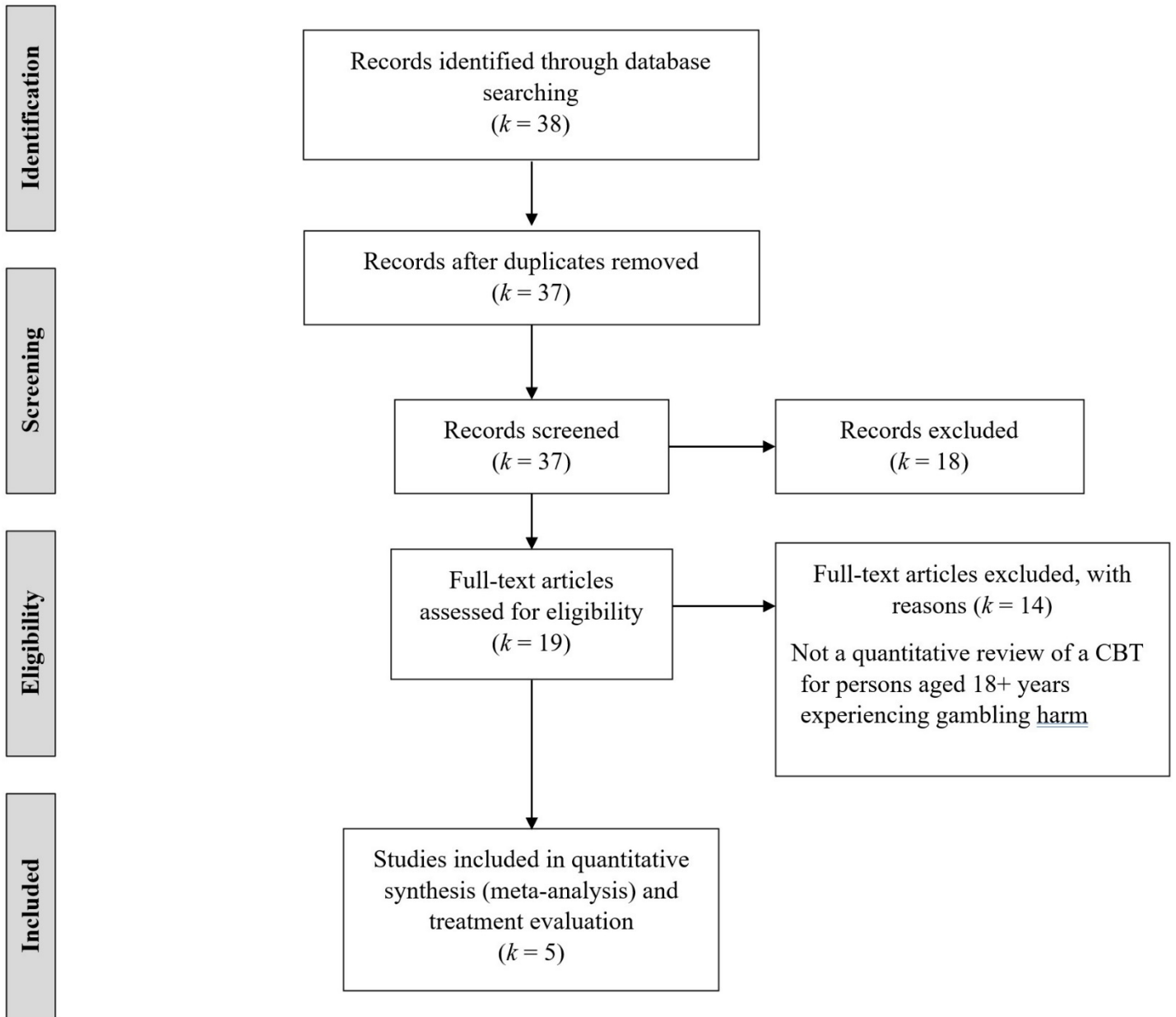


Figure 1. Flowchart for Cognitive-Behavioral Treatment for Gambling Disorder Search Process. This figure illustrates the search process for locating reviews eligible for inclusion in the treatment evaluation. k = number of unique records.

2.6 PICOTS

Table 1.

Description of Meta-Analyses Included in the Treatment Evaluation of CBT for Gambling Disorder

Study	# of studies	Population	Intervention	Comparison condition	Setting	Outcome(s)	Time points
Bergeron et al. (2022)	5	Individuals experiencing problem gambling and/or gambling disorder	CBT	None (Pre-post designs only)	NS	Severity; Duration; Beliefs; Craving;	Posttreatment (0 months); Follow up (6 and 12 months)
Cowlishaw et al. (2012)	11	Individuals experiencing problem gambling and/or gambling disorder	CBT	Treatment as usual; Inactive control	NS	Severity; Frequency; Intensity; Gambling disorder diagnosis; Anxiety; Depression	Posttreatment (0-3 months); Follow up (9-12 months)
Gooding & TARRIER (2009)	25	Individuals experiencing problem gambling and/or gambling disorder	CBT	Active control; Inactive control; None (pre-post)	NS	Severity; Frequency; Intensity; Duration	Posttreatment (0-3 months); Follow up (6 months)
Pfund, Forman, et al. (2023)	29	Individuals experiencing problem gambling and/or gambling disorder	CBT	Treatment as usual; Inactive control	NS	Severity; Frequency; Intensity; Duration	Posttreatment (0 months); Follow up (1-22 months)
Pfund, King, et al. (2023)	10	Individuals experiencing problem gambling and/or gambling disorder	CBT	Treatment as usual; Inactive control	NS	Anxiety; Depression; Quality of life Alcohol use	Posttreatment (0 months)

Note. CBT = cognitive-behavioral treatment; NS = not specified

3. Assessment of Review Quality

For each of the five included meta-analyses, two committee members (CLB, HSK) independently coded the AMSTAR-2 (Shea et al., 2017) items using a codebook. Discrepancies were resolved via discussion between CLB and HSK.

3.1 Identifying Critical Domains

Consistent with other evaluations of the Tolin et al. (2015) criteria (Boness et al., 2020; Pfund, Ginley, et al., 2023), we deemed the same AMSTAR-2 items as critical: (a) including components of PICOTS in the research questions and inclusion criteria, (b) using a comprehensive search strategy, (c) describing the included studies in adequate detail, (d) using appropriate methods for statistical combination of results, (e) accounting for risk of bias in individual studies, and (f) providing explanation for a discussion for any heterogeneity observed in the results.

3.2 Assigning an Overall Confidence Rating

Two committee members (CLB, HSK) independently rated their overall confidence (*critically low, low, moderate, and high*) in the results of each meta-analysis using a codebook. A rating of “High” was assigned if the meta-analysis had zero or one noncritical weakness, “Moderate” if the meta-analysis had no critical weaknesses and more than one noncritical weakness, “Low” if the meta-analysis had one critical weakness with or without noncritical weaknesses, or “Critically Low” if the meta-analysis had more than one critical weakness with or without noncritical weaknesses. Discrepancies were resolved via discussion between CLB and HSK.

3.3 Managing Reviews with Poor Quality

All meta-analyses, regardless of quality, were initially considered in statistical analyses. Sensitivity analyses were then conducted where meta-analyses rated as critically low or low quality were removed from the analyses.

Table 2.
AMSTAR-2 Results for Eligible Meta-Analyses

Item	Bergeron et al. (2022)	Cowlshaw et al. (2012)	Gooding & Tarrier (2009)	Pfund, Forman, et al. (2023)	Pfund, King, et al. (2023)
1. Did the research questions and inclusion criteria for the review include components of PICO?	N	Y	N	Y	Y
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	N	Y	N	Y	Y
3. Did the review authors explain their selection of the study designs for inclusion in the review?	N	Y	N	N	N
4. Did the review authors use a comprehensive literature search strategy?	PY	Y	N	PY	PY
5. Did the review authors perform study selection in duplicate?	Y	Y	N	Y	Y
6. Did the review authors perform data extraction in duplicate?	Y	Y	N	Y	Y
7. Did the review authors provide a list of excluded studies and justify the exclusions?	N	Y	N	Y	Y
8. Did the review authors describe the included studies in adequate detail?	N	Y	N	PY	PY

9. Did the review authors use a satisfactory technique for assessing the RoB in individual studies that were included in the review?					
RCT	NA	Y	N	Y	Y
NRSI	Y	NA	N	NA	NA
10. Did the review authors report on the sources of funding for the studies included in the review?	N	N	N	Y	Y
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?					
RCT	NA	Y	Y	Y	Y
NRSI	N	NA	Y	NA	NA
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	NA	Y	Y	N	N
13. Did the review authors account for RoB in individual studies when interpreting/discussing the results of the review?	NA	Y	Y	Y	Y
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	N	Y	Y	Y	Y
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	N	Y	N	Y	Y
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	N	Y	N	Y	Y
Overall rating	Critically low	High	Critically low	Moderate	Moderate

Notes. N = no; NA = not applicable; NRSI = non-randomized studies of interventions; PICO: (P = population, I = intervention, C = comparator group, O = outcome); RCT = randomized controlled trial; RoB = risk of bias; PY = partial yes; Y = yes. Items in bold are considered critical weaknesses if coded "no."

4. Evaluating Outcomes of Meta-Analyses and Judging the Quality of the Evidence

4.1 Creating Procedures for Extracting Data

RAP and a clinical psychology doctoral student trained in data extraction independently extracted effect size data from all meta-analyses, regardless of the overall confidence rating on the AMSTAR-2. The overall weighted effect sizes, as well as the lower limit and upper limit of the 95% confidence intervals (CI), were extracted from all five meta-analyses. When reported, the effect sizes, the lower limit and upper limit of the 95% CIs, the variance of effect sizes, and/or the standard error of effect sizes from individual studies were extracted. Effect size data were extracted for every outcome and every available follow-up assessment.

4.2 Data Collection and Validation

The overall weighted effect sizes and the lower and upper limits of the 95% CIs for every outcome and follow-up assessment were entered directly into an Excel spreadsheet. The effect sizes and the lower limit and upper limits of the 95% CIs from every outcome and follow-up assessment in individual studies were entered directly into Comprehensive Meta-Analysis (CMA) software. Discrepancies in effect size data were resolved via discussion between RAP and the clinical psychology doctoral student.

4.3 Statistically Combining Effect Sizes

Hedges’s *g* effect sizes were used to quantify the effect of CBT relative to control (i.e., treatment as usual, inactive treatment) on all outcomes at every follow-up assessment and to correct for small study bias (Hedges & Olkin, 1985). Meta-analyses that reported effect sizes that were different from Hedges’s *g*, like Cohen’s *d* (Cowlshaw et al., 2012), were converted to Hedges’s *g* using the CMA software.

The first analysis was conducted with all meta-analyses regardless of quality as determined by the overall AMSTAR-2 confidence rating. Using the overall weighted effect sizes and the lower and upper limits of the 95% CIs, mean effect sizes were calculated for every outcome at posttreatment and follow-up. This procedure was similar to the procedure from an evaluation of CBT for insomnia (Boness et al., 2020).

A sensitivity analysis was then conducted with only the moderate- and high-quality meta-analyses as determined by the overall AMSTAR-2 confidence ratings. Using the effect size data from individual studies (i.e., effect sizes, lower limit and upper limit of the 95% CIs), a robust variance estimation meta-analysis where ρ was assumed 0.8 (Hedges et al., 2010) was conducted with the “robumeta” and “clubSandwich” packages in R version 4.2.1. This meta-analysis used meta-regression models to estimate the weighted Hedges’s *g* effect sizes for each available outcome at every follow-up assessment. Models accounted for statistical dependency of individual studies that comprised multiple treatment groups and multiple effect sizes within those treatment groups. A random effects model was used because there was expected heterogeneity in recruitment methods, formats of CBT (e.g., in-person versus remote), and study methods. Results were only presented for models with adequate degrees of freedom after accounting for small sample size adjustments (Tipton, 2015).

4.4 Full Analysis

Table 3 presents the results of the full analysis that included all five meta-analyses regardless of quality per the AMSTAR-2 overall confidence ratings (all raw effect size estimates are provided in Supplemental Table 1). At posttreatment, CBT decreased several outcomes relative to control based on the 95% CIs not overlapping with zero, including gambling disorder severity, gambling frequency, gambling intensity, gambling duration, anxiety, depression, and gambling craving. Based on Cohen’s (1988) guidelines, effects were classified as small when $g = 0.20$, moderate when $g = 0.50$, and large when $g = 0.80$. Negative Hedges’s *g* values indicated decreases in an outcome relative to control, and positive Hedges’s *g* values indicated increases in an outcome relative to control.

Overall, the effects of CBT relative to control at posttreatment ranged from small to large. The largest effects were decreases in gambling duration ($g = -1.30$) and gambling disorder severity ($g = -1.16$) at posttreatment. CBT also increased quality of life at posttreatment ($g = 0.43$, 95% CI = 0.16, 0.70). At follow-up, fewer outcomes had sufficient information to report effect sizes. However, available effect sizes indicated that CBT decreased gambling disorder severity ($g = -0.79$), gambling craving ($g = -1.03$), and gambling beliefs ($g = -1.31$) relative to control based on the 95% CIs not overlapping with zero.

Table 3.
Mean Effect Sizes for Relevant Outcomes in All Five Meta-Analyses

Outcome	# of effect sizes	Mean Hedges’s <i>g</i>	Posttreatment			
			95% CI LL	95% CI UL	Min ES	Max ES
Gambling disorder severity	4	-1.16	-1.75	-0.56	-0.58	-1.82
Gambling frequency	3	-0.70	-1.04	-0.36	-0.54	-0.79
Gambling intensity	2	-0.42	-0.61	-0.23	-0.32	-0.52

Gambling duration	2	-1.30	-2.24	-0.36	-0.68	-1.92
Anxiety	2	-0.54	-0.80	-0.28	-0.44	-0.64
Depression	2	-0.50	-0.81	-0.20	-0.35	-0.66
Gambling disorder diagnosis ¹	1	0.13	0.05	0.31		
Gambling beliefs	1	-0.65	-1.32	0.05		
Gambling craving	1	-0.96	-1.76	-0.12		
Quality of life	1	0.43	0.16	0.70		
Alcohol use	1	-0.40	-0.82	0.03		

Follow-Up

Outcome	# of effect sizes	Mean Hedges's <i>g</i>	95% CI LL	95% CI UL	Minimum ES	Maximum ES
Gambling disorder severity	3	-0.79	-1.56	-0.02	-0.11	-1.69
Gambling frequency	3	-0.15	-0.47	0.17	-0.10	-0.23
Gambling duration	2	-1.55	-3.42	0.32	-0.65	-2.45
Gambling craving	2	-1.03	-1.56	-0.48	-1.01	-1.05
Gambling intensity	1	-0.15	-0.47	0.17		
Gambling beliefs	1	-1.31	-2.01	-0.61		

Notes. ¹Effect sizes represent a risk ratio and the 95% CI rather than Hedges's *g*. CI = confidence interval; ES = effect size; LL = lower limit; UL = upper limit

4.5 Sensitivity Analysis

Table 4 presents the results of the sensitivity analysis that included only the moderate- and high-quality meta-analyses per the AMSTAR-2 overall confidence ratings. Based on Cohen's (1988) guidelines, significant effects of CBT ranged from small to large. At posttreatment, CBT significantly decreased gambling disorder severity ($g = -0.91$, 95% CI = -1.33, -0.49), gambling frequency ($g = -0.52$, 95% CI = -0.77, -0.27), and gambling intensity ($g = -0.32$, 95% CI = -0.48, -0.16) relative to control. The effect of CBT on gambling duration, anxiety, and depression at posttreatment could not be calculated due to an insufficient number of degrees of freedom (Tipton, 2015). At follow-up, there was no significant differences in gambling disorder severity and gambling frequency between CBT and control. The effect of CBT on gambling intensity at follow-up could not be calculated due to an insufficient number of degrees of freedom (Tipton, 2015).

Table 4.

Robust Variance Estimation Meta-Analysis for All Outcomes Reported in the Cowlshaw, Pfund Forman, and Pfund King Meta-Analyses

Posttreatment						
Outcome	Meta-analyses included in Hedges's <i>g</i> calculation	<i>k</i> comprising Hedges's <i>g</i> value	<i>n</i> comprising Hedges's <i>g</i> value	Hedges's <i>g</i>	95% CI	<i>p</i> -value
Gambling disorder severity	Cowlshaw, Pfund Forman	21	1,643	-0.91	-1.33, -0.49	0.0002
Gambling frequency	Cowlshaw, Pfund Forman	19	2,468	-0.52	-0.77, -0.27	0.0004
Gambling intensity	Cowlshaw, Pfund Forman	16	1,549	-0.32	-0.48, -0.16	0.0009
Gambling duration	Pfund Forman	5	263	-	-	-
Anxiety	Cowlshaw, Pfund King	5	302	-	-	-
Depression	Cowlshaw, Pfund King	5	302	-	-	-
Quality of life	Pfund King	4	245	-	-	-
Alcohol use	Pfund King	2	102	-	-	-
Follow-Up						
Outcome	Meta-analyses included in Hedges's <i>g</i> calculation	<i>k</i> comprising Hedges's <i>g</i> value	<i>n</i> comprising Hedges's <i>g</i> value	Hedges's <i>g</i>	95% CI	<i>p</i> -value
Gambling disorder severity	Cowlshaw, Pfund Forman	7	848	-0.14	-0.40, 0.11	0.11
Gambling frequency	Cowlshaw, Pfund Forman	7	1,482	-0.10	-0.30, 0.10	0.26
Gambling intensity	Cowlshaw, Pfund Forman	5	615	-	-	-

Notes. Results were only presented for models with adequate degrees of freedom after accounting for small sample size adjustments to the robust variance estimates. *k* = primary studies.

4.6 Judging the Quality of the Evidence

The quality of the evidence for CBT for gambling disorder was designated moderate. This designation was made because there were three meta-analyses of adequate quality in the overall evaluation of the evidence (Cowlshaw et al., 2012; Pfund, Forman, et al., 2023; Pfund, King, et al., 2023). These meta-analyses were considered “moderate” and “high” quality based on the AMSTAR-2 overall confidence ratings suggesting they had some limitations but not major flaws. Furthermore, the confidence intervals of summary estimates for gambling disorder severity, gambling frequency, and gambling intensity were wide.

Table 5.

Judging the Quality of the Evidence for Cognitive-Behavioral Treatment for Gambling Disorder

Quality	Criteria
<input type="checkbox"/> <i>High quality</i>	All of the following: <ul style="list-style-type: none"> • There is a wide range of studies included in the analyses with no major limitations. • There is little variation between studies. • The summary estimate has a narrow confidence interval.
<input checked="" type="checkbox"/> <i>Moderate quality</i>	At least one of the following: <ul style="list-style-type: none"> • There are only a few studies, and some have limitations but not major flaws. • There is some variation between studies, or the confidence interval of the summary estimate is wide.
<input type="checkbox"/> <i>Low quality</i>	Any of the following: <ul style="list-style-type: none"> • The studies have major flaws. • There is important variation between studies. • The confidence interval of the summary estimate is very wide.

5. Consideration of Additional Contextual Factors

Based on the meta-analyses included in the present evaluation, there was limited evidence to evaluate CBT for gambling disorder on all relevant contextual factors. However, considering additional literature provided support for two contextual factors: (1) the effects of CBT are stronger than the effects of pharmacotherapy and motivational interviewing may have similar effects to CBT; and (2) CBT is flexibly adapted to both self-help workbooks and Internet modules. There is inconclusive evidence for the remaining four contextual factors. Nonetheless, the two positive contextual factors support our overall treatment recommendation.

5.1 How does the treatment effect size compare to other well-studied treatments?

Three other treatments have been well-studied in the literature: brief interventions (Peter et al., 2019), motivational interviewing (Yakovenko et al., 2015), and pharmacotherapy (Dowling et al., 2022). Based on Cohen’s (1988) guidelines, the meta-analysis of moderate- and high-quality indicated that the effects of CBT on all three outcomes ($g = -0.32$ to $g = -0.91$) are larger than the reported effects of brief interventions on gambling behavior ($g = -0.19$) (Quilty et al., 2019). The effects of CBT on gambling disorder symptom severity, gambling frequency, and gambling intensity at posttreatment are also stronger than the effects of antidepressants, opioid antagonists, and atypical antipsychotics on these same posttreatment outcomes as reported in a recent Cochrane review on pharmacotherapy (Dowling et al., 2022).

These effects of CBT on gambling frequency at posttreatment in the present quantitative review ($g = -0.52$) are smaller than the effects of motivational interviewing on gambling frequency ($g = -1.22$), and the effects of CBT on gambling intensity in this review ($g = -0.32$) are comparable to the effects of motivational interviewing on gambling intensity ($g = -0.26$) (Yakovenko et al., 2015). However, the quantitative review on motivational interviewing comprises fewer studies (3-5 studies per estimate of treatment effects) than the present quantitative review on cognitive-behavioral treatment (16-21 per estimate of treatment effects).

5.2 If the treatment effect size is similar to other well-studied treatments, does the evaluated treatment differ in number of sessions, length, or cost?

There is limited but promising support that the effects of CBT on gambling frequency and gambling intensity at posttreatment are comparable to the effects of motivational interviewing on these same posttreatment outcomes (Cowlshaw et al., 2012; Yakovenko et al., 2015). Both treatments produce small to large decreases in these outcomes at posttreatment. However, there is limited evidence for the maintenance of treatment effects beyond the posttreatment assessment.

Some arguments have been made that single-session motivational interventions produce the same effects on gambling outcomes as multiple sessions of CBT (Toneatto, 2016). However, these arguments do not consider that approximately 39% of individuals prematurely discontinue CBT (Pfund et al., 2021) and do not realize the full benefits of CBT (Pfund et al., 2020). For example, individuals who attended only one of six possible CBT sessions show comparable outcomes to individuals who attended one session of motivational interviewing using an intent-to-treat analysis (Larimer et al., 2012). More research is needed to determine the number of CBT sessions needed to achieve specific outcomes relative to other well-studied treatments. Such research will be difficult to conduct experimentally as individuals randomized to different treatment doses do not attend the full, intended treatment dose (Larimer et al., 2012; Pfund et al., 2020).

5.3 Is there evidence supporting the purported mechanism or active ingredient(s) of CBT?

There is currently limited evidence supporting the purported mechanisms of CBT for gambling disorder. However, one study by Petry and colleagues (2007) found that increases in coping skills mediated the effects of CBT on gambling behavior. Such research is a promising step forward in identifying mechanisms of CBT for gambling disorder, but, as with other areas of addiction treatment, research is needed to understand the mechanisms of CBT in various contextual environments (Witkiewitz et al., 2022).

5.4 Is there evidence that supports treatment efficacy in marginalized populations?

There is currently limited evidence supporting the efficacy of CBT on gambling disorder outcomes among marginalized populations. The randomized controlled trials comprising the moderate- and high-quality meta-analyses in the evaluation were conducted on six of the seven continents. However, a recent systematic review indicated that randomized controlled trials in the United States mostly comprise samples of individuals who identify as White, are employed, and report some level of college education (Peter et al., 2021). Future randomized controlled trials should therefore comprise more racially and socioeconomically diverse samples because gambling disorder disproportionately affects individuals from racially minoritized groups and individuals who represent lower socioeconomic statuses (Welte et al., 2015).

5.5 Has the treatment been studied by a wide array of researchers without strong allegiance to the treatment?

Based on studies included in the eligible meta-analyses (see Supplemental Table 2), CBT for gambling disorder has been studied by several independent research groups. However, no studies to date have been conducted on the association between researcher allegiance to CBT for gambling disorder and gambling outcomes. Future research should use common methods to quantify researcher allegiance, such as reprint analysis, examinations of previous publications, interviews with colleagues of authors, or interviews with the authors themselves, and examine their association with gambling outcomes.

5.6 Other factors: CBT is flexibly adapted to Internet modules and self-help workbooks.

The meta-analyses included in the present evaluation represented CBT conducted in-person, as well as CBT conducted via the Internet and self-help workbooks. Although in-person CBT produces larger effects on outcomes than Internet and self-help workbook CBT (Goslar et al., 2017), Internet and self-help

workbook CBT still significantly decrease gambling outcomes relative to minimal and inactive treatment controls (Augner et al., 2022; Goslar et al., 2017).

Table 6.

Additional Contextual Factors Considered in Increasing or Decreasing the GRADE Recommendation for CBT for Gambling Disorder

Positive	Negative
<ul style="list-style-type: none"> ✓ Treatment appears superior to other well-studied treatment(s) □ The treatment generates an effect that is similar to other well-studied treatments, but requires a very small number of sessions or length of time to generate the same effect at a much lower cost □ Evidence supports the purported mechanism or active ingredient(s) of treatment □ Treatment has demonstrated good effects with marginalized groups □ Treatment has been studied by a wide array of researchers without strong allegiance to the treatment ✓ Other: Treatment is flexibly adapted to Internet modules and self-help workbooks 	<ul style="list-style-type: none"> □ There are other psychological treatments that have well-documented and much larger effects □ The treatment generates an effect that is similar to other well-studied treatments, but requires a very large number of sessions or length of time to generate the same effect at a much higher cost □ Evidence fails to support the purported mechanism or active ingredient(s) of treatment □ Treatment has demonstrated weak effects with marginalized groups □ Treatment has been studied by a narrow array of researchers with strong allegiance to the treatment □ Other:

Note. This table identifies additional positive contextual factors supported by the literature on CBT for gambling disorder and was adapted from Tolin et al. (2015). Lack of identification of a positive or negative assessment of a contextual factor indicates that there are not enough data to make a firm conclusion in this category for CBT.

6. Overall Treatment Recommendation

Narrative Summary of GRADE Recommendation, Including Contextual Factors

There is moderate quality evidence that CBT for gambling disorder produces clinically meaningful effects on gambling outcomes when compared to minimal or inactive treatment controls. This finding remains true when effect sizes from low or critically low quality meta-analyses are removed. There is currently limited evidence to evaluate whether the effects of CBT endures beyond the posttreatment assessment and whether CBT produces a clinically meaningful effect on functional outcomes. Furthermore, there is a need for studies on the effectiveness of CBT in non-research settings. As such, based on the criteria outlined by Tolin and colleagues (2015), the current status of the literature merits a **strong** recommendation for CBT for gambling disorder.

Our **strong** recommendation is further strengthened by two contextual factors, including:

1. The effects of CBT on gambling outcomes are larger than the effects of pharmacotherapy and may be similar to the effects of motivational interviewing on gambling outcomes.
2. CBT is flexibly adapted to Internet modules and self-help workbooks.

Table 7.*Overall Treatment Recommendation for Cognitive-Behavioral Treatment for Gambling Disorder*

Recommendation	Criteria
<input type="checkbox"/> <i>Very strong recommendation</i>	<p>All of the following:</p> <ul style="list-style-type: none"> • There is high-quality evidence that the treatment produces a clinically meaningful effect on symptoms of the disorder being treated • There is high-quality evidence that the treatment produces a clinically meaningful effect on functional outcomes • There is high-quality evidence that the treatment produces a clinically meaningful effect on symptoms and/or functional outcomes at least three months after treatment discontinuation • At least one well-conducted study has demonstrated effectiveness in non-research settings
<input checked="" type="checkbox"/> <i>Strong recommendation</i>	<p>At least one of the following:</p> <ul style="list-style-type: none"> • There is moderate- to high-quality evidence that the treatment produces a clinically meaningful effect on symptoms of the disorder being treated • There is moderate- to high-quality evidence that the treatment produces a clinically meaningful effect on functional outcomes
<input type="checkbox"/> <i>Weak recommendation</i>	<p>Any of the following:</p> <ul style="list-style-type: none"> • There is only low- or very low-quality evidence that the treatment produces a clinically meaningful effect on symptoms of the disorder being treated • There is only low- or very low-quality evidence that the treatment produces a clinically meaningful effect on as well as on functional outcomes • There is moderate- to high-quality evidence that the effect of the treatment, although statistically significant, may not be of a magnitude that is clinically meaningful

Note. This table was adapted from Tolin et al. (2015).

References

- Augner, C., Vlasak, T., Aichhorn, W., & Barth, A. (2022). Psychological online interventions for problem gambling and gambling disorder—A meta-analytic approach. *Journal of Psychiatric Research*, *151*, 86–94.
- Bergeron, P.-Y., Giroux, I., Chrétien, M., & Bouchard, S. (2022). Exposure Therapy for Gambling Disorder: Systematic Review and Meta-Analysis. *Current Addiction Reports*, *9*, 179–194.
<https://doi.org/10.1007/s40429-022-00428-5>
- Boness, C. L., Hershenberg, R., Kaye, J., Mackintosh, M. A., Grasso, D. J., Noser, A., & Raffa, S. D. (2020). An evaluation of cognitive behavioral therapy for insomnia: A systematic review and application of Tolin's Criteria for empirically supported treatments. *Clinical Psychology: Science and Practice*, *27*, 1–15. <https://doi.org/10.1111/cpsp.12348>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.
- Cowlshaw, S., Merkouris, S., Dowling, N., Anderson, C., Jackson, A., & Thomas, S. (2012). Psychological therapies for pathological and problem gambling. *The Cochrane Database of Systematic Reviews*, *11*, CD008937. <https://doi.org/10.1002/14651858.CD008937.pub2>
- Dowling, N., Merkouris, S., Lubman, D., Thomas, S., Bowden-Jones, H., & Cowlshaw, S. (2022). Pharmacological interventions for the treatment of disordered and problem gambling. *Cochrane Database of Systematic Reviews*, *2022*(9). <https://doi.org/10.1002/14651858.CD008936.pub2>
- Gooding, P., & Tarrrier, N. (2009). A systematic review and meta-analysis of cognitive-behavioural interventions to reduce problem gambling: Hedging our bets? *Behaviour Research & Therapy*, *47*, 592–607.
<https://doi.org/10.1016/j.brat.2009.04.002>
- Goslar, M., Leibetseder, M., Muench, H. M., Hofmann, S. G., & Laireiter, A.-R. (2017). Efficacy of face-to-face versus self-guided treatments for disordered gambling: A meta-analysis. *Journal of Behavioral Addictions*, *6*, 142–162. <https://doi.org/10.1556/2006.6.2017.034>
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Academic Press.

- Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research Synthesis Methods*, 1(1), 39–65.
<https://doi.org/10.1002/jrsm.5>
- Larimer, M. E., Neighbors, C., Lostutter, T. W., Whiteside, U., Crouce, J. M., Kaysen, D., & Walker, D. D. (2012). Brief motivational feedback and cognitive behavioral interventions for prevention of disordered gambling: A randomized clinical trial. *Addiction*, 107, 1148–1158. <https://doi.org/10.1111/j.1360-0443.2011.03776.x>
- Peter, S. C., Brett, E. I., Suda, M. T., Leavens, E. L. S., Miller, M. B., Leffingwell, T. R., Whelan, J. P., & Meyers, A. W. (2019). A meta-analysis of brief personalized feedback interventions for problematic gambling. *Journal of Gambling Studies*, 35(2), 447–464. <https://doi.org/10.1007/s10899-018-09818-9>
- Peter, S. C., Pfund, R. A., & Ginley, M. K. (2021). Increased demographic representation in randomized control trials for gambling disorder in the United States is needed: A systematic review. *Journal of Gambling Studies*, 37(3), 1025–1041. <https://doi.org/10.1007/s10899-021-10055-w>
- Petry, N. M., Litt, M. D., Kadden, R., & Ledgerwood, D. M. (2007). Do coping skills mediate the relationship between cognitive-behavioral therapy and reductions in gambling in pathological gamblers? *Addiction*, 102, 1280–1291. <https://doi.org/10.1111/j.1360-0443.2007.01907.x>
- Pfund, R. A., Forman, D. P., Whalen, S. K., Zech, J. M., Ginley, M. K., Peter, S. C., McAfee, N. W., & Whelan, J. P. (2023). Effect of cognitive-behavioral techniques for problem gambling and gambling disorder: A systematic review and meta-analysis. *Addiction*.
- Pfund, R. A., Ginley, M. K., Boness, C. L., Rash, C. J., Zajac, K., & Witkiewitz, K. (2023). Contingency management for drug use disorders: Meta-analysis and application of Tolin's criteria. *Clinical Psychology: Science and Practice*. <https://doi.org/10.1037/cps0000121>
- Pfund, R. A., King, S. A., Forman, D. P., Zech, J. M., Ginley, M. K., Peter, S. C., McAfee, N. W., Witkiewitz, K., & Whelan, J. P. (2023). Effects of cognitive-behavioral techniques for gambling on recovery defined by gambling, psychological functioning, and quality of life: A systematic review and meta-analysis. *Psychology of Addictive Behaviors*.

- Pfund, R. A., Peter, S. C., McAfee, N. W., Ginley, M. K., Whelan, J. P., & Meyers, A. W. (2021). Dropout from face-to-face, multi-session psychological treatments for problem and disordered gambling: A systematic review and meta-analysis. *Psychology of Addictive Behaviors, 35*(8), 901–913.
<https://doi.org/10.1037/adb0000710>
- Pfund, R. A., Peter, S. C., Whelan, J. P., Meyers, A. W., Ginley, M. K., & Relyea, G. (2020). Is more better? A meta-analysis of dose and efficacy in face-to-face psychological treatments for problem and disordered gambling. *Psychology of Addictive Behaviors, 34*(5), 557–568. <https://doi.org/10.1037/adb0000560>
- Quilty, L. C., Wardell, J. D., Thiruchselvam, T., Keough, M. T., & Hendershot, C. S. (2019). Brief interventions for problem gambling: A meta-analysis. *PloS One, 14*(4), e0214502–e0214502.
<https://doi.org/10.1371/journal.pone.0214502>
- Schardt, C., Adams, M. B., Owens, T., Keitz, S., & Fontelo, P. (2007). Utilization of the PICO framework to improve searching PubMed for clinical questions. *BMC Medical Informatics and Decision Making, 7*, 1–6. <https://doi.org/10.1186/1472-6947-7-16>
- Tipton, E. (2015). Small sample adjustments for robust variance estimation with meta-regression. *Psychological Methods, 20*(3), 375–393. <https://doi.org/10.1037/met0000011>
- Tolin, D. F., McKay, D., Forman, E. M., Klonsky, E. D., & Thombs, B. D. (2015). Empirically supported treatment: Recommendations for a new model. *Clinical Psychology: Science and Practice, 22*, 317–338. <https://doi.org/10.1111/cpsp.12122>
- Toneatto, T. (2016). Single-session interventions for problem gambling may be as effective as longer treatments: Results of a randomized control trial. *Addictive Behaviors, 52*, 58–65.
<https://doi.org/10.1016/j.addbeh.2015.08.006>
- Welte, J. W., Barnes, G. M., Hoffman, J. H., & Wieczorek, W. F. (2015). Gambling and problem gambling in the United States: Changes between 1999 and 2013. *Journal of Gambling Studies, 31*, 695–715.
<https://doi.org/10.1007/s10899-014-9471-4>

Witkiewitz, K., Pfund, R. A., & Tucker, J. A. (2022). Mechanisms of behavior change in substance use disorder with and without formal treatment. *Annual Review of Clinical Psychology, 18*, 1–29.

<https://doi.org/10.1146/annurev-clinpsy-072720-014802>

Yakovenko, I., Quigley, L., Hemmelgarn, B. R., Hodgins, D. C., & Ronksley, P. (2015). The efficacy of motivational interviewing for disordered gambling: Systematic review and meta-analysis. *Addictive Behaviors, 43*, 72–82. <https://doi.org/10.1016/j.addbeh.2014.12.011>

Supplemental Table 1.

Weighted Hedges's g Effect Sizes Across the Five Meta-Analyses

Posttreatment						
Outcome (Hedges's <i>g</i>)	Bergeron	Cowlshaw	Gooding & Tarrier	Pfund, Forman	Pfund, King	Total
Abstinence	-	-	-1.87 (-1.54, -0.20)	-	-	-1.87 (-1.54, -0.20)
Gambling disorder diagnosis	-	0.13 (0.05, 0.31)	-	-	-	0.13 (0.05, 0.31)
Gambling disorder severity	-1.09 (-1.52, -0.64)	-1.82 (-2.61, -1.02)	-0.58 (-1.20, 0.04)	-1.14 (-1.68, -0.60)	-	-1.16 (-1.75, -0.56)
Gambling frequency	-	-0.78 (-1.11, -0.45)	-0.79 (-1.21, -0.36)	-0.54 (-0.80, -0.27)	-	-0.70 (-1.04, -0.36)
Gambling intensity	-	-0.52 (-0.71, -0.33)	-	-0.32 (-0.51, -0.13)	-	-0.42 (-0.61, -0.23)
Gambling duration	-1.92 (-2.77, -1.07)	-	-0.68 (-1.70, 0.35)	-	-	-1.30 (-2.24, -0.36)
Beliefs	-0.65 (-1.32, 0.05)	-	-	-	-	-0.65 (-1.32, 0.05)
Craving	-0.96 (-1.76, -0.12)	-	-	-	-	-0.96 (-1.76, -0.12)
Anxiety	-	-0.64 (-0.90, -0.37)	-	-	-0.44 (-0.70, -0.18)	-0.54 (-0.80, -0.28)
Depression	-	-0.66 (-0.93, -0.39)	-	-	-0.35 (-0.69, -0.01)	-0.50 (-0.81, -0.20)
Quality of life	-	-	-	-	0.43 (0.16, 0.70)	0.43 (0.16, 0.70)
Alcohol use	-	-	-	-	-0.40 (-0.82, 0.03)	-0.40 (-0.82, 0.03)
Follow-Up						
Outcome	Bergeron	Cowlshaw	Gooding & Tarrier	Pfund, Forman	Pfund, King	Total
Gambling disorder severity	-1.69 (-2.74, -0.62)	-0.11 (-0.43, 0.22)	-	-0.58 (-1.52, 0.36)	-	-0.79 (-1.56, -0.02)
Gambling frequency	-	-0.12 (-0.45, 0.20)	-0.23 (-0.66, 0.20)	-0.10 (-0.30, 0.10)	-	-0.15 (-0.47, 0.17)
Gambling intensity	-	-0.15 (-0.47, 0.18)	-	-	-	-0.15 (-0.47, 0.18)
Gambling duration	-2.45 (-5.33, 0.43)	-	-0.65 (-1.50, 0.21)	-	-	-1.55 (-3.42, 0.32)
Beliefs	-1.31 (-2.01, -0.61)	-	-	-	-	-1.31 (-2.01, -0.61)
Craving	-1.01 (-1.50, -0.49)	-	-1.05 (-1.63, -0.46)	-	-	-1.03 (-1.56, -0.48)

Notes. Omitted Hedges's *g* values indicate meta-analyses that did not analyze the effect of cognitive-behavioral treatment on specific outcomes.

Supplemental Table 2.

*Overlap Among Primary Studies Included in the Present Evaluation***Meta-analysis**

Study included in meta-analysis	Bergeron et al. (2022)	Cowlshaw et al. (2012)	Gooding & Tarrrier (2009)	Pfund, Forman, et al. (2023)	Pfund, King, et al. (2023)	Number of times each study was included across the four meta-analyses	Percentage of meta-analyses including each study
Abbott et al. (2018)				X		1	20
Blaszczynski et al. (2003)	X					1	20
Blaszczynski et al. (2005)	X		X			2	40
Boudreault et al. (2018)				X	X	2	40
Breen et al. (2001)			X			1	20
Carlbring & Smit (2008)				X	X	2	40
Carlbring et al. (2010)		X		X	X	3	60
Casey et al. (2017)				X	X	2	40
Cunningham et al. (2019)				X		1	20
Dham et al. (2015)	X					1	20
Doiron & Nicki (2007)			X			1	20
Dowling et al. (2007)		X	X	X	X	4	80
Echeburúa et al. (1996)	X		X			2	40
Echeburúa et al. (2000)	X					1	20
Echeburúa et al. (2002)	X					1	20
Ede et al. (2020)				X		1	20
Freidenberg et al. (2002)			X			1	20
Grant et al. (2009)		X		X	X	3	60
Harris & Mazmanian (2016)				X		1	20
Hodgins et al. (2001)			X	X		2	40
Hodgins et al. (2004)			X			1	20
Hodgins et al. (2009)				X		1	20
Jimenez-Murcia et al. (2007)			X			1	20
LaBrie et al. (2012)				X		1	20
Ladouceur et al. (1998)			X			1	20

Ladouceur et al. (2001)		X	X	X			3	60
Ladouceur et al. (2003)		X	X	X			3	60
Larimer et al. (2012)				X			1	20
Lesieur & Blume (1991)			X				1	20
Luquiens et al. (2016)				X			1	20
Marceaux & Melville (2011)		X		X			2	40
McConaghy et al. (1983)			X				1	20
McConaghy et al. (1988)	X						1	20
McConaghy et al. (1991)	X						1	20
Melville et al. (2004a)		X	X				2	40
Meville et al. (2004b)		X					1	20
Milton et al. (2002)			X				1	20
Myrseth et al. (2009)				X			1	20
Oakes et al. (2008)	X						1	20
Oei et al. (2010)		X		X	X		3	60
Oei et al. (2018)				X	X		2	40
Petry et al. (2006)		X	X	X			3	60
Petry et al. (2008)			X	X			2	40
Petry et al. (2009)				X			1	20
Petry et al. (2016)				X			1	20
Riley et al. (2011)	X						1	20
Smith et al. (2010)	X						1	20
Smith et al. (2015)	X						1	20
So et al. (2020)				X			1	20
Sylvain et al. (1997)		X	X	X			3	60
Taber et al. (1987)			X				1	20
Tolchard et al. (2006)	X						1	20
Toneatto & Dragonetti (2008)			X				1	20
Toneatto et al. (2014)				X			1	20
Wong et al. (2015)				X	X		2	40
Wulfert et al. (2006)			X				1	20
Total number of studies included in each meta-analysis	13	11	22	29	9	1.5 (average)	30 (average)	