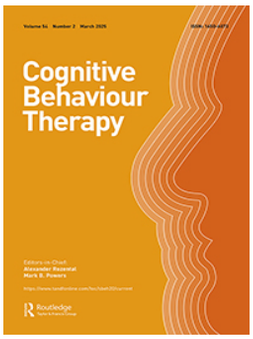

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Cognitive behavioural therapy for internalizing symptoms in LGBTQ+ people: a preliminary meta-analysis

Isaac B. J. M. D. Dunn [a], Emma Power [b], Liam J. Casey [a] and Bethany M. Wootton [a]

[a]Discipline of Clinical Psychology, Graduate School of Health, University of Technology, Sydney, NSW, Australia; [b]Department of Speech Pathology, Graduate School of Health, University of Technology, Sydney, NSW, Australia

ABSTRACT

Internalizing disorders are common in lesbian, gay, bisexual, transgender, queer, questioning, and otherwise non-heterosexual or non-cisgender (LGBTQ+) people. Few studies have evaluated the efficacy of cognitive behavior therapy (CBT), a well-established treatment for internalizing disorders, in LGBTQ+ people. The current study quantitatively synthesized outcomes from existing trials of CBT for internalizing disorders in LGBTQ+ people. Seven databases were searched, identifying 14 relevant studies with a total of 414 participants. A medium within-group effect size was found for depressive symptoms from pre-treatment to post-treatment (k = 14; g = 0.60; 95% CI: 0.44–0.76; I^2 = 71.59) and pre-treatment to 2–6-month follow-up (k = 7; g = 0.63; 95% CI: 0.40–0.86; I^2 = 71.59). For anxiety and related disorder symptoms, a medium within-group effect size was found from both pre-treatment to post-treatment (k = 10; g = 0.73; 95% CI: 0.47–0.99; I^2 = 71.59) and to 3–9-month follow-up (k = 5; g = 0.70; 95% CI: 0.54–0.87; I^2 = 36.04). Exploratory analyses indicated small between-group effects at post-treatment between intervention and control groups. Effect sizes were comparable to those in the general population, indicating preliminary support for treating internalizing disorders in LGBTQ+ people with CBT.

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LGBTQ+; internalizing disorders; cognitive behavior therapy; meta-analysis

Internalizing disorders are characterized by anxiety, distress, and negative affect (Krueger, 1999). These include mood disorders, such as major depressive disorder and persistent depressive disorder; anxiety disorders, such as generalized anxiety disorder, panic disorder, and social anxiety disorder; as well as anxiety-related disorders, such as post-traumatic stress disorder and obsessive-compulsive disorder (Kessler et al., 2011). These disorders are common, with 18–38% of adults developing an internalizing disorder in their lifetime (McGrath et al., 2023). Internalizing disorders can have a significant impact on occupational functioning (Plaisier et al., 2010) and quality of life (Hohls et al., 2021).

CONTACT Bethany M. Wootton bethany.wootton@uts.edu.au Discipline of Clinical Psychology, Graduate School of Health, University of Technology Sydney, PO Box 123 Broadway, Ultimo, NSW 2007, Australia
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While lesbian, gay, bisexual, transgender, queer, questioning, and otherwise non-heterosexual or non-cisgender (LGBTQ+) identifying people are not a homogenous group, across each of these identities, consistently elevated rates of poor mental health have been observed compared to non-LGBTQ+ people (Bränström et al., 2024). For example, research in the United Kingdom has suggested that lesbian, gay, and bisexual (LGB) people have 1.42 to 2.06 times the chance of developing internalizing disorders compared to heterosexual adults (Semlyen et al., 2016). In Sweden, people whose gender identity did not match their sex assigned at birth have been suggested to be approximately six times more likely to receive an anxiety or mood disorder diagnosis than the general population (Bränström & Pachankis, 2019). Population-based sampling using diagnostic interviews from the Australian Bureau of Statistics (2024) indicated that 80.4% of non-binary people, and 93.1% of people who used a different term than LGB to describe their sexual orientation, self-reported a lifetime mental health disorder. A large body of research indicates LGBTQ+ people are not inherently disordered but that high levels of minority stress account for these mental health disparities.

Meyer (2003) originally defined minority stress as the chronically high levels of stress people from socially stigmatized groups are exposed to due to often repeated incidents of prejudice and discrimination. Minority stressors can be distal, meaning stressors outside the person, and proximal, meaning internal stressors or processes within the individual. For example, distal stressors might include external prejudice events like stigma and discrimination. In previous trials (Pachankis et al., 2015; Pachankis, McConocha, et al., 2020), internal proximal stressors have been operationalized as (1) rejection sensitivity, meaning anxiously anticipating a threat of danger or rejection due to one's sexual/gender identity; (2) internalized stigma, meaning internalizing negative views about LGBTQ+ people; and (3) concealment of one's sexual orientation or gender identity (Meyer, 2003). Meta-analytic studies have identified that internalizing symptoms have a moderate positive association with rejection sensitivity (Gao et al., 2017), a small to moderate association with internalized LGBTQ+ related stigma (Newcomb & Mustanski, 2010), and a small, positive association with concealment of identity (Pachankis, Mahon, et al., 2020). Proximal stressors may also include general risk factors for psychopathology seen in the general population that are increased by discrimination, such as rumination (Hatzenbuehler, 2009; Meyer, 2003).

According to Meyer's (2003) model, people who identify with different sexual orientations, gender identities, races/ethnicities, among other constructs, will have differing experiences of minority stress processes which will directly contribute to mental health outcomes. These differing experiences have indirect effects on mental health outcomes too, as individuals' self-identity can affect the social support and coping strategies used to buffer the effects of stressors. In later adaptions of the model for transgender and gender-nonconforming people (Hendricks & Testa, 2012), unique experiences around gender identity and gender expression are asserted to have direct and indirect impacts on mental health outcomes for these individuals. Despite these differences in magnitude and typology, across all groups included in the minority stress model, the impact of distal stressors, community connectedness, coping strategies, and self-identity affect mental health outcomes (Hatzenbuehler, 2009; Hendricks & Testa, 2012; Meyer, 2003).

Several empirical findings since the model's inception appear consistent with this suggestion. Keefe et al. (2023) found in an intervention trial that self-identified race/

ethnicity moderated outcome, such that non-White identifying participants experienced greater reductions in comorbidity index scores than White-identifying participants (Keefe et al., 2023). Veale (2023) found that in cross-sectional survey data, people who experienced greater levels of transgender-related stigma had a greater likelihood of experiencing stress-related health conditions, such as hypertension, hypercholesteremia, and self-reported poor/fair health. Bostwick et al. (2010) analyzed epidemiological survey data to find that while gay, bisexual, and lesbian identifying participants had greater odds of anxiety or depressive disorder, those who self-reported bisexual behavior had the highest odds of any anxiety or depressive disorder. These findings indicate the important impact of moderating variables on minority stressors and mental health outcomes when evaluating the efficacy of CBT interventions.

Both Meyer (2003) and Hatzenbuehler (2009) emphasized that while structural and social-level change is needed to reduce psychopathology in LGBTQ+ people, implementing this change can take significant time (Hinshaw & Stier, 2008) and may be incomplete in addressing the issue effectively (Kalev et al., 2006). In the meantime, the internal psychological processes that result from minority stressors appear to be appropriate targets for treatment, given that they contribute to mental health outcomes above and beyond the impact of universal mechanisms of internalizing disorders such as rumination and avoidance (Feinstein et al., 2012; Hendricks & Testa, 2012; Jackson et al., 2022). Consequently, the guidelines issued by the American Psychological Association Task Force on Psychological Practice with Sexual Minority Persons (2021), who may also identify as non-cisgender, recommend applying an understanding the impact of unique proximal and distal stressors in treatments. Thus, if LGBTQ-specific minority stressors maintain internalizing disorder symptoms, for many people it may be that tailored interventions targeting both unique and universal mechanisms will support best practice symptom reduction and quality of life improvements (Barrera & Castro, 2006). For others, particularly if no proximal stressors are indicated, standard treatment may be sufficient.

Cognitive behavior therapy (CBT) is recommended as the gold-standard, first-line treatment for internalizing disorders (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006; Australian Psychological Society, 2018; National Institute for Health and Care Excellence, 2011). Research has supported the efficacy of CBT, indicating that across 106 meta-analyses, it has a medium to large effect size for treating internalizing disorders (Hofmann et al., 2012). However, with the exception of a few notable studies (Pachankis et al., 2015; Pachankis et al., 2022; Pachankis, McConocha, et al., 2020), most clinical trials evaluating the efficacy of CBT for internalizing disorders either do not include diverse samples of LGBTQ+ people or do not collect data specific to LGBTQ+ people. This may be problematic due to the unique mechanisms of psychopathology development (Hatzenbuehler, 2009) and the higher incidence of internalizing disorders in LGBTQ+ individuals (Cohen et al., 2016; Semlyen et al., 2016).

Multiple systematic reviews to understand the effectiveness of psychotherapy for mental health concerns in LGBTQ+ people have been completed in recent years, yet none have either examined CBT or quantified the efficacy of reviewed interventions using a meta-analysis. For example, in LGBTQ+ young people, three recent systematic reviews have been conducted on the effectiveness of various

psychotherapy interventions. Firstly, Van Der Pol-Harney and McAloon (2018) reviewed psychosocial interventions for LGBTQ+ youth including intersex and asexual participants who were aged 12 to 25 and found that three out of nine studies (33.33%) used CBT to target minority stress, coping skills, anxiety, and depression. The review found that all three included studies found that CBT significantly reduced symptoms of depression, and the one study that examined anxiety symptoms found a significant pre-treatment to post-treatment symptom reduction (Van Der Pol-Harney & McAloon, 2018). Secondly, Sheinfil et al. (2019) found six studies that targeted depression in LGBTQ+ youth aged 13–25, with the three studies that used cognitive and behavioral strategies to target internalising disorder symptoms (50%) indicating significant reductions in depressive symptoms. Finally, Bochicchio et al. (2020) found 10 studies targeting mental health outcomes in LGBTQ+ youth and adolescents, with four of the five CBT studies (80%) indicating a significant decrease in depression.

Three reviews have also been conducted for adult samples. Firstly, Layland et al. (2020) systematically reviewed 37 treatment studies targeting internalized stigma, finding three CBT studies targeting internalized stigma and internalizing disorders in LGBTQ+ adults. All three studies (100%) found significant reductions in depression measures (Layland et al., 2020). Among the few interventions examining stigma as reduction as a treatment outcome, mixed effects of varied therapies for stigma in men who have sex with men and LGBTQ+ adults combined were found (Layland et al., 2020). Secondly, McGeough and Cohen (2021) systematically reviewed psychological interventions for depression and anxiety in non-heterosexual women. CBT was indicated to have the strongest evidence in support of its use, despite only one included study having delivered and quantitatively evaluated a CBT protocol. Thirdly, Malik et al. (2023) conducted a systematic review of mental health disparities in non-heterosexual men and men who have sex with men, finding that two out of 28 included studies (7.14%) used CBT. Both of these studies found a significant reduction in depression, with one finding a reduction in social anxiety symptoms and the other in minority stress and general anxiety symptoms (Malik et al., 2023).

Based on these existing reviews, there is early and preliminary evidence supporting the efficacy of CBT for internalizing disorders in LGBTQ+ people. However, at this stage no studies have quantified the magnitude of this effect and moderators of outcome remain unknown. Additionally, many included studies in previous reviews were feasibility studies, which may be underpowered and can thus lead to misleading conclusions about CBT's efficacy. Therefore, to address these limitations, the current study aimed to quantify the efficacy of CBT for internalizing disorders in LGBTQ+ people using a systematic review and meta-analysis of clinical intervention studies. The secondary aims of the study were to understand what factors moderate treatment efficacy and to quantitatively examine the efficacy of CBT in reducing any internal minority stress processes in LGBTQ+ people. The study has the potential to inform best practice treatment for LGBTQ+ people with internalizing disorders.

Methods

Search strategy

The study adhered to PRISMA 2020 guidelines (Page et al., 2021), with the PRISMA 2020 Checklist available in Supplementary Material A. It complied with the Cochrane Handbook for Systematic Reviews (J. P. T. Higgins et al., 2019). The study protocol was pre-registered with the International Prospective Register of Systematic Reviews (PROSPERO; CRD42022358343).

The following seven databases were systematically searched for relevant research articles: CINAHL, Cochrane Collaboration's Central Register of Controlled Trials, Embase, Medline, PsycINFO, Web of Science, and Scopus. The same search terms were used for each database, with syntax adapted to each database's requirements, and are visible in Supplementary Material B. Example search terms for PsycINFO included: ("LGB*" OR "lesbian" OR "gay" OR "bisexua*" OR "asexu*" OR "transgender" OR "queer" OR "non-binary" OR "intersex" OR "homosexual" OR "non-heterosexual" OR "gender") AND ("dysphoria" OR "nonconforming" OR "identity" OR "minorit*") AND ("CBT" OR "cognitive therap*" OR "behavio* therap*" AND "anxi*" OR "*phobia" OR "panic" OR "depress*" OR "*traumatic" OR "obsessive" OR "internali*"). Consistent with the Cochrane Handbook's recommendation to maximize comprehensive searches' sensitivity (J. P. T. Higgins et al., 2019), search terms included synonyms for LGBTQ+ that were historically used in the literature but which have fallen out of use. The final searches were completed between 1 and 3 November 2023. The reference lists of relevant review articles and full-text articles were also reviewed to identify any articles not found in the search. Search terms were created by the first author in collaboration with the research team and iteratively refined with the assistance of a health sciences librarian. No language or date limitations were used. The first author conducted the search.

Study selection

Studies were included in the systematic review if they met the following inclusion criteria: (1) the study was a clinical trial (controlled or uncontrolled trial) with five or more participants, published in a peer-reviewed journal; (2) the study's treatment specifically targeted internalizing disorder symptoms or minority stress; (3) the study reported outcome data specifically for LGBTQ+ identifying participants; (4) the study used a validated outcome measure that measures internalizing disorder symptoms, that was previously published in a peer-reviewed journal with data amenable to meta-analysis; (5) the study used CBT in at least 75% of treatment sessions, meaning interventions were aimed at changing unhelpful thoughts or behaviors using cognitive and/or behavioral strategies related to internalizing disorder symptoms; (6) the study was published in English or available for accessible translation; and (7) the study adequately described the treatment methodology used. After pilot testing, the inclusion criteria were refined to define CBT's use and purpose in interventions and include the extraction of intervention providers per the TIDiER checklist (Hoffmann et al., 2014). Due to preliminary searches indicating limited research and significant knowledge gaps for sub-groups of LGBTQ+ people (S. E. Valentine & Shipherd, 2018), to maximise power, all studies which included

participants with any LGBTQ+ identity were included in this review. Thus, randomized controlled trials, as well as uncontrolled trials were included in this review.

Duplicates were removed using EndNote 20.4 (McCracken, 2023), a screening software program, before the title/abstract screen. All studies were screened by title and abstract against eligibility criteria by the first author. To increase reliability, 20% were co-screened independently by the last author. Full-text articles were first screened by the first author, with 20% independently assessed by the last author. Discrepancies were resolved via discussion with the third author. The last author co-reviewed all final full-text inclusions.

Data extraction

Data was extracted as per the TIDieR checklist (Hoffmann et al., 2014) where possible and included: (1) details of each study (title, author, year, country, and journal); (2) study type (randomized controlled trial [RCT], open trial [OT]); (3) sample demographics (child/adolescents/adults/combined sample, sexual orientations included, genders included, and disorder examined); (4) sample size; (5) use of structured clinical interviews; (6) treatment outcome data (e.g. means and standard deviations at pre-treatment, post-treatment, and follow-up), (7) intervention details (type of CBT (i.e. standard (non-adapted) or adapted CBT), session length, number of sessions, treatment provider); and 8) mode of treatment delivery (face to face or online, individual or group). Where possible, the most frequently used primary outcome measure for each internalizing disorder was extracted and reported on to allow for like-for-like comparisons. This was identified as the Center for Epidemiological Studies—Depression Scale (Radloff, 1977) for depression and the Overall Anxiety Severity and Impairment Scale (Norman et al., 2006) for anxiety. LGBTQ+ identity was extracted per each study's report of participant self-identification. For example, if study authors included asexual- or pansexual-identifying participants in a catch-all "other sexual orientation" category, potentially to conserve privacy or power for analyses, then in this study those participants were recorded as "other sexual orientation". Treatment provider data was extracted with three levels (licensed professional, trainee, and mixed) consistent with the approach used elsewhere in the literature (Rodgers et al., 2021). Missing data was recorded as not reported (NR), and all extracted continuous outcome data were converted into a Hedges's *g* statistic. The first and last authors extracted all data independently, and discrepancies were resolved via discussion.

Risk of bias assessment

Risk of bias was assessed using Version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2; Sterne et al., 2019). The first author initially assessed the risk of bias, with the last author independently assessing studies afterward. Discrepancies in ratings were resolved via discussion. The RoB 2 assessed the potential risk of bias in five domains: (1) risk of bias resulting from the randomization process, (2) risk of bias arising due to deviations from the intended intervention, (3) risk of bias due to outcome data that is missing, (4) risk of bias in outcome measurement, and (5) risk of bias due to selection of the reported result. The item on participant blinding was not used because it is not relevant to this review.

Data synthesis

Comprehensive Meta-Analysis Version 3.0 (CMA; Borenstein et al., 2014) was used to analyze the data. Random-effects models were used for within-group and between-group analyses to calculate effect sizes (Hedges' *g*) with 95% confidence intervals, in line with the recommendation of Borenstein et al. (2009a). Hedges' *g* was interpreted as 0.2 being a small effect, 0.5 being a medium effect, and 0.8 or greater being a large effect (Durlak, 2009). Analyses were conducted to calculate pooled within-group effect sizes from pre-treatment to post-treatment and pre-treatment to longest follow-up for depressive symptoms, anxiety and related disorder symptoms, and minority stress measures. As per previous studies (Pachankis et al., 2015; Pachankis, Mahon, et al., 2020), minority stressors were operationalized using measurements of three proximal treatment targets; rejection sensitivity, internalized homophobia, and sexual orientation concealment. Anxiety and related disorders was a variable that combined obsessive-compulsive symptoms, post-traumatic stress symptoms, and anxiety symptoms due to their shared core underlying mechanism of pathology in threat appraisal (Beck & Haigh, 2014; Rosellini et al., 2015) and their subsequent similarity in response to CBT (Smits et al., 2012).

Between-group analyses were conducted, comparing the post-treatment outcome scores of participants who received CBT to the post-treatment outcome scores of participants in any available, eligible control group. These analyses were conducted for depressive symptoms, anxiety and related disorder symptoms, and minority stress measures. A positive *g* value indicated a decrease in internalizing symptoms, with larger values indicating a larger effect.

As this was the first known meta-analysis of CBT for this population, post hoc power (1 - β) was calculated using the Metapower application (Griffin, 2021). The application calculates power using the observed *g* value, heterogeneity, number of studies, average study sample size, and a two-tailed *p*-value of .05. According to standard power conventions, a power of .80 was considered adequate to detect a meaningful effect size (Griffin, 2021). Pre-treatment to post-treatment depression and pre-treatment to follow-up anxiety were adequately powered (1 - β = .84 and .89, respectively). To guide the interpretation of these adequately powered results, the corresponding pre-treatment to follow-up depression scores (1 - β = .61) and pre-treatment to post-treatment anxiety scores (1 - β = .66) were reported despite their lower power levels. For minority stress measures, the power to detect effects was inadequate for both pre-treatment to post-treatment and pre-treatment to follow-up analyses, including for sexual orientation concealment (1 - β = .09 and .08, respectively), internalized homophobia (1 - β = .08 and .12, respectively), and rejection sensitivity (1 - β = .26 and .31, respectively). Between-group analyses were also underpowered for depression (1 - β = .34), anxiety and related disorders (1 - β = .40), internalized homophobia (1 - β = .12), sexual orientation concealment (1 - β = .06), and rejection sensitivity (1 - β = .12).

When there are few studies, the point estimate and confidence intervals can substantially differ from the true effect, meaning that estimates of the between-study variance and dispersion can only be interpreted with caution (Bender et al., 2018; Borenstein et al., 2009c). However, J. C. Valentine et al. (2010) recommend that meta-analysis is one of the most transparent synthesis methods to summarise existing literature and is the least

likely of the available synthesis options to arrive at non-valid conclusions. Thus, in line with the recommendation of J. C. Valentine et al. (2010), a preliminary meta-analysis with confidence intervals was conducted for underpowered variables to provide cautiously interpreted data syntheses to guide future researchers and provide a recommendation for further intervention studies in this area.

The I^2 statistic was used to evaluate the homogeneity of effect sizes (J. P. Higgins & Thompson, 2002). An I^2 value of 25% was considered to be low heterogeneity across studies, 50% to be moderate, and 75% to be high (J. P. Higgins et al., 2003). Sensitivity analyses were conducted to check the robustness of results using the "one study removed" method (Borenstein et al., 2009b). To assess for publication bias and to calculate an appropriately adjusted effect size, funnel plots were inspected, and the Trim and Fill procedure of Duval and Tweedie (2000) was used.

Exploratory, planned meta-regression analyses were conducted for within-group comparisons from pre-treatment to post-treatment and pre-treatment to follow-up to investigate sources of heterogeneity and determine any preliminary moderating effects of continuous moderators. Despite broad inclusion criteria, too few studies were available to conduct meaningful between-group moderator analyses (Fu et al., 2011). This was because meta-regression was only conducted when six or more studies reported data, in line with the recommendation of Fu et al. (2011) around the lower bound of studies included to find clinically meaningful results. Planned subgroup analyses were only able to be conducted where each subgroup of interest included the minimum recommended number of studies ($k = 4$) in each group to provide clinically meaningful results (Fu et al., 2011), which was largely consistent with the Cochrane Handbook's guidelines (J. P. T. Higgins et al., 2019).

Results

Study flow diagram

The study flow diagram is outlined in Figure 1 (Page et al., 2021). Co-rater statistics of the 1175 articles screened at the title abstract level indicated 82.68% agreement, at a substantial level of agreement (Cohen's κ = .72; 95% Confidence Interval [CI] = 0.60 to 0.85; Landis & Koch, 1977). After several pilot screens, at the full-text level, 86.05% agreement was found, indicating an "almost perfect" level of agreement (Cohen's 0.89, 95% CI = 0.70 to 1.00). After discussion 100% agreement was reached between reviewers.

Description of the studies

Table 1 summarises the demographic characteristics of 414 participants across 14 studies included in the analysis and Table 2 provides a summary of the intervention characteristics of the studies. The mean age in each study ranged from 16.5 (SD = 1.6) to 44.5 (SD = 10.4). Seven of the 14 studies (50.00%) included cisgender female participants. Four of the 14 studies (28.57%) included non-binary or transgender participants. Seven of the 14 studies (50.00%) were conducted in the United States of America, three of the 14 (21.43%) in Canada, two of the 14 (14.29%) in New Zealand, and one each of the 14 (7.14%) in China or England. Twelve out of 14 studies (85.71%) included bisexual

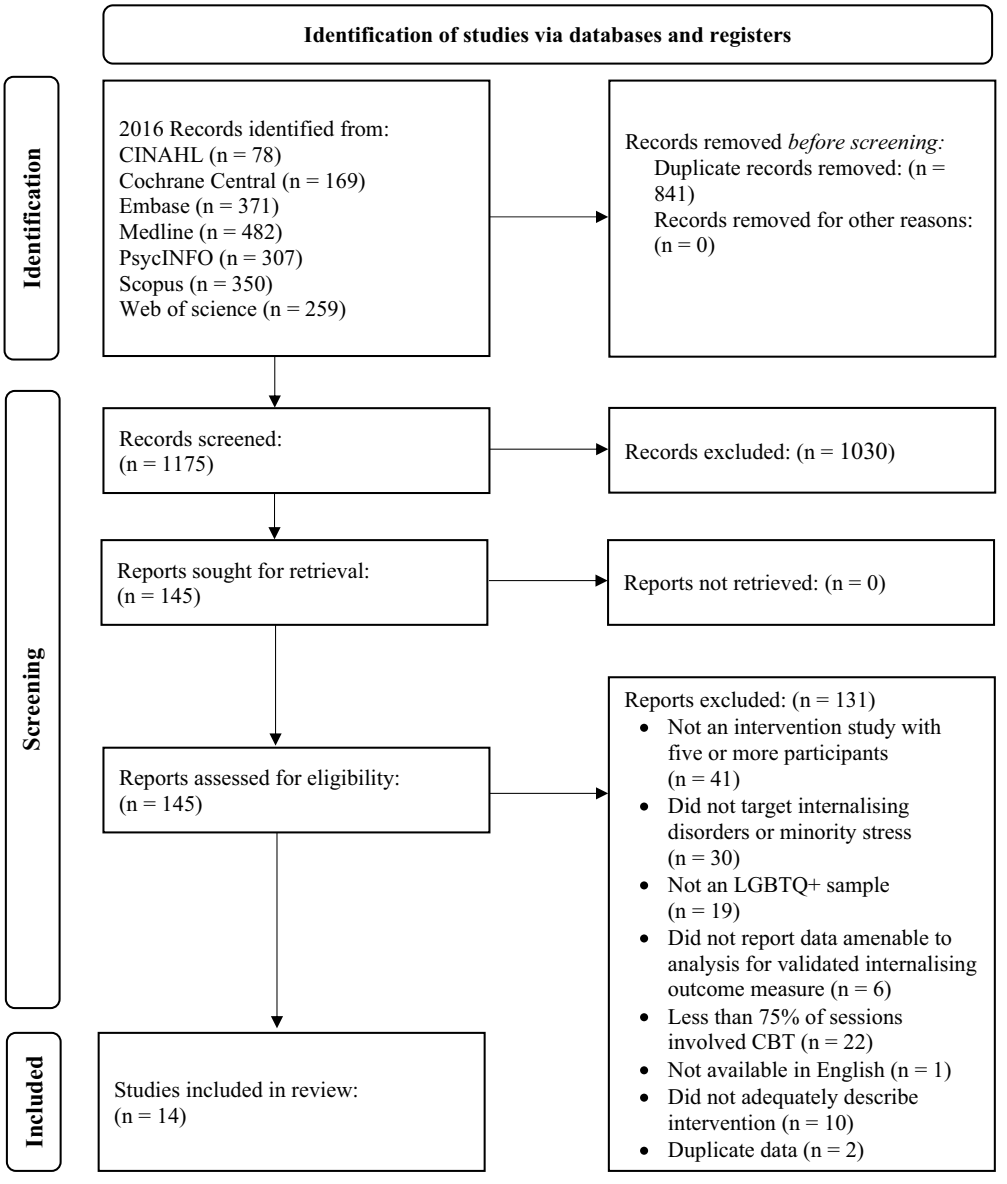

Figure 1. PRISMA flow diagram for systematic reviews.

participants, 11/14 studies (78.57%) included gay participants, six of the 14 studies (42.86%) included lesbian or queer participants, and three out of 14 studies (21.43%) included questioning/unsure participants or participants who identified as another sexual orientation (including asexual, pansexual, and non-specified identities). Four out of the 14 studies (28.57%) were RCTs. Two of the four RCTs (50.00%) used a waitlist control, one of the four RCTs (25.00%) used an HIV testing/counseling control, and one of the four RCTs used 10-weeks of self-report questionnaire assessment only (25.00%).

Follow-up outcome measures were collected for depressive symptoms at 2–6 months, with an average follow-up length of 3.5 months. Follow-up outcome measures were

Table 1. Demographic characteristics of included studies.

Study	Age (*M*)	White (%)	Cisgender female (%)	Non-binary (%)	Lesbian (%)	Gay (%)	Bisexual (%)	Transgender (%)	Queer (%)	Unsure (%)	Other (%)
Bezahler et al. (2022)	28.9	69.1	49.7	3.1	3.1	25.0	43.8	0.0	9.38	0.0	0.0
Craig and Austin (2016)	16.8	53.3	56.7	20.0	26.7	13.3	16.7	6.7	20.0	10.0	43.3
Fletcher and Reback (2022)	44.5	30.8	0.0	NR	0.0	79.0	21.1	0.0	0.0	0.0	0.0
Hambrook et al. (2022)	34.0	69.2	21.8	0.0	16.7	67.9	7.7	0.0	0.0	7.7	0.0
Hart et al. (2020)	32.5	59.4	0.0	NR	0.0	90.6	9.4	NR	0	0.0	0.0
Jackson et al. (2022)	26.5	0.0	0.0	0.0	0.0	76.2	14.3	4.8	9.5	0.0	0.0
Lucassen et al. (2015)	16.5	71.4	NR	NR	NR	NR	47.6	NR	NR	4.8	NR
Lucassen et al. (2021)	NR	66.2	N/A	NR	NR	NR	NR	100.0	NR	NR	NR
O'Cleirigh et al. (2019)	39.2	62.8	0.0	NR	0.0	62.8	27.9	0.0	NR	9.3	0.0
Pachankis et al. (2015)	25.9	52.4	0.0	0.0	0.0	92.6	7.9	0.0	NR	0.0	0.0
Pachankis, McConocha et al. (2020)	25.6	58.3	56.7	43.3	15.0	0.0	NR	NR	55.0	NR	30.0
Pachankis et al. (2023)	20.8	48.3	36.7	28.3	10.0	18.3	35.0	10.0	18.3	NR	18.4
Pan et al. (2021)	27.9	NR	0.00	NR	0.0	75.0	25.0	0.0	0.0	0.0	0.0
Ross et al. (2007)	40.7	69.6	39.1	0.0	30.4	47.8	21.7	0.0	4.3	0.0	0.0

The reporting method of LGBTQ+ identification varied, so should be considered with caution. For example, Lucassen et al. (2015) recruited only non-heterosexual participants, and Craig and Austin (2016) and Pachankis et al. (2020b) reported on single participants' multiple separate identities.

Table 2. Intervention characteristics.

Study	Construct	Outcome measure	Country	Design	*n* analyzed	CBT type	Delivery mode	Therapy hours	Provider type	Group or 1:1	Diagnostic interview
Bezahler et al. (2022)	DEP, OCD	HAMD-6, Y-BOCS-SR	USA	OT	32.0	S	FTF	248.8[a]	Mixed	Mixed	Yes
Craig & Austin (2016)	DEP	BDI-II	CAN	OT	30.0	A	FTF	NR	NR	Group	No
Fletcher and Reback (2022)	DEP	CESD-R	USA	OT	14.0	S	Online	7.0	NR	N/A	Yes
Hambrook et al. (2022)	DEP, ANX	PHQ-9, GAD-7	GBR	OT	61.0	A	FTF	12.0	NR	Group	No
Hart et al. (2020)	DEP, SAD	CES-D, LSAS	CAN	OT	21.0	A	FTF	10.0	Trainee	1:1	Yes
Jackson et al. (2022)	DEP, ANX, IH, RS, SOC	CES-D, OASIS, IHS, GRS, SCS	USA	OT	17.0	A	FTF	15.0	LP	Group	No
Lucassen et al. (2015)	DEP, ANX	CDRS-R, SCAS	NZL	OT	21.0	A	Online	3.5	N/A	N/A	No
Lucassen et al. (2021)	DEP	PHQ-9-A	NZL	OT	14.0	S	Online	3.5	N/A	N/A	No
O'Cleirigh et al. (2019)	PTSD	DPTSDS	USA	RCT	23.0	A	FTF	10.0	Mixed	1:1	No
Pachankis et al. (2015)	DEP, ANX, IH, RS, SC	CES-D, OASIS, IHS, GRS, SC	USA	RCT	32.0	A	FTF	10.0	Trainee	1:1	No
Pachankis, McConocha et al. (2020)	DEP, ANX, IH, RS, SC	CES-D, OASIS, LGB-IHS, SMWRRS, SOCS	USA	RCT	30.0	A	FTF	10.0	Mixed	1:1	No
Pachankis et al. (2023)	ANX, DEP	OASIS, ODSIS	USA	RCT	60.0	A	Online	NR	Mixed	N/A	No
Pan et al. (2021)	DEP, ANX	GAD-7-C, PHQ-9-C	CHN	OT	7.0	A	FTF	10.0	NR	1:1	No
Ross et al. (2007)	DEP, IH	BDI-II, LIHS	CAN	OT	23.0	A	FTF	30.0	NR	Group	Yes

DEP = Depression; OCD = Obsessive-compulsive disorder; ANX = Anxiety; SAD = Social anxiety disorder; IH = Internalized homophobia; RS = Rejection sensitivity; SOC = Sexual orientation concealment; OT = Open trial; S = Standard CBT; A = LGBTQ-Adapted CBT; FTF = Face-to-face; LP = Licensed professional. BDI-II = Beck Depression Inventory II (Beck et al., 1996); CDRS-R = Children's Depression Rating Scale—Revised (Poznanski and Mokros, 1995); CES-D = The Centre for Epidemiological Studies—Depression Scale (Radloff, 1977); CESD-R = Centre for Epidemiological Studies—Depression Scale—Revised (Eaton et al., 2004); DPTSDS = The Davidson PTSD Scale Total Scale (Davidson et al., 1997); GAD-7 = Generalised Anxiety Disorder-7 (Spitzer et al., 2006); GAD-7-C = Chinese-translated GAD-7 (He et al., 2010); GRS = Gay-Related Rejection Sensitivity Scale (Pachankis et al., 2008); HAM-D = hamilton Depression Rating Scale (Hamilton, 1960); HAMD-6 = amilton Depression Scale–6 (Bech et al., 1975); IHS = Internalized Homophobia Scale (Martin and Dean, 1992); LSAS = Liebowitz Social Anxiety Scale (Liebowitz, 1987); LGB-IHS = Lesbian, Gay, and Bisexual Identity Scale—Internalized Homonegativity Subscale (Mohr and Kendra, 2011); LIHS = Lesbian Internalized Homophobia Scale (Szymanski and Chung, 2001); OASIS = Overall Anxiety Severity and Impairment Scale (Norman et al., 2006); ODSIS = Overall Depression Severity and Impairment Scale (Bentley et al., 2014); PHQ-9 = Patient Health Questionnaire (Kroenke et al., 2001); PHQ-9-A= PHQ-9 for Adolescents (Johnson et al., 2002); PHQ-9-C = Chinese-validated PHQ-9 (Zhang et al., 2013); SCAS = Spence Children's Anxiety Scale (Spence, 1998); SOCS = Sexual Orientation Concealment Scale (Meyer et al., 2002); SMWRSS = Sexual Minority Women's Rejection Sensitivity Scale (Dyar et al., 2016); Y-BOCS-SR = Yale-Brown Obsessive-Compulsive Scale, Self-Report (Goodman et al., 1989; Steketee et al., 1996). Three-letter country codes were used according to the International Organization for Standardization (2023).

[a]Median number of sessions was reported, but not total treatment length; hence, the median number of sessions has been recorded.

collected for anxiety and related disorders at 3–9 months with an average follow-up length of 5.5 months. Follow-up outcome measures were collected for internalized homophobia at 2–4 months, with an average follow-up length of 3 months. Follow-up outcome measures were collected for rejection sensitivity and concealment at 3–4 months, with an average follow-up length of 3.5 months.

Treatment data

As seen in Table 2, most studies measured depression (13/14; 92.86%) and anxiety or anxiety-related disorders (10/14; 71.43%). Four of the 14 studies (28.57%) measured minority stress as a dependent variable. Most studies used LGBTQ-adapted CBT (11/14; 78.57%) and in-person treatment (10/14; 71.43%). The median number of sessions was 10, and the median total treatment hours was 10. Four of the 14 studies (28.57%) used structured clinical interviews, but only one of the 14 studies (7.14%) needed participants to meet diagnostic criteria for entry to the study (Bezahler et al., 2022). The most common type of treatment provider was a combination of trainees and licensed professionals (4/14; 28.57%).

Risk of bias

Table 3 outlines the risk of bias (RoB) assessment. A high RoB was indicated for 10/14 studies (71.43%), and some concerns were identified for four out of 14 studies (28.57%). This was due to several reasons. Firstly, 10/14 (71.43%) studies did not use random allocation or a control group. Secondly, nine out of 14 studies (64.29%) did not measure fidelity to the intervention, allowing for potential deviations from the intended intervention. Thirdly, all studies used self-report measures, potentially biasing measurement of the intended outcome. Fourthly, only five out of 14 studies (35.71%) used an intent-to-treat analysis, potentially biasing results due to missing outcome data. Three out of 14

Table 3. Risk of Bias (RoB) for included studies.

Study	1	2	3	4	5	Overall
Bezahler et al. (2022)	High[a]	Some concerns[b]	Low	Some concerns[e]	Some concerns[f]	High
Craig & Austin (2016)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High
Fletcher and Reback (2022)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High
Hambrook et al. (2022)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High
Hart et al. (2020)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High
Jackson et al. (2022)	High[a]	High[c]	High[d]	Some concerns[e]	Low	High
Lucassen et al. (2015)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[g]	High
Lucassen et al. (2021)	High[a]	Low	Low	Some concerns[e]	Some concerns[f]	High
O'Cleirigh et al. (2019)	Low	Low	Low	Some concerns[e]	Some concerns[g]	Some concerns
Pachankis et al. (2015)	Low	Low	Low	Some concerns[e]	Some concerns[f]	Some concerns
Pachankis, McConocha et al. (2020)	Low	Low	Low	Some concerns[e]	Some concerns[g]	Some concerns
Pachankis et al. (2023)	Low	Low	Low	Some concerns[e]	Low	Some concerns
Pan et al. (2021)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High
Ross et al. (2007)	High[a]	High[c]	High[d]	Some concerns[e]	Some concerns[f]	High

Potential bias due to: 1 = Randomization process; 2 = Deviations from the intended intervention; 3 = Missing outcome data, 4 = Measurement of outcome; 5 = Selection of the reported result; [a] No random allocation sequence; [b] Lack of fidelity monitoring; [c] Lack of analysis to account for adherence; [d] Lack of bias-correcting or sensitivity analysis to deal with missing data; [e] Use of self-report measure; [f] No pre-specified data plan; [g] Data analysis plan inconsistent with conducted trial or unavailable.

Table 4. Within-group effect sizes for depressive symptoms.

Study	*g*	95% CI	Weight
Pre-treatment to post-treatment			
Lucassen et al. (2021)	−0.03	[−0.41, 0.35]	6.94
Jackson et al. (2022)	0.14	[−0.18, 0.46]	7.85
Pachankis et al. (2023)	0.36	[0.16, 0.56]	9.69
Craig & Austin (2016)	0.41	[0.12, 0.69]	8.45
Fletcher and Reback (2022)	0.54	[0.29, 0.80]	8.84
Hambrook et al. (2022)	0.56	[0.35, 0.76]	9.59
Pachankis et al. (2015)	0.69	[0.40, 0.99]	8.27
Lucassen et al. (2015)	0.69	[0.34, 1.05]	7.29
Bezahler et al. (2022)	0.88	[0.57, 1.19]	8.00
Pachankis et al. (2020b)	0.90	[0.58, 1.23]	7.81
Hart et al. (2020)	0.91	[0.53, 1.30]	6.91
Ross et al. (2007)	0.94	[0.57, 1.31]	7.10
Pan et al. (2021)	1.38	[0.63, 2.14]	3.27
Pooled Effects	**0.60**	**[0.44, 0.76]**	
Pre-treatment to follow-up			
Lucassen et al. (2015)	0.05	[−0.26, 0.46]	12.40
Craig & Austin (2016)	0.36	[<-0.01, 0.72]	13.58
Pachankis et al. (2023)	0.50	[0.29, 0.70]	17.50
Hart et al. (2020)	0.70	[0.34, 1.06]	13.68
Ross et al. (2007)	0.74	[0.39, 10.09]	13.95
Pachankis, McConocha, et al., 2020	0.93	[0.60, 1.25]	14.51
Pachankis et al. (2015)	1.06	[0.73, 1.39]	14.38
Pooled Effects	**0.63**	**[0.40, 0.86]**	

(21.43%) studies used statistical methods to control for bias such as multiple imputation or full maximum likelihood estimation with robust standard errors. Seven out of 14 (53.85%) studies used completer analyses.

Within-group effect sizes for depressive symptoms

Table 4 outlines the within-group effects for depressive symptoms, organized by effect size in ascending order. On measures of depressive symptoms, there was a medium, positive, within-group pooled effect size from pre- to post-treatment (k = 13; g = 0.60; 95% CI: 0.44–0.76), with moderate levels of heterogeneity (I^2 = 71.59; Q = 42.24; p = <.001). These effect sizes were maintained at follow-up (k = 7; g = 0.63; 95% CI: 0.40–0.86), and heterogeneity remained moderate (I^2 = 72.31; Q = 21.67; p = .001). Using the trim-and-fill method, two studies were trimmed in the pre- to post-treatment analyses, and the effect size remained in the medium range (adjusted g = 0.55; 95% CI: 0.38–0.71). No studies were trimmed at follow-up. Using the one study removed method, all within-group depression effect sizes remained moderate.

Within-group effect sizes for symptoms of anxiety and related disorders

The effect of CBT on the symptoms of anxiety and related disorders is shown in Table 5, organized by effect size in ascending order. A medium pooled effect size was observed from pre- to post-treatment (k = 10; g = 0.73; 95% CI: 0.47–0.99), with high levels of heterogeneity (I^2 = 84.65; Q = 58.61; p = <.001). These medium pooled effect sizes were maintained at follow-up (k = 5; g = 0.70; 95% CI: 0.54–0.87) and with low heterogeneity levels (I^2 = 36.04; Q = 6.25; p = .181). Using the trim-and-fill method, three studies were trimmed for both within-study

Table 5. Within-group effect sizes for symptoms of anxiety and related disorders.

Study	*g*	95% CI	Weight
Pre-treatment to post-treatment			
Jackson et al. (2022)	0.03	[−0.29, 0.35]	10.57
Hambrook et al. (2022)	0.39	[0.19, 0.59]	11.71
Pachankis et al. (2023)	0.47	[0.27, 0.67]	11.67
O'Cleirigh et al. (2019)	0.56	[0.23, 0.89]	10.45
Hart et al. (2020)	0.64	[0.29, 0.99]	10.21
Pachankis, McConocha, et al., 2020	0.74	[0.43, 1.05]	10.71
Pachankis et al. (2015)	0.81	[0.50, 1.11]	10.74
Lucassen et al. (2015)	0.92	[0.42, 1.41]	8.62
Pan et al. (2021)	1.40	[0.64, 2.15]	6.09
Bezahler et al. (2022)	1.88	[1.44, 2.32]	9.22
Pooled Effects	**0.73**	**[0.47, 0.99]**	
Pre-treatment to follow-up			
Pachankis et al., (2023)	0.50	[0.29, 0.70]	30.34
O'Cleirigh et al. (2019)	0.68	[0.34, 1.03]	16.75
Pachankis, McConocha, et al., 2020	0.71	[0.40, 1.01]	19.67
Hart et al. (2020)	0.87	[0.49, 1.25]	14.47
Pachankis et al. (2015)	0.92	[0.60, 1.23]	18.78
Pooled Effects	**0.70**	**[0.54, 0.87]**	

analyses, with the effect size remaining in the medium range for both pre- to post-treatment analyses (adjusted g = 0.51; 95 CI%: 0.22–0.80) and pre-treatment to follow-up analyses (adjusted g = 0.55, 95% CI: 0.37–0.74). Using the one study removed method, both pre- to post-treatment anxiety and related disorder effect sizes ranged from medium to large but remained medium from pre-treatment to follow-up.

Within-group effect sizes for minority stress measures

To provide a preliminary quantitative synthesis of the existing research, the effect of CBT on minority stress variables is reported in Table 6, and results are organized by effect size in ascending order.

Internalized homophobia measures

A non-clinically relevant effect size was observed for internalized homophobia from pre- to post-treatment (k = 4; g = 0.05; 95% CI: −0.13 – 0.24), with low levels of heterogeneity (I^2 = 38.99; Q = 4.92; p = .178). The effect increased to small at follow-up (k = 3; g = 0.20; 95% CI: 0.04–0.36), with low levels of heterogeneity (I^2 = 0.00; Q = 0.41; p = .815). Using the trim-and-fill method, no studies were trimmed in either within-study analysis. Using the one study removed method, from pre- to post-treatment effect sizes remained non-clinically relevant, but from pre-treatment to follow-up they ranged from non-clinically relevant to small.

Sexual orientation concealment measures

A non-clinically relevant effect size was observed for sexual orientation concealment from pre- to post-treatment (k = 3; g = 0.17; 95% CI: 0.01–0.33), with low levels of heterogeneity (I^2 = 0.00; Q = 0.09; p = .957). The effect remained non-clinically relevant at follow-up (k = 2; g = 0.17; 95% CI: −0.02 – 0.36), with low levels of heterogeneity (I^2 = 0.00; Q = 0.01; p = .927).

Table 6. Within-group effect sizes for minority stress measures.

	Pre-treatment to post-treatment			Pre-treatment to follow-up		
Study	*g*	95% CI	Weight	*g*	95% CI	Weight
Internalized homophobia measures						
Ross et al. (2007)	−0.19	[−0.50, 0.12]	23.11	0.11	[−0.19, 0.42]	27.86
Jackson et al. (2022)	0.00	[−0.32, 0.32]	22.16	–	–	–
Pachankis, McConocha, et al., 2020	0.09	[0.18, 0.36]	27.13	0.23	[−0.04, 0.50]	37.19
Pachankis et al. (2015)	0.26	[−0.01, 0.53]	27.60	0.23	[−0.04, 0.51]	34.95
Pooled Effects	**0.05**	**[−0.13, 0.24]**		**0.20**	**[0.04, 0.36]**	
Rejection sensitivity measures						
Jackson et al. (2022)	0.13	[−0.19, 0.45]	32.04	–	–	–
Pachankis, McConocha, et al., 2020	0.38	[0.10, 0.65]	34.48	0.27	[−0.01, 0.54]	50.74
Pachankis et al. (2015)	0.73	[0.44, 1.03]	33.48	0.73	[0.44, 1.03]	49.26
Pooled Effects	**0.42**	**[0.09, 0.75]**		**0.50**	**[0.04, 0.95]**	
Sexual orientation concealment measures						
Jackson et al (2022).	0.14	[−0.18, 0.46]	25.92	–	–	–
Pachankis et al. (2015)	0.16	[−0.11, 0.42]	38.32	0.16	[−0.11, 0.42]	51.60
Pachankis, McConocha, et al., 2020	0.20	[−0.07, 0.47]	35.76	0.17	[−0.10, 0.45]	48.40
Pooled Effects	**0.17**	**[0.01, 0.33]**		**0.17**	**[−0.02, 0.36]**	

Using the trim-and-fill method, no studies were trimmed pre- to post-treatment, and too few studies were available pre-treatment to follow-up to conduct the analysis. Using the one study removed method, both within-group effect sizes remained non-clinically relevant.

Rejection sensitivity measures

A small effect size was observed for rejection sensitivity from pre- to post-treatment ($k = 3$; $g = 0.42$; 95% CI: 0.09–0.75), with moderate levels of heterogeneity ($I^2 = 72.97$; $Q = 7.40$; $p = 0.25$). The effect increased to a medium effect at follow-up ($k = 2$; $g = 0.50$; 95% CI: 0.04–0.95), with high levels of heterogeneity ($I^2 = 80.28$; $Q = 5.07$; $p = .024$). Using the trim-and-fill method, no studies were trimmed from pre- to post-treatment, and too few studies were available pre-treatment to follow-up to conduct the analysis. Using the one study removed method, both the pre- to post-treatment effect size and pre-treatment to follow-up effect size ranged from small to medium.

Within-group moderator analyses

Within-group meta-regression

As outlined in Table 7, the following moderators did not moderate change in depressive symptoms from pre- to post-treatment or pre-treatment to follow-up; age; percentage of cisgender female or non-binary participants; percentage of White participants; number of sessions; total hours of treatment; or proportion of participants who identified as gay, lesbian, queer, questioning, or another sexuality. However, the sample percentage of transgender-identifying participants across studies did moderate depressive symptom change from pre- to post-treatment ($Q_1 = -0.01$, $p = .015$), such that studies with higher sample percentages of transgender participants had lower pre- to post-treatment effect sizes. Insufficient studies were available at follow-up to test if the effect was maintained. Similarly, studies' sample percentage of bisexual-identifying participants moderated the outcome from pre-treatment to follow-up ($Q_1 = -0.02$, $p = .010$), such that studies with higher sample percentages of bisexual participants had lower pre-treatment to follow-up

Table 7. Within-Group Meta-Regression.

Variable	*k*	Point estimate	SE	95% CI	*p*
Pre-treatment to post-treatment depressive symptoms					
Age	12	0.01	0.01	[−0.01, 0.03]	.400
Cisgender female	11	<0.01	<0.01	[−0.01, 0.01]	.766
White	12	0.01	<0.01	[<−0.01, 0.01]	.061
Number of sessions	13	0.01	0.01	[<−0.01, 0.02]	.216
Length of treatment (hours)	11	<0.01	<0.01	[<−0.01, <0.01]	.393
Non-binary	8	<0.01	0.01	[−0.01, 0.01]	.894
Lesbian	11	<0.01	0.01	[−0.02, 0.02]	.976
Gay	11	<0.01	<0.01	[−0.01, 0.01]	.946
Bisexual	11	<0.01	0.01	[<−0.01, 0.02]	.640
Transgender	10	−0.01	<0.01	[−0.01, <0.01]	.015
Questioning	9	−0.03	0.02	[−0.07, 0.02]	.259
Queer	10	<0.01	0.01	[−0.01, 0.01]	.927
Another identified sexuality	11	<−0.01	0.01	[−0.02, 0.01]	.476
Pre-treatment to follow-up depressive symptoms					
Age	7	0.02	0.01	[<−0.01, 0.05]	.102
Cisgender female	6	<−0.01	<0.01	[−0.01, <0.01]	.330
White	7	−0.01	0.02	[−0.04, 0.02]	.490
Number of sessions	7	0.07	0.05	[−0.03, 0.17]	.158
Lesbian	6	−0.01	0.01	[−0.03, 0.01]	.359
Gay	6	<0.01	<0.01	[<−0.01, 0.01]	.295
Bisexual	6	−0.02	0.01	[−0.03, <−0.01]	.010
Another identified sexuality	6	−0.01	0.01	[−0.02, <0.01]	.229
Pre-treatment to post-treatment anxiety and related disorder symptoms					
Age	10	−0.01	0.02	[−0.05, 0.04]	.730
Cisgender female	9	0.01	0.01	[<−0.01, 0.02]	.212
White	9	0.01	0.01	[<0.01, 0.02]	.032
Number of sessions	10	0.02	0.01	[0.01, 0.04]	<.001
Length of treatment (hours)	9	0.01	<0.01	[<0.01, 0.01]	.001
Non-binary	6	<0.01	0.01	[−0.03, 0.02]	.939
Lesbian	9	−0.01	0.02	[−0.06, 0.03]	.558
Gay	9	<−0.01	<0.01	[−0.01, 0.01]	.422
Bisexual	9	0.02	0.01	[<−0.01, 0.04]	.073
Transgender	7	−0.07	0.05	[−0.18, 0.04]	.219
Questioning	7	−0.05	0.05	[−0.16, 0.06]	.361
Queer	7	<−0.01	0.01	[−0.02, 0.02]	.914
Another identified sexuality	9	<−0.01	0.01	[−0.03, 0.02]	.751

effect sizes. The percentage of bisexual-identifying participants did not moderate effect sizes from pre- to post-treatment for depressive symptoms (Q_1 = <0.01, p = .640).

Only three moderators of anxiety and related disorder symptoms were found to have a significant effect in meta-regression analyses. Studies' sample percentage of White participants moderated the change in anxiety and related disorder symptoms from pre-treatment to follow-up (Q_1 = 0.01, p = .032), such that studies with higher sample percentages of White participants had higher pre- to post-treatment effect sizes. Additionally, a higher number of total treatment hours (Q_1 = 0.01, p = .001) and a higher number of sessions (Q_1 = 0.02, p = <.001) moderated change in symptoms of anxiety and related disorders from pre- to post-treatment. This meant that for each one-unit increase in total treatment hours and number of sessions, the effect size for anxiety and related disorder symptom reduction increased by 0.01 and 0.02, respectively, from pre-treatment to post-treatment.

There were too few studies to perform adequately powered meta-regression analyses for anxiety and related disorders at follow-up. Too few studies measured the percentage of non-binary participants in their sample (k = 5) to conduct meta-regression for anxiety and related disorders from pre-treatment to post-treatment. Similarly, there were too few studies

evaluating change in depressive symptoms from pre- to post-treatment to conduct meta-regression for the studies' sample percentage of non-binary participants ($k = 5$), questioning participants ($k = 4$), or queer participants ($k = 5$). Finally, from pre-treatment to follow-up, there were too few studies evaluating depressive symptoms to conduct meta-regression for the studies' sample percentage of non-binary participants ($k = 5$), transgender participants ($k = 4$), questioning participants ($k = 4$), queer participants ($k = 5$), or total hours of treatment ($k = 5$).

Subgroup analysis

Table 8 outlines the pre- to post-treatment subgroup analyses for depressive symptoms and anxiety and related disorder symptoms. For depressive symptoms, subgroup analysis indicated that the only variable that significantly moderated the outcome was the mode of treatment delivery ($Q_1 = 9.38$, $p = .009$). Studies with treatment delivered individually had a large effect size ($k = 4$; $g = 0.86$; 95% CI = 0.66–1.05) compared to a medium effect for studies that delivered group treatment ($k = 4$; $g = 0.50$; 95% CI = 0.23–0.77). Studies delivered online (i.e. with no face-to-face component) had a small effect ($k = 4$; $g = 0.40$; 95% CI: 0.16–0.65). One study (Bezahler et al., 2022) used blended in-person and group treatment and was removed for this analysis. There were no significant moderators for anxiety and related disorders measures. There were too few studies to conduct pre-treatment to follow-up or between-group sub-group analysis.

Between-group analyses

Table 9 outlines the between-group effects, organized by effect size in ascending order, for depressive symptoms, anxiety and related disorder symptoms, and minority stress measures.

Depressive symptoms

On measures of depressive symptoms, there was a small, positive, between-group pooled effect size at post-treatment ($k = 3$; $g = 0.32$; 95% CI: 0.07–0.57), with low levels of

Table 8. Sub-group analyses of the overall effect size pre-treatment to post-treatment.

Variable	*k*	*g*	95% CI	*Q*-value	*p*-value
Depressive symptoms					
Age				1.59	.207
Adult	8	0.78	[0.50, 0.86]		
Included child/adolescent participants	5	0.46	[0.18, 0.75]		
Mode of Treatment Delivery				9.38	.009
Individual	4	0.86	[0.66, 1.05]		
Group	4	0.50	[0.23, 0.77]		
Online	4	0.40	[0.16, 0.65]		
Telehealth Mode				3.46	.063
Face-to-face	9	0.70	[0.51, 0.90]		
Online	4	0.40	[0.16, 0.65]		
Anxiety and related disorder symptoms					
Study Type				0.67	.414
Open trial	6	.84	[0.34, 1.33]		
RCT	4	.62	[0.45, 0.78]		
Risk of Bias				0.67	.414
High	6	.84	[0.34, 1.33]		
Some concerns	4	.62	[0.45, 0.78]		

Table 9. Between-Group Effect Sizes at post-treatment.

Study	*g*	95% CI	Weight
Depressive symptoms			
Pachankis et al. (2023)	0.18	[−0.17, 0.54]	48.68
Pachankis et al. (2015)	0.28	[−0.21, 0.77]	26.24
Pachankis, McConocha, et al., 2020	0.62	[0.11, 1.14]	24.08
Pooled Effects	**0.32**	**[−0.39, 3.55]**	
Anxiety and related disorder symptoms			
Pachankis et al., (2023)	0.03	[−0.32, 0.39]	35.28
O'Cleirigh et al. (2019)	0.43	[−0.17, 1.02]	18.29
Pachankis et al. (2015)	0.52	[0.02, 1.02]	23.70
Pachankis, McConocha, et al., 2020	0.62	[0.11, 1.13]	22.73
Pooled Effects	**0.35**	**[0.06, 0.65]**	
Rejection sensitivity measures			
Pachankis, McConocha, et al., 2020	0.11	[−0.39, 0.61]	49.20
Pachankis et al. (2015)	0.36	[−0.13, 0.86]	50.80
Pooled Effects	**0.24**	**[−0.11, 0.59]**	
Internalized homophobia measures			
Pachankis, McConocha, et al., 2020	−0.42	[−0.92, 0.09]	48.81
Pachankis et al. (2015)	0.01	[−0.47, 0.50]	51.19
Pooled Effects	**−0.20**	**[−0.62, 0.23]**	
Sexual orientation concealment measures			
Pachankis et al. (2015)	−0.16	[−0.65, 0.33]	51.13
Pachankis, McConocha, et al., 2020	−0.11	[−0.61, 0.40]	48.87
Pooled Effects	**−0.13**	**[−0.48, 0.22]**	

heterogeneity (I^2 = 0.00; Q = 1.93; p = .381). Using the trim-and-fill method, no studies were trimmed. Using the one study removed method, the effect size remained small.

Anxiety and related disorder symptoms

On measures of anxiety and related disorders, there was a small, positive, between-group pooled effect size at post-treatment (k = 4; g = 0.35; 95% CI: 0.06–0.65), with low levels of heterogeneity (I^2 = 34.22; Q = 4.56; p = .207). Using the trim-and-fill method, two studies were trimmed, and the effect size was reduced to non-clinically relevant (adjusted g = 0.15; 95% CI: −0.16 – 0.47). Using the one study removed method, the effect size ranged from small to medium.

Rejection sensitivity measures

On measures of rejection sensitivity, there was a small, positive, between-group pooled effect size at post-treatment (k = 2; g = 0.24; 95% CI: −0.11 – 0.59), with low levels of heterogeneity (I^2 = 0.00; Q = 0.51; p = .476). Too few studies were available to use the trim-and-fill method. Using the one study removed method, the effect size ranged from non-clinically relevant to small.

Internalized homophobia measures

On measures of internalized homophobia, there was a small, negative, between-group pooled effect size at post-treatment (k = 2; g = −0.20; 95% CI: −0.62 – 0.23), with low levels of heterogeneity (I^2 = 31.30; Q = 1.46; p = .228). Too few studies were available to use the trim-and-fill method. Using the one study removed method, the effect size ranged from a small, negative effect to a non-clinically relevant positive effect.

Sexual orientation concealment measures

On measures of sexual orientation concealment, there was a non-clinically relevant, negative, between-group pooled effect size at post-treatment ($k = 2$; $g = -0.13$; 95% CI: −0.48 – 0.22), with low levels of heterogeneity ($I^2 = 0.00$; $Q = 0.03$; $p = .875$). Too few studies were available to use the trim-and-fill method. Using the one study removed method, the effect size remained non-clinically relevant.

Discussion

The aim of this study was to estimate the efficacy of CBT for internalizing disorders in LGBTQ + adults using a meta-analytic approach. The secondary aims of the study were to understand what factors moderate treatment efficacy and to quantitatively examine the efficacy of CBT in reducing selected internal minority stress processes in LGBTQ+ people. The results provide preliminary evidence to suggest that CBT for internalizing disorders in LGBTQ+ people is an efficacious treatment.

Overall, for depressive symptoms, medium within-group pooled effect sizes were found from pre-treatment to post-treatment ($g = 0.60$), which were maintained at follow-up ($g = 0.63$). The between-group effects at post-treatment were in the small range ($g = 0.32$). The between-group effects in the current study are smaller than those seen in previous meta-analyses. For instance, Cuijpers et al. (2016) found a medium between-group effect for adults diagnosed with depression ($g = 0.75$) when compared to pill placebo, waitlist control, or care as usual control groups. However, considering that only three studies were included in the between-group analysis of the current study, the power to detect effects was low, and so the between-group effect size ought to be considered preliminary. Therefore, further studies are needed to fully elucidate CBT's within- and between-group effects on depressive symptoms in LGBTQ+ people.

For symptoms of anxiety and related disorders, a medium within-group effect size was found from pre-treatment to post-treatment ($g = 0.73$), which was maintained at follow-up ($g = 0.70$). The between-group effect at post-treatment for anxiety and related disorders was in the small range ($g = 0.35$). This effect size is lower than those seen in previous meta-analyses. For instance, Carpenter et al. (2018) found a medium between-group effect at post-treatment when compared to pill or psychological placebo for adults diagnosed with an anxiety or related disorder ($g = 0.56$). This discrepancy may be explained by several characteristics of the literature included in this review. Two out of four (50%) of the between-group studies used a control group with the potential for a psychological placebo effect, such as HIV testing and counseling, which may provide non-specific therapeutic effects (Mohr et al., 2009). Secondly, given that this study included participants with symptoms of comorbid conditions and Carpenter et al. (2018) excluded such studies, it may be that the complexity of participant symptom presentations impacted within- and between-group effect sizes. Finally, the between-group effect sizes in this review were likely impacted by the small sample size and low power. Thus, a key conclusion from these underpowered, preliminary results is that more research is needed for LGBTQ+ people with symptoms of anxiety and related disorders to fully determine the within- and between-group effects of CBT in this population.

A secondary aim of this study was to quantify the efficacy of CBT for minority stressors in LGBTQ+ people. CBT was found to have a small within-group effect on rejection sensitivity measures from pre-treatment to post-treatment ($g = 0.42$), medium within-group effect from

pre-treatment to follow-up (g = 0.50), and a small between-group effect between treatment and control groups at post-treatment (g = 0.25). Given the high heterogeneity found for the effects and the one study removed method indicating variability in these effects, more studies are needed to elucidate the robustness of these within-group and between-group effects. However, these preliminary results are consistent with previous research in heterosexual adults, which has indicated that rejection sensitivity is a promising transdiagnostic treatment target due to its association with depression (g = 0.33) and anxiety and related disorders (g = 0.43) (Gao et al., 2017). These preliminary effects suggest that LGBTQ+ related rejection sensitivity, a proximal minority stressor, may be a promising treatment target in CBT for LGBTQ+ clients presenting with internalizing disorder symptoms.

For internalized homophobia, the within-group effect from pre-treatment to post-treatment was non-clinically relevant (g = 0.05) and increased from pre-treatment to follow-up to small (g = 0.20). However, between-group analyses indicated a small, negative effect (g = −0.20), indicating that participants in the treatment group had higher internalized homophobia than the control group at post-treatment. However, in the one study out of two in the analysis (Pachankis, McConocha, et al., 2020) that had a difference between the intervention and control group, the control group entered the study at pre-treatment with the same mean score (M = 1.49) as the intervention group at follow-up (M = 1.49). However, both groups indicated a reduction in scores, which indicates potential issues with randomization in this study. Overall, the findings suggest that although CBT may have a small effect on reducing participants' scores on measures of internalized homophobia at follow-up, waitlist control participants may still experience a spontaneous reduction of internalized homophobia. The effects should be considered preliminary due to the small number of studies included in this analysis, sensitivity analyses indicating variability in the found effect size. Further research is needed to fully understand the effect of CBT for reducing explicitly measured internalized homophobia in LGBTQ+ people.

Similar results were seen for sexual orientation concealment. The within-group effect size was not clinically relevant from pre-treatment to post-treatment (g = 0.17) and from pre-treatment to follow-up (g = 0.17). However, between-group analyses at post-treatment indicated a non-clinically relevant effect size (g = −0.13) in a negative direction, suggesting either a potentially iatrogenic effect or that controls experience a slightly larger reduction in concealment than those who receive CBT. It is important to highlight that these results should be considered preliminary and interpreted with caution given that the analyses were underpowered, both studies included in the analysis had some risk of bias, and the variability in the findings indicated by the one study removed method. Taken together, it may be advisable for clinicians to carefully formulate before targeting sexual orientation concealment or internalized homophobia with CBT (Pachankis et al., 2023). For example, other factors like family support may impact sexual orientation concealment's impact on well-being (Liu et al., 2023). Of the few studies that measured minority stress measures, multiple differing questionnaires were used. As recommended in measurement of LGBTQ+ microaggressions (Fisher et al., 2019), development of psychometrically sound questionnaires that all research projects may find utility from will allow for collection of more robust data in the future. The key conclusion from this finding is that further research is needed to understand the within- and between-group effects of CBT on sexual orientation concealment measures.

An additional aim of this study was to understand moderators of treatment efficacy. Exploratory analyses indicated that for each one-unit increase in the percentage of

transgender-identified participants in the sample, the effect size of treatment on depressive symptoms at post-treatment decreased by 0.01. Analyses were underpowered at follow-up, so it was not possible to understand if the effect was maintained at follow-up. The proportion of transgender-identifying individuals did not moderate anxiety and related disorder symptoms. With only four studies reporting on their sample's percentage of transgender-identifying participants, these results should be considered preliminary and warrant replication. While the effects are likely underpowered and only exploratory in nature, they do highlight the heterogeneous needs of LGBTQ+ people and the importance of applying intersectional approaches to address the impact of multiple layered levels of stigma on depressive symptoms (Cole, 2009; White Hughto et al., 2015).

Similarly, for each one-unit increase in the percentage of bisexual-identified participants in the sample, the effect size of the treatment for depressive symptoms at follow-up decreased by 0.02. The proportion of bisexual-identifying individuals did not moderate anxiety and related disorder symptoms. Given some studies included bisexual identification in "other" sexuality categories or only included non-heterosexual participants, these results should be considered with caution. However, the finding is consistent with previous research suggesting that bisexual-identifying people have unique contributors to psychological distress, such as biphobia, invisibility and erasure, which may not be covered in generalized LGBTQ+ treatment programs (Taylor et al., 2019). Given the low power of the analysis, the key conclusion is that further studies are needed to understand the efficacy of CBT for symptoms of depressive disorders and anxiety and related disorders in bisexual people.

Further exploratory moderator analyses indicated that the pre-treatment to post-treatment effect size for anxiety and related disorder symptoms was moderated by three variables: the sample percentage of White-identifying participants, number of sessions, and total hours of treatment. That is, for each one-unit increase in the sample percentage of white participants, effect sizes increased by 0.01. These findings are consistent with those of Fattoracci et al. (2021), which indicated that intersectional microaggressions (i.e. simultaneously racist and heterosexist discrimination) predicted mental health outcomes better than heterosexist or racist microaggressions alone. Similarly, for each one-unit increase in the number of sessions and total hours of treatment, effect sizes for anxiety and related disorders from pre-treatment to post-treatment increased by 0.02 and 0.01, respectively. This differs from previous analyses, which have found no effect of treatment quantity on outcome in the general population (Carpenter et al., 2018; Cuijpers et al., 2016), indicating the need for replication in large, controlled studies.

Interestingly, the preliminary meta-regression results, while underpowered, appear to indicate that CBT is equally efficacious for people who identify as gay, lesbian, queer, or another identified sexuality, as well as for those of differing ages, as suggested in previous controlled trials (Pachankis et al., 2015; Pachankis, McConocha, et al., 2020). Previous research has indicated differential levels of rumination and distress in LGBTQ+ people between genders (Timmins et al., 2020), and some but not all minority stress processes are theorized to differ according to gender and sexuality in the minority stress model (Meyer, 2003). The inconsistency between previous research and this finding may reflect the lack of power in the moderator analysis (Griffin, 2021). Thus, further research that collects demographic and intervention data, including LGBTQ+ participants' self-identification, is needed to understand the moderating effect of sexual orientation and age on treatment efficacy.

Unfortunately, there were insufficient studies in each subgroup for depressive symptoms to compare the effects of moderators like CBT type, risk of bias, and study design. Interestingly, individual treatment had a large effect size ($g = 0.86$) and was significantly more effective ($p = .009$) than group treatment, which had a moderate effect size ($g = 0.50$). This finding was inconsistent with previous tentative findings of no differences between individual and group treatment for depression (Cuijpers et al., 2016). Given the small number of studies included in this analysis and that five out of eight (62.5%) of the studies had a high risk of bias, this finding should be considered preliminary. Further studies are needed to understand the differential efficacy of group compared to individual treatment for internalizing symptoms in LGBTQ+ people.

Similarly, too few studies for anxiety and related disorders were found to conduct subgroup analysis for any category beyond study design and risk of bias. However, preliminary conclusions may be drawn about the efficacy of LGBTQ-adapted CBT, of which most studies of depression (10/13; 76.92%) and anxiety and related disorders (9/10; 90%) used. This suggests that adapted CBT for LGBTQ+ people may be an efficacious treatment option. Such a conclusion would be consistent with minority stress theory due to LGBTQ-adapted CBT targeting the unique mechanisms of minority stress that maintain internalizing disorders (Hatzenbuehler, 2009; Meyer, 2003). However, due to the lack of studies and power in this review, future meta-analyses and active-controlled studies are needed to make conclusive statements about the comparative efficacy of standard CBT to LGBTQ-adapted CBT.

Limitations

While the present results are promising, with a range of disorders considered in a diverse population, they have several methodological limitations. Firstly, despite growing interest in this research area (McGeough & Cohen, 2021), the key limitation of this review is that the research base for CBT in LGBTQ+ people is still emerging, which resulted in some of our analyses being underpowered. As a result, both the pooled effects and moderator analyses' findings must be considered preliminary due to uncertainty in the results, with future replication required once the evidence base builds. Secondly, the resulting lack of subgroup analyses meant that the source of the moderate heterogeneity between studies for depression outcomes could not be investigated. Thirdly, while including non-controlled studies may have contributed to the low publication bias found, it also may have resulted in the high number of included studies with a high risk of bias (10/14; 71.43%). Fourthly, sensitivity analyses using the one study removed method for several analyses of anxiety and related disorders, rejection sensitivity, and internalized homophobia indicated that the effects may vary should any one study be excluded. Further studies are needed to determine the robustness of these effects.

Additionally, the evidence synthesized from the included studies in the review requires several contextual considerations. Firstly, only one included study required a diagnosis for entry to the study, and thus, the participants in this review may have sub-clinical levels of depression and anxiety. This means that the symptom change reported may not be reflective of symptom change seen in participants with clinically diagnosed depressive and anxiety disorders. Moderate to high heterogeneity was found for all within-group internalizing disorder symptom analyses except for anxiety and related disorders at follow-up. This heterogeneity may result from only one of the included studies excluding participants with secondary symptoms of comorbid disorders. In future trials, researchers might

consider using intent-to-treat analyses, control groups, and structured clinical interviews to decrease the risk of bias in findings. Secondly, the findings may have limited generalisability to lesbian, queer, questioning, gender-diverse, and otherwise non-heterosexual identifying participants, reflected in 6, 6, 5, 4, and 3 studies, respectively. Bisexual and gay identifying participants were reflected in 12 and 11 of the 14 studies, respectively. Thirdly, only one included study was conducted in a non-Western country, despite overall strong reporting on self-identified race or ethnicity in 13/14 studies (92.86%). More research in non-Western settings is needed, including participants with various LGBTQ+ identities.

Conclusion and implications for practice

Based on the findings of this study, it appears there is preliminary evidence to suggest that CBT is efficacious in the treatment of internalizing symptoms in LGBTQ+ people. To progress the field further it is important for larger controlled trials to be conducted. It is also important for future studies to directly compare the efficacy of standard CBT compared to LGBTQ+ adapted CBT. Within such future studies it is important that they include structured diagnostic interviews to assign diagnoses, use clear exclusion criteria for secondary non-internalizing disorders, and use intent-to-treat analyses. Large studies with diverse samples are needed to tease apart the efficacy of CBT for different sub-groups. Further investigation and adaption of treatment protocols to improve CBT treatment outcomes for bisexual, transgender, and non-White participants may also be warranted. Given the variation in the use of minority stress questionnaires between studies, the development of psychometrically sound measures of minority stress processes is also urgently needed. This will ensure that there are multiple comparable data points across studies for future reviews. Future intervention studies would be also well-advised to consider using non-adult samples, and also trial various treatment delivery modes (such as group, web-delivered, or videoconferencing-delivered).

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ORCID

Isaac B. J. M. D. Dunn https://orcid.org/0009-0002-8880-6596
Emma Power https://orcid.org/0000-0002-2638-0406
Liam J. Casey https://orcid.org/0000-0003-2299-8062
Bethany M. Wootton https://orcid.org/0000-0001-9036-0699

Data availability statement

The data that support this study's findings are available upon request from the corresponding author.

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