Reduced Specificity and Increased Overgenerality of Autobiographical Memory Persist as
Cognitive Vulnerabilities in Remitted Major Depression: A Meta-Analysis

Hallford, D. J.^{1,2}, Rusanov, D.¹, Yeow, J. J. E.¹, & Barry, T. J.³

¹ School of Psychology, Deakin University, 1 Gheringhap Street, Geelong, Victoria 3220,
Melbourne, Australia

²Corresponding Author, School of Psychology, Deakin University, 221 Burwood Hwy,
Burwood, Victoria 3125, Melbourne, Australia, Phone: + 61 3 9251 7777, Email:
david.hallford@deakin.edu.au

³ Faculty of Social Sciences, University of Hong Kong, Pok Fu Lam, Hong Kong, +852 3917
7457, E: tjbarry@hku.hk; tom.j.barry@icloud.com

Abstract

Difficulty in accessing specific memories, referred to as reduced memory specificity or overgeneral memory, has been established as a marker of clinical depression. However, it is not clear if this deficit persists following the remission of depressive episodes. The current study involved a systematic review and meta-analysis of empirical studies with the aim of establishing whether remitted depression was associated with retrieving fewer specific and more overgeneral autobiographical memories. Seventeen studies were identified as eligible. The results indicated that people with remitted depression recalled fewer specific memories ($k = 15$; $g = -0.314$, 95% CI $[-0.543; -0.085]$, $z = -2.69$, $p = .007$) and more categoric memories ($k = 9$; $g = 0.254$, 95% CI $[0.007; 0.501]$, $z = 2.02$, $p = .043$) compared to people who had never been depressed. Given that these deficits have elsewhere been shown to be prognostic of future depressive symptoms, these findings provide further evidence that reduced memory specificity/overgeneral memory appears to be a risk factor for future episodes of depression in those that are in remission. The findings are discussed in terms of how this knowledge might influence clinical understanding of relapse prevention and maintenance of remission in those with a history of depression.

Keywords: memory specificity; overgeneral memory; major depression; depression; remission; meta-analysis

Introduction

Autobiographical memories refer to information about one's personal past experiences, with specific memories referring to discrete event-level experiences, no longer than a day in duration (e.g., *a long walk in a local park with two friends*). Difficulty in accessing specific memories, referred to as reduced memory specificity or overgeneral memory, has been established as a cognitive marker of depression (Liu et al., 2013; Williams, 1992) and other mental illnesses (Barry, T.J., Hallford, D. J., Takano, 2021; van Vreeswijk & de Wilde, 2004). On failing to retrieve specific memories, people may instead recall non-specific events, including recurrent events or *categories* of events (e.g., my daughters' birthdays, or birthday parties), or events which lasted for *extended* periods of time (e.g., when I was a teenager I was very active). Difficulty in recalling specific memories is a predictor of future depressive symptoms, independent of depressive symptoms at baseline (Hallford, Rusanov, et al., 2021). This effect is significantly stronger in those that are already clinically depressed. This suggests that reduced memory specificity/overgeneral memory is both a risk factor for depressive symptoms in general, and a relatively stronger maintaining factor when people do then experience clinical depression. This is perhaps unsurprising given that retrieving specific information about one's past experiences is implicated in adaptive processes such as problem-solving (Hallford, Noory, et al., 2018), planning and decision-making (Dalglish & Werner-Seidler, 2014), up-regulating anticipatory pleasure for future events (Hallford et al., 2020; Painter & Kring, 2016) and maintaining social support (Barry, Vinograd, et al., 2019; Chiu et al., 2019).

While a deficit in memory specificity has been well established in clinical depression, it is less clear whether or not this deficit persists following remission of clinical depression. That is, when people remit from episodes of major depression, are they still more likely to retrieve non-specific memories relative to people who have not been depressed? If these

difficulties do persist, then difficulties retrieving specific memories represents not only a symptom of depression, but also a marker of vulnerability to future episodes. Studies to date provide conflicting answers to this question. For example, Kuyken and Dalgleish (2011) and Mackinger, Pachinger, Leibetseder, and Fartacek (2000) found large differences in memory specificity between people in remission from depression and healthy control participants with no history of depression. In contrast, other studies, such as those by Crane et al. (2007) and Park et al. (2002), found small, non-significant differences. There may be a number of reasons for this heterogeneity in findings. For instance, smaller samples less accurately estimate population differences given the greater variance in sampling distribution. They also have less statistical power to detect small effects, meaning researchers may draw false negative conclusions when the ‘true’ effects are only modest in size. It could also be that there are differences in studies on current/residual depressive symptoms between those in remission from depression and those with no history of depression. Potentially, group differences in memory specificity/overgenerality could be accounted for by these current/residual depressive symptoms, rather than attributed to an effect of historical depressive symptoms. Another consideration might be the number of previous episodes of depression that people have experienced, with a greater number of previous episodes potentially entrenching differences in memory specificity/overgenerality relative to those without a history of depression.

In addition to depression being a highly prevalent disorder (Lim et al., 2018), it is also a recurring illness, with estimates that 50% of people experience multiple episodes or a more chronic course of illness (Eaton et al., 2008). More clarity around risk factors for relapse, such as low memory specificity, will be invaluable in identifying who is more likely to become unwell, and to inform interventions designed to maintain remission of depression. Although one previous review on cognitive abilities in remitted depression reported on a very

small number of studies assessing specificity and overgenerality (Semkovska et al., 2019), the criteria for a healthy comparator group did not include ruling out a history of depression. Therefore, one cannot assume that the observed effects (which were around the moderate range) are a result of that independent variable. Against this background, the aim of this study was to examine whether people who are in remission from clinical depression show reduced specificity and increased overgeneral retrieval of personal memories relative to people that have never experienced clinical depression. To achieve this, a systematic review of the literature was conducted, and the studies from this review were meta-analysed to estimate if whether, and to what extent, there were differences between these two populations across the breadth of available literature. Potential moderator variables (discussed below) were also analysed to help determine if there were specific factors that may predict any observed differences. Given previous findings, it was hypothesised that people with a history of depression would have significantly reduced memory specificity and significantly increased overgeneral memory relative to those who had never been depressed.

Method

The study procedure was pre-registered within the PROSPERO database (ID: CRD42020203509). The data and scripts used for analysis in this study are open access and available at <https://osf.io/bfcyj/>

Search strategy

The search strategy involved using the search engines Proquest and Ovid to search for keywords on the Embase, PsycARTICLES and PsycINFO databases. The current systematic search was nested within a larger systematic search which aimed to collect all articles that examined memory specificity in clinical and non-clinical samples (Barry, T.J., Hallford, D. J., Takano, 2021). The included keywords related to psychiatric disorders, including depression, *autobiographical memory* and combinations of either *specificity* or *overgeneral*.

A full list of search terms can be viewed in the supplementary material. From this broader search, only articles relating to depression and remitted depression were of interest. Search terms were included to try and examine processes that might explain any group differences (e.g., *rumination*, *brooding*, *executive function*, *verbal fluency*, *problem-solving*, etc; see Williams, 2006 for a review of these processes). However, within the present analysis, there were too few studies involving samples of people with remitted depression for a systematic review or meta-analysis of these factors, and so this was not attempted. Following the database search, review articles, including systematic reviews and meta-analyses were examined for relevant citations that were missed in the first iteration. The authors' personal collections were reviewed and relevant experts within the field were contacted and consulted for additional data. The search and request for studies was conducted on April 18th, 2021. See Figure 1 for a flow chart and the supplementary material for a completed 2020 updated PRISMA checklist for reporting standards (Page et al., 2021).

Study eligibility

To be included, studies needed to be written in English, report original empirical data, and contain two groups of participants: one defined by a history of clinical depression but currently in remission, and another with no historical or current clinical depression. This, therefore, would not include studies that compared people with remitted and current depression (e.g., Brittlebank et al., 1993). Classification of a historical diagnosis of depression and the ruling out of current diagnosis of depression was to be performed using criteria from the Diagnostic and Statistical manuals (DSM) or International Classification of Diseases (ICD), either through clinical interview or a structured interview with a trained clinician. Although memory specificity can be assessed using a number of different measures, in order to reduce heterogeneity between the studies an inclusion criterion was use of the Autobiographical Memory Test (AMT)(Williams & Broadbent, 1986a) to assess memory

specificity/overgenerality. The AMT uses a protocol, whereby participants are provided with a list of cue words one by one and are asked to provide autobiographical memories which are then coded in terms of how specific or non-specific they are. It was expected that the majority of studies within this area of research would have used the AMT. It was further specified that studies could report AMT outcomes in terms of the number or proportion of specific memories, or the number or proportion of general or non-specific memories, and these would be meta-analysed separately. A specific memory was to be defined as a discrete event lasting less than 24 hours (*when I walked my dog last Friday*). A general memory could refer either to a categorical event (i.e., a memory that occurred on multiple occasions, *when I walk my dog*) or an extended event (i.e., a memory that occurred over a period of time longer than 24 hours, *when I owned a dog*) or could be presented as a sum of both types of these events. Studies must have reported adequate data to be included in analyses (i.e., means and standard deviations of AMT scores, or other summary statistics from which mean and standard deviations can be derived, and study sample sizes).

Data extraction and handling

Two trained research assistants (coauthors / and /) conducted the search in tandem. One research assistant extracted all data initially, and the second research assistant then extracted all the data again checking for discrepancies. The first author (/) then checked the data and any remaining disparities were resolved through discussion. We extracted the number of participants in each group within a given study, their mean age, the number of women, and the diagnostic tool used to assess for major depression, measure of depressive symptom severity, number of previous episodes of depression, number of cues used, cue valence, and duration for cue response. Where a study explicitly reported the education levels and ethnicity of participants, this was also extracted.

The mean and standard deviation scores for both the clinical and control group for the measure depression symptom severity used within each study was extracted. Although studies were selected on the basis that neither of the groups of participants being compared had clinical depression, nonetheless there may have been differences in depressive symptoms that might account for group differences in specific or general memories. Therefore, a standardised mean difference for severity scores between groups for each study was computed and this variable was assessed as a potential moderator through meta-regression. We extracted the mean and standard deviation for the number or proportion of specific and general memories retrieved across cues on the AMT. Where this information was available for different cue valences, this was also extracted so these could be analysed separately. We also extracted the duration of time participants were given to recall each memory following cue presentation, whether responses could be given verbally or otherwise, and the number of cues given to participants.

Analytic strategy

Random-effects meta-analyses with maximum likelihood estimators were conducted using the meta package (Balduzzi et al., 2019) in R statistical software 4.0.3 (R Core Team (2020), 2020) for specific and overgeneral memories separately, using Hedge's g as the effect size. Forest plots were used to graphically depict the overall effect size and 95% confidence interval and prediction interval, as well as the individual study point estimates and 95% confidence intervals. Between-study effect size heterogeneity was reported in terms of Q , τ^2 , and I^2 . A significant Q statistic indicates that factors outside of sampling error account for effect size estimate variation, whereas a non-significant Q statistic suggests that differences in effect size estimates between studies are likely to result from sampling error at the subject level (Lipsey & Wilson, 2001). The τ^2 statistic indicates the absolute value of the true variance. The power of the Q statistic to detect statistically significant differences is based on

the number of studies used in the meta-analysis. In contrast, the I^2 index does not rely on statistical significance, and is instead a percentage of total variation in a set of effect sizes that is due to heterogeneity between studies rather than chance (Higgins & Thompson, 2002). Interpretations of I^2 indices of 25%, 50%, and 75% were taken as low, medium, and high heterogeneity, respectively (Higgins, Thompson, Deeks, & Altman, 2003). These analyses were conducted for overall effect sizes across cue types and for each cue valence separately.

Regarding potential moderators of any observed heterogeneity, we tested for differences in depressive symptom severity between the group by using the effect size estimated from means and SDs, age, the difference between groups in the number of women (to assess for the influence of gender), number of cues used in the AMT, and the duration of time given for retrieval on the AMT. Given that extreme scores might unduly influence an overall effect, we identified outliers as any study for which its confidence intervals did not overlap with the confidence interval of the pooled effect size. Sensitivity analyses were conducted by removing these studies, and then conducting the analyses again to assess for changes in the overall effect.

Assessing Risk of Bias

To assess for bias, we used several different methods. At the study level, sources of bias were assessed by auditing whether: 1) the study involved randomisation between and within the study tasks (e.g., were cue words presented in a fixed or random order), 2) participants' group allocation was concealed from them, 3) participants and personnel were blind to the nature of the study, 4) the coders for the autobiographical memory task were blind to participants' group designation and the nature of the study during coding, 5) there was evidence for incomplete outcome reporting or for the contrary such as with pre-registration, 5) particular participants were included in the study, but were omitted from analyses for unclear reasons, and 6) scores for particular measures were included in the study,

but were selectively omitted from the final report. If these potential sources of bias were observed, then *a high risk of bias* was noted. If the study did not include enough information to assess clearly whether this was a potential source of bias *some concern* was noted. If the study explicitly noted the steps taken to manage the bias mentioned, then a *low risk of bias* was noted. To assess publication bias in the sample of studies, we generated funnel plots, on which effect size estimates were plotted on the x-axis, and the inverse of their standard error on the y-axis. Plots resemble a funnel, with less precise estimates at the base of the funnel and estimates with the smallest standard errors at the top. If there is no publication bias, the funnel plot will, hypothetically, be symmetrical. However, missing studies suppressed by publication bias may cause noticeable asymmetry in a funnel plot. Egger's test (Egger, 1997) was used as a statistical test for funnel plot asymmetry, with a significant *p*-value indicative of funnel plot asymmetry, and therefore publication bias. A *p*-curve analysis was also used to assess the potential of *p*-hacking, that is, selective presentation or analysis of data motivated to attain a *p*-value below an alpha of .05 (REF: Simonsohn, Nelson, & Simmons, 2014). The assumption is that where the distribution of *p*-values below .05 are left-skewed this indicates a bias towards results that are only marginally statistically significant relative to those that are clearly below an alpha of .05. This can be interpreted as indicating that *p*-hacking has biased the overall meta-analytic effect. In this analysis, an estimate of statistical power is provided, with higher power increasing the likelihood of observing a smaller *p*-value and a 'true effect'.

Results

Study Characteristics

The search resulted in 17 eligible studies (see Figure 1). Sample characteristics of the 17 articles included in the meta-analysis are provided in Table 1. Fifteen effect sizes were calculated for studies reported on specificity as an index of AMT responses, with nine effect sizes were calculated for overgeneral memories. All nine studies that reported overgeneral

memories in response to the AMT presented number or proportion of categoric memories as an index of overgeneral memory, while only two studies reported the remaining possible overgeneral responses (i.e., extended memories or semantic associates [words that might be thematically related, but not representing a memory per se, e.g., I like flowers]). Given this, categoric memories were used as the index of overgeneral memory in all analyses.

The sample sizes ranged from nine to 275 participants (range 9-164 for remitted depression; range 10-275 controls). The studies in this review were published between 2000 and 2016, with the exception of one preprint published in 2021. The mean age of participants was 20.9 years (range 11 – 86 years), with case and control samples across all studies having approximately equal age means. The average proportion of women in the studies was 78.18% (remitted depression group= 82.7%, control= 73.7%). All studies used interviews to assess for depression diagnoses or rule out history of depression, and all but two used structured, standardised diagnostic interview tools.

There were several different measures of depression severity used across samples; however, the most frequently used was the Beck Depression Inventory-II (BDI-II; $n = 8$; 44.4%; Beck et al., 1996). Ten studies provided information about the number of past episodes in the remitted depression group, however, means and standard deviations could only be extracted or calculated from nine. Barnhofer et al. (2007) provided median and range values which were converted to means and standard deviations using the Box-Cox method (McGrath et al., 2020). Haddad et al. (2014) provided the mean and range, the latter of which was used to estimate the standard deviation (Hozo et al., 2005). For Haringsma et al. (2010) the mean and standard deviation was estimated using tabled data indicating that 26 participants had experienced only one previous episode and the remaining 37 participants, who were reported as having two or more previous episodes, were conservatively coded as

having two episodes. For (Spinhoven et al., 2006) the mean and standard deviation could be estimated from the data provided, although participants that were reported as having six or more previous episodes were conservatively coded as experiencing six episodes.

As required, all studies measured memory specificity or overgenerality using the Autobiographical Memory Test (AMT)(Williams & Broadbent, 1986b). Furthermore, all studies asked for responses verbally, apart from one study that deviated from this format and required a written response (Wessel et al., 2001). The number of cues provided in order to elicit specific memories in the AMT varied across the studies (range = 10-40). Positive and negative valence were the most commonly reported valences. Too few studies reported neutral valence to assess these responses to these cues separately. Half of the studies allocated a 30 second response time for AMT cues, while the rest used different response times (range = 20-120 seconds).

Risk of bias

All studies were found to have at least some concern regarding risk of bias (see the Supplementary Materials for the full coding of studies). As indicated in Table 2, within each category of possible source of bias studies were predominantly coded as there being some concern. In most studies there was no clear concern that data was reported incompletely. No studies were pre-registered, so the risk of selective reporting could not be ruled out. These findings suggest that studies conducted in this area are likely to have one, if not several, possible sources of bias, and should be interpreted accordingly and in the context of indicators of publication bias.

Main Analyses

Specific Memory Retrieval.

The results indicated that people with remitted depression recalled fewer specific memories compared to people who had never been depressed, with a small to moderate-sized effect ($k = 15$; $g = -0.314$, 95% CI $[-0.543; -0.085]$, $z = -2.69$, $p = .007$). See Figure 2 for a forest plot of effect sizes, including a prediction interval indicating the interval in which a future observation is likely to fall. Regarding heterogeneity, there was a statistically significant amount of unexplained variance between the study effect sizes ($Q[14] = 43.41$, $p < .001$; $I^2 = 67.7\%$, $\tau^2 = .12$), indicating a basis for test of moderators that might explain this variance. Outlier analysis indicated there was one outlying effect size (Gupta & Kar, 2012; $SMD = -1.69$). On omitting this outlier and rerunning the analysis, the results were not substantively changed, and still showed a significant, small to moderate-sized effect ($k = 14$; $g = -0.262$, 95% CI $[-0.477; -0.046]$, $z = -2.38$, $p = .017$). There was also still a statistically significant, substantial amount of variance between the study effects ($Q[14] = 35.42$, $p < .001$; $I^2 = 63.4\%$, $\tau^2 = .09$).

Valence Effects. On meta-analysing group differences for studies that examined positively-valenced cues separately, the results indicated a significant difference between the remitted depression and never depressed groups, with a small to moderate-sized effect ($k = 10$; $g = -0.366$, 95% CI $[-0.676; -0.056]$, $z = -2.31$, $p = .020$), and significant heterogeneity ($Q[9] = 40.85$, $p < .001$; $I^2 = 78\%$, $\tau^2 = .17$). One outlier was found (Kuyken & Dalgleish, 2011), and when removed, the effect was largely similar and marginally above the threshold for statistical significance, ($k = 9$; $g = -0.250$, 95% CI $[-0.517; 0.016]$, $z = -1.84$, $p = .065$), with a statistically significant amount of unexplained variance between the study effect sizes ($Q[8] = 26.20$, $p = .001$; $I^2 = 69.5\%$, $\tau^2 = .10$). Similarly, for studies that examined negatively-valenced cues separately, there was a significant difference between the remitted depression and never depressed, also with a small to moderate-sized effect ($k = 10$; $g = -0.324$, 95% CI $[-0.603; -0.046]$, $z = -2.29$, $p = .022$), and significant heterogeneity ($Q[9] = 32.81$, $p < .001$; $I^2 =$

72.6%, $\tau^2 = .13$). One outlier was found (Mackinger et al., 2000) and when removed, the effect was again largely similar and marginally above the threshold for statistical significance, ($k = 9$; $g = -0.222$, 95% CI[-0.464; 0.019], $z = -1.80$, $p = .071$), with a statistically significant amount of unexplained variance between the study effect sizes ($Q[8] = 26.89$, $p = .007$; $I^2 = 61.7\%$, $\tau^2 = .07$). Given that the effects for positive and negatively-valenced cues largely overlapped in their confidence intervals, valence did not appear to be a factor in group difference in specific memories.

Moderator Analyses. The differences between the remitted depression and never depressed groups in specific memories was not predicted by differences between the groups in depression symptom severity, $b = 0.123$, $SE = 0.214$, 95% CI[-0.297; 0.544], $z = 0.57$, $p = 0.565$, nor by age differences between the groups, $b = 0.004$, $SE = 0.009$, 95% CI[-0.014; 0.022], $z = 0.43$, $p = 0.663$, differences in the number of women between the groups, $b = -0.006$, $SE = 0.004$, 95% CI[-0.014; 0.001], $z = -1.51$, $p = 0.129$, number of cues used for retrieval, $b = -0.010$, $SE = 0.012$, 95% CI[-0.014; 0.035], $z = 0.81$, $p = 0.415$, or retrieval duration, $b = -0.006$, $SE = 0.004$, 95% CI[-0.015; 0.002], $z = -1.50$, $p = 0.132$. In assessing the number of past episodes of depression as a moderator, one study on adolescents (Kuyken & Dalgleish, 2011) was excluded given this was the only study in this subsample comprised of adolescents, and that having fewer past depressive episodes was likely to be a function of being substantially younger relative to the remaining samples which were mostly young to middle aged adults. The results from the remaining studies ($k = 8$) indicated no clear evidence for a moderating effect, $b = -0.099$, $SE = 0.070$, 95% CI[-0.237; 0.037], $z = -1.42$, $p = 0.155$. The results did not substantially differ when the adolescent study was included.

Publication Bias. Figure 3 shows a funnel plot of the full sample of studies assessing specificity. The results of Eggers' test did not indicate funnel plot asymmetry, intercept = -2.43, 95% CI[-4.82; -0.06], $p = 0.079$). The results of the P -curve analysis

showed there was adequate power to detect an effect, 79% (95%CI 33.4 - 96.4%), and that there was evidence of a “true” effect in the overall findings. Taken together these analyses suggest that the observed group differences in specificity were not the product of publication bias or “*p*-hacking”.

Categoric Memory Retrieval

The results indicated that people with remitted depression recalled more categoric memories compared to people who had never been depressed, with a small to moderate-sized effect ($k = 9$; $g = 0.254$, 95% CI[0.007; 0.501], $z = 2.02$, $p = .043$). See Figure 3 for a forest plot of effect sizes, including a prediction interval. A test for heterogeneity indicated there was not a statistically significant amount of unexplained variance between the study effect sizes ($Q[8] = 12.49$, $p = .134$; $I^2 = 36\%$, $\tau^2 = .05$). No outliers were detected.

Valence Effects. On meta-analysing group differences for studies that examined positively-valenced cues separately, the results indicated a significant difference between the remitted depression and never depressed groups, with a small to moderate-sized effect ($k = 7$; $g = 0.339$, 95% CI[0.058; 0.619], $z = 2.37$, $p = .017$), with no significant heterogeneity ($Q[6] = 9.17$, $p = .164$; $I^2 = 34.6\%$, $\tau^2 = .04$). No outliers were detected. For studies that examined negatively-valenced cues separately, there was a small to moderate, but non-significant difference between the remitted depression and never depressed groups ($k = 7$; $g = 0.278$, 95% CI[-0.182; 0.740], $z = 1.19$, $p = .235$), and significant heterogeneity ($Q[6] = 23.99$, $p < .001$; $I^2 = 75\%$, $\tau^2 = .28$). No outliers were found. In summary, a significant effect was found for positively-valenced cues, but not for negatively-valenced cues. However, given the similarity in their effect size and confidence intervals that predominantly overlapped, this did not provide clear evidence that cue valence was a factor in group differences in categoric memories.

Moderator Analyses. The difference between the remitted depression and never depressed groups in categoric memories (across cue-valences) was not predicted by differences between the groups in depression symptom severity, $b = -.400$, $SE = 0.245$, 95% CI $[-0.881; 0.081]$, $z = -1.62$, $p = 0.103$, nor age differences between the groups, $b = -0.004$, $SE = 0.12$, 95% CI $[-0.029; 0.021]$, $z = -0.31$, $p = 0.753$, differences in the number of women between the groups, $b = -0.004$, $SE = 0.013$, 95% CI $[-0.030; 0.021]$, $z = -0.36$, $p = 0.718$, number of cues used for retrieval, $b = -0.008$, $SE = 0.011$, 95% CI $[-0.031; 0.014]$, $z = -0.74$, $p = 0.454$, or retrieval duration, $b = 0.012$, $SE = 0.010$, 95% CI $[-0.007; 0.032]$, $z = 1.23$, $p = 0.216$. Again, when assessing past episodes of depression, a study with adolescents was excluded (Kuyken & Dalgleish, 2011). This left few studies ($k = 4$), among which there was no clear evidence for a moderating effect, $b = 0.028$, $SE = 0.071$, 95% CI $[-0.111; 0.167]$, $z = 0.039$, $p = 0.693$. Notably, this analysis had very low statistical power.

Publication Bias. Figure 5 shows a funnel plot of the full sample of studies assessing categoric memories. The results of Eggers' test did not indicate the presence of funnel plot asymmetry, intercept = 0.51, 95% CI $[-3.84; 4.87]$, $p = 0.822$, and therefore did not support the presence of publication bias. Although statistical power was low for Eggers test ($k < 10$), the results were highly non-significant and not suggestive of a false-negative result for bias. As there were two or less p -values less than .05, p -curve analysis could not be conducted.

Discussion

This study systematically sampled and reviewed extant literature to examine whether or not, and to what extent, reduced specificity or overgenerality in autobiographical memory retrieval persists following the remission of depression. To do this, studies that compared groups of people with a history of clinical depression and no current depression to people with no historical or current clinical depression were included. The results of the meta-

analyses indicated that small to moderate deficits in the recall of specific, event-level personal memories are apparent amongst people who have remitted from clinical depression. In combination with other existing meta-analyses showing that the presence of depression diagnoses is also associated with reduced specificity (Liu et al., 2013; Williams et al., 2007), our findings therefore provide evidence for a cognitive deficit that persists beyond episodes of major depression. This is significant, as evidence shows that difficulty in retrieving event-level, specific personal memories is prognostic of future depressive symptoms (Hallford, Rusanov, et al., 2021). Therefore, our study provides further evidence that reduced memory specificity/overgeneral memory may be a risk factor for future episodes of depression in those that are in remission. The between group effect sizes were smaller than those typically found in studies and meta-analyses that compare people with active clinical depression to those who are not depressed (Liu et al., 2013; Williams et al., 2007). This suggests that there may be other processes associated with being depressed that make the remembering of specific, event-level memories harder.

There was not strong evidence that memory specificity varied based on the valence of cues. This indicates that people with a history of depression recall fewer memories of specific personal events that occurred in particular places and times in their lives regardless of whether this is prompted by a positive or negatively-valenced word. Although cue valence does not correspond to the emotional valence of memory in a 1:1 manner, evidence indicates that the majority of responses on the AMT will have an emotional valence consistent with the cue word (Young et al., 2012).

Interestingly, the observed impairments in autobiographical memory were not explained by differences in current depressive symptoms between the groups. Therefore, it was not residual depressive symptoms or a generally higher baseline level of subclinical depressive symptoms in those with remitted depression that accounted for these differences.

The substantial heterogeneity in the analyses of specific and categoric memories was not explained by any of the other moderators either. This heterogeneity is associated with wide confidence intervals around the point estimates, and therefore, although there does appear to be observable group differences, there are unknown factors that predict when these differences are likely to be smaller or larger. The risk of bias assessment did not provide any clear evidence of bias in publication, nor *p*-hacking, while the risk of bias within studies indicated possible causes for concern across all studies.

There were few studies that reported on number of previous episodes, and no clear evidence that this moderated the observed effects. This may be an important factor to consider in future research though, given that the severity of other deficits in cognitive functioning that persist after the remission of depression do appear to be predicted by higher numbers of previous episodes (Semkovska et al., 2019). Further, while this review can confirm deficits in specific memories, and a tendency to instead recall a greater number of categoric memories, in remitted depression, it cannot ascertain if this was a precursor to people's initial episode, or whether this occurred as a result of depression and then continued as a risk factor for future episodes, i.e., the 'scar' hypothesis for depression (Lewinsohn et al., 1981). Prospective studies are needed to assess if people who experience clinical depression already have relatively lower pre-morbid memory specificity than those who do not experience clinical depression, or whether these deficits emerge and persist as a result of clinical depression.

This study suggests that memory specificity is a suitable target for intervention not only in the treatment of active depression (Barry et al., 2021), but also in the reduction of relapse. Fortunately, there is now robust evidence that memory specificity is a modifiable cognitive variable, both in clinical and non-clinical samples (Barry, Sze, et al., 2019). Indeed, recent research has indicated that improvement in memory specificity can be achieved

through face-to-face (Barry, Sze, et al., 2019), and automated, online methods (Hallford, Austin, et al., 2021).

As reduced specificity/overgenerality of personal memories appears to be transdiagnostic in nature (Barry, T.J., Hallford, D. J., Takano, 2021), it may well persist beyond remission in other mental disorders. Through our search of the literature, there was little evidence of studies that investigated this outside of depression. Another consideration for future research is that future thinking specificity is also markedly diminished in those with clinical depression (Hallford, Austin, et al., 2018), and whether or not these difficulties also persist beyond remission has yet to be tested.

In conclusion, this review provides evidence that people who are in remission from clinical depression have difficulties retrieving specific autobiographical memories and instead recall more categoric memories, relative to those that have no history of depression. Although these effects are only small to moderate in size, it is a factor that is known to predict future depressive symptoms. Knowledge that this difficulty persists even when people are otherwise free from depression may inform programs designed to reduce depressive relapse and the immense personal and societal burden of this illness.

References

- Balduzzi, S., Rücker, G., & Schwarzer, G. (2019). How to perform a meta-analysis with R: A practical tutorial. *Evidence-Based Mental Health*, 22(4).
<https://doi.org/10.1136/ebmental-2019-300117>
- Barnhofer, T., Crane, C., Spinhoven, P., & Williams, J. M. G. (2007). Failures to retrieve specific memories in previously depressed individuals: Random errors or content-related? *Behaviour Research and Therapy*, 45(8).
<https://doi.org/10.1016/j.brat.2007.02.006>
- Barry, T. J., Hallford, D. J., Hitchcock, C., Takano, K., & Raes, F. (2021). The current state of memory Specificity Training (MeST) for emotional disorders. In *Current Opinion in Psychology* (Vol. 41). <https://doi.org/10.1016/j.copsyc.2021.02.002>
- Barry, T. J., Sze, W. Y., & Raes, F. (2019). A meta-analysis and systematic review of Memory Specificity Training (MeST) in the treatment of emotional disorders. *Behaviour Research and Therapy*, 116. <https://doi.org/10.1016/j.brat.2019.02.001>
- Barry, T. J., Vinograd, M., Boddez, Y., Raes, F., Zinbarg, R., Mineka, S., & Craske, M. G. (2019). Reduced autobiographical memory specificity affects general distress through poor social support. *Memory*, 27(7). <https://doi.org/10.1080/09658211.2019.1607876>
- Barry, T.J., Hallford, D. J., Takano, K. (2021). *Autobiographical Memory Impairments as a Transdiagnostic Feature of Mental Illness: A meta-analysis of autobiographical memory specificity and overgenerality amongst people with psychiatric diagnoses*.
<https://doi.org/10.31234/osf.io/ab5cu>
- Beck, A. T., Steer, R. A., Ball, R., & Ranieri, W. F. (1996). Comparison of Beck depression inventories -IA and -II in psychiatric outpatients. *Journal of Personality Assessment*, 67(3). https://doi.org/10.1207/s15327752jpa6703_13

- Brittlebank, A. D., Scott, J., Williams, J. M. G., & Ferrier, I. N. (1993). Autobiographical memory in depression: State or trait marker? *British Journal of Psychiatry*, 162(JAN.). <https://doi.org/10.1192/bjp.162.1.118>
- Chiu, C. H. M., Ma, H. W., Boddez, Y., Raes, F., & Barry, T. J. (2019). Social support from friends predicts changes in memory specificity following a stressful life event. *Memory*, 27(9). <https://doi.org/10.1080/09658211.2019.1648687>
- Dalgleish, T., & Werner-Seidler, A. (2014). Disruptions in autobiographical memory processing in depression and the emergence of memory therapeutics. In *Trends in Cognitive Sciences* (Vol. 18, Issue 11). <https://doi.org/10.1016/j.tics.2014.06.010>
- Eaton, W. W., Shao, H., Nestadt, G., Lee, B. H., Bienvenu, O. J., & Zandi, P. (2008). Population-based study of first onset and chronicity in major depressive disorder. *Archives of General Psychiatry*, 65(5). <https://doi.org/10.1001/archpsyc.65.5.513>
- Gupta, R., & Kar, B. R. (2012). Attention and memory biases as stable abnormalities among currently depressed and currently remitted individuals with unipolar depression. *Frontiers in Psychiatry*, 3(NOV). <https://doi.org/10.3389/fpsyt.2012.00099>
- Haddad, A. D. M., Harmer, C. J., & Williams, J. M. G. (2014). Executive dysfunction and autobiographical memory retrieval in recovered depressed women. *Journal of Behavior Therapy and Experimental Psychiatry*, 45(2). <https://doi.org/10.1016/j.jbtep.2013.12.001>
- Hallford, D. J., Austin, D. W., Takano, K., Fuller-Tyszkiewicz, M., & Raes, F. (2021). Computerized Memory Specificity Training (c-MeST) for major depression: A randomised controlled trial. *Behaviour Research and Therapy*, 136. <https://doi.org/10.1016/j.brat.2020.103783>

- Hallford, D. J., Austin, D. W., Takano, K., & Raes, F. (2018). Psychopathology and episodic future thinking: A systematic review and meta-analysis of specificity and episodic detail. *Behaviour Research and Therapy*, 102. <https://doi.org/10.1016/j.brat.2018.01.003>
- Hallford, D. J., Farrell, H., & Lynch, E. (2020). Increasing Anticipated and Anticipatory Pleasure Through Episodic Thinking. *Emotion*. <https://doi.org/10.1037/emo0000765>
- Hallford, D. J., Noory, N., & Mellor, D. (2018). Reduced autobiographical memory specificity as a mediating factor between general anxiety symptoms and performance on problem-solving tasks. *Applied Cognitive Psychology*, 32(5). <https://doi.org/10.1002/acp.3428>
- Hallford, D. J., Rusanov, D., Yeow, J. J. E., & Barry, T. J. (2021). Overgeneral and specific autobiographical memory predict the course of depression: An updated meta-analysis. In *Psychological Medicine*. <https://doi.org/10.1017/S0033291721001343>
- Haringsma, R., Spinhoven, P., Engels, G. I., & van der Leeden, R. (2010). Effects of sad mood on autobiographical memory in older adults with and without lifetime depression. *British Journal of Clinical Psychology*, 49(3). <https://doi.org/10.1348/014466509X454840>
- Hozo, S. P., Djulbegovic, B., & Hozo, I. (2005). Estimating the mean and variance from the median, range, and the size of a sample. *BMC Medical Research Methodology*, 5. <https://doi.org/10.1186/1471-2288-5-13>
- Kuyken, W., & Dalgleish, T. (2011). Overgeneral autobiographical memory in adolescents at risk for depression. *Memory*, 19(3). <https://doi.org/10.1080/09658211.2011.554421>
- Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? *Journal of Abnormal Psychology*, 90(3). <https://doi.org/10.1037/0021-843X.90.3.213>

- Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of Depression in the Community from 30 Countries between 1994 and 2014 /692/699/476/1414 /692/499 article. *Scientific Reports*, 8(1).
<https://doi.org/10.1038/s41598-018-21243-x>
- Liu, X., Li, L., Xiao, J., Yang, J., & Jiang, X. (2013). Abnormalities of autobiographical memory of patients with depressive disorders: A meta-analysis. In *Psychology and Psychotherapy: Theory, Research and Practice* (Vol. 86, Issue 4).
<https://doi.org/10.1111/j.2044-8341.2012.02077.x>
- Mackinger, H. F., Pachinger, M. M., Leibetseder, M. M., & Fartacek, R. R. (2000). Autobiographical memories in women remitted from major depression. *Journal of Abnormal Psychology*, 109(2). <https://doi.org/10.1037/0021-843X.109.2.331>
- McGrath, S., Zhao, X. F., Steele, R., Thombs, B. D., Benedetti, A., Levis, B., Riehm, K. E., Saadat, N., Levis, A. W., Azar, M., Rice, D. B., Sun, Y., Krishnan, A., He, C., Wu, Y., Bhandari, P. M., Neupane, D., Imran, M., Boruff, J., ... Zhang, Y. (2020). Estimating the sample mean and standard deviation from commonly reported quantiles in meta-analysis. *Statistical Methods in Medical Research*, 29(9).
<https://doi.org/10.1177/0962280219889080>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. In *The BMJ* (Vol. 372).
<https://doi.org/10.1136/bmj.n71>

- Painter, J. M., & Kring, A. M. (2016). Toward an understanding of anticipatory pleasure deficits in schizophrenia: Memory, prospection, and emotion experience. *Journal of Abnormal Psychology, 125*(3). <https://doi.org/10.1037/abn0000151>
- R Core Team (2020). (2020). R: A language and environment for statistical computing. In *R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.*
- Semkovska, M., Quinlivan, L., O'Grady, T., Johnson, R., Collins, A., O'Connor, J., Knittle, H., Ahern, E., & Gload, T. (2019). Cognitive function following a major depressive episode: a systematic review and meta-analysis. *The Lancet Psychiatry, 6*(10). [https://doi.org/10.1016/S2215-0366\(19\)30291-3](https://doi.org/10.1016/S2215-0366(19)30291-3)
- Spinhoven, P., Bockting, C. L. H., Schene, A. H., Koeter, M. W. J., Wekking, E. M., & Williams, J. M. G. (2006). Autobiographical memory in the euthymic phase of recurrent depression. *Journal of Abnormal Psychology, 115*(3). <https://doi.org/10.1037/0021-843X.115.3.590>
- van Vreeswijk, M. F., & de Wilde, E. J. (2004). Autobiographical memory specificity, psychopathology, depressed mood and the use of the Autobiographical Memory Test: A meta-analysis. *Behaviour Research and Therapy, 42*(6). [https://doi.org/10.1016/S0005-7967\(03\)00194-3](https://doi.org/10.1016/S0005-7967(03)00194-3)
- Wessel, I., Meeren, M., Peeters, F., Arntz, A., & Merckelbach, H. (2001). Correlates of autobiographical memory specificity: The role of depression, anxiety and childhood trauma. *Behaviour Research and Therapy, 39*(4). [https://doi.org/10.1016/S0005-7967\(00\)00011-5](https://doi.org/10.1016/S0005-7967(00)00011-5)
- Williams, J. M. G. (1992). Autobiographical memory and emotional disorders. In *The handbook of emotion and memory: Research and theory.*

- Williams, J. M. G. (2006). Capture and rumination, functional avoidance, and executive control (CaRFAX): Three processes that underlie overgeneral memory. In *Cognition and Emotion* (Vol. 20, Issues 3–4). <https://doi.org/10.1080/02699930500450465>
- Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical memory specificity and emotional disorder. In *Psychological Bulletin* (Vol. 133, Issue 1). <https://doi.org/10.1037/0033-2909.133.1.122>
- Williams, J. M. G., & Broadbent, K. (1986a). Autobiographical memory in suicide attempters. *Journal of Abnormal Psychology*, 95, 144–149. <https://doi.org/10.1037/0021-843X.95.2.144>
- Williams, J. M. G., & Broadbent, K. (1986b). Autobiographical Memory in Suicide Attempters. *Journal of Abnormal Psychology*, 95(2). <https://doi.org/10.1037/0021-843X.95.2.144>
- Young, K. D., Erickson, K., & Drevets, W. C. (2012). Match between cue and memory valence during autobiographical memory recall in depression. *Psychological Reports*, 111(1). <https://doi.org/10.2466/09.02.15.PR0.111.4.129-148>

Table 1
Characteristics of Studies Included in Analyses

Author(s)	Year of Publication	Sample size	Age- <i>M</i> (<i>SD</i> ; Range)	Number of Females	Education	Race & Ethnicity	Diagnostic Tool	Number of Past Episodes in remitted MDD group	Depression Severity Measure	Number of Cues	Cues Valence	Memories reported	Duration for Responses (seconds)
Aglan, Williams, Pickles, & Hill	2010	$N_{case} = 46$ $N_{control} = 57$	$M_{case} = 32.96$ (2.52; 25-37) $M_{control} = 31.19$ (3.05; 25-37)	$N_{case} = 46$ $N_{control} = 57$	NR	NR	RECAP or SADS (for child); DSM-IV for adult	45% had >1 past episodes	NR	15	5 positive, 5 negative, 5 neutral	Overgeneral	30
Barnhofer, Crane, Spinhoven, & Williams	2007	$N_{case} = 16$ $N_{control} = 19$	$M_{case} = 34.44$ (14.75; 12-41) $M_{control} = 29.74$ (10.74; 12-41)	$N_{case} = 10$ $N_{control} = 11$	NR	NR	SCID for DSM-IV-TR	Mean of 5.0 past episodes ($SD = 6.5$)	BDI-II	24	12 positive, 12 negative	Specific	30
Burnside, Startup, Byatt, Rollinson, & Hill	2004	$N_{case} = 18$ $N_{control} = 19$	$M_{case} = 38.2$ (2.41; 31-41) $M_{control} = 35.8$ (3.07; 31-41)	$N_{case} = 22$ $N_{control} = 19$	NR	NR	SADS-L	NR	BDI	10	5 positive, 5 negative	Overgeneral	30
Champagne et al.	2016	$N_{case} = 25$ $N_{control} = 25$	$M_{case} = 13.92$ (2.27; 11-18) $M_{control} = 13.96$ (1.79; 11-18)	$N_{case} = 14$ $N_{control} = 13$	NR	80% Caucasian in Remitted MDD group. 92% Caucasian in control group.	K-SADS-PL	NR	CDI	10	5 positive, 5 negative	Specific	60
Crane, Barnhofer,	2007	$N_{case} = 23$ $N_{control} = 21$	$M_{case} = 36.13$ (13.92; 18-62)	$N_{case} = 14$	NR	NR	SCID for DSM-IV	Mean of 6.8 past	BDI-II	36	18 positive, 18	Both	30

Jermann et al.	2013	$N_{case} = 36$ $N_{control} = 20$	$M_{case} = 46.8$ (10.5) $M_{control} = 45.9$ (8.8)	$N_{case} = 25$ $N_{control} = 15$	≥ 12 years in education. Education in years Remitted MDD group, $M = 15.4$; $SD = 3.4$ Education in years for control group, $M = 14.0$; $SD = 3.4$	NR	MADRS	Mean of 4.5 past episodes ($SD = 2.2$)	BDI-II	12	6 positive, 6 negative	Both	NR
Kuyken & Dalgleish	2011	$N_{case} = 15$ $N_{control} = 15$	$M_{case} = 16.73$ (0.8; 14-18) $M_{control} = 16.07$ (1.67; 14-18)	$N_{case} = 13$ $N_{control} = 10$	Highest level of education for Remitted MDD group: 27% Primary, 60% Lower Secondary, 13% Higher Secondary Highest level of education for control group: 20% Primary, 73% Lower Secondary, 7% Higher Secondary	NR	SCID for DSM-IV	Mean of 1.2 past episodes ($SD = 1.1$)	BDI-II	10	5 positive, 5 negative	Both	30
Mackinger, Pachinger, Leibetseder, & Fartacek	2000	$N_{case} = 21$ $N_{control} = 20$	$M_{case} = 47.9$ (11.4; 21-60) $M_{control} = 46$ (11; 21-60)	$N_{case} = 21$ $N_{control} = 20$	NR	NR	DSM-III-R	NR	BDI	12	6 positive, 6 negative	Both	60
Matsumoto, Takahasi,	2021	$N_{case} = 21$ $N_{control} = 21$	$M_{case} = 30.14$ (4.87)	$N_{case} = 11$ $N_{control} = 12$	Education in years Remitted MDD group,	100% Japanese sample	SCID for DSM-IV- TR	Mean of 1.6 past	BDI-II	10	5 positive, 5 negative	Both	30

& Hallford			$M_{control} = 29.19$ (4.69)		$M = 15.10$; $SD = 1.95$			episodes ($SD = 1.3$)					
					Education in years for control group, $M = 15.67$; $SD = 1.32$								
Park, Goodyer, & Teasdale	2002	$N_{case} = 9$ $N_{control} = 33$	$M_{case} = 14.4$ (1.1; 12-17) $M_{control} = 14.6$ (1.3; 12-17)	$N_{case} = 6$ $N_{control} = 21$	NR	NR	K-SADS- PL	NR	MFQ	12	6 positive, 6 negative	Overgeneral	60
Spinhoven , et al.	2006	$N_{case} = 122$ $N_{control} = 37$	$M_{case} = 44.7$ (9) $M_{control} = 44.2$ (13.3)	$N_{case} = 92$ $N_{control} = 29$	Education level for Remitted MDD group: 13.5% Low, 35.1% Medium, 51.4% High Education level for control group: 29.3% Low, 33.6% Medium, 37.1% High	NR	SCID for DSM-IV	Mean of 4.1 past episodes was ($SD = 1.5$)	BDI	10	5 positive, 5 negative	Specific	60
Sumner et al.	2014	$N_{case} = 164$ $N_{control} = 275$	$M_{case} = 22.5$ (0.9; 20-25) $M_{control} = 22.4$ (0.9; 20-25)	$N_{case} = 121$ $N_{control} = 179$	NR	61% Caucasian in Remitted MDD group. 58% Caucasian in control group.	SCID for DSM-IV	NR	/	12	6 positive, 6 negative	Specific	30
Wessel et al.	2001	$N_{case} = 20$ $N_{control} = 24$	$M_{case} = 37.5$ (8.5; 20-58) $M_{control} = 35.1$ (10.4; 20-58)	$N_{experimental} = 13$ $N_{control} = 12$	Education level for Remitted	NR	DSM-III-R	NR	SDS	10	5 positive, 5 negative	Specific	120

					MDD group, $M=7.1$; $SD=2.1$								
					Education level for control group, $M=7.2$; $SD=2.3$								
					(Education level ranged from 1= <i>no education</i> to 11= <i>university degree</i>)								
Wessel, Postma, Huntjens, & Crane	2013	$N_{case} = 28$ $N_{control} = 33$	$M_{case} = 38.71$ (7.23; 24-64) $M_{control} = 40$ (7.7; 24-64)	$N_{case} = 28$ $N_{control} = 33$	Education level for Remitted MDD group, $M=4.5$; $SD=$ 1.55 Education level for control group, $M=5.24$; $SD=1.25$ (Education level ranged from 1= <i>elementary school</i> to 7= <i>university degree</i>)	NR	SCID-I	NR	BDI-II	10	5 positive, 5 negative	Specific	30
Williams, Barnhofer, Crane, & Beck	2005	$N_{case} = 34$ $N_{control} = 22$	$M_{case} = 43.21$ (10.70; 18-65) $M_{control} = 49.6$ (7.3; 18-65)	$N_{case} = 23$ $N_{control} = 13$	NR	NR	SCID for DSM-IV	Mean of 2.7 past episodes ($SD = 2.1$)	BDI-II	18	6 positive, 6 negative, 6 neutral	Specific	30

Table 2.

Proportion of studies in categories of potential risk of bias

Random sequence generation	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red	Red	Red	Red	Red
Allocation concealment	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red
Blinding of participants and personnel	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red	Red
Blinding of outcome assessment	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Red	Red	Red
Incomplete outcome data	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Yellow
Selective Reporting	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow

Note: Green = low risk of bias, Yellow = some concern, Red = High risk of bias.

Figure 1. PRISMA Flowchart for the Systematic Search

Figure 2. Forest plot of effect sizes for studies assessing specific memories

Figure 3. Funnel plot of studies assessing specific memories

Figure 4. Forest plot of effect sizes for studies assessing categoric memories

Figure 5. Funnel plot of studies assessing categoric memories

Supplementary Material

Post traumatic stress

(Post traumatic stress AND "overgeneral memory") OR (Post traumatic stress AND "memory specificity") OR (Post traumatic stress AND "memory specificity" AND ruminat*) OR (Post traumatic stress AND "memory specificity" AND brooding) OR (Post traumatic stress AND "memory specificity" AND reflection) OR (Post traumatic stress AND "memory specificity" AND "executive function") OR (Post traumatic stress AND "memory specificity" AND "executive control") OR (Post traumatic stress AND "memory specificity" AND avoidance) OR (Post traumatic stress AND "memory specificity" AND "verbal fluency") OR (Post traumatic stress AND "memory specificity" AND "semantic fluency") OR (Post traumatic stress AND "memory specificity" AND "inhibitory control") OR (Post traumatic stress AND "memory specificity" AND updating) OR (Post traumatic stress AND "memory specificity" AND "repetitive thinking") OR (Post traumatic stress AND "memory specificity" AND worry) OR (Post traumatic stress AND "memory specificity" AND "problem solving") OR (Post traumatic stress AND "memory specificity" AND "future thinking") OR (Post traumatic stress AND "overgeneral memory" AND ruminat*) OR (Post traumatic stress AND "overgeneral memory" AND brooding) OR (Post traumatic stress AND "overgeneral memory" AND reflection) OR (Post traumatic stress AND "overgeneral memory" AND "executive function") OR (Post traumatic stress AND "overgeneral memory" AND "executive control") OR (Post traumatic stress AND "overgeneral memory" AND avoidance) OR (Post traumatic stress AND "overgeneral memory" AND "verbal fluency") OR (Post traumatic stress AND "overgeneral memory" AND "semantic fluency") OR (Post traumatic stress AND "overgeneral memory" AND "inhibitory control") OR (Post traumatic stress AND "overgeneral memory" AND updating) OR (Post traumatic stress AND "overgeneral memory" AND "repetitive thinking") OR (Post traumatic stress AND "overgeneral memory" AND worry) OR (Post traumatic stress AND "overgeneral memory" AND "problem solving") OR (Post traumatic stress AND "overgeneral memory" AND "future thinking")

Depression

(Depression AND "overgeneral memory") OR (Depression AND "memory specificity") OR (Depression AND "memory specificity" AND ruminat*) OR (Depression AND "memory specificity" AND brooding) OR (Depression AND "memory specificity" AND reflection) OR (Depression AND "memory specificity" AND "executive function") OR (Depression AND "memory specificity" AND "executive control") OR (Depression AND "memory specificity" AND avoidance) OR (Depression AND "memory specificity" AND "verbal fluency") OR (Depression AND "memory specificity" AND "semantic fluency") OR (Depression AND "memory specificity" AND "inhibitory control") OR (Depression AND "memory specificity" AND updating) OR (Depression AND "memory specificity" AND "repetitive thinking") OR (Depression AND "memory specificity" AND worry) OR (Depression AND "memory specificity" AND "problem solving") OR (Depression AND "memory specificity" AND "future thinking") OR (Depression AND "overgeneral memory" AND ruminat*) OR (Depression AND "overgeneral memory" AND brooding) OR (Depression AND "overgeneral memory" AND reflection) OR (Depression AND "overgeneral memory" AND "executive function") OR (Depression AND "overgeneral memory" AND "executive control") OR (Depression AND "overgeneral memory" AND avoidance) OR (Depression AND "overgeneral memory" AND

"verbal fluency") OR (Depression AND "overgeneral memory" AND "semantic fluency") OR (Depression AND "overgeneral memory" AND "inhibitory control") OR (Depression AND "overgeneral memory" AND updating) OR (Depression AND "overgeneral memory" AND "repetitive thinking") OR (Depression AND "overgeneral memory" AND worry) OR (Depression AND "overgeneral memory" AND "problem solving") OR (Depression AND "overgeneral memory" AND "future thinking")

Bipolar

(Bipolar AND "memory specificity") OR (Bipolar AND "overgeneral memory") OR (Bipolar AND "memory specificity" AND ruminat*) OR (Bipolar AND "memory specificity" AND brooding) OR (Bipolar AND "memory specificity" AND reflection) OR (Bipolar AND "memory specificity" AND "executive function") OR (Bipolar AND "memory specificity" AND "executive control") OR (Bipolar AND "memory specificity" AND avoidance) OR (Bipolar AND "memory specificity" AND "verbal fluency") OR (Bipolar AND "memory specificity" AND "semantic fluency") OR (Bipolar AND "memory specificity" AND "inhibitory control") OR (Bipolar AND "memory specificity" AND updating) OR (Bipolar AND "memory specificity" AND "repetitive thinking") OR (Bipolar AND "memory specificity" AND worry) OR (Bipolar AND "memory specificity" AND "problem solving") OR (Bipolar AND "memory specificity" AND "future thinking") OR (Bipolar AND "overgeneral memory" AND ruminat*) OR (Bipolar AND "overgeneral memory" AND brooding) OR (Bipolar AND "overgeneral memory" AND reflection) OR (Bipolar AND "overgeneral memory" AND "executive function") OR (Bipolar AND "overgeneral memory" AND "executive control") OR (Bipolar AND "overgeneral memory" AND avoidance) OR (Bipolar AND "overgeneral memory" AND "verbal fluency") OR (Bipolar AND "overgeneral memory" AND "semantic fluency") OR (Bipolar AND "overgeneral memory" AND "inhibitory control") OR (Bipolar AND "overgeneral memory" AND updating) OR (Bipolar AND "overgeneral memory" AND "repetitive thinking") OR (Bipolar AND "overgeneral memory" AND worry) OR (Bipolar AND "overgeneral memory" AND "problem solving") OR (Bipolar AND "overgeneral memory" AND "future thinking")

Schizophrenia

(Schizophrenia AND "overgeneral memory") OR (Schizophrenia AND "memory specificity") OR (Schizophrenia AND "memory specificity" AND ruminat*) OR (Schizophrenia AND "memory specificity" AND brooding) OR (Schizophrenia AND "memory specificity" AND reflection) OR (Schizophrenia AND "memory specificity" AND "executive function") OR (Schizophrenia AND "memory specificity" AND "executive control") OR (Schizophrenia AND "memory specificity" AND avoidance) OR (Schizophrenia AND "memory specificity" AND "verbal fluency") OR (Schizophrenia AND "memory specificity" AND "semantic fluency") OR (Schizophrenia AND "memory specificity" AND "inhibitory control") OR (Schizophrenia AND "memory specificity" AND updating) OR (Schizophrenia AND "memory specificity" AND "repetitive thinking") OR (Schizophrenia AND "memory specificity" AND worry) OR (Schizophrenia AND "memory specificity" AND "problem solving") OR (Schizophrenia AND "memory specificity" AND "future thinking") OR (Schizophrenia AND "overgeneral memory" AND ruminat*) OR (Schizophrenia AND "overgeneral memory" AND brooding) OR (Schizophrenia AND "overgeneral memory" AND reflection) OR (Schizophrenia AND "overgeneral memory" AND "executive function") OR (Schizophrenia AND "overgeneral memory" AND "executive control") OR (Schizophrenia AND "overgeneral memory" AND avoidance) OR (Schizophrenia AND "overgeneral memory" AND "verbal fluency") OR

(Schizophrenia AND "overgeneral memory" AND "semantic fluency") OR (Schizophrenia AND "overgeneral memory" AND "inhibitory control") OR (Schizophrenia AND "overgeneral memory" AND updating) OR (Schizophrenia AND "overgeneral memory" AND "repetitive thinking") OR (Schizophrenia AND "overgeneral memory" AND worry) OR (Schizophrenia AND "overgeneral memory" AND "problem solving") OR (Schizophrenia AND "overgeneral memory" AND "future thinking")

Anxiety disorder

(Anxiety disorder AND "overgeneral memory") OR (Anxiety disorder AND "memory specificity") OR (Anxiety disorder AND "memory specificity" AND ruminat*) OR (Anxiety disorder AND "memory specificity" AND brooding) OR (Anxiety disorder AND "memory specificity" AND reflection) OR (Anxiety disorder AND "memory specificity" AND "executive function") OR (Anxiety disorder AND "memory specificity" AND "executive control") OR (Anxiety disorder AND "memory specificity" AND avoidance) OR (Anxiety disorder AND "memory specificity" AND "verbal fluency") OR (Anxiety disorder AND "memory specificity" AND "semantic fluency") OR (Anxiety disorder AND "memory specificity" AND "inhibitory control") OR (Anxiety disorder AND "memory specificity" AND updating) OR (Anxiety disorder AND "memory specificity" AND "repetitive thinking") OR (Anxiety disorder AND "memory specificity" AND worry) OR (Anxiety disorder AND "memory specificity" AND "problem solving") OR (Anxiety disorder AND "memory specificity" AND "future thinking") OR (Anxiety disorder AND "overgeneral memory" AND ruminat*) OR (Anxiety disorder AND "overgeneral memory" AND brooding) OR (Anxiety disorder AND "overgeneral memory" AND reflection) OR (Anxiety disorder AND "overgeneral memory" AND "executive function") OR (Anxiety disorder AND "overgeneral memory" AND "executive control") OR (Anxiety disorder AND "overgeneral memory" AND avoidance) OR (Anxiety disorder AND "overgeneral memory" AND "verbal fluency") OR (Anxiety disorder AND "overgeneral memory" AND "semantic fluency") OR (Anxiety disorder AND "overgeneral memory" AND "inhibitory control") OR (Anxiety disorder AND "overgeneral memory" AND updating) OR (Anxiety disorder AND "overgeneral memory" AND "repetitive thinking") OR (Anxiety disorder AND "overgeneral memory" AND worry) OR (Anxiety disorder AND "overgeneral memory" AND "problem solving") OR (Anxiety disorder AND "overgeneral memory" AND "future thinking")

Panic Disorder

(Panic Disorder AND "memory specificity") OR (Panic Disorder AND "overgeneral memory") OR (Panic Disorder AND "memory specificity" AND ruminat*) OR (Panic Disorder AND "memory specificity" AND brooding) OR (Panic Disorder AND "memory specificity" AND reflection) OR (Panic Disorder AND "memory specificity" AND "executive function") OR (Panic Disorder AND "memory specificity" AND "executive control") OR (Panic Disorder AND "memory specificity" AND avoidance) OR (Panic Disorder AND "memory specificity" AND "verbal fluency") OR (Panic Disorder AND "memory specificity" AND "semantic fluency") OR (Panic Disorder AND "memory specificity" AND "inhibitory control") OR (Panic Disorder AND "memory specificity" AND updating) OR (Panic Disorder AND "memory specificity" AND "repetitive thinking") OR (Panic Disorder AND "memory specificity" AND worry) OR (Panic Disorder AND "memory specificity" AND "problem solving") OR (Panic Disorder AND "memory specificity" AND "future thinking") OR (Panic Disorder AND "overgeneral memory" AND ruminat*) OR (Panic Disorder AND "overgeneral memory" AND brooding) OR (Panic

Disorder AND "overgeneral memory" AND reflection) OR (Panic Disorder AND "overgeneral memory" AND "executive function") OR (Panic Disorder AND "overgeneral memory" AND "executive control") OR (Panic Disorder AND "overgeneral memory" AND avoidance) OR (Panic Disorder AND "overgeneral memory" AND "verbal fluency") OR (Panic Disorder AND "overgeneral memory" AND "semantic fluency") OR (Panic Disorder AND "overgeneral memory" AND "inhibitory control") OR (Panic Disorder AND "overgeneral memory" AND updating) OR (Panic Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Panic Disorder AND "overgeneral memory" AND worry) OR (Panic Disorder AND "overgeneral memory" AND "problem solving") OR (Panic Disorder AND "overgeneral memory" AND "future thinking")

Social Anxiety Disorder

(Social Anxiety Disorder AND "memory specificity") OR (Social Anxiety Disorder AND "overgeneral memory") OR (Social Anxiety Disorder AND "memory specificity" AND ruminat*) OR (Social Anxiety Disorder AND "memory specificity" AND brooding) OR (Social Anxiety Disorder AND "memory specificity" AND reflection) OR (Social Anxiety Disorder AND "memory specificity" AND "executive function") OR (Social Anxiety Disorder AND "memory specificity" AND "executive control") OR (Social Anxiety Disorder AND "memory specificity" AND avoidance) OR (Social Anxiety Disorder AND "memory specificity" AND "verbal fluency") OR (Social Anxiety Disorder AND "memory specificity" AND "semantic fluency") OR (Social Anxiety Disorder AND "memory specificity" AND "inhibitory control") OR (Social Anxiety Disorder AND "memory specificity" AND updating) OR (Social Anxiety Disorder AND "memory specificity" AND "repetitive thinking") OR (Social Anxiety Disorder AND "memory specificity" AND worry) OR (Social Anxiety Disorder AND "memory specificity" AND "problem solving") OR (Social Anxiety Disorder AND "memory specificity" AND "future thinking") OR (Social Anxiety Disorder AND "overgeneral memory" AND ruminat*) OR (Social Anxiety Disorder AND "overgeneral memory" AND brooding) OR (Social Anxiety Disorder AND "overgeneral memory" AND reflection) OR (Social Anxiety Disorder AND "overgeneral memory" AND "executive function") OR (Social Anxiety Disorder AND "overgeneral memory" AND "executive control") OR (Social Anxiety Disorder AND "overgeneral memory" AND avoidance) OR (Social Anxiety Disorder AND "overgeneral memory" AND "verbal fluency") OR (Social Anxiety Disorder AND "overgeneral memory" AND "semantic fluency") OR (Social Anxiety Disorder AND "overgeneral memory" AND "inhibitory control") OR (Social Anxiety Disorder AND "overgeneral memory" AND updating) OR (Social Anxiety Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Social Anxiety Disorder AND "overgeneral memory" AND worry) OR (Social Anxiety Disorder AND "overgeneral memory" AND "problem solving") OR (Social Anxiety Disorder AND "overgeneral memory" AND "future thinking")

General Anxiety Disorder

(General Anxiety Disorder AND "memory specificity") OR (General Anxiety Disorder AND "overgeneral memory") OR (General Anxiety Disorder AND "memory specificity" AND ruminat*) OR (General Anxiety Disorder AND "memory specificity" AND brooding) OR (General Anxiety Disorder AND "memory specificity" AND reflection) OR (General Anxiety Disorder AND "memory specificity" AND "executive function") OR (General Anxiety Disorder AND "memory specificity" AND "executive control") OR (General Anxiety Disorder AND "memory specificity" AND avoidance) OR (General Anxiety Disorder AND "memory

specificity" AND "verbal fluency") OR (General Anxiety Disorder AND "memory specificity" AND "semantic fluency") OR (General Anxiety Disorder AND "memory specificity" AND "inhibitory control") OR (General Anxiety Disorder AND "memory specificity" AND updating) OR (General Anxiety Disorder AND "memory specificity" AND "repetitive thinking") OR (General Anxiety Disorder AND "memory specificity" AND worry) OR (General Anxiety Disorder AND "memory specificity" AND "problem solving") OR (General Anxiety Disorder AND "memory specificity" AND "future thinking") OR (General Anxiety Disorder AND "overgeneral memory" AND ruminat*) OR (General Anxiety Disorder AND "overgeneral memory" AND brooding) OR (General Anxiety Disorder AND "overgeneral memory" AND reflection) OR (General Anxiety Disorder AND "overgeneral memory" AND "executive function") OR (General Anxiety Disorder AND "overgeneral memory" AND "executive control") OR (General Anxiety Disorder AND "overgeneral memory" AND avoidance) OR (General Anxiety Disorder AND "overgeneral memory" AND "verbal fluency") OR (General Anxiety Disorder AND "overgeneral memory" AND "semantic fluency") OR (General Anxiety Disorder AND "overgeneral memory" AND "inhibitory control") OR (General Anxiety Disorder AND "overgeneral memory" AND updating) OR (General Anxiety Disorder AND "overgeneral memory" AND "repetitive thinking") OR (General Anxiety Disorder AND "overgeneral memory" AND worry) OR (General Anxiety Disorder AND "overgeneral memory" AND "problem solving") OR (General Anxiety Disorder AND "overgeneral memory" AND "future thinking")

Agoraphobia

(Agoraphobia AND "memory specificity") OR (Agoraphobia AND "overgeneral memory") OR (Agoraphobia AND "memory specificity" AND ruminat*) OR (Agoraphobia AND "memory specificity" AND brooding) OR (Agoraphobia AND "memory specificity" AND reflection) OR (Agoraphobia AND "memory specificity" AND "executive function") OR (Agoraphobia AND "memory specificity" AND "executive control") OR (Agoraphobia AND "memory specificity" AND avoidance) OR (Agoraphobia AND "memory specificity" AND "verbal fluency") OR (Agoraphobia AND "memory specificity" AND "semantic fluency") OR (Agoraphobia AND "memory specificity" AND "inhibitory control") OR (Agoraphobia AND "memory specificity" AND updating) OR (Agoraphobia AND "memory specificity" AND "repetitive thinking") OR (Agoraphobia AND "memory specificity" AND worry) OR (Agoraphobia AND "memory specificity" AND "problem solving") OR (Agoraphobia AND "memory specificity" AND "future thinking") OR (Agoraphobia AND "overgeneral memory" AND ruminat*) OR (Agoraphobia AND "overgeneral memory" AND brooding) OR (Agoraphobia AND "overgeneral memory" AND reflection) OR (Agoraphobia AND "overgeneral memory" AND "executive function") OR (Agoraphobia AND "overgeneral memory" AND "executive control") OR (Agoraphobia AND "overgeneral memory" AND avoidance) OR (Agoraphobia AND "overgeneral memory" AND "verbal fluency") OR (Agoraphobia AND "overgeneral memory" AND "semantic fluency") OR (Agoraphobia AND "overgeneral memory" AND "inhibitory control") OR (Agoraphobia AND "overgeneral memory" AND updating) OR (Agoraphobia AND "overgeneral memory" AND "repetitive thinking") OR (Agoraphobia AND "overgeneral memory" AND worry) OR (Agoraphobia AND "overgeneral memory" AND "problem solving") OR (Agoraphobia AND "overgeneral memory" AND "future thinking")

Specific phobia

(Specific phobia AND "memory specificity") OR (Specific phobia AND "overgeneral memory") OR (Specific phobia AND "memory specificity" AND ruminat*) OR (Specific phobia AND "memory specificity" AND brooding) OR (Specific phobia AND "memory specificity" AND reflection) OR (Specific phobia AND "memory specificity" AND "executive function") OR (Specific phobia AND "memory specificity" AND "executive control") OR (Specific phobia AND "memory specificity" AND avoidance) OR (Specific phobia AND "memory specificity" AND "verbal fluency") OR (Specific phobia AND "memory specificity" AND "semantic fluency") OR (Specific phobia AND "memory specificity" AND "inhibitory control") OR (Specific phobia AND "memory specificity" AND updating) OR (Specific phobia AND "memory specificity" AND "repetitive thinking") OR (Specific phobia AND "memory specificity" AND worry) OR (Specific phobia AND "memory specificity" AND "problem solving") OR (Specific phobia AND "memory specificity" AND "future thinking") OR (Specific phobia AND "overgeneral memory" AND ruminat*) OR (Specific phobia AND "overgeneral memory" AND brooding) OR (Specific phobia AND "overgeneral memory" AND reflection) OR (Specific phobia AND "overgeneral memory" AND "executive function") OR (Specific phobia AND "overgeneral memory" AND "executive control") OR (Specific phobia AND "overgeneral memory" AND avoidance) OR (Specific phobia AND "overgeneral memory" AND "verbal fluency") OR (Specific phobia AND "overgeneral memory" AND "semantic fluency") OR (Specific phobia AND "overgeneral memory" AND "inhibitory control") OR (Specific phobia AND "overgeneral memory" AND updating) OR (Specific phobia AND "overgeneral memory" AND "repetitive thinking") OR (Specific phobia AND "overgeneral memory" AND worry) OR (Specific phobia AND "overgeneral memory" AND "problem solving") OR (Specific phobia AND "overgeneral memory" AND "future thinking")

Substance Abuse Disorder

(Substance Abuse Disorder AND "memory specificity") OR (Substance Abuse Disorder AND "overgeneral memory") OR (Substance Abuse Disorder AND "memory specificity" AND ruminat*) OR (Substance Abuse Disorder AND "memory specificity" AND brooding) OR (Substance Abuse Disorder AND "memory specificity" AND reflection) OR (Substance Abuse Disorder AND "memory specificity" AND "executive function") OR (Substance Abuse Disorder AND "memory specificity" AND "executive control") OR (Substance Abuse Disorder AND "memory specificity" AND avoidance) OR (Substance Abuse Disorder AND "memory specificity" AND "verbal fluency") OR (Substance Abuse Disorder AND "memory specificity" AND "semantic fluency") OR (Substance Abuse Disorder AND "memory specificity" AND "inhibitory control") OR (Substance Abuse Disorder AND "memory specificity" AND updating) OR (Substance Abuse Disorder AND "memory specificity" AND "repetitive thinking") OR (Substance Abuse Disorder AND "memory specificity" AND worry) OR (Substance Abuse Disorder AND "memory specificity" AND "problem solving") OR (Substance Abuse Disorder AND "memory specificity" AND "future thinking") OR (Substance Abuse Disorder AND "overgeneral memory" AND ruminat*) OR (Substance Abuse Disorder AND "overgeneral memory" AND brooding) OR (Substance Abuse Disorder AND "overgeneral memory" AND reflection) OR (Substance Abuse Disorder AND "overgeneral memory" AND "executive function") OR (Substance Abuse Disorder AND "overgeneral memory" AND "executive control") OR (Substance Abuse Disorder AND "overgeneral memory" AND avoidance) OR (Substance Abuse Disorder AND "overgeneral memory" AND "verbal fluency") OR (Substance Abuse Disorder AND "overgeneral memory" AND "semantic fluency") OR (Substance Abuse Disorder AND "overgeneral memory" AND "inhibitory

control") OR (Substance Abuse Disorder AND "overgeneral memory" AND updating) OR (Substance Abuse Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Substance Abuse Disorder AND "overgeneral memory" AND worry) OR (Substance Abuse Disorder AND "overgeneral memory" AND "problem solving") OR (Substance Abuse Disorder AND "overgeneral memory" AND "future thinking")

Substance use disorder

(Substance use disorder AND "memory specificity") OR (Substance use disorder AND "overgeneral memory") OR (Substance use disorder AND "memory specificity" AND ruminat*) OR (Substance use disorder AND "memory specificity" AND brooding) OR (Substance use disorder AND "memory specificity" AND reflection) OR (Substance use disorder AND "memory specificity" AND "executive function") OR (Substance use disorder AND "memory specificity" AND "executive control") OR (Substance use disorder AND "memory specificity" AND avoidance) OR (Substance use disorder AND "memory specificity" AND "verbal fluency") OR (Substance use disorder AND "memory specificity" AND "semantic fluency") OR (Substance use disorder AND "memory specificity" AND "inhibitory control") OR (Substance use disorder AND "memory specificity" AND updating) OR (Substance use disorder AND "memory specificity" AND "repetitive thinking") OR (Substance use disorder AND "memory specificity" AND worry) OR (Substance use disorder AND "memory specificity" AND "problem solving") OR (Substance use disorder AND "memory specificity" AND "future thinking") OR (Substance use disorder AND "overgeneral memory" AND ruminat*) OR (Substance use disorder AND "overgeneral memory" AND brooding) OR (Substance use disorder AND "overgeneral memory" AND reflection) OR (Substance use disorder AND "overgeneral memory" AND "executive function") OR (Substance use disorder AND "overgeneral memory" AND "executive control") OR (Substance use disorder AND "overgeneral memory" AND avoidance) OR (Substance use disorder AND "overgeneral memory" AND "verbal fluency") OR (Substance use disorder AND "overgeneral memory" AND "semantic fluency") OR (Substance use disorder AND "overgeneral memory" AND "inhibitory control") OR (Substance use disorder AND "overgeneral memory" AND updating) OR (Substance use disorder AND "overgeneral memory" AND "repetitive thinking") OR (Substance use disorder AND "overgeneral memory" AND worry) OR (Substance use disorder AND "overgeneral memory" AND "problem solving") OR (Substance use disorder AND "overgeneral memory" AND "future thinking")

Eating Disorder

(Eating Disorder AND "memory specificity") OR (Eating Disorder AND "overgeneral memory") OR (Eating Disorder AND "memory specificity" AND ruminat*) OR (Eating Disorder AND "memory specificity" AND brooding) OR (Eating Disorder AND "memory specificity" AND reflection) OR (Eating Disorder AND "memory specificity" AND "executive function") OR (Eating Disorder AND "memory specificity" AND "executive control") OR (Eating Disorder AND "memory specificity" AND avoidance) OR (Eating Disorder AND "memory specificity" AND "verbal fluency") OR (Eating Disorder AND "memory specificity" AND "semantic fluency") OR (Eating Disorder AND "memory specificity" AND "inhibitory control") OR (Eating Disorder AND "memory specificity" AND updating) OR (Eating Disorder AND "memory specificity" AND "repetitive thinking") OR (Eating Disorder AND "memory specificity" AND worry) OR (Eating Disorder AND "memory specificity" AND "problem solving") OR (Eating

Disorder AND "memory specificity" AND "future thinking") OR (Eating Disorder AND "overgeneral memory" AND ruminat*) OR (Eating Disorder AND "overgeneral memory" AND brooding) OR (Eating Disorder AND "overgeneral memory" AND reflection) OR (Eating Disorder AND "overgeneral memory" AND "executive function") OR (Eating Disorder AND "overgeneral memory" AND "executive control") OR (Eating Disorder AND "overgeneral memory" AND avoidance) OR (Eating Disorder AND "overgeneral memory" AND "verbal fluency") OR (Eating Disorder AND "overgeneral memory" AND "semantic fluency") OR (Eating Disorder AND "overgeneral memory" AND "inhibitory control") OR (Eating Disorder AND "overgeneral memory" AND updating) OR (Eating Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Eating Disorder AND "overgeneral memory" AND worry) OR (Eating Disorder AND "overgeneral memory" AND "problem solving") OR (Eating Disorder AND "overgeneral memory" AND "future thinking")

Anorexia Nervosa

(Anorexia Nervosa AND "memory specificity") OR (Anorexia Nervosa AND "overgeneral memory") OR (Anorexia Nervosa AND "memory specificity" AND ruminat*) OR (Anorexia Nervosa AND "memory specificity" AND brooding) OR (Anorexia Nervosa AND "memory specificity" AND reflection) OR (Anorexia Nervosa AND "memory specificity" AND "executive function") OR (Anorexia Nervosa AND "memory specificity" AND "executive control") OR (Anorexia Nervosa AND "memory specificity" AND avoidance) OR (Anorexia Nervosa AND "memory specificity" AND "verbal fluency") OR (Anorexia Nervosa AND "memory specificity" AND "semantic fluency") OR (Anorexia Nervosa AND "memory specificity" AND "inhibitory control") OR (Anorexia Nervosa AND "memory specificity" AND updating) OR (Anorexia Nervosa AND "memory specificity" AND "repetitive thinking") OR (Anorexia Nervosa AND "memory specificity" AND worry) OR (Anorexia Nervosa AND "memory specificity" AND "problem solving") OR (Anorexia Nervosa AND "memory specificity" AND "future thinking") OR (Anorexia Nervosa AND "overgeneral memory" AND ruminat*) OR (Anorexia Nervosa AND "overgeneral memory" AND brooding) OR (Anorexia Nervosa AND "overgeneral memory" AND reflection) OR (Anorexia Nervosa AND "overgeneral memory" AND "executive function") OR (Anorexia Nervosa AND "overgeneral memory" AND "executive control") OR (Anorexia Nervosa AND "overgeneral memory" AND avoidance) OR (Anorexia Nervosa AND "overgeneral memory" AND "verbal fluency") OR (Anorexia Nervosa AND "overgeneral memory" AND "semantic fluency") OR (Anorexia Nervosa AND "overgeneral memory" AND "inhibitory control") OR (Anorexia Nervosa AND "overgeneral memory" AND updating) OR (Anorexia Nervosa AND "overgeneral memory" AND "repetitive thinking") OR (Anorexia Nervosa AND "overgeneral memory" AND worry) OR (Anorexia Nervosa AND "overgeneral memory" AND "problem solving") OR (Anorexia Nervosa AND "overgeneral memory" AND "future thinking")

Bulimia Nervosa

(Bulimia Nervosa AND "memory specificity") OR (Bulimia Nervosa AND "overgeneral memory") OR (Bulimia Nervosa AND "memory specificity" AND ruminat*) OR (Bulimia Nervosa AND "memory specificity" AND brooding) OR (Bulimia Nervosa AND "memory specificity" AND reflection) OR (Bulimia Nervosa AND "memory specificity" AND "executive function") OR (Bulimia Nervosa AND "memory specificity" AND "executive control") OR (Bulimia Nervosa AND "memory specificity" AND avoidance) OR (Bulimia Nervosa AND

"memory specificity" AND "verbal fluency") OR (Bulimia Nervosa AND "memory specificity" AND "semantic fluency") OR (Bulimia Nervosa AND "memory specificity" AND "inhibitory control") OR (Bulimia Nervosa AND "memory specificity" AND updating) OR (Bulimia Nervosa AND "memory specificity" AND "repetitive thinking") OR (Bulimia Nervosa AND "memory specificity" AND worry) OR (Bulimia Nervosa AND "memory specificity" AND "problem solving") OR (Bulimia Nervosa AND "memory specificity" AND "future thinking") OR (Bulimia Nervosa AND "overgeneral memory" AND ruminat*) OR (Bulimia Nervosa AND "overgeneral memory" AND brooding) OR (Bulimia Nervosa AND "overgeneral memory" AND reflection) OR (Bulimia Nervosa AND "overgeneral memory" AND "executive function") OR (Bulimia Nervosa AND "overgeneral memory" AND "executive control") OR (Bulimia Nervosa AND "overgeneral memory" AND avoidance) OR (Bulimia Nervosa AND "overgeneral memory" AND "verbal fluency") OR (Bulimia Nervosa AND "overgeneral memory" AND "semantic fluency") OR (Bulimia Nervosa AND "overgeneral memory" AND "inhibitory control") OR (Bulimia Nervosa AND "overgeneral memory" AND updating) OR (Bulimia Nervosa AND "overgeneral memory" AND "repetitive thinking") OR (Bulimia Nervosa AND "overgeneral memory" AND worry) OR (Bulimia Nervosa AND "overgeneral memory" AND "problem solving") OR (Bulimia Nervosa AND "overgeneral memory" AND "future thinking")

Binge-Eating Disorder

(Binge Eating Disorder AND "memory specificity") OR (Binge Eating Disorder AND "overgeneral memory") OR (Binge Eating Disorder AND "memory specificity" AND ruminat*) OR (Binge Eating Disorder AND "memory specificity" AND brooding) OR (Binge Eating Disorder AND "memory specificity" AND reflection) OR (Binge Eating Disorder AND "memory specificity" AND "executive function") OR (Binge Eating Disorder AND "memory specificity" AND "executive control") OR (Binge Eating Disorder AND "memory specificity" AND avoidance) OR (Binge Eating Disorder AND "memory specificity" AND "verbal fluency") OR (Binge Eating Disorder AND "memory specificity" AND "semantic fluency") OR (Binge Eating Disorder AND "memory specificity" AND "inhibitory control") OR (Binge Eating Disorder AND "memory specificity" AND updating) OR (Binge Eating Disorder AND "memory specificity" AND "repetitive thinking") OR (Binge Eating Disorder AND "memory specificity" AND worry) OR (Binge Eating Disorder AND "memory specificity" AND "problem solving") OR (Binge Eating Disorder AND "memory specificity" AND "future thinking") OR (Binge Eating Disorder AND "overgeneral memory" AND ruminat*) OR (Binge Eating Disorder AND "overgeneral memory" AND brooding) OR (Binge Eating Disorder AND "overgeneral memory" AND reflection) OR (Binge Eating Disorder AND "overgeneral memory" AND "executive function") OR (Binge Eating Disorder AND "overgeneral memory" AND "executive control") OR (Binge Eating Disorder AND "overgeneral memory" AND avoidance) OR (Binge Eating Disorder AND "overgeneral memory" AND "verbal fluency") OR (Binge Eating Disorder AND "overgeneral memory" AND "semantic fluency") OR (Binge Eating Disorder AND "overgeneral memory" AND "inhibitory control") OR (Binge Eating Disorder AND "overgeneral memory" AND updating) OR (Binge Eating Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Binge Eating Disorder AND "overgeneral memory" AND worry) OR (Binge Eating Disorder AND "overgeneral memory" AND "problem solving") OR (Binge Eating Disorder AND "overgeneral memory" AND "future thinking")

Obsessive Compulsive Disorder

(Obsessive compulsive disorder AND "memory specificity") OR (Obsessive compulsive disorder AND "overgeneral memory") OR (Obsessive compulsive disorder AND "memory specificity" AND ruminat*) OR (Obsessive compulsive disorder AND "memory specificity" AND brooding) OR (Obsessive compulsive disorder AND "memory specificity" AND reflection) OR (Obsessive compulsive disorder AND "memory specificity" AND "executive function") OR (Obsessive compulsive disorder AND "memory specificity" AND "executive control") OR (Obsessive compulsive disorder AND "memory specificity" AND avoidance) OR (Obsessive compulsive disorder AND "memory specificity" AND "verbal fluency") OR (Obsessive compulsive disorder AND "memory specificity" AND "semantic fluency") OR (Obsessive compulsive disorder AND "memory specificity" AND "inhibitory control") OR (Obsessive compulsive disorder AND "memory specificity" AND updating) OR (Obsessive compulsive disorder AND "memory specificity" AND "repetitive thinking") OR (Obsessive compulsive disorder AND "memory specificity" AND worry) OR (Obsessive compulsive disorder AND "memory specificity" AND "problem solving") OR (Obsessive compulsive disorder AND "memory specificity" AND "future thinking") OR (Obsessive compulsive disorder AND "overgeneral memory" AND ruminat*) OR (Obsessive compulsive disorder AND "overgeneral memory" AND brooding) OR (Obsessive compulsive disorder AND "overgeneral memory" AND reflection) OR (Obsessive compulsive disorder AND "overgeneral memory" AND "executive function") OR (Obsessive compulsive disorder AND "overgeneral memory" AND "executive control") OR (Obsessive compulsive disorder AND "overgeneral memory" AND avoidance) OR (Obsessive compulsive disorder AND "overgeneral memory" AND "verbal fluency") OR (Obsessive compulsive disorder AND "overgeneral memory" AND "semantic fluency") OR (Obsessive compulsive disorder AND "overgeneral memory" AND "inhibitory control") OR (Obsessive compulsive disorder AND "overgeneral memory" AND updating) OR (Obsessive compulsive disorder AND "overgeneral memory" AND "repetitive thinking") OR (Obsessive compulsive disorder AND "overgeneral memory" AND worry) OR (Obsessive compulsive disorder AND "overgeneral memory" AND "problem solving") OR (Obsessive compulsive disorder AND "overgeneral memory" AND "future thinking")

Body Dysmorphic Disorder

(Body Dysmorphic Disorder AND "memory specificity") OR (Body Dysmorphic Disorder AND "overgeneral memory") OR (Body Dysmorphic Disorder AND "memory specificity" AND ruminat*) OR (Body Dysmorphic Disorder AND "memory specificity" AND brooding) OR (Body Dysmorphic Disorder AND "memory specificity" AND reflection) OR (Body Dysmorphic Disorder AND "memory specificity" AND "executive function") OR (Body Dysmorphic Disorder AND "memory specificity" AND "executive control") OR (Body Dysmorphic Disorder AND "memory specificity" AND avoidance) OR (Body Dysmorphic Disorder AND "memory specificity" AND "verbal fluency") OR (Body Dysmorphic Disorder AND "memory specificity" AND "semantic fluency") OR (Body Dysmorphic Disorder AND "memory specificity" AND "inhibitory control") OR (Body Dysmorphic Disorder AND "memory specificity" AND updating) OR (Body Dysmorphic Disorder AND "memory specificity" AND "repetitive thinking") OR (Body Dysmorphic Disorder AND "memory specificity" AND worry) OR (Body Dysmorphic Disorder AND "memory specificity" AND "problem solving") OR (Body Dysmorphic Disorder AND "memory specificity" AND "future thinking") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND ruminat*) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND brooding) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND reflection) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "executive function") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "executive control") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND avoidance) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "verbal fluency") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "semantic fluency") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "inhibitory control") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND updating) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND worry) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "problem solving") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "future thinking")

Disorder AND "overgeneral memory" AND brooding) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND reflection) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "executive function") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "executive control") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND avoidance) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "verbal fluency") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "semantic fluency") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "inhibitory control") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND updating) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND worry) OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "problem solving") OR (Body Dysmorphic Disorder AND "overgeneral memory" AND "future thinking")

Psychotic disorder

(Psychotic disorder AND "memory specificity") OR (Psychotic disorder AND "overgeneral memory") OR (Psychotic disorder AND "memory specificity" AND ruminat*) OR (Psychotic disorder AND "memory specificity" AND brooding) OR (Psychotic disorder AND "memory specificity" AND reflection) OR (Psychotic disorder AND "memory specificity" AND "executive function") OR (Psychotic disorder AND "memory specificity" AND "executive control") OR (Psychotic disorder AND "memory specificity" AND avoidance) OR (Psychotic disorder AND "memory specificity" AND "verbal fluency") OR (Psychotic disorder AND "memory specificity" AND "semantic fluency") OR (Psychotic disorder AND "memory specificity" AND "inhibitory control") OR (Psychotic disorder AND "memory specificity" AND updating) OR (Psychotic disorder AND "memory specificity" AND "repetitive thinking") OR (Psychotic disorder AND "memory specificity" AND worry) OR (Psychotic disorder AND "memory specificity" AND "problem solving") OR (Psychotic disorder AND "memory specificity" AND "future thinking") OR (Psychotic disorder AND "overgeneral memory" AND ruminat*) OR (Psychotic disorder AND "overgeneral memory" AND brooding) OR (Psychotic disorder AND "overgeneral memory" AND reflection) OR (Psychotic disorder AND "overgeneral memory" AND "executive function") OR (Psychotic disorder AND "overgeneral memory" AND "executive control") OR (Psychotic disorder AND "overgeneral memory" AND avoidance) OR (Psychotic disorder AND "overgeneral memory" AND "verbal fluency") OR (Psychotic disorder AND "overgeneral memory" AND "semantic fluency") OR (Psychotic disorder AND "overgeneral memory" AND "inhibitory control") OR (Psychotic disorder AND "overgeneral memory" AND updating) OR (Psychotic disorder AND "overgeneral memory" AND "repetitive thinking") OR (Psychotic disorder AND "overgeneral memory" AND worry) OR (Psychotic disorder AND "overgeneral memory" AND "problem solving") OR (Psychotic disorder AND "overgeneral memory" AND "future thinking")

Sleep wake disorder

(Sleep wake disorder AND "memory specificity") OR (Sleep wake disorder AND "overgeneral memory") OR (Sleep wake disorder AND "memory specificity" AND ruminat*) OR (Sleep wake disorder AND "memory specificity" AND brooding) OR (Sleep wake disorder AND "memory specificity" AND reflection) OR (Sleep wake disorder AND "memory specificity" AND "executive function") OR (Sleep wake disorder AND "memory specificity" AND "executive control") OR (Sleep wake disorder AND "memory specificity" AND avoidance) OR (Sleep wake disorder AND "memory specificity" AND "verbal fluency") OR (Sleep wake

disorder AND "memory specificity" AND "semantic fluency") OR (Sleep wake disorder AND "memory specificity" AND "inhibitory control") OR (Sleep wake disorder AND "memory specificity" AND updating) OR (Sleep wake disorder AND "memory specificity" AND "repetitive thinking") OR (Sleep wake disorder AND "memory specificity" AND worry) OR (Sleep wake disorder AND "memory specificity" AND "problem solving") OR (Sleep wake disorder AND "memory specificity" AND "future thinking") OR (Sleep wake disorder AND "overgeneral memory" AND ruminat*) OR (Sleep wake disorder AND "overgeneral memory" AND brooding) OR (Sleep wake disorder AND "overgeneral memory" AND reflection) OR (Sleep wake disorder AND "overgeneral memory" AND "executive function") OR (Sleep wake disorder AND "overgeneral memory" AND "executive control") OR (Sleep wake disorder AND "overgeneral memory" AND avoidance) OR (Sleep wake disorder AND "overgeneral memory" AND "verbal fluency") OR (Sleep wake disorder AND "overgeneral memory" AND "semantic fluency") OR (Sleep wake disorder AND "overgeneral memory" AND "inhibitory control") OR (Sleep wake disorder AND "overgeneral memory" AND updating) OR (Sleep wake disorder AND "overgeneral memory" AND "repetitive thinking") OR (Sleep wake disorder AND "overgeneral memory" AND worry) OR (Sleep wake disorder AND "overgeneral memory" AND "problem solving") OR (Sleep wake disorder AND "overgeneral memory" AND "future thinking")

Insomnia

(Insomnia AND "memory specificity") OR (Insomnia AND "overgeneral memory") OR (Insomnia AND "memory specificity" AND ruminat*) OR (Insomnia AND "memory specificity" AND brooding) OR (Insomnia AND "memory specificity" AND reflection) OR (Insomnia AND "memory specificity" AND "executive function") OR (Insomnia AND "memory specificity" AND "executive control") OR (Insomnia AND "memory specificity" AND avoidance) OR (Insomnia AND "memory specificity" AND "verbal fluency") OR (Insomnia AND "memory specificity" AND "semantic fluency") OR (Insomnia AND "memory specificity" AND "inhibitory control") OR (Insomnia AND "memory specificity" AND updating) OR (Insomnia AND "memory specificity" AND "repetitive thinking") OR (Insomnia AND "memory specificity" AND worry) OR (Insomnia AND "memory specificity" AND "problem solving") OR (Insomnia AND "memory specificity" AND "future thinking") OR (Insomnia AND "overgeneral memory" AND ruminat*) OR (Insomnia AND "overgeneral memory" AND brooding) OR (Insomnia AND "overgeneral memory" AND reflection) OR (Insomnia AND "overgeneral memory" AND "executive function") OR (Insomnia AND "overgeneral memory" AND "executive control") OR (Insomnia AND "overgeneral memory" AND avoidance) OR (Insomnia AND "overgeneral memory" AND "verbal fluency") OR (Insomnia AND "overgeneral memory" AND "semantic fluency") OR (Insomnia AND "overgeneral memory" AND "inhibitory control") OR (Insomnia AND "overgeneral memory" AND updating) OR (Insomnia AND "overgeneral memory" AND "repetitive thinking") OR (Insomnia AND "overgeneral memory" AND worry) OR (Insomnia AND "overgeneral memory" AND "problem solving") OR (Insomnia AND "overgeneral memory" AND "future thinking")

Personality Disorder

(Personality Disorder AND "memory specificity") OR (Personality Disorder AND "overgeneral memory") OR (Personality Disorder AND "memory specificity" AND ruminat*) OR (Personality Disorder AND "memory specificity" AND brooding) OR (Personality Disorder

AND "memory specificity" AND reflection) OR (Personality Disorder AND "memory specificity" AND "executive function") OR (Personality Disorder AND "memory specificity" AND "executive control") OR (Personality Disorder AND "memory specificity" AND avoidance) OR (Personality Disorder AND "memory specificity" AND "verbal fluency") OR (Personality Disorder AND "memory specificity" AND "semantic fluency") OR (Personality Disorder AND "memory specificity" AND "inhibitory control") OR (Personality Disorder AND "memory specificity" AND updating) OR (Personality Disorder AND "memory specificity" AND "repetitive thinking") OR (Personality Disorder AND "memory specificity" AND worry) OR (Personality Disorder AND "memory specificity" AND "problem solving") OR (Personality Disorder AND "memory specificity" AND "future thinking") OR (Personality Disorder AND "overgeneral memory" AND ruminat*) OR (Personality Disorder AND "overgeneral memory" AND brooding) OR (Personality Disorder AND "overgeneral memory" AND reflection) OR (Personality Disorder AND "overgeneral memory" AND "executive function") OR (Personality Disorder AND "overgeneral memory" AND "executive control") OR (Personality Disorder AND "overgeneral memory" AND avoidance) OR (Personality Disorder AND "overgeneral memory" AND "verbal fluency") OR (Personality Disorder AND "overgeneral memory" AND "semantic fluency") OR (Personality Disorder AND "overgeneral memory" AND "inhibitory control") OR (Personality Disorder AND "overgeneral memory" AND updating) OR (Personality Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Personality Disorder AND "overgeneral memory" AND worry) OR (Personality Disorder AND "overgeneral memory" AND "problem solving") OR (Personality Disorder AND "overgeneral memory" AND "future thinking")

Sexual Disorder

(Sexual Disorder AND "memory specificity") OR (Sexual Disorder AND "overgeneral memory") OR (Sexual Disorder AND "memory specificity" AND ruminat*) OR (Sexual Disorder AND "memory specificity" AND brooding) OR (Sexual Disorder AND "memory specificity" AND reflection) OR (Sexual Disorder AND "memory specificity" AND "executive function") OR (Sexual Disorder AND "memory specificity" AND "executive control") OR (Sexual Disorder AND "memory specificity" AND avoidance) OR (Sexual Disorder AND "memory specificity" AND "verbal fluency") OR (Sexual Disorder AND "memory specificity" AND "semantic fluency") OR (Sexual Disorder AND "memory specificity" AND "inhibitory control") OR (Sexual Disorder AND "memory specificity" AND updating) OR (Sexual Disorder AND "memory specificity" AND "repetitive thinking") OR (Sexual Disorder AND "memory specificity" AND worry) OR (Sexual Disorder AND "memory specificity" AND "problem solving") OR (Sexual Disorder AND "memory specificity" AND "future thinking") OR (Sexual Disorder AND "overgeneral memory" AND ruminat*) OR (Sexual Disorder AND "overgeneral memory" AND brooding) OR (Sexual Disorder AND "overgeneral memory" AND reflection) OR (Sexual Disorder AND "overgeneral memory" AND "executive function") OR (Sexual Disorder AND "overgeneral memory" AND "executive control") OR (Sexual Disorder AND "overgeneral memory" AND avoidance) OR (Sexual Disorder AND "overgeneral memory" AND "verbal fluency") OR (Sexual Disorder AND "overgeneral memory" AND "semantic fluency") OR (Sexual Disorder AND "overgeneral memory" AND "inhibitory control") OR (Sexual Disorder AND "overgeneral memory" AND updating) OR (Sexual Disorder AND "overgeneral memory" AND "repetitive thinking") OR (Sexual Disorder AND "overgeneral memory" AND worry) OR (Sexual Disorder AND "overgeneral memory" AND "problem solving") OR (Sexual Disorder AND "overgeneral memory" AND "future thinking")

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 2
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 3-5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 6 and Supplementary Material
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 7
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Page 8
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Page 8
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	/
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 8
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the	Page 8

Section and Topic	Item #	Checklist item	Location where item is reported
		model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Pages 8-9
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Page 8
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Page 8-10
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Pages 8-10
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 6
Study characteristics	17	Cite each included study and present its characteristics.	Table 1
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Supplementary Material
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Forest Plots Figures
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Pages 11-17
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Pages 11-17
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Pages 11-17
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Pages 11-17
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Pages 11-17
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Page 17
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 17-20
	23b	Discuss any limitations of the evidence included in the review.	Pages 18-22
	23c	Discuss any limitations of the review processes used.	Pages 18-22
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 21-22
OTHER INFORMATION			

Section and Topic	Item #	Checklist item	Location where item is reported
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page 5
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 5
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Last page
Competing interests	26	Declare any competing interests of review authors.	Last page
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 5

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71