

Digital Cognitive Bias Modification for Interpretation: Multilevel Meta-Analysis of Interpretation Bias, Anxiety, and Depression Outcomes

Supplementary Materials

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S1. Definitions and brief literature review of the moderator variables

1. Study Characteristics

Due to the stringent inclusion criteria (i.e., published RCTs only), many study-level moderators have not been examined for digital CBM-I in previous meta-analyses, including *publication status* and *risk of bias*. However, the current digital CBM-I literature comprises a considerable variety in terms of these characteristics, which might systematically affect the observed effects in trials.

For instance, though not published in a peer-reviewed journal, some studies still provide detailed examinations of digital CBM-I on various outcomes.¹ Moreover, the risk of bias could be incorporated into the analytic plan without necessarily excluding the high risk studies. Risk of bias assessments provide reliable metrics on this matter, which, then, could be used as a moderator variable. This is a recommended² but rarely employed approach in the CBM literature, which incorporates the risk of bias results in the analytic plan.

2. Sample Characteristics

Clinical Status. CBM-I is still debated whether to be a suitable prevention, prodromal-, or remission-appropriate intervention, or to be an intervention for clinical populations. The recent meta-analyses were limited in testing the role of clinical status of samples since they either did not include symptom outcomes³ or only included clinical samples.^{4,5} Earlier meta-analyses, however, have found clinical status insignificant for symptom outcomes.⁶⁻⁹ One earlier meta-analysis⁸ has found that CBM-I show higher improvement in interpretation bias in clinical samples, while a more recent meta-analysis³ found an opposite finding with healthy samples benefiting from CBM-I more compared to clinical samples. Considering that most of the meta-analyses examined the effects of clinical status are now out of date and none has restricted their examination to digital CBM-I, the meta-analytic examination of this is warranted.

Diagnosis. Many studies examined digital CBM-I on individuals with different diagnoses (e.g.,¹⁰). However, diagnosis still awaits to be examined as a moderator in the context of digital CBM-I, especially to test if effects are disorder-specific.

Age Category. To date, the findings on minors and adults for CBM-I have been in line, both finding significant effects for anxiety^{4,7} with non-significant effects for depression^{4,9} and lower effectiveness for remote delivery compared to in-person.^{5,11} However, the moderation of age category has not been examined specifically for digital CBM-I yet.

3. Training Characteristics

Imagery. Imagery has been argued to enhance the effects of CBM-I through increasing the exposure to the positive ending and its mood amplification properties.¹² As a result, many studies incorporated imagery instructions for CBM-I scenarios to enhance the effects on target mechanism and symptom scores.¹³ Despite the large number of studies that included imagery practice in their digital CBM-I practice,^{10,14} it was only examined meta-analytically by Menne-Lothmann et al. (2014) as a moderator for CBM-I. Imagery has found to increase the effect sizes both for interpretation bias and mood change, supporting its use in CBM-I.⁸ However, it has been a decade since then, and it requires an update incorporating the most recent findings, especially for digital CBM-I.

Dose. Dose in CBM-I research has been referred through different units, including session number, item per session, or their product. Earlier studies have found a significant moderation for dose with larger effect sizes observed for higher doses^{6,8} while this was not confirmed by more recent meta-analyses.^{3-5,7,9,11} However, this examination has not been done in the context of digital delivery only studies.

Training Paradigm. The paradigm used in CBM-I studies show a range, including ambiguous scenarios (AS),¹⁴ Word-Sentence Association Training (WSAT),¹⁵ and morphed faces.¹⁶ While an earlier meta-analysis has found higher effects on interpretation bias for AS⁸, these were not confirmed by more recent meta-analyses.^{3,7} Moreover, training paradigm remains untested for digital CBM-I and for symptom outcomes.

Stimulus Type. This refers to the use of verbal stimulus (e.g., scenarios or word-sentence pairs) or non-verbal stimulus (e.g., faces). Though very similar to training paradigm, it examines the influence of stimulus type on a

different level. Even though there is a heterogeneity in the literature in terms of stimulus type,^{15,16} this was not examined as a moderator for CBM-I previously.

Stimulus Modality. While some studies use completely visual presentation of the session materials,¹⁶ some others use auditory materials (e.g., voice recordings).¹⁰ The previous meta-analyses comparing the different modalities have found no significant moderation.^{3,8} Yet, this remains unexamined for digital CBM-I.

Delivery. To date, all meta-analyses^{3,5,11,17} but one⁴ have found laboratory-delivery to have stronger effects than home-delivery. However, Fodor et al.⁴ have coded delivery setting dichotomously as laboratory vs others, with “others” including home, clinic, or combinations. Especially since delivery at clinics could have higher effects due to researcher-led setting, the composition of the “other” group could have masked the difference between laboratory and home/digital delivery. Despite these findings, more granular examinations, such as examining the potential differences between app-based and web-based delivery are missing. Examining the influence of the heterogeneity within the remote delivery could inform the real-life implementation of digital CBM-I.

Comparator. While some studies do not find any significant moderation of the control condition on interpretation bias,³ other studies have found that it can influence the results especially for symptom outcomes including anxiety⁷ and depression.⁴ More specifically, the effects on anxiety were only significant compared to negative training, and not when compared to neutral or no training.⁷ Similarly, the effects of CBM-I on depression were only significant when compared to waitlist, and not when compared to sham (also known as 50/50 or no contingency training) training.⁴ The latter finding is of particular importance as lately it has been hypothesised that sham training could endorse interpretation flexibility and therefore have some treatment effects.⁵ Yet, the influence of comparators, including sham training, has not been tested specifically for digital CBM-I studies.

S2. Sensitivity to assumed within-study sampling-error correlations

To examine whether the primary findings were sensitive to assumptions concerning sampling-error dependency, the post-treatment between-group meta-analyses were re-estimated using assumed correlations among different outcomes measured concurrently of $\rho = .30, .50, .70$, and $.90$. The follow-up analyses were re-estimated across all combinations of $\rho = .30, .50, .70$, and $.90$ and one-month autocorrelations across repeated follow-up measurements of $\phi = .30, .50, .70, .80$, and $.90$. The primary models assumed $\rho = .50$ at both timepoints and $\phi = .80$ at follow-up.

The direction and statistical significance of the pooled effects were unchanged across all examined specifications, with only minor variation in their estimated magnitude (Table S3). At post-treatment, pooled effects ranged from $g = -0.545$ to -0.522 for interpretation bias, from $g = -0.197$ to -0.189 for anxiety, and from $g = -0.161$ to -0.159 for depression. Across the combinations of ρ and ϕ examined at follow-up, pooled effects ranged from $g = -0.471$ to -0.443 for interpretation bias, from $g = -0.230$ to -0.219 for anxiety, and from $g = -0.173$ to -0.171 for depression. All estimates remained statistically significant across the examined specifications (all $p < .01$), indicating that the findings were robust to alternative assumptions concerning within-study and temporal sampling-error dependency.

S3. Comprehensive summary of primary between-group effect sizes, heterogeneity estimates, and outlier sensitivity analyses

Meta-analyses were conducted at two timepoints—post-treatment and follow-up—and for three outcomes—interpretation bias, anxiety, and depression—resulting in six separate between-group meta-analyses. After Benjamini–Hochberg correction across the six primary meta-analyses, all pooled effects remained statistically significant (BH-adjusted $p < .0001$ for interpretation bias and anxiety at both timepoints; BH-adjusted $p = .0012$ for depression at both timepoints).

The percentages reported below partition the estimated heterogeneity only; they do not incorporate sampling error and are not I^2 statistics. Models without the within-study heterogeneity component could not be estimated for any outcome.

1. Post-Treatment Effects

Interpretation bias. Digital CBM-I significantly improved post-treatment interpretation bias, $g = -0.54$, $SE = 0.05$, 95% CI $[-0.64, -0.43]$, $p < .0001$. The 95% prediction interval included zero $[-1.17, 0.10]$. Variance decomposition within the full model indicated that 99.81% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.1023$) and 0.19% within studies ($\sigma^2 = 0.0002$). Descriptive AIC and BIC comparisons clearly favoured retaining the between-study heterogeneity component; relative to the full model, the model without this component had $\Delta AIC = 223$ and $\Delta BIC = 219$. Ten effect sizes from seven studies were identified as potential outliers. After excluding these effect sizes, the pooled effect remained significant and similar in magnitude, $g = -0.52$, $SE = 0.05$, 95% CI $[-0.61, -0.43]$, $p < .0001$.

Anxiety. Digital CBM-I significantly reduced post-treatment anxiety, $g = -0.19$, $SE = 0.04$, 95% CI $[-0.27, -0.12]$, $p < .0001$. The 95% prediction interval included zero $[-0.51, 0.12]$. Variance decomposition within the full model indicated that 99.50% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.0244$) and 0.50% within studies ($\sigma^2 = 0.0001$). Descriptive AIC and BIC comparisons favoured retaining the between-study heterogeneity component; relative to the full model, the model without this component had $\Delta AIC = 6.53$ and $\Delta BIC = 3.18$. Four effect sizes from four studies were identified as potential outliers. After excluding these effect sizes, the pooled effect remained significant and similar in magnitude, $g = -0.19$, $SE = 0.03$, 95% CI $[-0.26, -0.12]$, $p < .0001$.

Depression. Digital CBM-I significantly reduced post-treatment depression, $g = -0.16$, $SE = 0.04$, 95% CI $[-0.25, -0.07]$, $p = .0012$. The 95% prediction interval included zero $[-0.49, 0.17]$. Variance decomposition within the full model indicated that 99.91% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.0258$) and 0.09% within studies ($\sigma^2 = 0.00002$). Descriptive AIC and BIC comparisons favoured retaining the between-study heterogeneity component; relative to the full model, the model without this component had $\Delta AIC = 6.71$ and $\Delta BIC = 4.49$. Two effect sizes from two studies were identified as potential outliers. After excluding these effect sizes, the pooled effect remained significant and similar in magnitude, $g = -0.15$, $SE = 0.04$, 95% CI $[-0.23, -0.07]$, $p < .001$.

2. Follow-Up Effects

Interpretation bias. At follow-up, digital CBM-I was associated with a significant improvement in interpretation bias, $g = -0.46$, $SE = 0.06$, 95% CI $[-0.58, -0.34]$, $p < .0001$. The 95% prediction interval did not include zero $[-0.72, -0.20]$. Variance decomposition within the full model indicated that 99.84% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.0146$) and 0.16% within studies ($\sigma^2 = 0.00002$). However, descriptive AIC and BIC comparisons favoured the model without the between-study heterogeneity component; relative to this model, the full model had $\Delta AIC = 1.67$ and $\Delta BIC = 3.83$. One effect size was identified as a potential outlier. After its exclusion, the pooled effect remained significant and similar in magnitude, $g = -0.44$, $SE = 0.04$, 95% CI $[-0.53, -0.34]$, $p < .0001$.

Anxiety. At follow-up, digital CBM-I was associated with a significant reduction in anxiety, $g = -0.23$, $SE = 0.04$, 95% CI $[-0.31, -0.15]$, $p < .0001$. The 95% prediction interval did not include zero $[-0.39, -0.06]$. Variance decomposition within the full model indicated that 99.84% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.0054$) and 0.16% within studies ($\sigma^2 = 0.000009$). However, descriptive AIC and BIC comparisons favoured the model without the between-study heterogeneity component; relative to this model, the

full model had $\Delta AIC = 1.60$ and $\Delta BIC = 4.08$. One effect size was identified as a potential outlier. After its exclusion, the pooled effect remained significant and similar in magnitude, $g = -0.22$, $SE = 0.04$, 95% CI $[-0.30, -0.15]$, $p < .0001$.

Depression. At follow-up, digital CBM-I was associated with a significant reduction in depression, $g = -0.17$, $SE = 0.04$, 95% CI $[-0.26, -0.08]$, $p = .0012$. The 95% prediction interval included zero $[-0.35, 0.01]$. Variance decomposition within the full model indicated that 99.74% of the estimated heterogeneity occurred between studies ($\sigma^2 = 0.0062$) and 0.26% within studies ($\sigma^2 = 0.00002$). However, descriptive AIC and BIC comparisons favoured the model without the between-study heterogeneity component; relative to this model, the full model had $\Delta AIC = 1.61$ and $\Delta BIC = 3.48$. One effect size was identified as a potential outlier. After its exclusion, the pooled effect remained significant and similar in magnitude, $g = -0.15$, $SE = 0.04$, 95% CI $[-0.23, -0.08]$, $p < .001$.

S4. Comprehensive summary of moderation analysis findings

Mean age and gender could not be examined as moderators because sufficiently complete group-level data were unavailable. The moderator analyses were based on the primary between-group effect sizes; therefore, study design was not examined as a moderator. Categorical moderators were formally tested only when at least two categories contained five or more independent studies. Categories below this threshold were excluded from the relevant analysis, and the moderator analysis was not conducted when fewer than two eligible categories remained. Randomisation was not examined as a moderator for any outcome (see S3 for the rationale). For each categorical moderator, one omnibus moderator p value was entered into the Benjamini–Hochberg (BH) correction, applied separately within each outcome-by-timepoint family. Subgroup-specific contrasts and their p values were descriptive and were not entered as separate multiplicity tests.

Several moderator analyses could not be conducted because of insufficient studies or insufficient variation across categories. At post-treatment, these were publication status, and stimulus type for interpretation bias; publication status and stimulus type for anxiety; and age category, publication status, delivery method, and stimulus type for depression. At follow-up, clinical status, diagnosis, age category, imagery, comparator type, training paradigm, stimulus type, and stimulus modality could not be examined for interpretation bias; age category, comparator type, training paradigm, and stimulus type could not be examined for anxiety; and diagnosis, age category, comparator type, training paradigm, delivery method, and stimulus type could not be examined for depression. Risk of bias was not examined as a moderator for any follow-up outcome. Publication status had no category variation at follow-up, as all included studies were published. Delivery method also had no category variation for interpretation bias or anxiety at follow-up, as all included studies were web-delivered; for follow-up depression, the mobile app delivery category contained fewer than five studies.

Nine moderator tests reached nominal significance before multiplicity correction: comparator type for post-treatment interpretation bias; diagnosis for post-treatment anxiety; clinical status, diagnosis, imagery, and stimulus modality for post-treatment depression; diagnosis for follow-up anxiety; and imagery and stimulus modality for follow-up depression. Of these, only clinical status and stimulus modality for post-treatment depression remained significant following BH correction. All other formal moderator tests were non-significant before correction.

1. Interpretation bias

Post-Treatment Effects. Comparator type was nominally significant at the omnibus level, although it did not remain significant following BH correction ($p = .0382$; BH-adjusted $p = .4579$). Effects were smaller in studies using sham comparators ($g = -0.34$, $SE = 0.05$) than in studies using neutral CBM comparators ($g = -0.53$, $SE = 0.06$); within the omnibus model, the sham-versus-neutral contrast was $b = 0.195$, $SE = 0.040$, $p = .0101$. Training paradigm, dose, number of sessions, items per session, clinical status, diagnosis, risk of bias, age category, imagery, delivery method, and stimulus modality also did not significantly moderate post-treatment interpretation-bias effects.

Follow-up Effects. None of the moderators that could be examined significantly moderated interpretation-bias effects at follow-up. Follow-up duration was not associated with effect magnitude, $b = 0.0024$, $SE = 0.0032$, 95% CI $[-0.0176, 0.0224]$, $p = .548$. Dose, number of sessions, and items per session were also non-significant.

2. Anxiety

Post-Treatment Effects. Diagnosis was nominally significant, although it did not remain significant following BH correction. Studies involving general anxiety diagnoses showed a larger estimated effect ($g = -0.28$, $SE = 0.04$) than studies involving diagnoses classified as other ($g = -0.02$, $SE = 0.07$; $b = 0.263$, $SE = 0.083$, $p = .0083$; BH-adjusted $p = .1001$). Diagnosis categories represented by fewer than five independent studies were excluded from this comparison. Dose, number of sessions, items per session, clinical status, risk of bias, age category, imagery, comparator type, training paradigm, delivery method, and stimulus modality did not significantly moderate post-treatment anxiety effects.

Follow-up Effects. Diagnosis was nominally significant at follow-up, although it did not remain significant following BH correction. Studies involving general anxiety diagnoses showed a larger estimated effect ($g = -0.30$, $SE = 0.04$) than studies involving diagnoses classified as other ($g = -0.08$, $SE = 0.06$; $b = 0.213$, $SE = 0.075$, $p = .0237$; BH-adjusted $p = .1897$). Clinical status, imagery, stimulus modality, dose, number of sessions, and items

per session did not significantly moderate follow-up anxiety effects. Follow-up duration was also not a significant moderator, $b = 0.0058$, $SE = 0.0022$, 95% CI $[-0.0008, 0.0124]$, $p = .069$.

3. Depression

Post-Treatment Effects. Clinical status and stimulus modality significantly moderated post-treatment depression effects following BH correction. For clinical status, the analysis included the eligible subclinical and clinical categories; the healthy category was excluded because it contained fewer than five independent studies. Effects were smaller in subclinical samples ($g = -0.08$, $SE = 0.06$) than in clinical samples ($g = -0.33$, $SE = 0.06$; $b = -0.251$, $SE = 0.082$, $p = .0068$; BH-adjusted $p = .0338$). Effects were also smaller for visual delivery ($g = -0.10$, $SE = 0.05$) than for auditory delivery ($g = -0.34$, $SE = 0.05$; $b = -0.241$, $SE = 0.071$, $p = .0060$; BH-adjusted $p = .0338$).

Diagnosis and imagery were nominally significant moderators but did not remain significant following BH correction. In the restricted diagnosis analysis, estimated effects were largest in studies involving depression diagnoses ($g = -0.37$, $SE = 0.09$), followed by general anxiety diagnoses ($g = -0.22$, $SE = 0.09$), and smallest in diagnoses classified as other ($g = -0.07$, $SE = 0.05$); the omnibus test yielded $p = .0446$ and BH-adjusted $p = .1114$. Effects were also larger when imagery was used ($g = -0.20$, $SE = 0.05$) than when it was absent ($g = -0.06$, $SE = 0.05$; $b = -0.145$, $SE = 0.064$, $p = .0433$; BH-adjusted $p = .1114$). Dose, number of sessions, items per session, risk of bias, comparator type, and training paradigm did not significantly moderate post-treatment depression effects.

Follow-up Effects. Imagery and stimulus modality were nominally significant moderators of follow-up depression effects, although neither remained significant following BH correction. Effects were smaller when imagery was absent ($g = -0.05$, $SE = 0.05$) than when imagery was used ($g = -0.22$, $SE = 0.05$; $b = -0.174$, $SE = 0.061$, $p = .0239$; BH-adjusted $p = .0946$). Effects were also smaller for visual delivery ($g = -0.12$, $SE = 0.06$) than for auditory delivery ($g = -0.30$, $SE = 0.03$; $b = -0.180$, $SE = 0.067$, $p = .0270$; BH-adjusted $p = .0946$).

Clinical status did not significantly moderate follow-up depression effects, although the estimated effect was numerically larger in clinical samples ($g = -0.23$, $SE = 0.06$) than in subclinical samples ($g = -0.15$, $SE = 0.06$), $b = -0.080$, $SE = 0.088$, $p = .383$; BH-adjusted $p = .537$. Dose, number of sessions, and items per session were also non-significant. Follow-up duration did not significantly moderate depression effects, $b = -0.0019$, $SE = 0.0031$, 95% CI $[-0.0117, 0.0079]$, $p = .582$.

Table S1. Summary of the characteristics studies (n = 73) included in meta-analysis

Category	Characteristic	n / descriptive value
Randomisation	Randomised	63
	Non-randomised	10
Publication	Published	65
	Unpublished	8
Publication Year	Before 2010	1
	2010–2015	13
	2016–2020	18
	2021–2026	41
Country	USA	21
	UK	14
	China	11
	Australia	9
	Netherlands	7
	Iran	2
	Japan	2
	Germany	1
	Germany and the Netherlands	1
	Germany and Switzerland	1
	New Zealand	1
	The Netherlands and Belgium	1
	Turkey	1
	Switzerland	1
Sample type	Adults	62
	Minors	10
	Mixed minors and adults	1
Clinical status	Subclinical	43
	Clinical	21
	Healthy/no clinical status	9
Diagnostic focus	Anxiety disorders	43
	Other disorders	14
	No diagnosis	9
	Depression	5
	Comorbid anxiety and depression	3
Delivery	Web	61
	Mobile App	12
Sessions	Range 1–56 sessions; median = 7; 70 studies with usable data	—
	≥6 sessions	43

	2–5 sessions	15
	1 session	12
	Missing or invalid	3
<i>Items per session</i>	Range 14–160; median = 42 across 69 unique study–item configurations from 65 studies	—
<i>Stimulus type</i>	Verbal	69
	Non-verbal	3
	Both	2
<i>Stimulus modality</i>	Visual	62
	Auditory	10
	Both	2
<i>Paradigm</i>	Ambiguous scenarios	64
	Other paradigms	8
	Both	2
<i>Imagery</i>	Present	52
	Absent	23
<i>Control condition</i>	Neutral CBM-I	17
	Sham training	17
	Other/unspecified	14
	WL/TAU	11
	None/no comparator	10
	Unresolved ambiguity	8
	No-task comparator	7
	Negative training	2
<i>Follow-up</i>	Interpretation bias	2–29 weeks; M = 8.45, Md = 7, SD = 6.44
	Anxiety	2–52 weeks; M = 11.60, Md = 8, SD = 9.78
	Depression	2–52 weeks; M = 11.80, Md = 8, SD = 9.96

Note. Counts may exceed 73 within some characteristics because individual studies could include multiple intervention conditions differing in imagery, paradigm, stimulus type, stimulus modality, or comparator type. Country labels were harmonised by combining “UK” and “United Kingdom” and standardising country-name capitalisation.

Table S2. Sample size for each time point in the meta-analysis

Time point	Group	n
<i>Baseline</i>	Total	10,870
	CBM-I	5,958
	Control	4,912
<i>Post-treatment</i>	Total	8,310
	CBM-I	4,643
	Control	3,667
<i>Follow-up</i>	Total	3,637
	CBM-I	2,021
	Control	1,616

Table S3. Sensitivity of the primary between-group pooled effects to assumed within-study sampling-error correlations

Outcome	φ	$\rho = .30$	$\rho = .50$	$\rho = .70$	$\rho = .90$
Post-Treatment					
Interpretation bias	NA	−0.545 [−0.646, −0.444]	−0.537 [−0.639, −0.435]	−0.533 [−0.633, −0.433]	−0.522 [−0.623, −0.421]
Anxiety	NA	−0.197 [−0.271, −0.123]	−0.194 [−0.267, −0.121]	−0.191 [−0.263, −0.119]	−0.189 [−0.257, −0.121]
Depression	NA	−0.161 [−0.252, −0.071]	−0.159 [−0.250, −0.068]	−0.160 [−0.252, −0.068]	−0.161 [−0.254, −0.068]
Follow-Up Effects					
Interpretation bias	.30	−0.470 [−0.601, −0.339]	−0.459 [−0.578, −0.339]	−0.444 [−0.541, −0.348]	−0.447 [−0.547, −0.348]
	.50	−0.470 [−0.601, −0.339]	−0.459 [−0.579, −0.339]	−0.444 [−0.541, −0.347]	−0.447 [−0.547, −0.348]
	.70	−0.470 [−0.602, −0.339]	−0.460 [−0.581, −0.338]	−0.444 [−0.543, −0.344]	−0.447 [−0.549, −0.345]
	.80	−0.471 [−0.603, −0.338]	−0.460 [−0.583, −0.337]†	−0.443 [−0.544, −0.342]	−0.447 [−0.550, −0.343]
	.90	−0.471 [−0.604, −0.338]	−0.460 [−0.584, −0.336]	−0.443 [−0.547, −0.340]	−0.446 [−0.552, −0.341]
Anxiety	.30	−0.223 [−0.306, −0.140]	−0.221 [−0.304, −0.139]	−0.219 [−0.302, −0.136]	−0.223 [−0.305, −0.142]
	.50	−0.224 [−0.306, −0.142]	−0.222 [−0.304, −0.140]	−0.220 [−0.302, −0.138]	−0.224 [−0.304, −0.144]
	.70	−0.226 [−0.307, −0.145]	−0.224 [−0.305, −0.144]	−0.222 [−0.302, −0.143]	−0.225 [−0.302, −0.147]
	.80	−0.228 [−0.308, −0.147]	−0.226 [−0.306, −0.147]†	−0.224 [−0.303, −0.145]	−0.225 [−0.302, −0.148]
	.90	−0.230 [−0.310, −0.149]	−0.228 [−0.307, −0.149]	−0.226 [−0.303, −0.149]	−0.226 [−0.303, −0.149]
Depression	.30	−0.173 [−0.262, −0.083]	−0.173 [−0.262, −0.083]	−0.173 [−0.262, −0.083]	−0.173 [−0.262, −0.083]
	.50	−0.172 [−0.262, −0.082]	−0.172 [−0.262, −0.082]	−0.172 [−0.262, −0.082]	−0.172 [−0.262, −0.082]
	.70	−0.171 [−0.264, −0.079]	−0.171 [−0.264, −0.079]	−0.171 [−0.264, −0.079]	−0.171 [−0.264, −0.079]
	.80	−0.171 [−0.264, −0.077]	−0.171 [−0.264, −0.077]†	−0.171 [−0.264, −0.077]	−0.171 [−0.264, −0.077]
	.90	−0.171 [−0.266, −0.075]	−0.171 [−0.266, −0.075]	−0.171 [−0.266, −0.075]	−0.171 [−0.266, −0.075]

Note. Values are Hedges's [95% CR2 confidence interval]. At post-treatment, ρ denotes the assumed sampling-error correlation among outcomes measured concurrently. At follow-up, φ denotes the assumed one-month autocorrelation across repeated follow-up occasions. †Primary specification: $\rho = .50$ at post-treatment and $\rho = .50$, $\varphi = .80$ at follow-up. Negative values favour digital CBM-I. All estimates remained statistically significant (all $p < .01$).

Table S4. Pooled within-group change effect sizes for cbm-i group on interpretation bias, anxiety, and depression at post-treatment

Outcome	<i>g</i>	SE	95% CI
Interpretation bias	−0.83	0.06	[−0.95, −0.72]
Anxiety	−0.54	0.05	[−0.63, −0.44]
Depression	−0.45	0.05	[−0.56, −0.35]

Table S5. Characteristics of the studies (n = 74) included in the systematic review

<i>Study</i>	<i>Outcome(s)*</i>	<i>Timepoints†</i>	<i>Sample Sizes‡</i>	<i>Age Mean §</i>	<i>Female %</i>	<i>Clinical Status</i>	<i>Diagnosis (if applicable)</i>	<i>Comparator</i>	<i>Training Paradigm</i>	<i>Imagery</i>	<i>Delivery</i>	<i>Dose (Session Number x Item Per Session)</i>	<i>Publication Status</i>
<i>Abado et al. 2026¹⁸</i>	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (2 Weeks)	1. CBM-I (n = 44) 2. Control (n = 44)	24.23	84.10	Subclinical	Anxiety	Sham	AS	No	Web	270	Published
<i>Antognelli et al. 2020¹⁹</i>	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (3 Weeks)	1. CBM-I (n = 43) 2. Control (n = 46)	22.96	77.50	Subclinical	Anxiety	Sham	AS	No	Web	100	Published
<i>Beard et al. 2021²⁰</i>	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. CBM-I (n = 14)	35	64.00	Clinical	Comorbid	NA	AS	Yes	Phone	NA	Published
<i>Beard et al. 2022²¹</i>	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (8 Weeks)	1. CBM-I (n = 14)	44.36	85.71	Subclinical	Anxiety	NA	Other	No	Phone	960	Published
<i>Bouwman et al. 2025²²</i>	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 50) 2. Neutral CBM-I (n = 50)	Not Retrieved	100.00	Subclinical	Anxiety	Neutral CBM-I	AS	No	Web	40	Published
<i>Brettschneider et al. 2015²³</i>	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (14 Weeks)	1. CBM-I (n = 39)	35.30	64.10	Clinical	Anxiety	NA	AS	Yes	Web	NA	Published
<i>Butler et al. 2015²⁴</i>	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-Up (3 Weeks)	1. Positive CBM-I + C-CBT (n = 20) 2. Neutral CBM-I + C-CBT (n = 20)	24.13	70.00	Subclinical	Anxiety	Neutral CBM-I	AS	Yes	Web	120	Published
<i>Cartwright et al. 2025²⁵</i>	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks)	1. CBM-I (n = 35) 2. Unresolved Ambiguity (n = 32)	Not Retrieved	100.00	Subclinical	Other	Unresolved Ambiguity	AS	Yes	Web	300	Published

3. Follow-up (16 Weeks)													
<i>Clarke 2018 (1; Study 6)</i> ²⁶	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 28) 2. Control (n = 31)	24.53	69.49	Subclinical	Anxiety	Neutral CBM-I	AS	Yes	Web	180	Unpublished
<i>Clarke 2018 (2; Study 7)</i> ²⁶	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. CBM-I Positive (n = 21) 2. Exercise (n = 21) 3. CBM-I + Exercise (n = 22) 4. CBM-I Neutral (n = 18)	27.02	56.10	Subclinical	Anxiety	1. Neutral CBM-I 2. Other/unspecified	AS	Yes	Web	180	Unpublished
<i>Cougle et al. 2017</i> ²⁷	1. Interpretation Bias 2. Depression	1. Post-Treatment 2. Follow-up (8 Weeks)	1. IBM-H (n = 30) 2. HVC (n = 28)	40.71	68.97	Clinical	Other	Unspecified (Other)	AS	Yes	Web	512	Published
<i>Cougle et al. 2020</i> ²⁸	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (16 Weeks)	1. CBM-I (n = 31) 2. PMR (n = 33)	29.50	71.88	Clinical	Anxiety	Unspecified (Other)	AS	Yes	Web	1120	Published
<i>Curtis 2013</i> ²⁹	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (5 Weeks)	1. CBM-I (n = 8)	15.50	75.00	Clinical	Anxiety	NA	AS	Yes	Web	210	Unpublished
<i>Daniel et al. 2020</i> ³⁰	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 51) 2. EMA-only (n = 55)	20.44	73.60	Subclinical	Anxiety	No Task	AS	No	Phone	180	Published
<i>de Voogd et al. 2017</i> ³¹	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (16 Weeks) 3. Follow-up (30 Weeks)	1. Scenario Training (n = 36) 2. Picture-Word Training (n = 44) 3. Control (n = 39)	15.64	63.04	Subclinical	Comorbid	Neutral CBM-I	AS	Yes	Web	1. 480 (Scenarios Training) 2. 336 (Picture-Word Training)	Published
<i>de Voogd et al. 2018</i> ³²	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (16 Weeks) 3. Follow-up (30 Weeks)	1. CBM-I (n = 134) 2. Placebo (n = 39)	14.35	60.69	Healthy	Healthy	Neutral CBM-I	AS	Yes	Web	336	Published
<i>Derin & Yorulmaz 2022</i> ³³	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks)	1. iCBM-I (n = 28) 2. iCBM-A (n = 28)	26.38	85.00	Subclinical	Anxiety	WL/TAU	AS	No	Web	288	Published

			3. iCBM-C (n = 32) 4. WLC (n = 29)										
<i>Dietel et al. 2020</i> ³⁴	1. Interpretation Bias 2. Depression	1. Post-Treatment 2. Follow-up (3 Weeks) 3. Follow-up (6 Weeks)	1. CBM-I (n = 107) 2. ICC (n = 107) WLC (n = 104)	23.09	91.49	Subclinical	Other	1. Other Unspecified (ICC as WSAP task without feedback) 2. WL/TAU	Other	No	Web	630	Published
<i>Dillon et al. 2023</i> ³⁵	1. Interpretation Bias	1. Post-Treatment	1. CBM-I (n = 13)	58.62	23.17	Clinical	Anxiety	NA	AS	Yes	Phone	512	Published
<i>Dillon et al. 2026</i> ³⁶	1. Interpretation Bias 2. Depression	1. Post-Treatment 2. Follow-up (16 Weeks)	1. MARI (n = 16) 2. Mindfulness app (n = 14)	51.19	16.65	Clinical	Anxiety	Unspecified (Other)	AS	Yes	Phone	719.46	Published
<i>Dodd et al. 2022</i> ³⁷	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks)	1. CBM-I (n = 84) 2. Relaxation (n = 83)	19.00	80.90	Subclinical	Other	Unspecified (Other)	AS	No	Web	112	Published
<i>Duijzings et al. 2024</i> ³⁸	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. CBM-I (n = 57) 2. Sham (n = 70)	Not Retrieved	Not Retrieved	Subclinical	Other	Sham	AS	No	Web	48	Published
<i>Eberle et al. 2023</i> ³⁹	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (6 Weeks)	1. Positive CBM-I + Negation (n = 149) 2. Positive CBM-I (n = 177) 3. Sham Blocked (n = 151) 4. Sham Random (n = 176) 5. Neutral CBM-I (n = 318)	40.42	73.28	Subclinical	Other	1. Sham (Blocked and Random) 2. Neutral CBM-I	AS	Yes	Web	160	Published
<i>Eberle et al. 2024</i> ⁴⁰	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (13 Weeks)	1. CBM-I LR (n = 287) 2. CBM-I HR (n = 263) 3. CBM-I HR + Coaching (n = 281) 4. Psychoeducation (n = 240)	37.20	81.92	Subclinical	Anxiety	Unspecified (Other)	AS	Yes	Web	200	Published

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<i>Edwards et al. 2018</i> ⁴¹	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 123) 2. Neutral CBM-I (n = 122) 3. Sham (n = 134)	32.90	67.25	Clinical	Anxiety	1. Neutral CBM-I 2. Sham	AS	Yes	Web	70	Published
<i>Feng 2020</i> ^{42¶}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Unpublished
<i>Hampson 2014</i> ⁴³	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (2 Weeks)	1. CBM-I (n = 6)	34.80	33.33	Clinical	Anxiety	NA	AS	Yes	Web	350	Unpublished
<i>Hirsch et al. 2018</i> ⁴⁴	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (7 Weeks)	1. CBM_RNT (n = 43) 2. CBM_STAND (n = 44) 3. Control (n = 44)	30.03	Not Retrieved	Clinical	1. Anxiety 2. Depression	Unresolved Ambiguity	AS	Yes	Web	500	Published
<i>Hirsch et al. 2020</i> ⁴⁵	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks)	1.CBM_ENH (n = 53) 2.CBM_RNT (n = 54) 3.Control (n = 54)	Not Retrieved	Not Retrieved	Subclinical	Anxiety	Unresolved Ambiguity	AS	Yes (only in CBM_ENH condition)	Web	500	Published
<i>Hirsch et al. 2021</i> ⁴⁶	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks) 3. Follow-up (16 Weeks)	1. CBM-I (n = 111) 2. Control (n = 103)	34.76	89.90	Clinical	Anxiety	Unresolved Ambiguity	AS	Yes	Web	400	Published
<i>Hoid et al. 2023</i> ⁴⁷	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 34) 2. No Task (n = 29) 3. Sham (n = 31)	22.40	76.33	Subclinical	Anxiety	1. No Task 2. Sham	AS	Yes	Phone	2,800	Published
<i>Hoppitt et al. 2014</i> ⁴⁸	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (6 Weeks)	1. CBM-I (n = 35) 2. Placebo Control (n = 34)	Not Retrieved	Not Retrieved	Healthy	Healthy	Unspecified (Other)	AS	Yes	Web	130	Published
<i>Hughes et al. 2026</i> ⁴⁹	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (8 Weeks) 3. Follow-up (20 Weeks)	1. FLEX CBM-I (n = 66) 2. Matched control (n = 65)	51.50	74.05	Clinical	Other	Unresolved Ambiguity	AS	Yes	Web	360	Published

<i>Ji et al. 2021</i> ⁵⁰	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. Positive CBM-I (n = 252) 2. 50-50 CBM-I (n = 265) 3. No-training Control (n = 290)	33.23	72.24	Subclinical	Comorbid	1. Sham 2. No Task	AS	Yes	Web	320	Published
<i>Lam et al. 2025</i> ⁵¹	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 36) 2. Neutral CBM-I (n = 36)	24.53	38.89	Subclinical	Anxiety	Neutral CBM-I	AS	Yes	Web	90	Published
<i>Larrazabal et al. 2024</i> ⁵²	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (8 Weeks) 3. Follow-up (24 Weeks)	1. Standard CBM-I (40 items per session) (n = 135) 2. CBM-I with 30 Scenarios (n = 153) 3. CBM-I + Psychoeducation (n = 156) 4. CBM-I + write-your-own-scenario (n = 138) 5. Psychoeducation control (n = 143)	Not Retrieved	77.38	Subclinical	Anxiety	Unspecified (Other)	AS	Yes	Web	1. 200 (for standard CBM-I) 2. 150 (for CBM-I with 30 items)	Published
<i>Liao et al. 2022</i> ⁵³	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	CBM-I (n = 28) Control Group (n = 25)	36.88	41.86	Healthy	NA	No Task	AS	No	Phone	1500	Published
<i>Lin et al. 2026</i> ⁵⁴	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. Text-Only CBM-I (n = 33) 2. No-Character CBM-I (n = 38) 3. Character CBM-I (n = 36) 4. Neutral CBM-I/Control (n = 31)	25.10	Not Retrieved	Subclinical	Depression	Neutral CBM-I	AS	Yes	Web	98	Published
<i>Mao et al. 2023</i> ⁵⁵	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	Positive FIBM (n = 46) Negative FIBM (n = 46) Accurate FIBM (n = 48)	15.26	64.29	Subclinical	Anxiety	Waitlist/TAU	AS	Yes	Phone	320	Published

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<i>McNally 2014</i> ⁵⁶	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (2 Weeks)	1. CBM-I (n = 7)	42.29	71.43	Subclinical	Anxiety	NA	AS	Yes	Web	350	Unpublished
<i>Mousavi et al. 2025</i> ⁵⁷	1. Interpretation Bias	1. Post-Treatment	1. CBM-I (n = 42) 2. No Task (n = 42)	Not Retrieved	63.10	Subclinical	Other	No Task	AS	No	Phone	250	Published
<i>Namaky et al. 2021</i> ⁵⁸	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (3 Weeks)	1. Positive CBM-I (n = 50) 2. Positive + Negation (n = 58) 3. Neutral CBM-I (n = 43) 4. Sham (n = 45)	20	65.86	Subclinical	Other	1. Neutral CBM-I 2. Sham	AS	Yes	Web	192	Published
<i>Nasiry et al. 2020</i> ⁵⁹	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (10 Weeks)	1. CBM-I (n = 18) 2. Placebo (n = 17)	9.43	54.29	Clinical	Anxiety	Unresolved Ambiguity	AS	Yes	Web	200	Published
<i>Peters et al. 2017</i> ⁶⁰	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. FIBM (n = 52) 2. Sham-FIBM (n = 52)	24.47	70.19	Healthy	NA	Unspecified (Other)	AS	No	Web	180	Published
<i>Pictet et al. 2016</i> ⁶¹	1. Interpretation Bias 2. Depression	1. Post-Treatment 2. Follow-up (3 Weeks)	1. Imagery CBM-I (n = 34) 2. Sham (n = 34) 3. Waitlist (n = 33)	26.30	79.09	Subclinical	Depression	1. Sham 2. WL/TAU	AS	Yes	Web	256	Published
<i>Pradhan et al. 2025</i> ⁶²	1. Anxiety 2. Depression	1. Post-Treatment 2. Follow-up (4 Weeks)	1. Cancer-specific CBM (n = 60) 2. Pain-related CBM (n = 58) 3. Sham (n = 56)	Not Retrieved	Not Retrieved	Clinical	Other	Sham	1. Other (Cancer-specific CBM) 2. AS (Pain-related CBM)	1. No (Cancer-specific CBM) 2. Yes (Pain-related CBM)	Web	1. 640 (Cancer-specific CBM) 2. 120 (Pain-related CBM)	Published
<i>Reuland & Teachman 2015</i> ⁶³	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (4-8 Weeks)	1. CBM-I (n = 6)	13.57	50.00	Clinical	Anxiety	NA	AS	Yes	Web	400	Published
<i>Riddleston et al. 2023</i> ⁶⁴	1. Interpretation Bias	1. Post-Treatment	1. CBM-I (n = 29) 2. Control (n = 27)	21.57	83.93	Subclinical	Other	Unresolved Ambiguity	AS	Yes	Web	50	Published
<i>Rogers & Sicouri 2022</i> ⁶⁵	1. Interpretation Bias	1. Post-Treatment	1. CBM-IA (n = 23)	19.67	55.00	Subclinical	Anxiety	Neutral CBM-I	AS	Yes	Web	50	Published

	2. Anxiety 3. Depression	2. Follow-up (2 Weeks)	2. Control (n = 21)										
<i>Salemink et al. 2009</i> ⁶⁶	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 17) 2. Control (n = 17)	21.30	Not Retrieve d	Subclinical	Anxiety	Sham	AS	Yes	Web	832	Published
<i>Salemink et al. 2014 (Study 1)</i> ⁶⁷	1. Anxiety 2. Depression	1. Post-Treatment 2. Follow-up (13 Weeks)	1. CBM-I (n = 18) 2. Control (n = 18)	40.25	72.22	Clinical	Anxiety	Sham	AS	Yes	Web	832	Published
<i>Salemink et al. 2014 (Study 2)</i> ⁶⁷	1. Anxiety 2. Depression	1. Post-Treatment 2. Follow-up (13 Weeks)	1. CBM-I (n = 18) 2. Control (n = 19)	37.54	70.27	Clinical	Anxiety	Neutral CBM- I	AS	Yes	Web	832	Published
<i>Salemink et al. 2015</i> ⁶⁸	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment	1. CBM-I + TAU (n = 9) 2. Placebo + TAU (n = 7)	15.38	62.50	Clinical	Anxiety	WL/TAU	AS	No	Web	432	Published
<i>Sharpe et al. 2023</i> ⁶⁹	1. Anxiety 2. Depression	1. Post-Treatment 2. Follow-up (4 Weeks)	1. CBM-I + PE (n = 73) 2. CBM-I – PE (n = 74) 3. Placebo + PE (n = 74) 4. Placebo – PE (n = 67)	49.44	85.23	Subclinical	Other	Unresolved Ambiguity	AS	Yes	Web	120	Published
<i>Silverman et al. 2024</i> ⁷⁰	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. English CBM-I (n = 8) 2. Spanish CBM-I (n = 4) 3. Bilingual CBM- I (n = 12)	NA	60.00	Subclinical	Anxiety	NA	AS	Yes	Web	80	Unpublished
<i>Steinman & Teachman 2015</i> ⁷¹	1. Interpretation Bias	1. Post-Treatment	1. CBM-0 (n = 70) 2. CBM-1 (n = 70) 3. CBM-2 (n = 70) 4. CBM-3 (n = 70) 5. Control	Not Retrie ved	64.86	Healthy	NA	Sham	AS	Yes	Web	36	Published
<i>Steinman et al. 2021</i> ⁷²	1. Interpretation Bias	1. Post-Treatment	1. %100 Positive (n = 59) 2. Imagery only/audio (n = 63) 3. Anxious Imagery (n = 68)	27.52	75.91	Subclinical	Anxiety	1. Attention Switching 2. Neutral CBM-I 3. No Task 4. Sham 5. Other (Unspecified)	AS	Yes	Web	70	Published

4. Intention Implementation (n = 81)
5. Generate positive ending (n = 67)
6. Group of words (n = 77)
7. Monetary Reward (n = 71)
8. Sham (n = 64)
9. Reframing negative events (n = 72)
10. Adding Pictures (n = 61)
11. Matching Facial Expressions (n = 75)
12. Attention Switching (n = 74)
13. Neutral CBM-I (n = 67)
14. No Task (n = 73)

<i>Terashima & Sensui 2024 (Study 1)</i> ⁷³	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (5 Weeks)	1. CBM-I (n = 20) 2. Control (n = 18)	18.92	63.16	Subclinical	Anxiety	WL/TAU	AS	Yes	Web	98	Published
<i>Terashima & Sensui 2024 (Study 2)</i> ⁷³	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (5 Weeks)	1. CBM-I (n = 34) 2. Control (n = 21)	19.07	81.82	Subclinical	Other	WL/TAU	AS	Yes	Web	242	Published
<i>Tsai et al. 2024</i> ⁷⁴	1. Interpretation Bias	1. Post-Treatment 2. Follow-up (2 Weeks)	1. CBM-I (n = 34) 2. Control (n = 34)	20.42	76.05	Healthy	NA	Unspecified (Other)	AS	No	Web	67	Published
<i>Vrinzen et al. 2026</i> ⁷⁵	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. Positive CBM-I (n = 137) 2. Negative training (n = 137)	Not Retrieved	Not Retrieved	Healthy	Healthy	Negative Training	AS	No	Web	40	Published
<i>van Wie 2022</i> ⁷⁶	1. Anxiety 2. Depression	1. Post-Treatment	1. CBM-I (n = 56) 2. Control (n = 53)	14.59	50.24	Subclinical	Other	Waitlist/TAU	Other	No	Phone	992	Unpublished

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<i>Wheeler et al. 2023</i> ⁷⁷	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 46) 2. Control (n = 46)	22.87	63.04	Healthy	NA	Negative Training	Other	Yes	Web	30	Unpublished
<i>Williams et al. 2013</i> ⁷⁸	1. Interpretation Bias 2. Depression	1. Post-Treatment	1. CBM-I (n = 38) 2. Control (n = 31)	44.76	76.19	Clinical	Depression	WL/TAU	AS	Yes	Web	448	Published
<i>Williams et al. 2015</i> ⁷⁹	1. Interpretation Bias 2. Depression	1. Post-Treatment	1. CBM-I (n = 36) 2. Control (n = 39)	41.82	73.33	Clinical	Depression	Sham	AS	Yes	Web	448	Published
<i>Wilver & Cougle 2019</i> ⁸⁰	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (16 Weeks)	1. CBM-I (n = 25) 2. PMR (n = 25)	28.52	84.00	Subclinical	Anxiety	Unspecified (Other)	Both	Yes	Web	712	Published
<i>Wolfe et al. 2026</i> ⁸¹	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (9 Weeks)	1. MindTrails Teen (n = 15)	15.14	21.43	Subclinical	Anxiety	NA	AS	Yes	Phone	NA	Published
<i>Wolters et al. 2021</i> ⁸²	1. Anxiety	1. Post-Treatment	1. CBM-I (n = 40) 2. Control (n = 39)	13.60	46.00	Clinical	Anxiety	WL/TAU	AS	No	Web	288	Published
<i>Wu et al. 2024</i> ⁸³	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (7 Weeks)	1. CBM-I (n = 30) 2. Neutral CBM-I (n = 30) 3. Waitlist/TAU (n = 30)	21.15	63.90	Subclinical	Anxiety	1. Neutral CBM-I 2. No Task	Both	Yes	Web	NA	Published
<i>Xiayu et al. 2024</i> ⁸⁴	1. Interpretation Bias 2. Anxiety 3. Depression	1. Post-Treatment 2. Follow-up (7 Weeks)	1. CBM-I (n = 76) 2. Sham (n = 76) 3. No Task (n = 76)	22.38	62.30	Subclinical	Anxiety	1. Sham 2. Waitlist/TAU	AS	Yes	Web	120	Published
<i>Xiran Sun et al. 2019</i> ⁸⁵	1. Interpretation Bias 2. Anxiety	1. Post-Treatment 2. Follow-up (8 Weeks)	1. CBM-I (n = 19) 2. Control (n = 19)	21.26	81.58	Subclinical	Anxiety	Sham	AS	No	Web	640	Published
<i>Yang et al. 2017</i> ⁸⁶	1. Interpretation Bias	1. Post-Treatment	1. CBM-I (n = 20) 2. CBM-A (n = 20) 3. AIM (n = 16) 4. Control (n = 20)	Not Retrieved	75.00	Subclinical	Anxiety	Unspecified (Other)	Other	No	Phone	160	Published
<i>Zeng et al. 2024</i> ⁸⁷	1. Interpretation Bias	1. Post-Treatment	1. CBM-I (n = 61)	13.74	53.72	Healthy	NA	Neutral CBM-I	Other	No	Web	320	Published

		2. Follow-up (5 Weeks)	2. Neutral CBM-I (n = 60)										
<i>Zhang et al. 2026⁸⁸</i>	1. Interpretation Bias 2. Anxiety	1. Post-Treatment	1. CBM-I (n = 31) 2. Neutral CBM-I (n = 31)	20.52	63.98	Subclinical	Anxiety	Neutral CBM-I	Other	No	Web	NA	Published

Note. *Only the outcomes that were used in this study were included, all of which include pre- and post-treatment assessment scores. Even some studies also assessed other variables that are written in the table, but they either did not include pre- or post-treatment scores or they were out of scope (i.e., the scope of this study was limited with interpretation bias, anxiety, and depression). †All follow-up durations refer to the time between baseline and the follow-up assessment. Also, the follow-up assessment point as added only for those of data were retrieved ‡Please note that the sample sizes shared here is at T0 (baseline), however the meta-analysis was conducted based on both T1 (when computing post-treatment effect sizes) and T0 (when computing pre-treatment baseline differences to control for it) §Due to multiple control groups for some studies, the age mean of CBM-I group is shared. ¶Indicates that the paper was included in the systematic review but not in the meta-analyses due to essential data missing. NA = Not Applicable, PE=Psychoeducation, AS=Ambiguous Scenarios, WL/TAU=Waitlist/Treatment as Usual, Sham=50% Positive, 50% Negative Endings

Table S6. Subgroup analysis table showing the effect sizes, related statistics, and significance for each category/group

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
Post-Treatment Effects						
Interpretation Bias						
<i>Dose</i>	Per one-unit increase	55(313)	0.000033	0.000129	0.26(8.78)	.802
<i>Session Number</i>	Per additional session	57(324)	-0.0140	0.0145	-0.97(4.71)	.381
<i>Items Per Session</i>	Per additional item	52(304)	0.00223	0.00191	1.17(7.67)	.279
<i>Clinical Status</i>	Healthy	9(20)	-0.44	0.15	-2.94(7.85)	.019
	Subclinical	36(273)	-0.55	0.06	-9.31(33.83)	< .001
	Clinical	12(31)	-0.57	0.13	-4.43(10.39)	.001
<i>Diagnosis</i>	No Diagnosis	9(20)	-0.44	0.15	-2.94(7.86)	.019
	Anxiety (General)	31(233)	-0.58	0.06	-9.99(28.65)	< .001
	Depression	5(12)	-0.43	0.11	-3.80(3.79)	.021
	Comorbid	2(16)	N/A	N/A	N/A	N/A
	Other	11(43)	-0.62	0.15	-4.15(9.78)	.002
<i>Risk of Bias</i>	Low Risk	5(140)	N/A	N/A	N/A	N/A
	Moderate Risk	15(53)	-0.55	0.11	-4.95(11.54)	< .001
	High Risk	37(131)	-0.54	0.06	-9.59(31.24)	< .001
<i>Age Category</i>	Adults	51(311)	-0.56	0.05	-10.44(48.31)	< .001
	Minors	5(12)	-0.26	0.17	-1.52(3.63)	.211
	Adults and Minors	1(1)	N/A	N/A	N/A	N/A
<i>Imagery</i>	Absent	19(54)	-0.43	0.11	-4.01(13.07)	.001
	Present	39(270)	-0.59	0.07	-8.31(33.42)	< .001
<i>Publication Status</i>	Published	54(315)	-0.52	0.05	-10.36(50.79)	< .001
	Unpublished	3(9)	N/A	N/A	N/A	N/A
<i>Comparator</i>	Neutral CBM-I	15(64)	-0.53	0.06	-9.06(11.75)	< .001
	Inactive Control (No Task or Waiting List/Treatment as Usual)	15(67)	-0.64	0.08	-8.37(14.16)	< .001
	Sham (50/50)	13(82)	-0.34	0.05	-6.37(13.30)	< .001
	Unresolved Ambiguity	8(25)	-0.66	0.14	-4.63(6.73)	.003

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
Training Paradigm	Other/Unspecified	14(83)	-0.43	0.06	-7.03(10.40)	< .001
	Ambiguous Scenarios	50(295)	-0.51	0.05	-9.42(46.86)	< .001
	Other Types	7(29)	-0.73	0.14	-5.32(5.87)	.002
Delivery	Phone/Mobile App	6(8)	-0.95	0.22	-4.21(4.75)	.009
	Web-Based Platform	51(316)	-0.50	0.05	-10.04(48.05)	< .001
Stimulus Type	Verbal	54(317)	-0.54	0.05	-11.24(51.71)	< .001
	Other Types (Non-verbal or both)	4(7)	N/A	N/A	N/A	N/A
Stimulus Modality	Auditory	10(36)	-0.61	0.07	-8.19(4.47)	< .001
	Visual	47(286)	-0.52	0.05	-10.20(42.86)	< .001
Anxiety						
Dose	Per one-unit increase	47(205)	0.000176	0.000094	1.86(7.61)	.102
Session Number	Per additional session	49(212)	0.00224	0.00662	0.34(3.86)	.752
Items Per Session	Per additional item	44(200)	0.00113	0.000933	1.22(3.77)	.295
Clinical Status	Healthy	6(10)	-0.07	0.12	-0.60(4.72)	.579
	Subclinical	33(179)	-0.20	0.04	-4.64(26.88)	< .001
	Clinical	10(23)	-0.27	0.08	-3.25(7.33)	.013
Diagnosis	No Diagnosis	6(10)	N/A	N/A	N/A	N/A
	Anxiety (General)	31(162)	-0.28	0.04	-7.37(18.26)	< .001
	Depression	2(13)	N/A	N/A	N/A	N/A
	Comorbid	2(10)	N/A	N/A	N/A	N/A
	Other	9(17)	-0.02	0.07	-0.27(7.01)	.792
Risk of Bias	Low Risk	5(97)	N/A	N/A	N/A	N/A
	Moderate Risk	11(26)	-0.11	0.07	-1.66(9.47)	.129
	High Risk	33(89)	-0.22	0.05	-4.73(25.70)	< .001
Age Category	Adults	42(198)	-0.20	0.04	-5.52(35.03)	< .001
	Minors	6(12)	-0.24	0.22	-1.09(4.16)	.336
	Adults and Minors	1(2)	N/A	N/A	N/A	N/A
Imagery	Absent	18(32)	-0.16	0.07	-2.41(14.46)	.030

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
<i>Publication Status</i>	Present	33(180)	-0.21	0.04	-5.50(26.71)	< .001
	Published	45(203)	-0.21	0.04	-5.69(35.96)	< .001
	Unpublished	4(9)	N/A	N/A	N/A	N/A
<i>Comparator</i>	Neutral CBM-I	14(50)	-0.18	0.05	-3.97(10.30)	.002
	Inactive Control (No Task or Waiting List/Treatment as Usual)	13(48)	-0.28	0.09	-3.26(9.09)	.010
	Sham (50/50)	11(46)	-0.16	0.05	-2.88(8.99)	.018
	Unresolved Ambiguity	7(20)	-0.25	0.09	-2.85(5.28)	.033
	Other/Unspecified	10(45)	-0.10	0.06	-1.65(6.44)	.147
<i>Training Paradigm</i>	Ambiguous Scenarios	43(199)	-0.20	0.03	-5.74(35.31)	< .001
	Other Types	7(13)	-0.14	0.13	-1.08(5.18)	.327
<i>Delivery</i>	Phone/Mobile App	5(9)	-0.04	0.14	-0.32(3.34)	.771
	Web-Based Platform	44(203)	-0.21	0.04	-5.71(35.51)	< .001
<i>Stimulus Type</i>	Verbal	46(205)	-0.20	0.04	-5.47(37.60)	< .001
	Other Types (Non-verbal or both)	4(7)	N/A	N/A	N/A	N/A
<i>Stimulus Modality</i>	Auditory	6(24)	-0.26	0.06	-4.69(3.66)	.012
	Visual	43(186)	-0.18	0.04	-4.74(32.86)	< .001
Depression						
<i>Dose</i>	Per one-unit increase	36(67)	-0.000091	0.000159	-0.57(8.14)	.583
<i>Session Number</i>	Per additional session	37(69)	-0.0134	0.00621	-2.16(3.24)	.113
<i>Items Per Session</i>	Per additional item	33(64)	0.000511	0.00121	0.42(2.86)	.703
<i>Clinical Status</i>	Healthy	3(3)	N/A	N/A	N/A	N/A
	Subclinical	22(47)	-0.08	0.06	-1.37(18.66)	.186
	Clinical	12(19)	-0.33	0.06	-5.97(8.98)	< .001
<i>Diagnosis</i>	No Diagnosis	3(3)	N/A	N/A	N/A	N/A
	Anxiety (General)	17(24)	-0.22	0.09	-2.60(12.57)	.023
	Depression	5(17)	-0.37	0.09	-4.08(3.71)	.018
	Comorbid	2(6)	N/A	N/A	N/A	N/A
	Other	11(19)	-0.07	0.05	-1.59(8.87)	.147

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
<i>Risk of Bias</i>	Low Risk	4(6)	N/A	N/A	N/A	N/A
	Moderate Risk	10(21)	-0.11	0.07	-1.60(8.03)	.149
	High Risk	23(42)	-0.19	0.06	-3.03(19.22)	.007
<i>Age Category</i>	Adults	33(63)	-0.17	0.05	-3.57(28.46)	.001
	Minors	3(5)	N/A	N/A	N/A	N/A
	Adults and Minors	1(1)	N/A	N/A	N/A	N/A
<i>Imagery</i>	Absent	12(14)	-0.06	0.05	-1.21(9.57)	.256
	Present	27(55)	-0.20	0.05	-3.79(23.09)	< .001
<i>Publication Status</i>	Published	35(65)	-0.15	0.05	-3.33(29.98)	.002
	Unpublished	2(4)	N/A	N/A	N/A	N/A
<i>Comparator</i>	Neutral CBM-I	8(18)	-0.12	0.06	-2.00(5.77)	.095
	Inactive Control (No Task or Waiting List/Treatment as Usual)	12(15)	-0.31	0.15	-2.10(10.16)	.061
	Sham (50/50)	10(16)	-0.04	0.07	-0.54(9.22)	.601
	Unresolved Ambiguity	6(11)	-0.23	0.09	-2.50(4.72)	.058
	Other/Unspecified	8(9)	-0.11	0.08	-1.43(5.65)	.204
<i>Training Paradigm</i>	Ambiguous Scenarios	33(62)	-0.17	0.05	-3.41(28.65)	.002
	Other Types	5(7)	-0.08	0.08	-0.93(3.47)	.413
<i>Delivery</i>	Phone/Mobile App	3(3)	N/A	N/A	N/A	N/A
	Web-Based Platform	34(66)	-0.15	0.05	-3.27(29.48)	.003
<i>Stimulus Type</i>	Verbal	35(66)	-0.17	0.05	-3.66(30.29)	< .001
	Other Types (Non-verbal or both)	3(3)	N/A	N/A	N/A	N/A
<i>Stimulus Modality</i>	Auditory	8(15)	-0.34	0.05	-7.14(6.48)	< .001
	Visual	29(54)	-0.10	0.05	-1.93(23.42)	.065
Follow-Up Effects						
Interpretation Bias						
<i>Follow-Up Duration</i>	Per additional week since baseline	16(65)	0.00243	0.00317	0.77(1.45)	.548
<i>Dose</i>	Per one-unit increase	15(55)	-0.000034	0.000552	-0.06(2.00)	.957
<i>Session Number</i>	Per additional session	16(65)	-0.00887	0.0300	-0.30(7.11)	.776

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
<i>Items Per Session</i>	Per additional item	13(52)	-0.00243	0.00365	-0.67(4.27)	.540
<i>Clinical Status</i>	Healthy	2(3)	N/A	N/A	N/A	N/A
	Subclinical	11(57)	-0.51	0.07	-6.88(8.40)	< .001
	Clinical	3(5)	N/A	N/A	N/A	N/A
<i>Diagnosis</i>	No Diagnosis	2(3)	N/A	N/A	N/A	N/A
	Anxiety (General)	10(45)	-0.54	0.08	-6.95(6.39)	< .001
	Depression	1(1)	N/A	N/A	N/A	N/A
	Other	3(16)	N/A	N/A	N/A	N/A
<i>Age Category</i>	Adults	14(62)	-0.47	0.07	-7.26(10.34)	< .001
	Minors	2(3)	N/A	N/A	N/A	N/A
<i>Imagery</i>	Absent	4(7)	N/A	N/A	N/A	N/A
	Present	12(58)	-0.50	0.07	-7.14(8.01)	< .001
<i>Comparator</i>	Neutral CBM-I	5(9)	-0.59	0.12	-5.00(3.90)	.008
	Inactive Control	2(3)	N/A	N/A	N/A	N/A
	Sham (50/50)	4(12)	N/A	N/A	N/A	N/A
	Unresolved Ambiguity	1(2)	N/A	N/A	N/A	N/A
	Other/Unspecified	7(39)	-0.40	0.07	-5.50(4.56)	.004
<i>Training Paradigm</i>	Ambiguous Scenarios	13(58)	-0.41	0.03	-11.81(5.26)	< .001
	Other Types	3(7)	N/A	N/A	N/A	N/A
<i>Stimulus Modality</i>	Auditory	1(1)	N/A	N/A	N/A	N/A
	Visual	14(62)	-0.47	0.06	-7.20(10.78)	< .001
Anxiety						
<i>Follow-Up Duration</i>	Per additional week since baseline	26(89)	0.00581	0.00220	2.64(3.35)	.069
<i>Dose</i>	Per one-unit increase	25(81)	0.000055	0.000151	0.37(6.31)	.726
<i>Session Number</i>	Per additional session	26(89)	-0.00119	0.0165	-0.07(10.69)	.944
<i>Items Per Session</i>	Per additional item	23(77)	-0.000407	0.00109	-0.37(1.63)	.751
<i>Clinical Status</i>	Healthy	2(8)	N/A	N/A	N/A	N/A
	Subclinical	16(59)	-0.24	0.04	-5.78(10.39)	< .001

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
<i>Diagnosis</i>	Clinical	8(22)	-0.24	0.09	-2.61(4.59)	.052
	No Diagnosis	2(8)	N/A	N/A	N/A	N/A
	Anxiety (General)	17(58)	-0.30	0.04	-6.95(8.17)	< .001
	Depression	1(4)	N/A	N/A	N/A	N/A
	Comorbid	1(4)	N/A	N/A	N/A	N/A
	Other	6(15)	-0.08	0.06	-1.36(4.67)	.235
<i>Age Category</i>	Adults	23(77)	-0.23	0.04	-5.82(15.57)	< .001
	Minors	2(6)	N/A	N/A	N/A	N/A
	Adults and Minors	1(6)	N/A	N/A	N/A	N/A
<i>Imagery</i>	Absent	7(15)	-0.20	0.06	-3.40(5.28)	.018
	Present	21(74)	-0.23	0.04	-5.42(14.09)	< .001
<i>Comparator</i>	Neutral CBM-I	6(16)	-0.16	0.04	-3.59(4.16)	.021
	Inactive Control	3(7)	N/A	N/A	N/A	N/A
	Sham (50/50)	7(17)	-0.21	0.06	-3.20(5.16)	.023
	Unresolved Ambiguity	7(24)	-0.28	0.08	-3.50(4.57)	.020
	Other/Unspecified	6(25)	-0.14	0.06	-2.23(2.83)	.117
<i>Training Paradigm</i>	Ambiguous Scenarios	24(82)	-0.22	0.04	-5.80(16.12)	< .001
	Other Types	3(7)	N/A	N/A	N/A	N/A
<i>Stimulus Type</i>	Verbal	25(84)	-0.22	0.04	-5.74(16.93)	< .001
	Other Types (Non-verbal or both)	2(5)	N/A	N/A	N/A	N/A
<i>Stimulus Modality</i>	Auditory	5(20)	-0.29	0.09	-3.07(3.29)	.048
	Visual	20(67)	-0.20	0.04	-5.18(12.11)	< .001
Depression						
<i>Follow-Up Duration</i>	Per additional week since baseline	25(49)	-0.00190	0.00310	-0.61(3.03)	.582
<i>Dose</i>	Per one-unit increase	24(47)	0.000130	0.000175	0.75(7.57)	.479
<i>Session Number</i>	Per additional session	25(49)	-0.0187	0.0131	-1.43(11.14)	.181
<i>Items Per Session</i>	Per additional item	22(45)	0.00108	0.000742	1.46(1.86)	.291
<i>Clinical Status</i>	Healthy	1(3)	N/A	N/A	N/A	N/A

Moderator	Category	n(k)	Estimate	SE	t(Satt df)	p(Satt)
<i>Diagnosis</i>	Subclinical	15(31)	-0.15	0.06	-2.31(11.65)	.040
	Clinical	9(15)	-0.23	0.06	-3.67(5.49)	.012
	No Diagnosis	1(3)	N/A	N/A	N/A	N/A
	Anxiety (General)	14(19)	-0.22	0.08	-2.75(8.90)	.023
	Depression	2(3)	N/A	N/A	N/A	N/A
	Comorbid	1(4)	N/A	N/A	N/A	N/A
<i>Age Category</i>	Other	8(20)	-0.12	0.03	-4.05(6.17)	.006
	Adults	23(42)	-0.18	0.05	-3.78(17.21)	.001
	Minors	1(4)	N/A	N/A	N/A	N/A
	Adults and Minors	1(3)	N/A	N/A	N/A	N/A
<i>Comparator</i>	Neutral CBM-I	6(12)	-0.04	0.04	-1.19(4.26)	.296
	Inactive Control	4(5)	N/A	N/A	N/A	N/A
	Sham (50/50)	7(11)	-0.01	0.05	-0.30(5.31)	.779
	Unresolved Ambiguity	6(14)	-0.28	0.05	-5.84(4.34)	.003
	Other/Unspecified	6(7)	-0.12	0.10	-1.17(3.50)	.314
<i>Imagery</i>	Absent	7(10)	-0.05	0.05	-0.93(5.09)	.396
	Present	20(39)	-0.22	0.05	-4.52(14.38)	< .001
<i>Training Paradigm</i>	Ambiguous Scenarios	22(41)	-0.18	0.05	-3.70(16.98)	.002
	Other Types	4(8)	N/A	N/A	N/A	N/A
<i>Delivery</i>	Phone/Mobile App	1(1)	N/A	N/A	N/A	N/A
	Web-Based Platform	24(48)	-0.17	0.05	-3.69(18.54)	.002
<i>Stimulus Type</i>	Verbal	24(46)	-0.17	0.05	-3.67(18.36)	.002
	Other Types (Non-verbal or both)	2(3)	N/A	N/A	N/A	N/A
<i>Stimulus Modality</i>	Auditory	6(13)	-0.30	0.03	-9.49(4.11)	< .001
	Visual	19(36)	-0.12	0.06	-1.98(13.34)	.069

Note. $n(k)$ = number of independent studies (effect sizes). For continuous moderators, the estimate is the meta-regression coefficient b ; for categorical moderators, it is the pooled subgroup Hedges's g . Negative estimates indicate greater improvement favouring digital CBM-I. $p(\text{Satt})$ is the Satterthwaite-adjusted, uncorrected p value testing the relevant coefficient or subgroup estimate against zero. It is not a test of differences between moderator categories and is not BH-adjusted. A statistically significant subgroup estimate does not establish statistically significant moderation. N/A indicates that the category contained fewer than five independent studies, was deliberately excluded from a prespecified restricted moderator analysis, or did not support a reliable subgroup estimate. Moderators with no category variation were omitted. Diagnosis refers to the symptom/diagnostic category assigned in the dataset and does not necessarily indicate that every participant had a clinical diagnosis.

Table S7. Formal moderator tests and Benjamini-Hochberg-adjusted p values

Moderator	Parameter or contrast	n (k)	b	SE	95% CI	Test statistic	p	BH-adjusted p
Post-treatment effects								
Interpretation bias								
Dose	Per one-unit increase in dose	55 (313)	0.0000333	0.000129	[-0.000260, 0.000326]	t(8.78) = 0.26	.8023	.8752
Number of sessions	Per additional training session	57 (324)	-0.0140	0.0145	[-0.0520, 0.0240]	t(4.71) = -0.97	.3812	.5717
Items per session	Per additional item per session	52 (304)	0.00223	0.00191	[-0.00222, 0.00668]	t(7.67) = 1.17	.2788	.4779
Clinical status	Joint test across retained categories	57 (324)	-	-	-	F(2, 18.30) = 0.27	.7699	.8752
Diagnosis	Joint test across retained categories	55 (308)	-	-	-	F(3, 12.60) = 0.72	.5561	.7415
Risk of bias	High vs moderate risk	52 (184)	0.0176	0.125	[-0.242, 0.278]	t(21.30) = 0.14	.8892	.8892
Age category	Minors vs adults	56 (323)	0.297	0.182	[-0.198, 0.791]	t(4.22) = 1.63	.1740	.4779
Imagery	Imagery vs no imagery	57 (324)	-0.166	0.141	[-0.480, 0.147]	t(10) = -1.18	.2640	.4779
Comparator type	Joint test across retained categories	55 (321)	-	-	-	F(4, 4.91) = 6.08	.0382*	.4579
Training paradigm	Other paradigms vs ambiguous scenarios	57 (324)	-0.216	0.147	[-0.557, 0.126]	t(7.63) = -1.47	.1820	.4779
Delivery method	Phone/mobile app vs web platform	57 (324)	-0.448	0.230	[-1.020, 0.125]	t(5.62) = -1.94	.1031	.4779
Stimulus modality	Auditory vs visual	56 (322)	-0.0917	0.0591	[-0.315, 0.132]	t(2.32) = -1.55	.2443	.4779
Anxiety								
Dose	Per one-unit increase in dose	47 (205)	0.000176	0.0000944	[-0.0000440, 0.000395]	t(7.61) = 1.86	.1017	.6104
Number of sessions	Per additional training session	49 (212)	0.00224	0.00662	[-0.0164, 0.0209]	t(3.86) = 0.34	.7523	.8207
Items per session	Per additional item per session	44 (200)	0.00113	0.000933	[-0.00152, 0.00379]	t(3.77) = 1.22	.2947	.6581
Clinical status	Joint test across retained categories	49 (212)	-	-	-	F(2, 10.80) = 0.79	.4775	.7272
Diagnosis	Other diagnoses vs general anxiety	40 (179)	0.263	0.0830	[0.0817, 0.445]	t(11.60) = 3.17	.0083*	.1001
Risk of bias	High vs moderate risk	44 (115)	-0.115	0.0809	[-0.287, 0.0571]	t(15.66) = -1.42	.1758	.6581
Age category	Minors vs adults	48 (210)	-0.0446	0.225	[-0.622, 0.533]	t(5.01) = -0.20	.8504	.8504
Imagery	Imagery vs no imagery	49 (212)	-0.0447	0.0724	[-0.198, 0.108]	t(16.20) = -0.62	.5454	.7272
Comparator type	Joint test across retained categories	47 (209)	-	-	-	F(4, 6.63) = 0.89	.5205	.7272
Training paradigm	Other paradigms vs ambiguous scenarios	49 (212)	0.0558	0.133	[-0.272, 0.384]	t(5.82) = 0.42	.6899	.8207
Delivery method	Phone/mobile app vs web platform	49 (212)	0.162	0.146	[-0.244, 0.569]	t(3.97) = 1.11	.3291	.6581
Stimulus modality	Auditory vs visual	48 (210)	-0.0839	0.0548	[-0.256, 0.0878]	t(3.08) = -1.53	.2208	.6581

Moderator	Parameter or contrast	n (k)	b	SE	95% CI	Test statistic	p	BH-adjusted p
Depression								
Dose	Per one-unit increase in dose	36 (67)	-0.0000912	0.000159	[-0.000457, 0.000275]	t(8.14) = -0.57	.5826	.6473
Number of sessions	Per additional training session	37 (69)	-0.0134	0.00621	[-0.0324, 0.00553]	t(3.24) = -2.16	.1125	.2250
Items per session	Per additional item per session	33 (64)	0.000511	0.00121	[-0.00346, 0.00448]	t(2.86) = 0.42	.7034	.7034
Clinical status (restricted)	Clinical vs subclinical	34 (66)	-0.251	0.0815	[-0.423, -0.0792]	t(17) = -3.08	.0068*	.0338*
Diagnosis (restricted)	Joint test across retained categories	32 (60)	-	-	-	F(2, 10.40) = 4.25	.0446*	.1114
Risk of bias	High vs moderate risk	33 (63)	-0.0890	0.0919	[-0.285, 0.107]	t(15.24) = -0.97	.3481	.5637
Imagery	Imagery vs no imagery	37 (69)	-0.145	0.0636	[-0.285, -0.00525]	t(11.06) = -2.28	.0433*	.1114
Comparator type	Joint test across retained categories	37 (69)	-	-	-	F(4, 7.91) = 0.87	.5215	.6473
Training paradigm	Other paradigms vs ambiguous scenarios	37 (69)	0.0932	0.0975	[-0.181, 0.367]	t(3.87) = 0.96	.3946	.5637
Stimulus modality	Auditory vs visual	37 (69)	-0.241	0.0711	[-0.398, -0.0849]	t(11) = -3.40	.0060*	.0338*
Follow-up effects								
Interpretation bias								
Follow-up duration	Per additional week from baseline	16 (65)	0.00243	0.00317	[-0.0176, 0.0224]	t(1.45) = 0.77	.5477	.9567
Dose	Per one-unit increase in dose	15 (55)	-0.0000339	0.000552	[-0.00241, 0.00234]	t(2) = -0.06	.9567	.9567
Number of sessions	Per additional training session	16 (65)	-0.00887	0.0300	[-0.0797, 0.0619]	t(7.11) = -0.29	.7763	.9567
Items per session	Per additional item per session	13 (52)	-0.00243	0.00365	[-0.0123, 0.00745]	t(4.27) = -0.67	.5400	.9567
Anxiety								
Follow-up duration	Per additional week from baseline	26 (89)	0.00581	0.00220	[-0.000788, 0.0124]	t(3.35) = 2.64	.0689	.2757
Dose	Per one-unit increase in dose	25 (81)	0.0000551	0.000151	[-0.000309, 0.000419]	t(6.31) = 0.37	.7264	.9949
Number of sessions	Per additional training session	26 (89)	-0.00119	0.0165	[-0.0375, 0.0352]	t(10.70) = -0.07	.9438	.9949
Items per session	Per additional item per session	23 (77)	-0.000407	0.00109	[-0.00628, 0.00546]	t(1.63) = -0.37	.7513	.9949
Clinical status	Clinical vs subclinical	24 (81)	-0.000672	0.102	[-0.234, 0.232]	t(8.55) = -0.0066	.9949	.9949
Diagnosis	Other diagnoses vs general anxiety	23 (73)	0.213	0.0748	[0.0375, 0.388]	t(7.31) = 2.85	.0237*	.1897
Imagery	Imagery vs no imagery	26 (89)	-0.0345	0.0662	[-0.196, 0.127]	t(6.09) = -0.52	.6206	.9949
Stimulus modality	Auditory vs visual	25 (87)	-0.0909	0.102	[-0.345, 0.163]	t(5.71) = -0.89	.4110	.9949
Depression								
Follow-up duration	Per additional week from baseline	25 (49)	-0.00190	0.00310	[-0.0117, 0.00790]	t(3.03) = -0.61	.5818	.5818
Dose	Per one-unit increase in dose	24 (47)	0.000130	0.000175	[-0.000277, 0.000537]	t(7.57) = 0.74	.4787	.5584
Number of sessions	Per additional training session	25 (49)	-0.0187	0.0131	[-0.0474, 0.0101]	t(11.10) = -1.43	.1808	.4219

Moderator	Parameter or contrast	n (k)	b	SE	95% CI	Test statistic	p	BH-adjusted p
Items per session	Per additional item per session	22 (45)	0.00108	0.000742	[-0.00235, 0.00451]	t(1.86) = 1.46	.2910	.5093
Clinical status	Clinical vs subclinical	24 (46)	-0.0801	0.0884	[-0.274, 0.113]	t(11.50) = -0.91	.3832	.5365
Imagery	Imagery vs no imagery	25 (49)	-0.174	0.0611	[-0.318, -0.0305]	t(7.25) = -2.85	.0239*	.0946
Stimulus modality	Auditory vs visual	25 (49)	-0.180	0.0673	[-0.335, -0.0262]	t(8.28) = -2.68	.0270*	.0946

Note. n = number of independent studies; k = number of effect sizes. b is the CR2 cluster-robust meta-regression slope for a continuous moderator or the non-reference-versus-reference coefficient for a binary categorical moderator. For binary moderators, the t test is equivalent to the one-degree-of-freedom HTZ omnibus test whose p value entered the BH family. Multi-category moderators are reported using HTZ F tests; these joint tests do not have a single b, SE, or confidence interval, and category-specific subgroup estimates are reported in Table S6. Degrees of freedom are Satterthwaite-adjusted for t tests and HTZ-adjusted for omnibus F tests. Confidence intervals are unadjusted 95% CR2/Satterthwaite intervals. BH correction was applied separately within each outcome-by-timepoint family, with one p value per formally conducted moderator. Bold BH-adjusted p values remained significant at $p < .05$. Tests not conducted because of sparse categories or insufficient variation are not shown. Restricted analyses excluded categories represented by fewer than five independent studies.

Table S8. Modified Egger's test results for each outcome and timepoints.

Outcome (timepoint)	Slope estimate	CR2 SE	<i>t</i>	Satterthwaite df	<i>p</i>
<i>Interpretation bias (post-treatment)</i>	0.441	0.685	0.643	21.1	.527
<i>Anxiety (post-treatment)</i>	-0.371	0.539	-0.688	18.4	.500
<i>Depression (post-treatment)</i>	0.083	0.808	0.103	13.3	.920
<i>Interpretation bias (follow-up)</i>	-0.125	1.163	-0.107	2.47	.923
<i>Anxiety (follow-up)</i>	0.881	0.080	10.989	6.97	< .001
<i>Depression (follow-up)</i>	0.546	0.606	0.902	6.74	.398

Note. The predictor was the modified standard error where the modified standard error is the square root of the sum of the reciprocals of the intervention- and control-group sample sizes. Inference used study-clustered CR2 standard errors and Satterthwaite degrees of freedom. A significant slope indicates funnel-plot asymmetry or small-study effects but does not establish publication bias.

Table S9. Exclusion reasons for each report excluded at the full-text screening

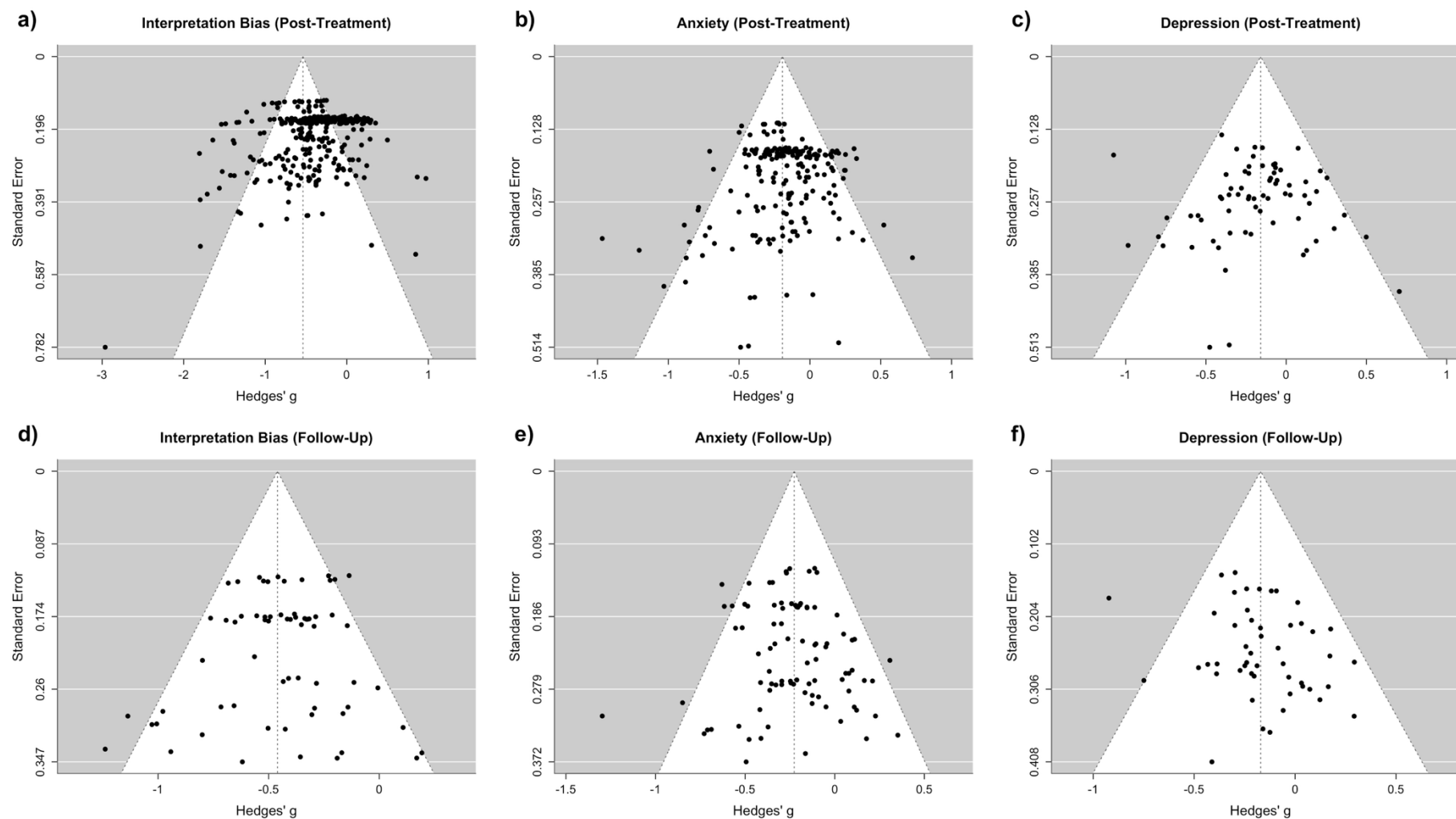
#	Citation	Full Title	Exclusion Reason
1	Wolters et al. 2015	Improving treatment: Supplementing cognitive behavioral therapy with a cognitive bias modification training for children and adolescents with OCD	An earlier conference abstract version of an included study (see Wolters et al. 2021)
2	Frommelt et al. 2023	Study protocol for a randomized controlled trial investigating the effect of online interpretation bias intervention on stress reactivity in the children of parents with depression: The CoCo study.	Protocol Paper
3	Schmidt & Vereenooghe 2021	Targeting hostile attributions in inclusive schools through online cognitive bias modification: A randomised experiment.	One fourth of participants presented neurodevelopmental disorders (NDD) or special educational needs (SEN)
4	Prior et al. 2020	Acceptability and co-development of an online cognitive bias modification intervention for emerging adults with hazardous alcohol use and social anxiety: A mixed methods study.	Used CBM-I with another training paradigm (results confounded)
5	Courtney & Peckham 2020	Interpretation bias modification	Review Article
6	Feng et al. 2020	Impact of imagery-enhanced interpretation training on offline and online interpretations in worry.	Lab-based CBM-I
7	Elhamiasl, 2018	Reciprocal Influences of Interpretation and Attentional Biases to Health-Related Information	Lab-based CBM-I
8	Wilver, 2017	Interpretation Bias Modification for Body Dysmorphic Disorder: Evaluation of an Internet-Based Treatment	Thesis dissertation of an excluded study (see Nieto & Vazquez, 2021)
9	Pictet, 2014	Modulating cognitive bias in the context of depression: mental imagery, emotion and behaviour	Thesis dissertation of an included study (see Pictet et al., 2016)
10	Ghosh et al. 2023	Design of serious games based on cognitive bias modification and learned helplessness paradigms for treatment of depression	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
11	Kroener et al., 2023	Cognitive bias modification for interpretation (CBM-I) for post-traumatic stress disorder: study protocol of an app-based randomised controlled trial	Protocol Paper
12	Prior et al. 2021	A web-based cognitive bias modification intervention (Re-train Your Brain) for emerging adults with co-occurring social anxiety and hazardous alcohol use: Protocol for a multiarm randomized controlled pilot trial	Protocol Paper
13	Chivu & Nedelcea 2019	A gamified intervention combining CBM-I and social skills training for children with aggressive behavior: Proof of concept	Used CBM-I with another training paradigm (results confounded)
14	Zhang et al., 2018	Mobile Phone Cognitive Bias Modification Research Platform for Substance Use Disorders: Protocol for a Feasibility Study	Protocol Paper
15	Frommelt et al. 2023	The influence of outcome expectancy on interpretation bias training in social anxiety: an experimental pilot study	Lab-based CBM-I

16	Prior et al. 2023	Web-Based Cognitive Bias Modification Program for Young People with Social Anxiety and Hazardous Alcohol Use: Feasibility, Acceptability, and Preliminary Efficacy Study	Used CBM-I with another training paradigm (results confounded)
17	Nieto & Vazquez 2021	'Relearning how to think': A brief online intervention to modify biased interpretations in emotional disorders—study protocol for a randomised controlled trial	Protocol Paper
18	Rafezi et al. 2019	Designing a Serious Game "Events" and Investigating the Effectiveness in Modifying Confirmation Bias: A Single Subject Study	No CBM-I administered (instead, confirmation bias is targeted)
19	Ghosh et al. 2023	Serious Games Based on Cognitive Bias Modification and Learned Helplessness Paradigms for the Treatment of Depression: Design and Acceptability Study	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
20	Korn et al. 2019	An experimental Study on the Induction of an Eating Disorder-Specific Interpretation Bias in Healthy Individuals: Testing the Interpretation Modification Paradigm for Eating Disorders (IMP-ED)	Lab-based CBM-I
21	Weisberg et al. 2022	Development of a cognitive bias modification intervention for anxiety disorders in primary care	Used CBM-I with another training paradigm (results confounded)
22	Almeida et al. 2014	Cognitive bias modification to prevent depression (COPE): study protocol for a randomised controlled trial	Protocol Paper
23	Rowlands et al. 2022	Cognitive bias modification training of attention and interpretation to reduce expectations of social rejection in adolescents with eating disorders: A small efficacy randomized controlled trial	Used CBM-I with another training paradigm (results confounded)
24	Masterson et al. 2022	'Don't stop believing': The role of training beliefs in cognitive bias modification paradigms	No CBM-I administered
25	Levanthal et al 2025	Adapting a mobile anxiety intervention for a university community: Insights from a qualitative analysis	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
26	Beltzer et al. 2023	Changes in Learning from Social Feedback After Web-Based Interpretation Bias Modification: Secondary Analysis of a Digital Mental Health Intervention Among Individuals with High Social Anxiety Symptoms	A secondary analysis of an included study (see Daniels et al., 2020)
27	Hullu et al. 2017	Cognitive bias modification and CBT as early interventions for adolescent social and test anxiety: Two-year follow-up of a randomized controlled trial	Used CBM-I with another training paradigm (results confounded)
28	Krahe et al. 2016	Cognitive bias modification for interpretation with and without prior repetitive negative thinking to reduce worry and rumination in generalised anxiety disorder and depression: protocol for a multisession experimental study with an active control condition	Protocol Paper
29	Salemink et al. 2023	Cognitive Bias Modification of Interpretation training for youth with OCD: Who benefits? Examining the role of OCD severity, interpretation bias, and autism symptoms	A secondary analysis of an included study (see Wolters et al. 2021)

30	Nieto & Vasquez, 2021	Disentangling the mediating role of modifying interpretation bias on emotional distress using a novel cognitive bias modification program	Used CBM-I with another training paradigm (results confounded)
31	Burley et al. 2020	Increasing Engagement in eHealth Interventions Using Personalization and Implementation Intentions	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
32	Wernitz et al. 2022	Lessons Learned: Providing Supportive Accountability in an Online Anxiety Intervention	A secondary analysis of an included study (see Eberle et al. 2021)
33	Ramadurai et al. 2022	Operationalizing Engagement with an Interpretation Bias Smartphone App Intervention: Case Series	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
34	Boukhechba et al. 2018	Physiological Changes over the Course of Cognitive Bias Modification for Social Anxiety	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
35	Chen & Qu, 2023	The effects of challenge and threat states on coping flexibility: evidence from framing and exemplar priming	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
36	Hsu et al., 2023	User-Centered Development of STOP (Successful Treatment for Paranoia): Material Development and Usability Testing for a Digital Therapeutic for Paranoia	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
37	Hohensee et al. 2020	The Effect of Confidence on Dropout Rate and Outcomes in Online Cognitive Bias Modification	A secondary analysis of an included study (see Ji et al. 2018)
38	Patel et al. 2023	Appearance-related safety behaviors predict symptoms of body dysmorphic disorder following internet-based treatment	A secondary analysis of an included study (see Wilver & Coughle, 2019)
39	Daniel et al. 2022	Cognitive Bias Modification for Threat Interpretations: Using Passive Mobile Sensing to Detect Intervention Effects in Daily Life	A secondary analysis of an included study (see Daniel et al. 2020)
40	Zech et al. 2023	Safety Behaviors Predict Long-Term Treatment Outcome Following Internet-Based Treatment of Adults with Social Anxiety Disorder	A secondary analysis of an included study (see Coughle et al. 2020)
41	Livermon et al. 2025	A mobile intervention to reduce anxiety among university students, faculty, and staff: Mixed methods study on users' experiences	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
42	Petz et al. 2025	Examining State Affective and Cognitive Outcomes Following Brief Mobile Phone-Based Training Sessions to Reduce Anxious Interpretations	Does not report one of the outcomes (interpretation bias, anxiety, or depression)
43	Vela de la Garza Evia et al. 2025	Behavioral engagement patterns and psychosocial outcomes in web-based interpretation bias training for anxiety	A secondary analysis of an included study (see Eberle et al. 2024)

44	Bae et al. 2024	Early Attrition Prediction for Web-Based Interpretation Bias Modification to Reduce Anxious Thinking: A Machine Learning Study	A secondary analysis of an included study (see Eberle et al. 2024)
45	Hsu et al. 2026	Generative artificial intelligence in mental health: A preliminary study on automating materials development for cognitive bias modification	No symptom outcomes and no CBM-I delivery
46	Patel et al. 2026	Loneliness Predicts Symptom Outcomes Following a Digital Intervention for Appearance Concerns	No CBM-I
47	Tyson et al. 2025	Testing associations between negative interpretation inflexibility, anxiety symptoms and intolerance of uncertainty	No CBM-I

Figure S1. Funnel plots for interpretation bias, anxiety, and depression (left to right) are shown for post-treatment effects (top row) and follow-up effects (bottom row).



Note. Panels A–C display the distribution of raw effect sizes at post-treatment for interpretation bias, anxiety, and depression, respectively. Panels D–F display the corresponding distributions at follow-up. Each black dot represents an individual, unadjusted effect size (Hedges' g) plotted against its standard error. The vertical dotted line represents the

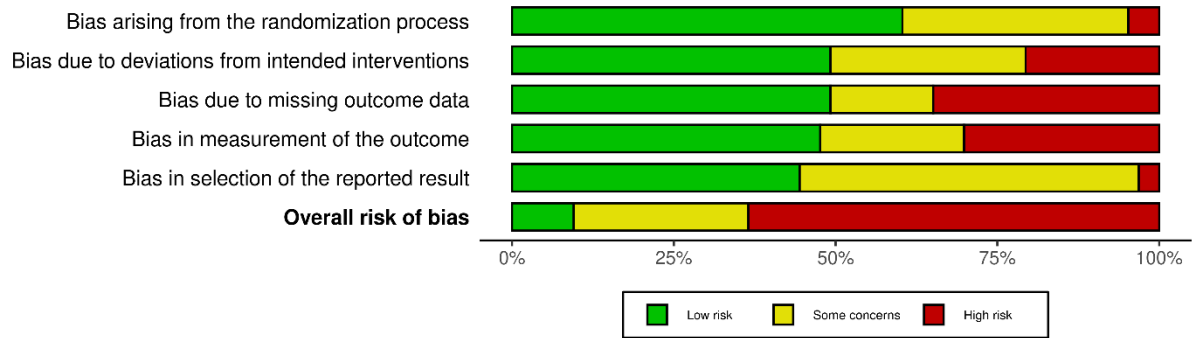
overall pooled effect estimate for that model. The white triangular region indicates the pseudo-95% confidence limits within which effect sizes are expected to scatter in the absence of publication bias and heterogeneity.

Figure S2. The results of Risk of Bias-2 assessment for randomised studies (above), and Risk Of Bias In Non-randomized Studies - of Interventions assessment for non-randomised studies (below).

Study	Risk of bias domains					Overall
	D1	D2	D3	D4	D5	
Antognelli et al. 2020	+	+	-	+	-	-
Bouwman et al. 2025	+	+	+	+	+	+
Butler et al. 2015	-	-	+	-	-	+
Catwright et al. 2025	+	+	+	+	+	+
Clarke 2018 (Study 6)	-	-	+	-	+	+
Clarke 2018 (Study 7)	-	-	+	-	+	-
Cougler et al. 2017	+	-	+	+	-	+
Cougler et al. 2020	+	+	+	-	+	-
Daniel et al. 2020	-	-	-	+	+	+
de Voogd et al. 2017	+	-	+	+	+	+
Darin & Yorulmaz 2022	+	+	+	+	-	+
Dietel et al. 2020	+	-	-	+	-	-
Dodd et al. 2022	-	-	+	+	+	+
Duijzings et al. 2024	+	+	+	+	+	+
Eberle et al. 2023	+	+	+	+	+	+
Eberle et al. 2024	+	+	+	+	+	+
Edwards et al. 2018	-	-	+	-	-	-
Hirsch et al. 2018	+	+	+	-	+	+
Hirsch et al. 2020	+	+	+	+	-	+
Hirsch et al. 2021	+	+	+	+	+	+
Hoid et al. 2023	-	+	+	+	-	+
Hoppitt et al. 2014	-	+	+	-	+	+
Ji et al. 2021	+	+	+	+	+	+
Lam et al. 2025	-	-	+	-	+	-
Larrazabal et al. 2024	-	+	+	+	+	+
Liao et al. 2022	+	-	+	+	-	+
Mao et al. 2023	-	+	+	+	+	+
Mousavi et al. 2025	-	+	+	+	-	+
Namaky et al. 2021	+	+	-	+	-	-
Nasiry et al. 2020	-	+	+	+	-	+
Peters et al. 2017	+	+	+	+	+	+
Pictot et al. 2016	-	-	+	+	-	+
Riddleston et al. 2023	-	+	+	-	-	+
Rogers & Sicouri 2022	+	-	+	+	+	-
Salemink et al. 2009	-	-	-	-	-	+
Salemink et al. 2014 (Study 1)	+	+	+	+	-	+
Salemink et al. 2014 (Study 2)	+	+	+	+	-	+
Salemink et al. 2015	+	+	+	+	-	+
Sharpe et al. 2023	+	+	+	+	+	+
Steinman & Teachman 2015	-	+	+	+	-	-
Steinman et al. 2021	+	+	+	+	+	+
Terashima & Sensui 2023 (Study 1)	-	+	+	+	-	+
Terashima & Sensui 2023 (Study 2)	+	+	+	+	-	+
Tsai et al. 2024	+	+	-	+	-	+
van Wie 2022	+	+	+	+	+	+
Voogd et al. 2018	+	+	+	+	+	+
Wheeler 2023	-	-	+	+	-	-
Williams et al. 2013	+	-	+	+	+	+
Williams et al. 2015	+	+	+	+	+	+
Wilwer & Cougle 2019	+	+	+	+	-	-
Wolters et al. 2021	+	-	+	+	+	+
Wu et al. 2024	-	+	+	-	-	+
Xiayu et al. 2024	+	+	-	+	+	+
Xiran Sun et al. 2019	-	+	+	+	-	+
Yang et al. 2017	-	+	+	-	+	+
Zeng et al. 2024	+	+	-	-	-	-
Abado et al. 2025	+	+	+	+	+	+
Dillon et al. 2026	+	+	+	-	+	-
Hughes et al. 2026	+	+	-	+	+	-
Lin et al. 2026	+	+	+	+	-	-
Pradhan et al. 2025	+	+	+	+	+	+
Vincent et al. 2026	+	+	+	+	+	+
Zhang et al. 2026	+	+	+	+	-	-

Domains:
D1: Bias arising from the randomization process.
D2: Bias due to deviations from standard intervention.
D3: Bias due to missing outcome data.
D4: Bias in measurement of the outcome.
D5: Bias in selection of the reported result.

Judgement
High
Some concerns
Low



	Risk of bias domains							Overall
	D1	D2	D3	D4	D5	D6	D7	
McNally 2014	⊗	-	+	-	⊗	⊗	+	⊗
Beard et al. 2022	⊗	+	+	+	+	⊗	+	⊗
Hampson 2014	⊗	+	+	+	+	⊗	+	⊗
Dillon et al. 2023	⊗	+	+	⊗	-	⊗	+	⊗
Beard et al. 2021	⊗	+	+	⊗	⊗	⊗	-	⊗
Brettschneider et al. 2015	⊗	+	+	+	⊗	⊗	+	⊗
Reuland & Teachman 2014	⊗	+	+	+	+	-	+	⊗
Amie 2013	⊗	⊗	+	-	⊗	⊗	+	⊗
Silverman et al. 2023	⊗	+	+	+	⊗	⊗	+	⊗

Domains:

D1: Bias due to confounding.

D2: Bias due to selection of participants.

D3: Bias in classification of interventions.

D4: Bias due to deviations from intended interventions.

D5: Bias due to missing data.

D6: Bias in measurement of outcomes.

D7: Bias in selection of the reported result.

Judgement

⊗ Serious

- Moderate

+ Low

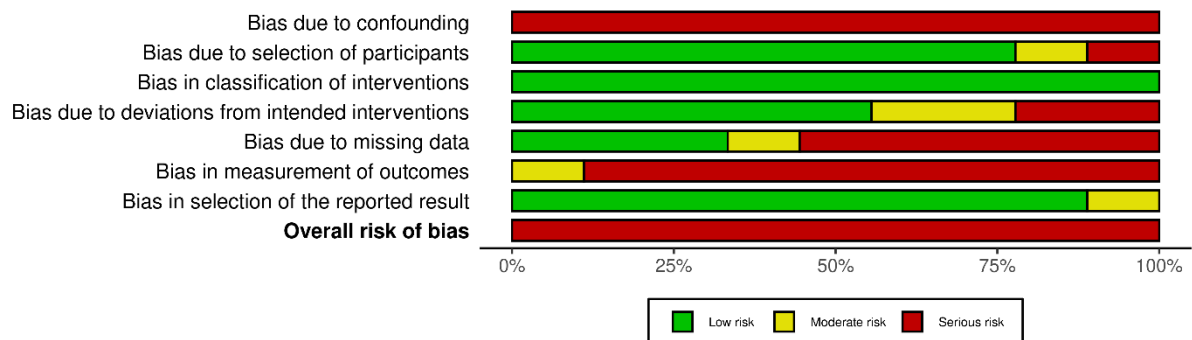


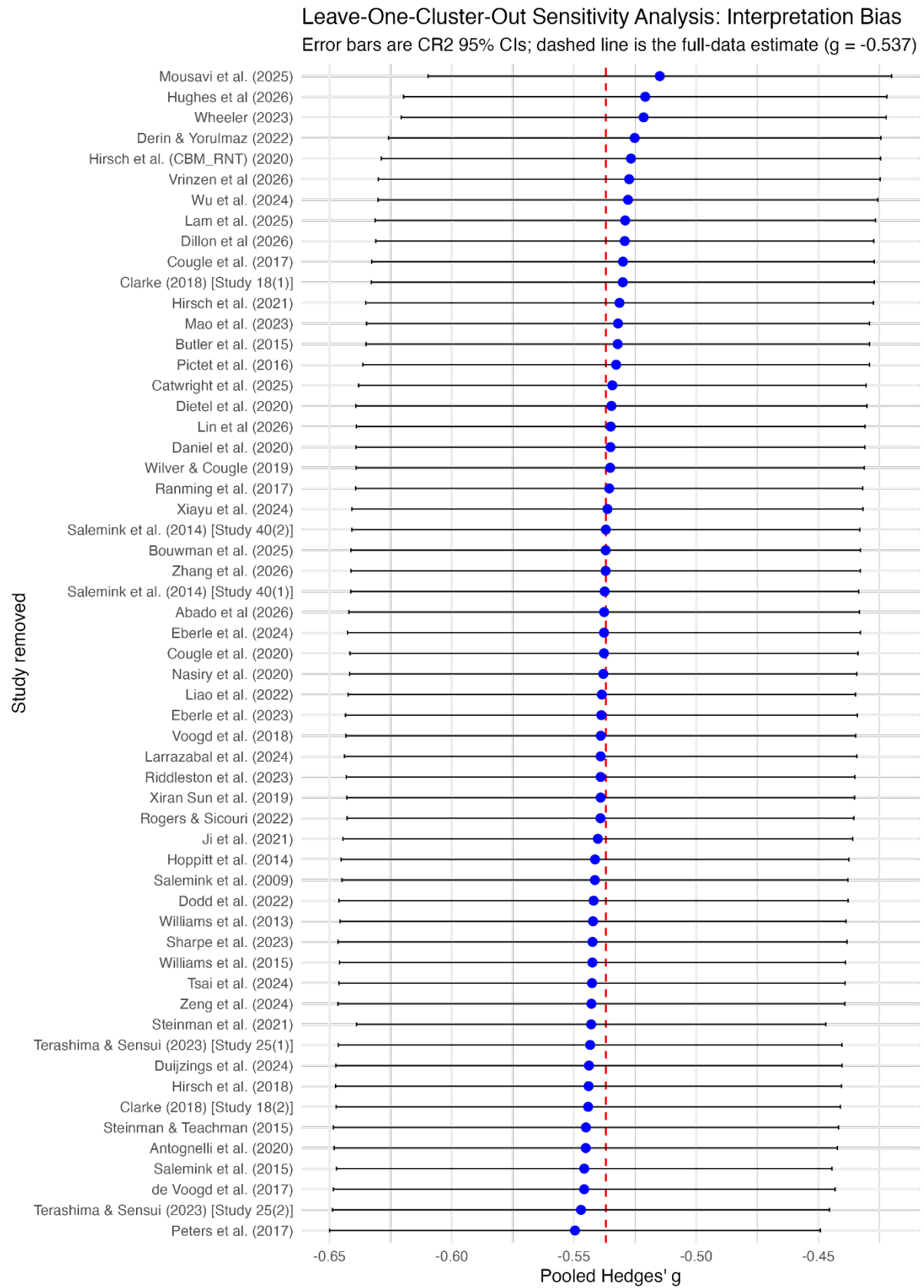
Figure S3. LOCO sensitivity analysis for interpretation bias at post-treatment.

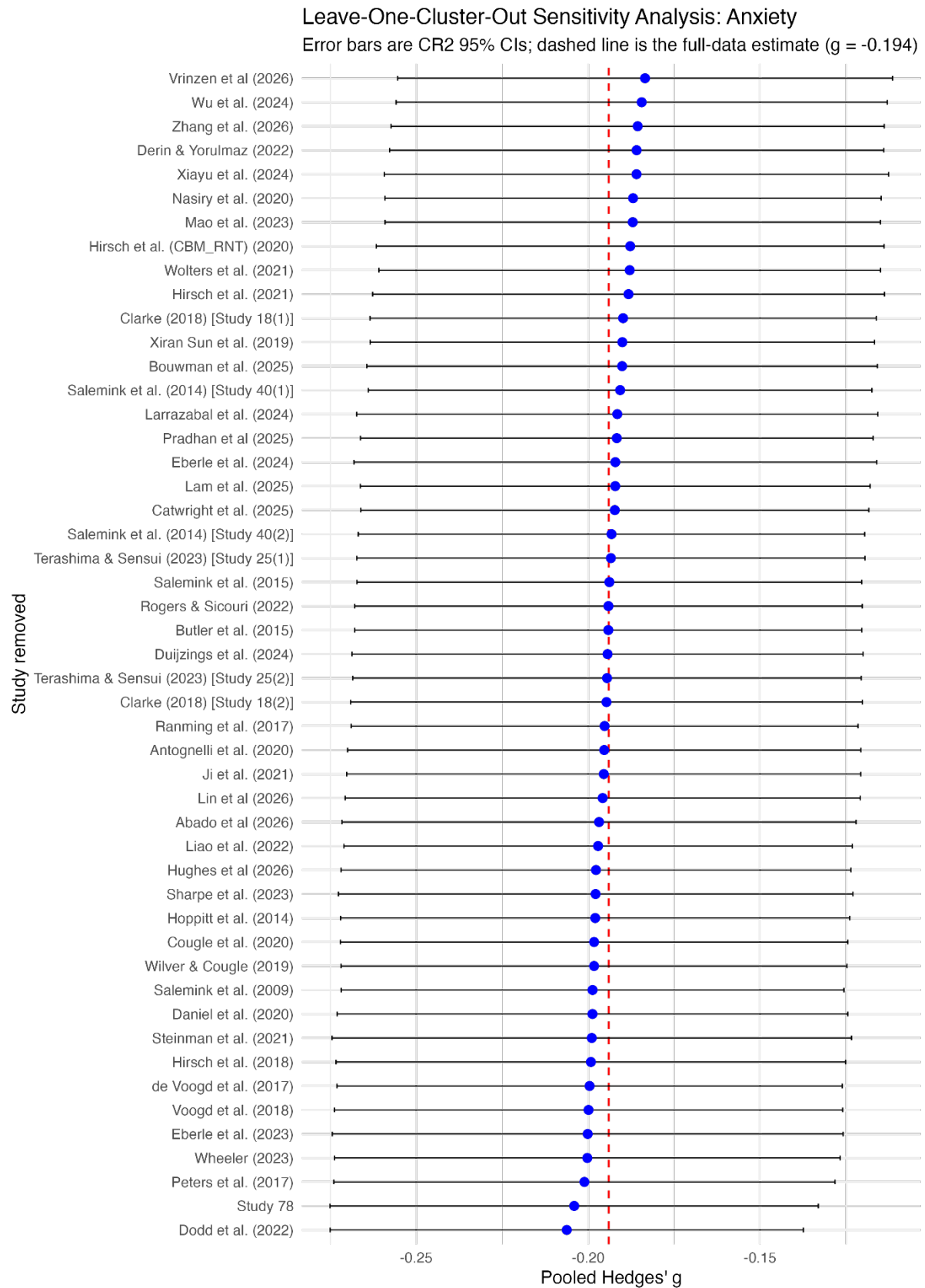
Figure S4. LOCO sensitivity analysis for anxiety at post-treatment.

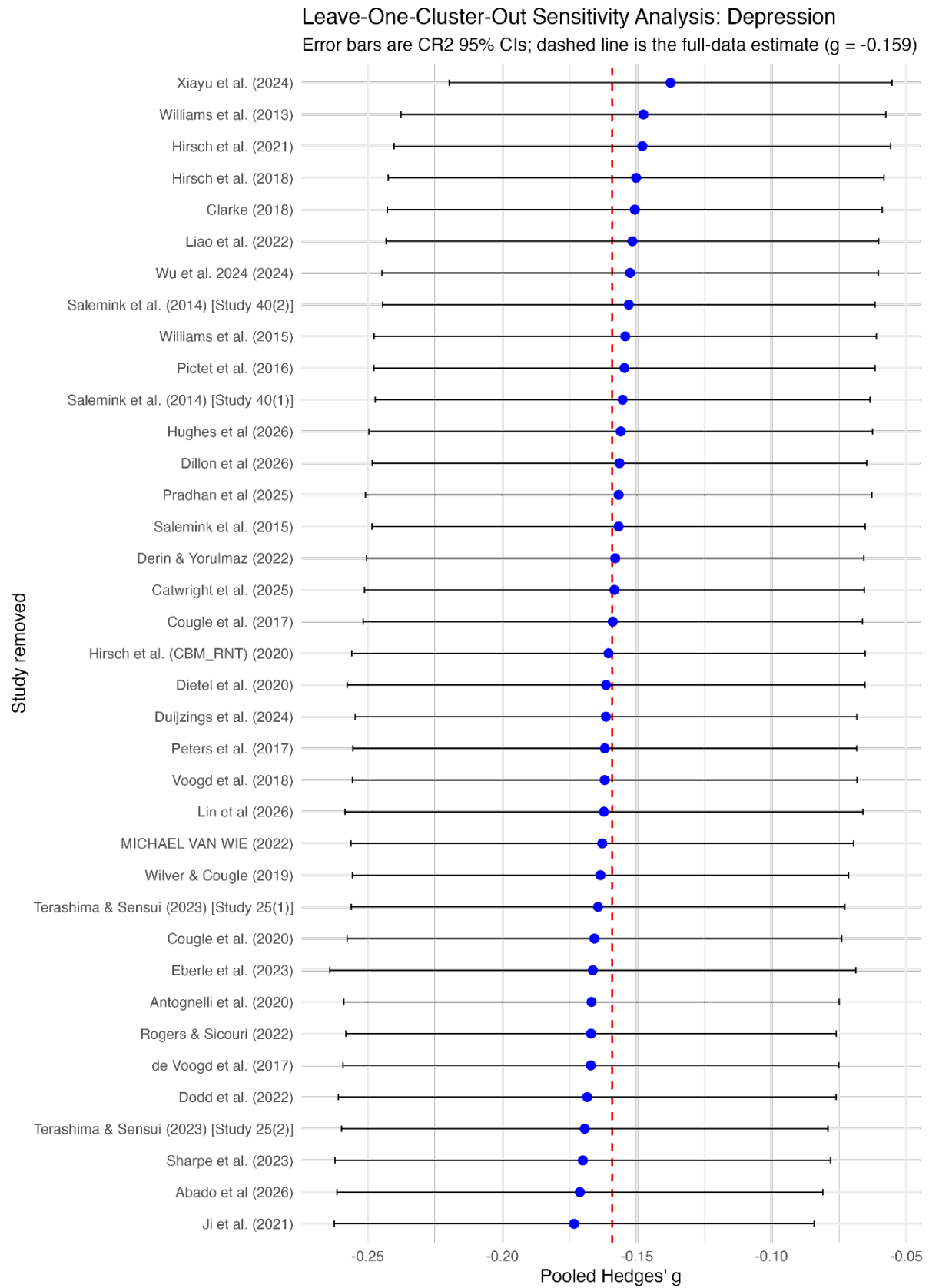
Figure S5. LOCO sensitivity analysis for depression at post-treatment.

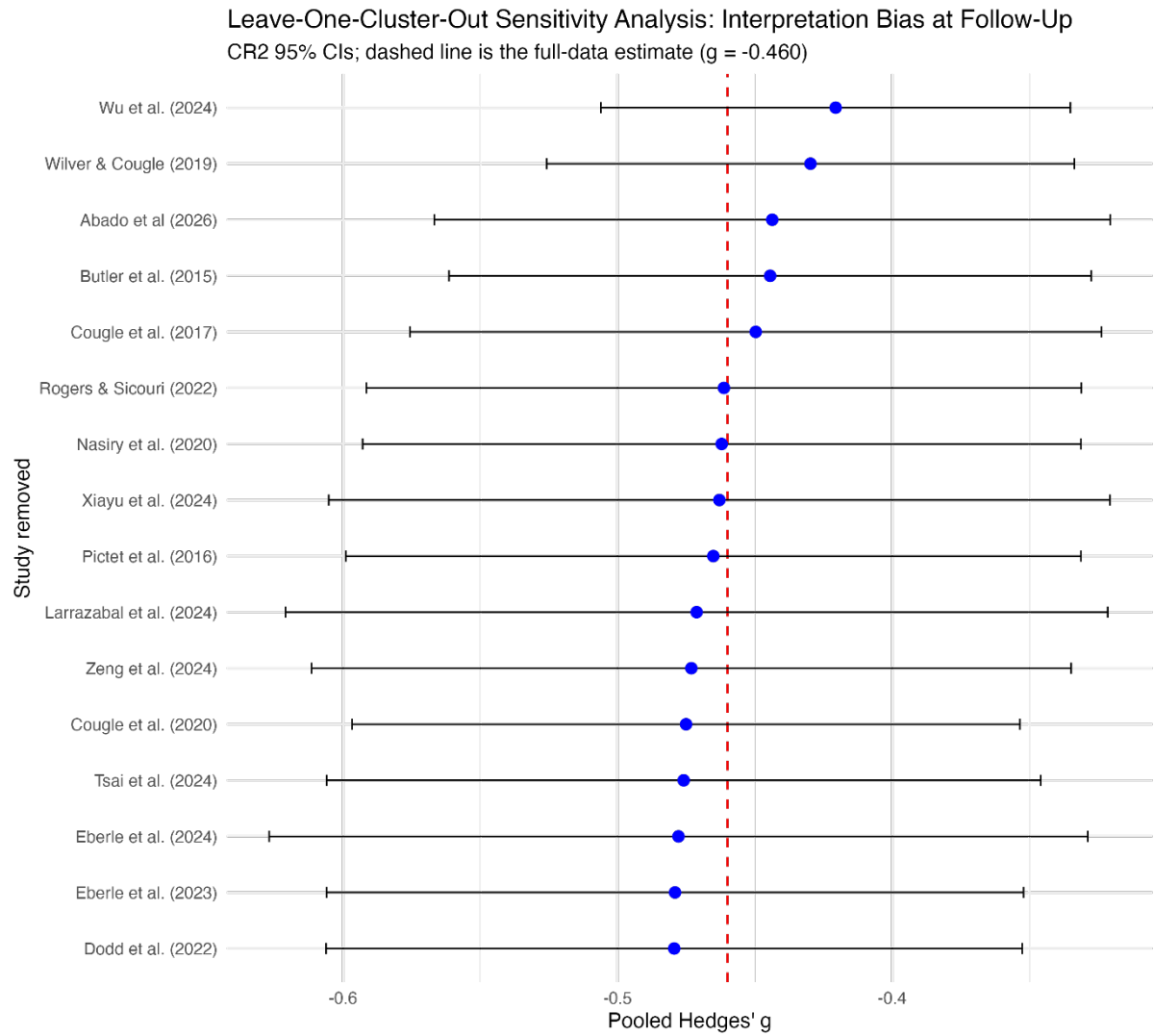
Figure S6. LOCO sensitivity analysis for interpretation bias at follow-up.

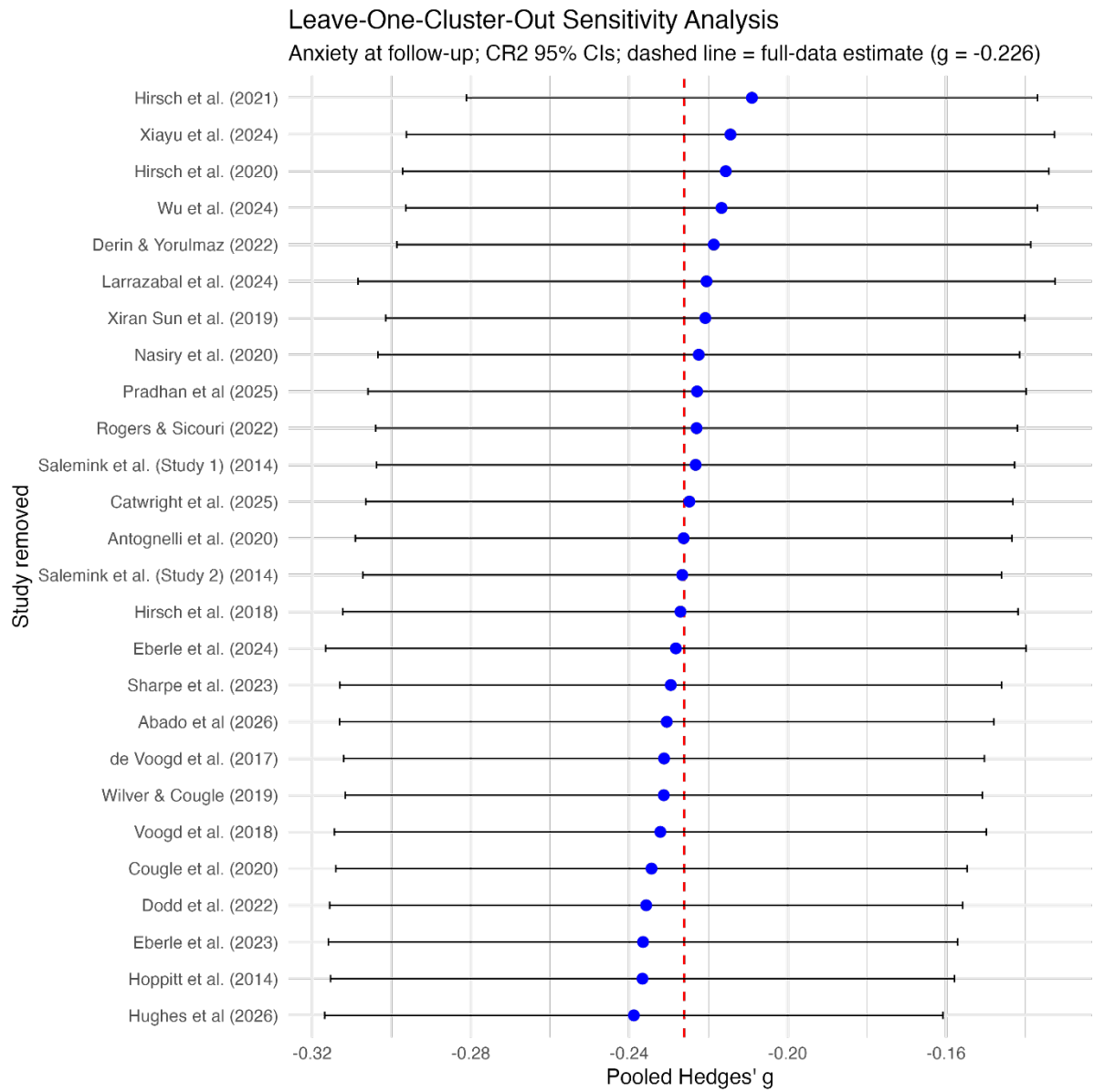
Figure S7. LOCO sensitivity analysis for anxiety at follow-up.

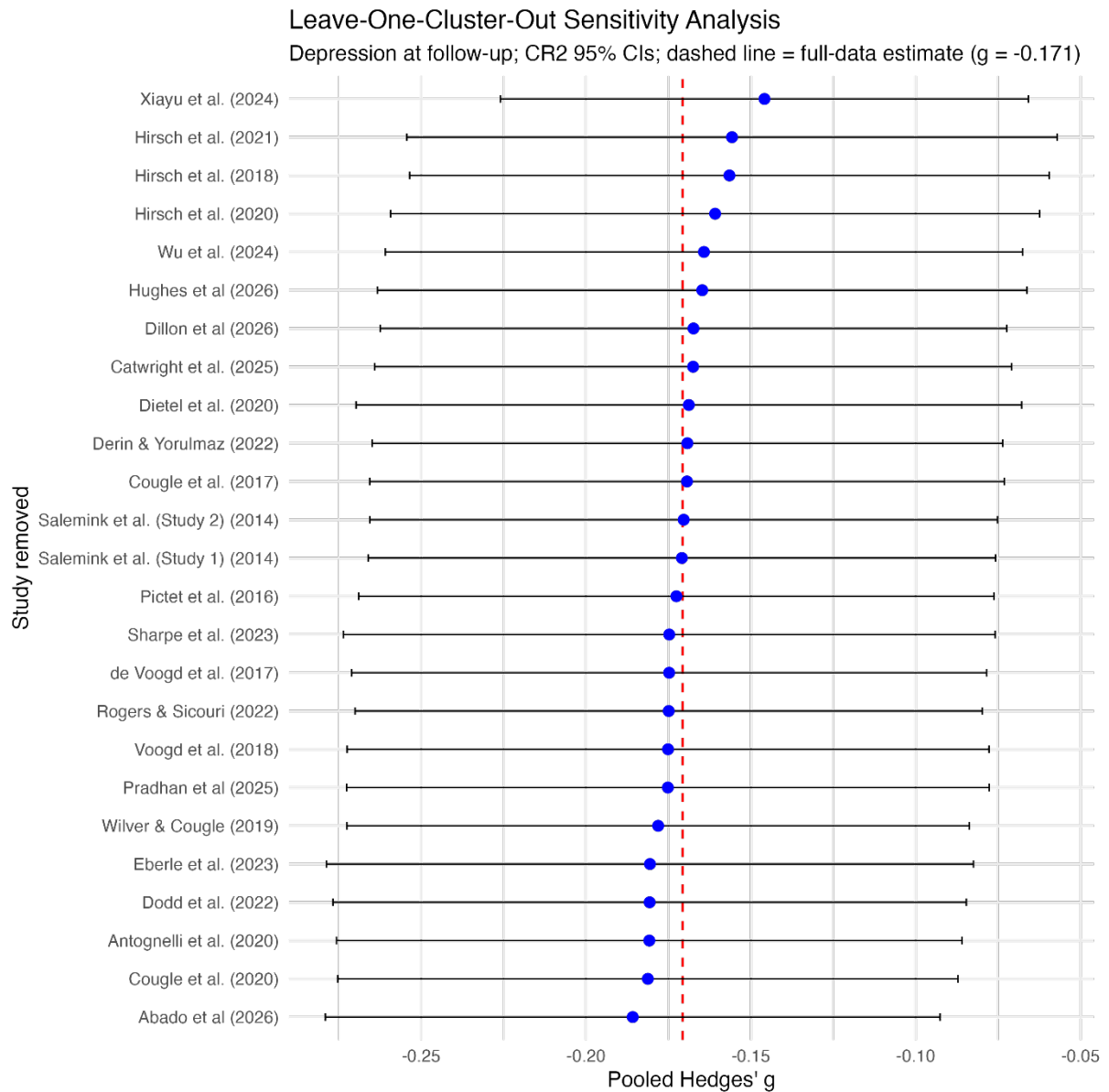
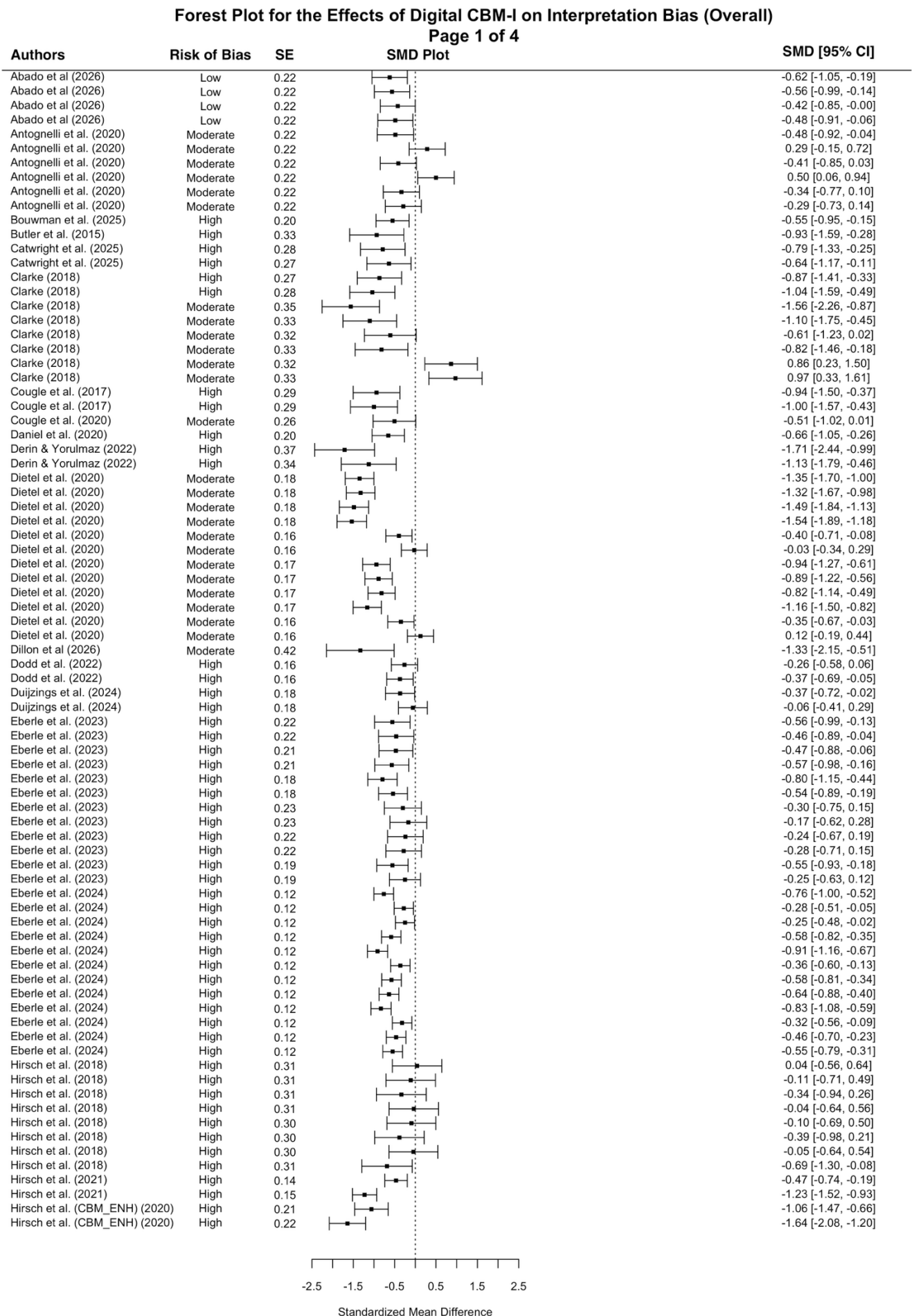
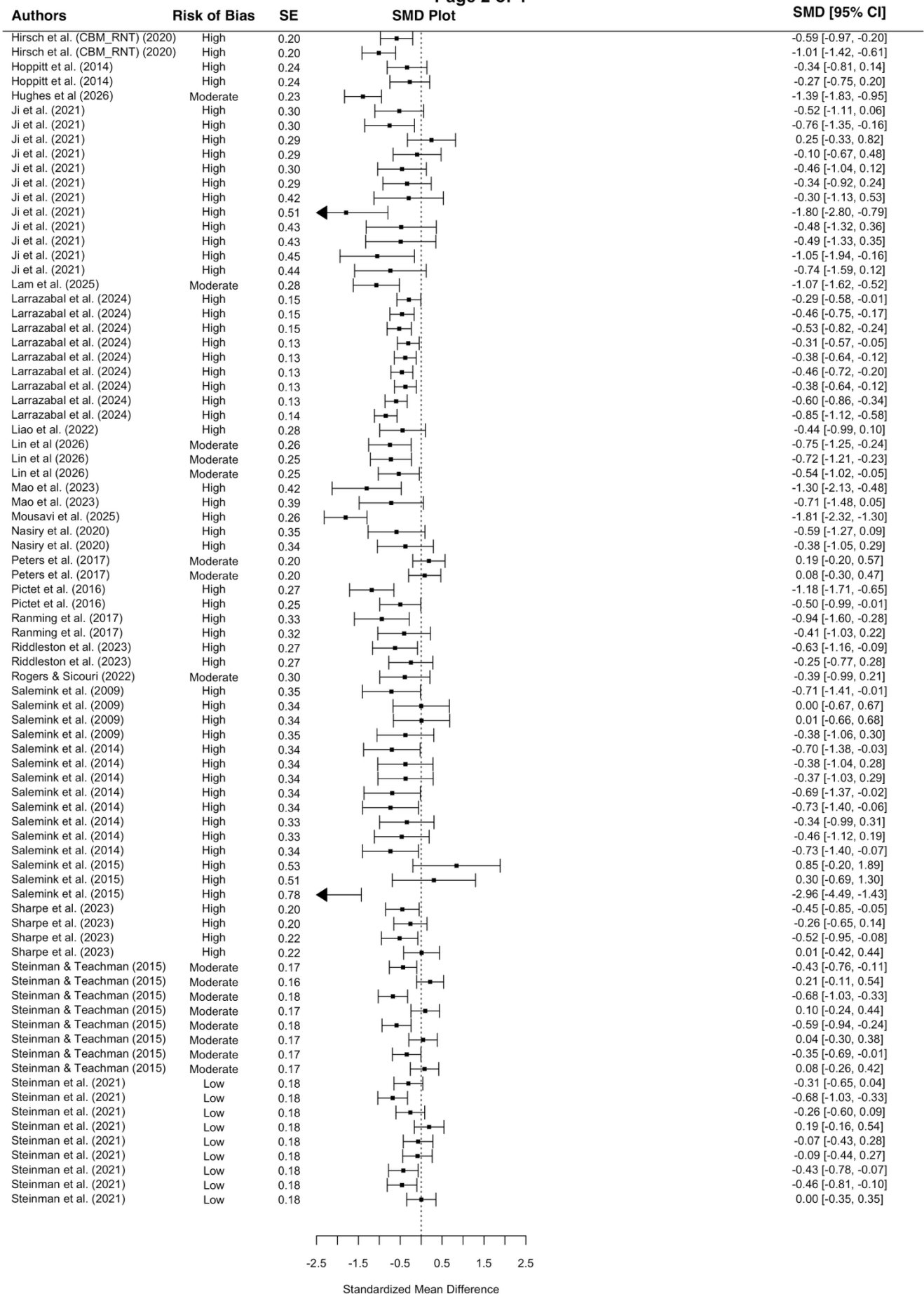
Figure S8. LOCO sensitivity analysis for depression at follow-up.

Figure S9. Forest plot for post-treatment effects on interpretation bias

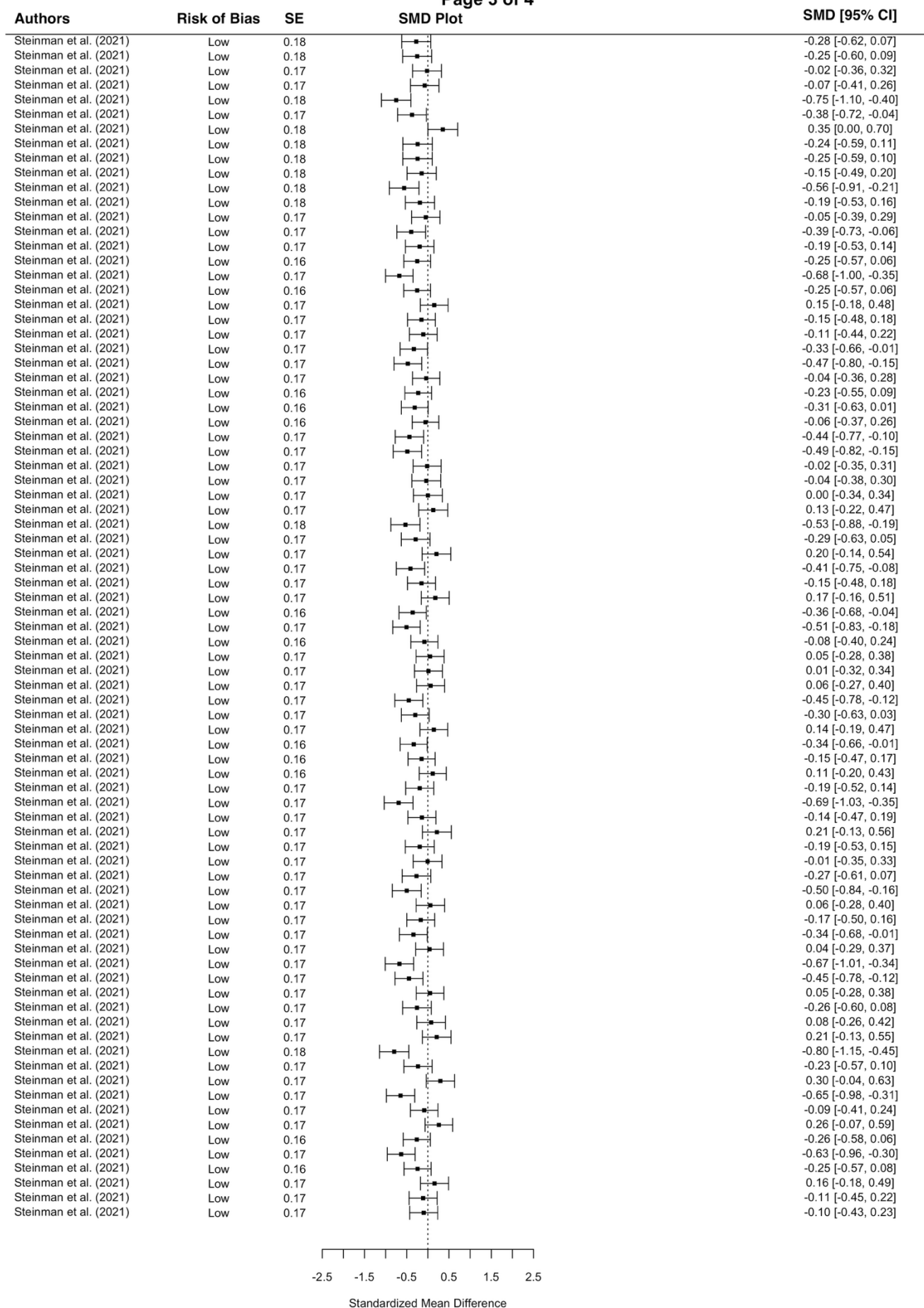
Forest Plot for the Effects of Digital CBM-I on Interpretation Bias (Overall)

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Forest Plot for the Effects of Digital CBM-I on Interpretation Bias (Overall)

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Forest Plot for the Effects of Digital CBM-I on Interpretation Bias (Overall)

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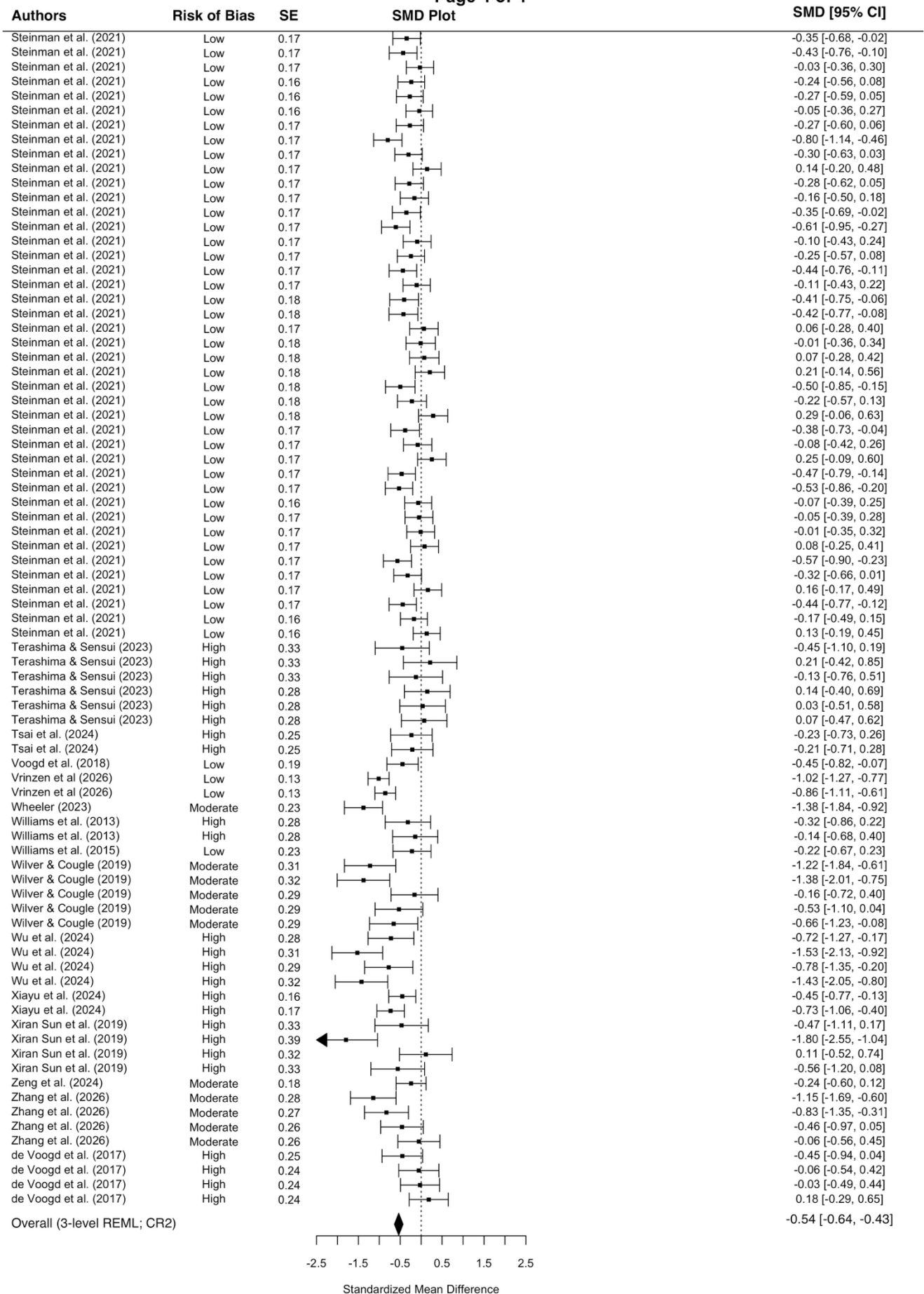
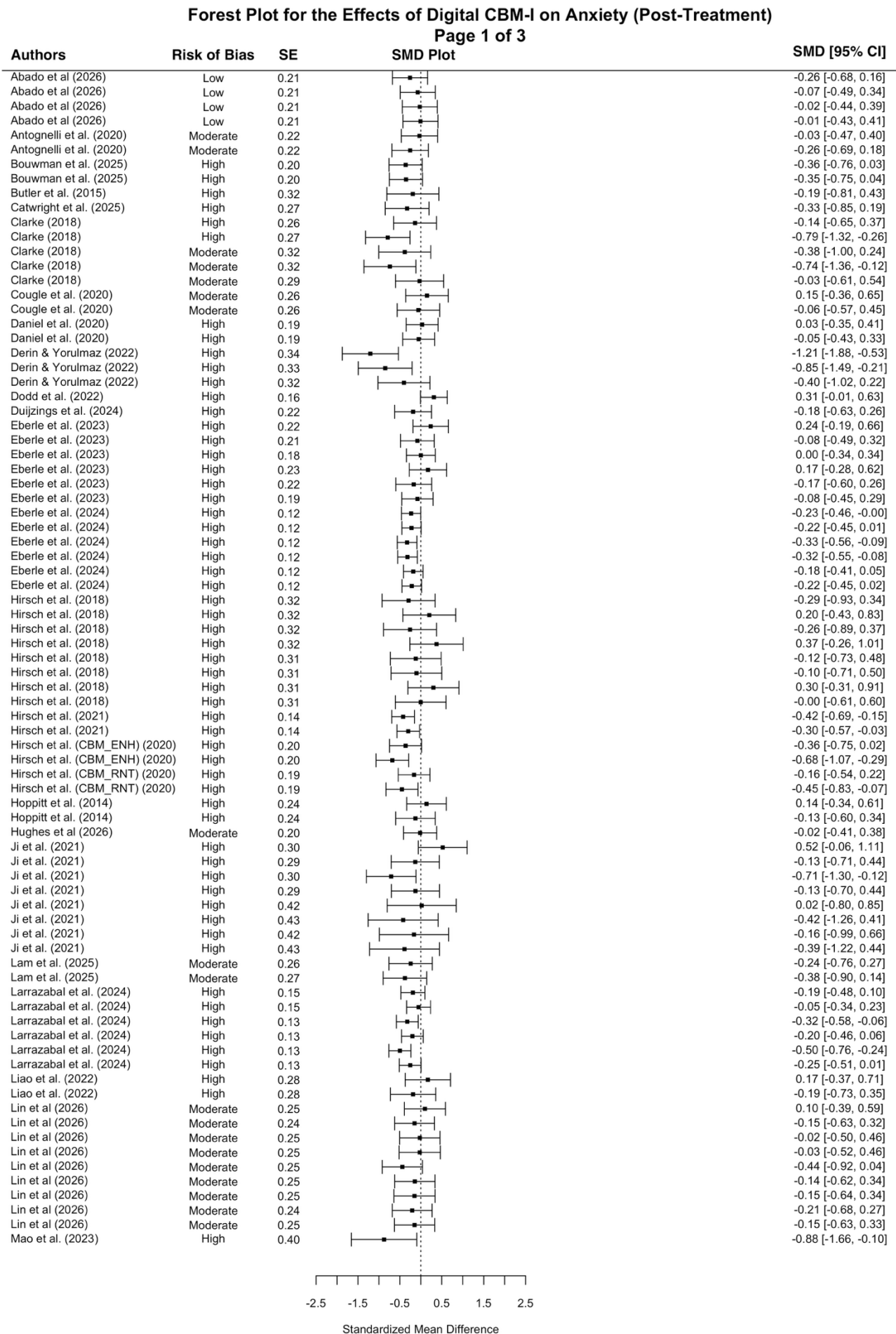
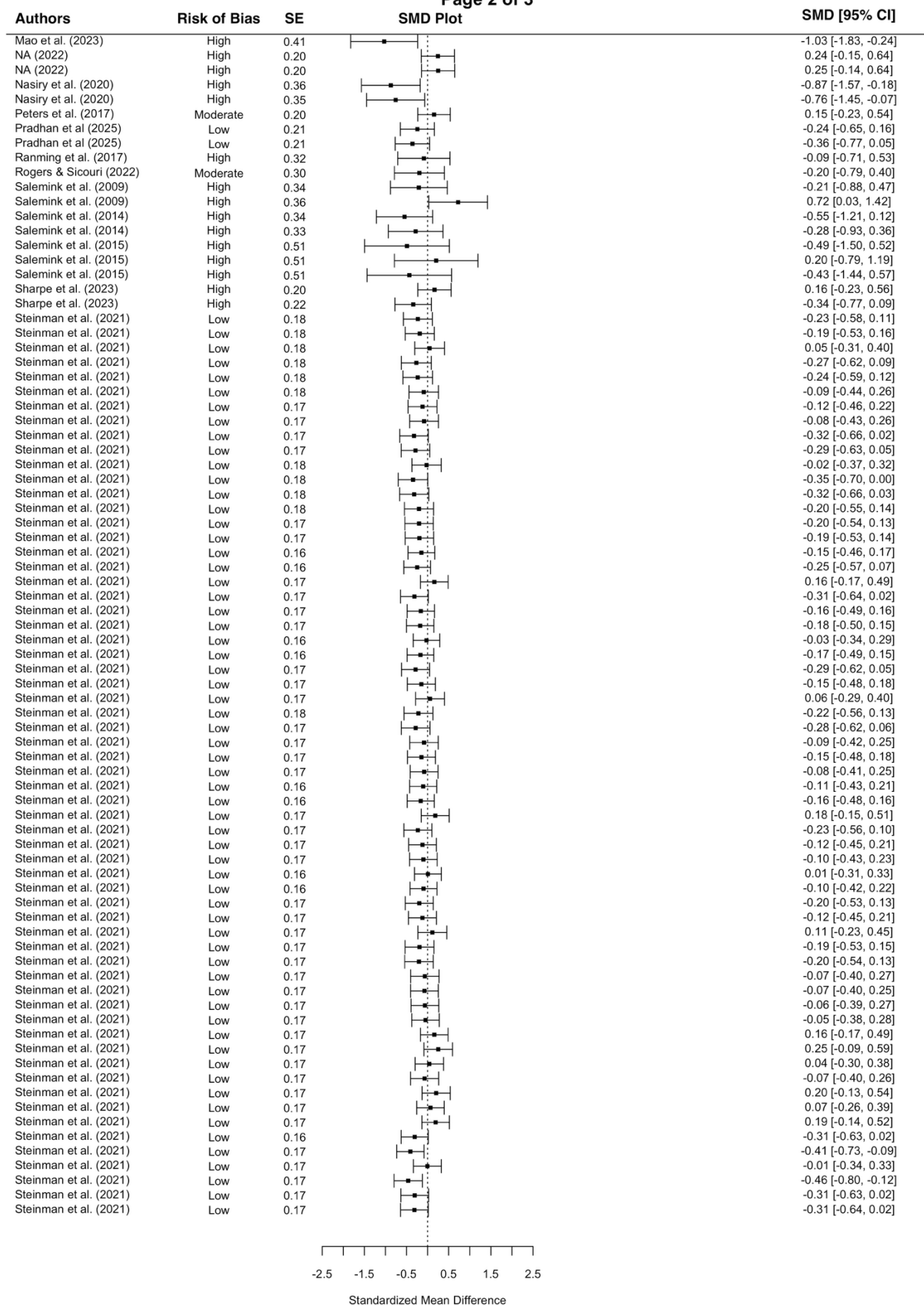


Figure S10. Forest plot for post-treatment effects on anxiety

Forest Plot for the Effects of Digital CBM-I on Anxiety (Post-Treatment)

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Forest Plot for the Effects of Digital CBM-I on Anxiety (Post-Treatment)

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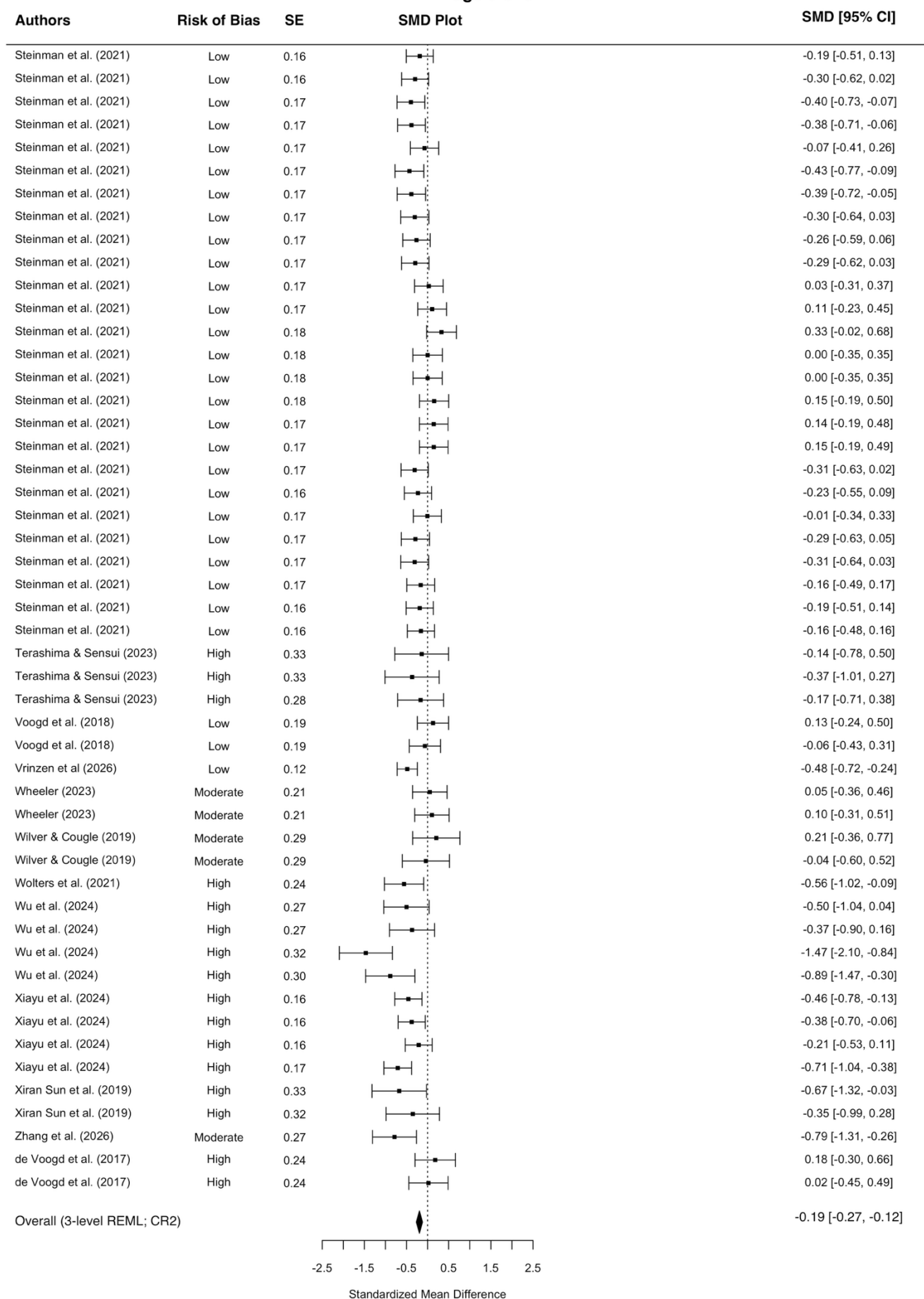


Figure S11. Forest plot for post-treatment effects on depression**Forest Plot for the Effects of Digital CBM-I on Depression (Post-Treatment)**

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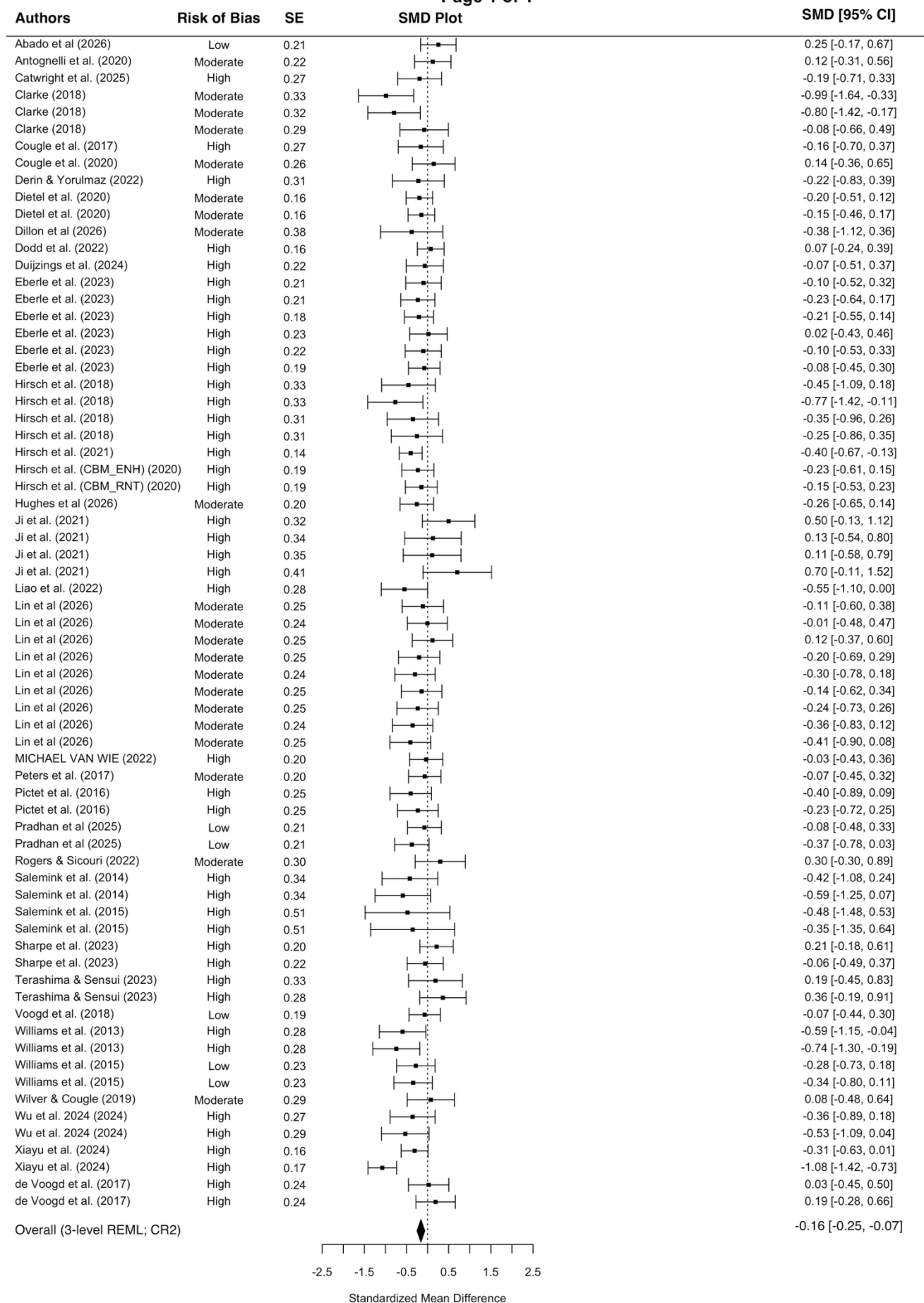


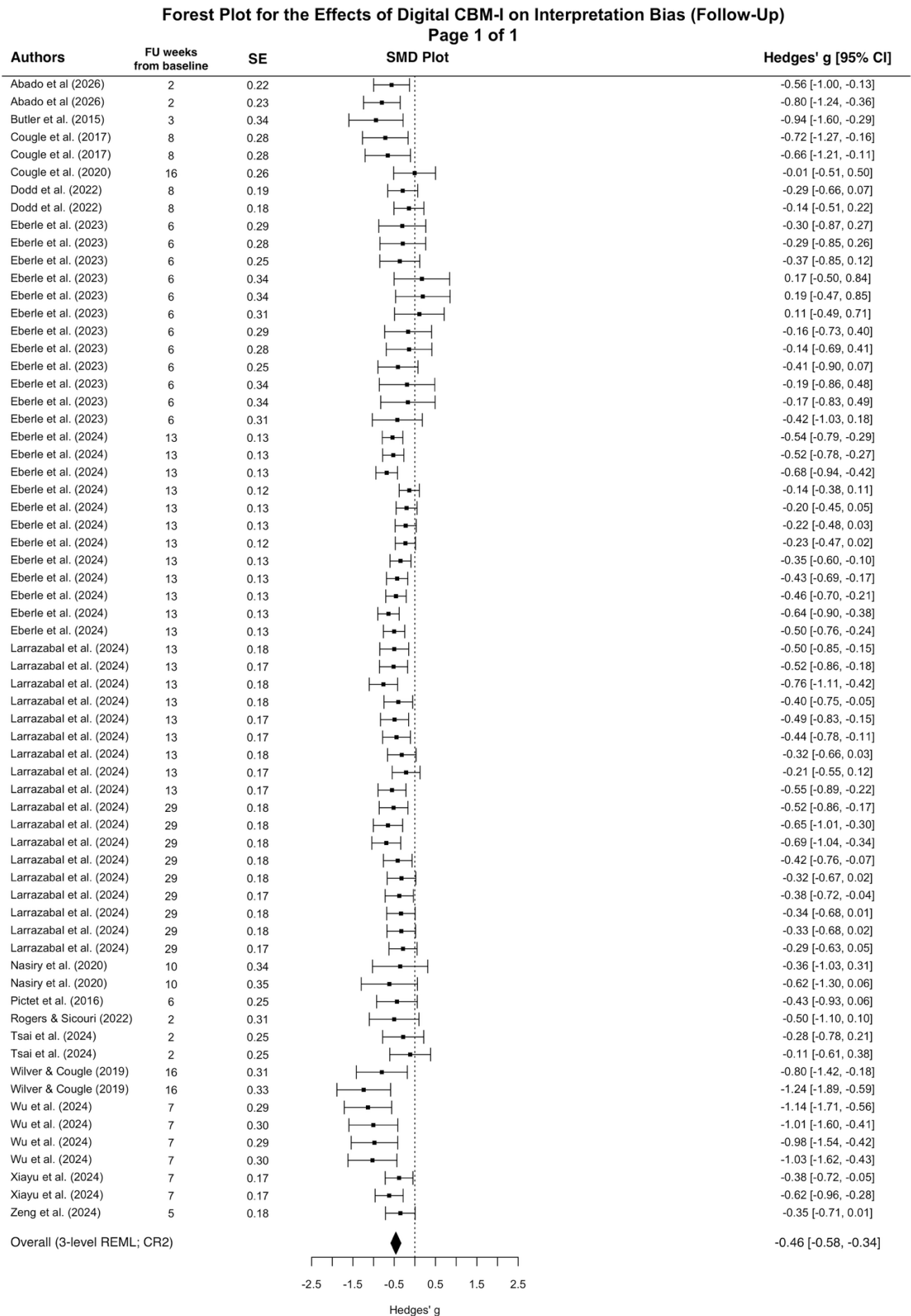
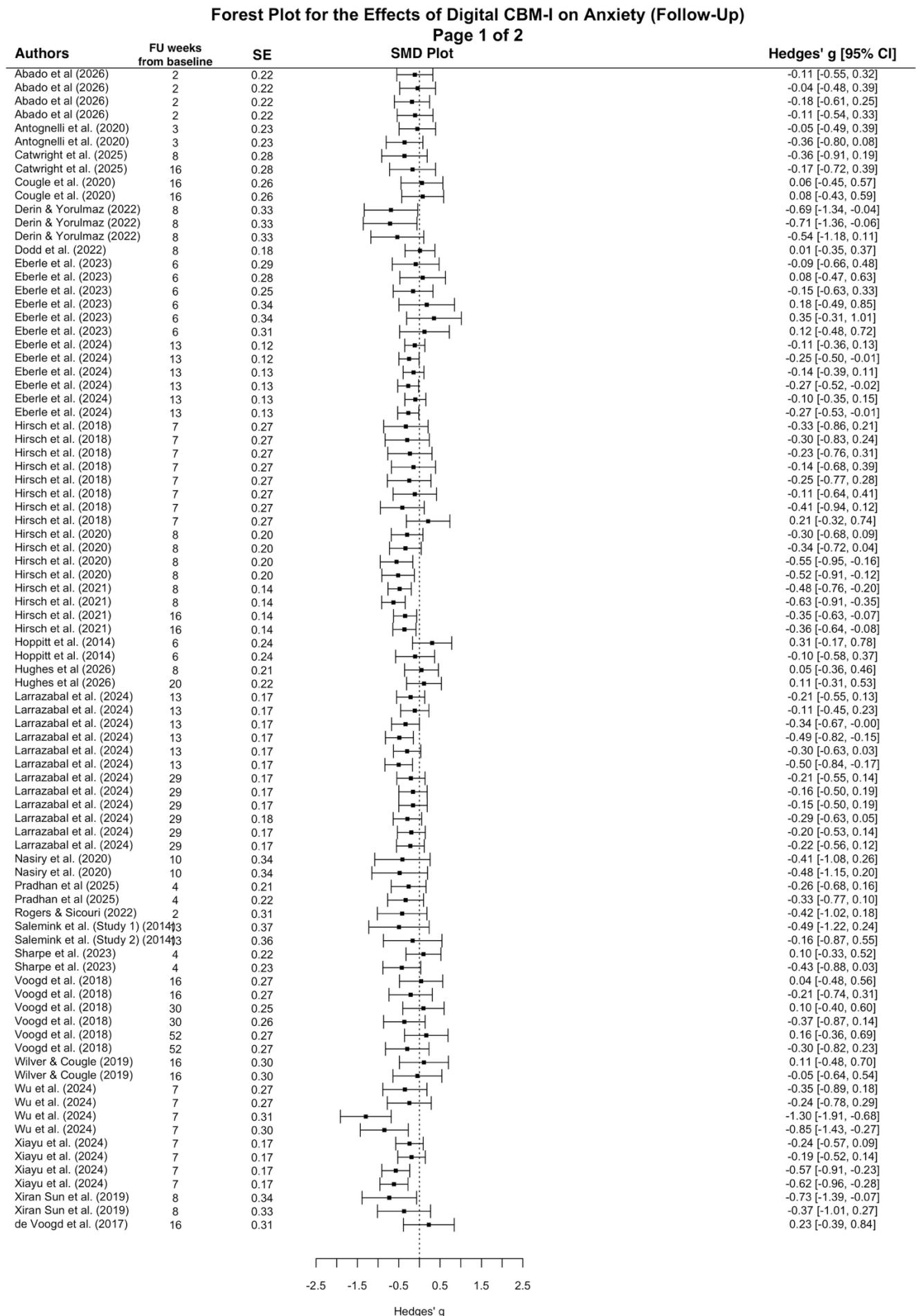
Figure S12. Forest plot for follow-up effects on interpretation bias

Figure S13. Forest plot for follow-up effects on anxiety

Forest Plot for the Effects of Digital CBM-I on Anxiety (Follow-Up)
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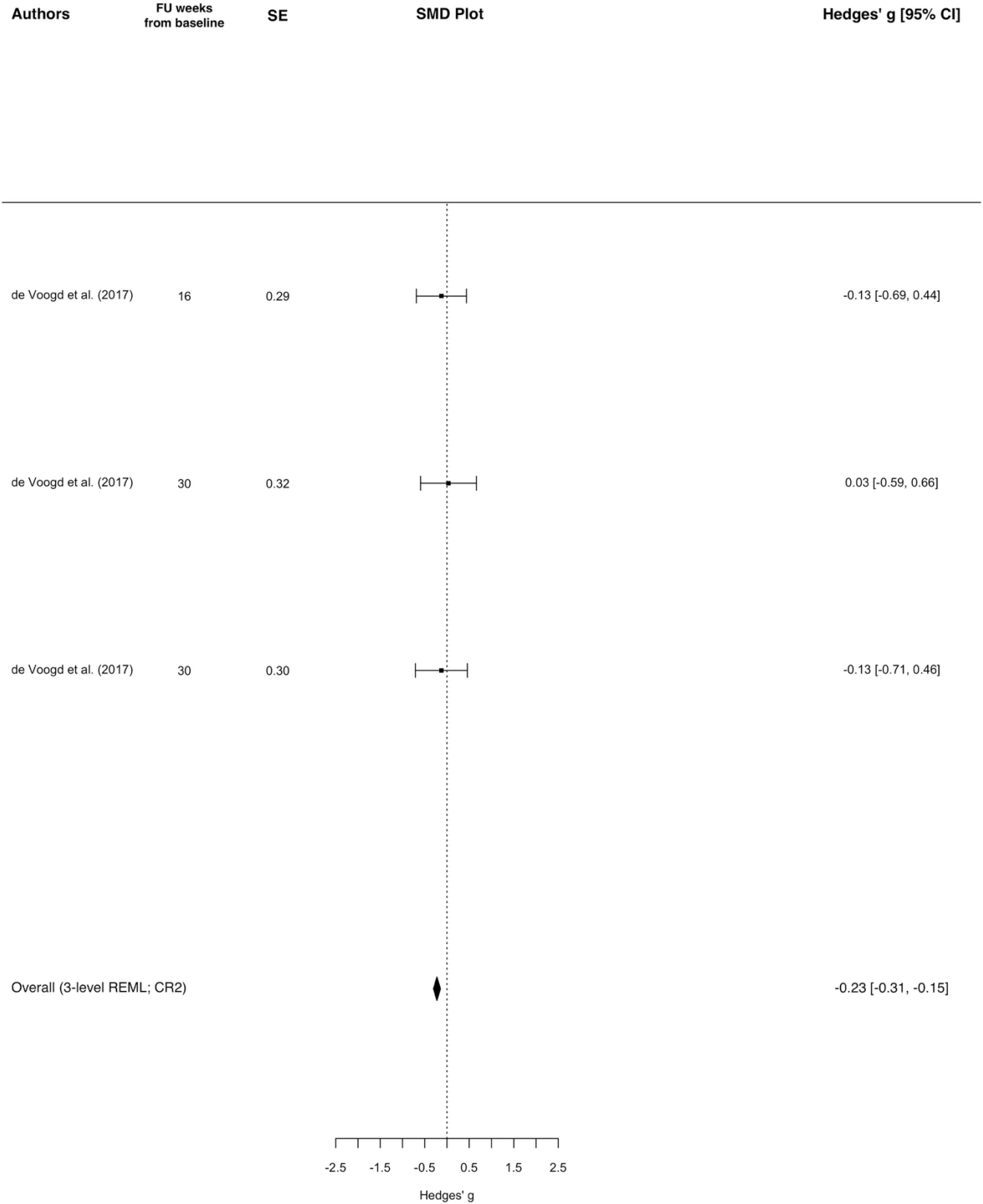
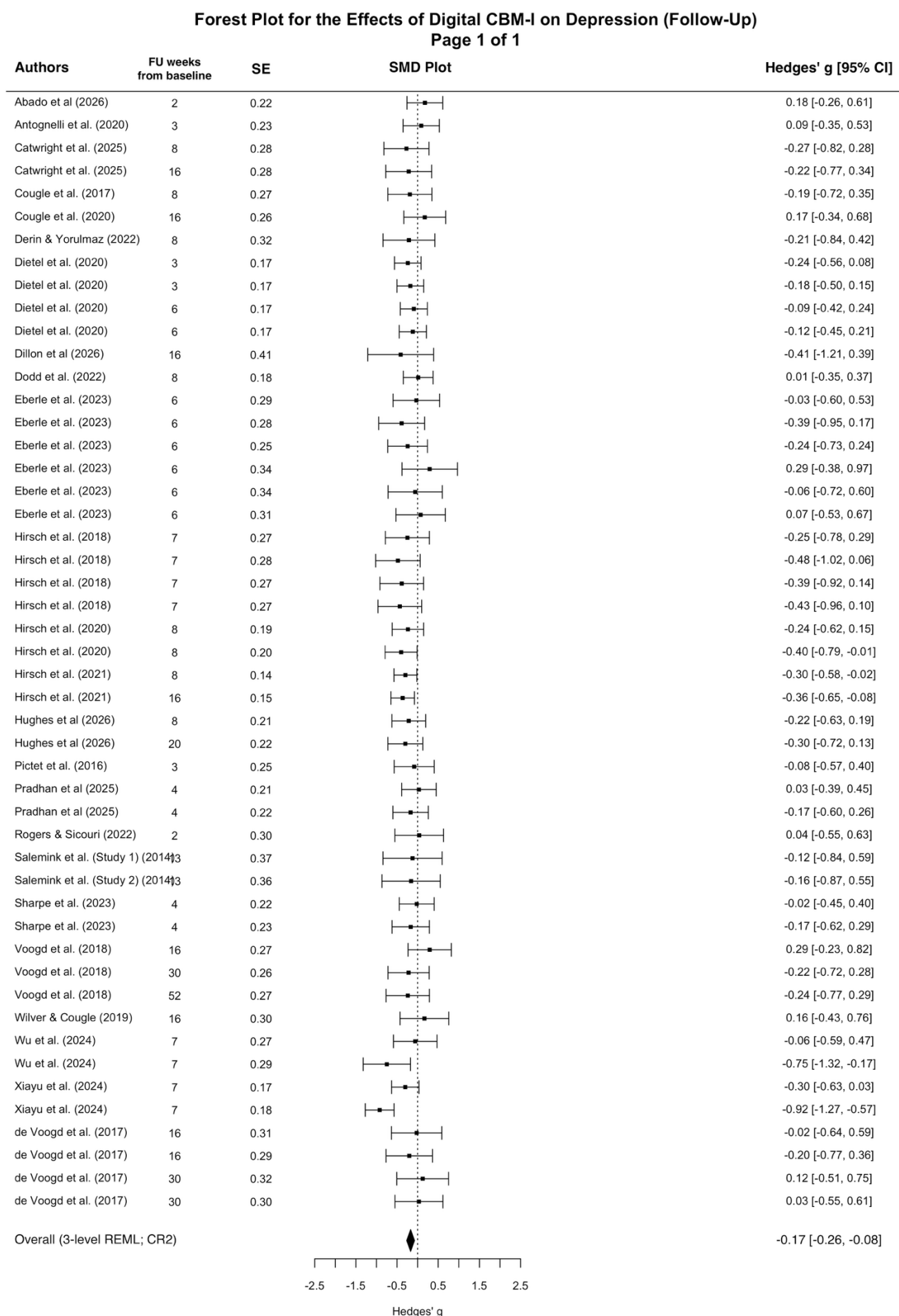


Figure S14. Forest plot for follow-up effects on depression

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