Learning to manage depression: A systematic review and meta-analysis of skills learned in therapy as a mediator of improved well-being

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Abstract**Objective**

In therapy, clients may learn skills to manage depression. Failing to learn such skills would increase the risk of relapse. To assess this hypothesis, we conducted a systematic review of studies that assess the mediating effects of learning skills in treatment for depression.

Method

We searched four databases using 11 keywords to find randomised trials using any intervention and reporting a skill-based outcome. We conducted full-text screening, data-extraction, and risk of bias in duplicate.

Results

Searches retrieved 4,506 unique records. After screening 28 full-texts, 13 met inclusion criteria. Acquisition of skills in psychotherapy was found to be a mechanism through which interventions reduce depression. Skills learned in psychotherapy either have a mediating effect on depression or are associated with positive therapeutic outcomes. Stronger skill-acquisition was also associated with reductions in depressive symptomatology.

Conclusions

Results suggest that therapists should not only focus on the content and relationships built in therapy, but also attend to the pedagogy involved in treatment.

Keywords

Learning, mediators, depression, skills, mechanism of change.

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Depression was ranked as the single largest contributor to global disability; it affects hundreds of millions of people worldwide (World Health Organisation, 2020). Several psychotherapeutic interventions have been developed for the treatment of depression, such as interpersonal, cognitive behavioural, problem solving and psychodynamic therapy (Barth et al., 2013). Therapeutic approaches have demonstrated moderate to large effects on depression ($d = 0.66$, 95% CI [-0.73, -0.60]) and many interventions had comparable effects (Barth et al., 2013).

Nevertheless, just because we know *that* treatments are effective does not mean we know *why* they are effective. If we better understand key mechanisms of change, we can better design and deliver treatments for depression. Mechanisms of change are defined as processes that are responsible for the change; they explain why and how change has occurred (Kazdin, 2007). These important questions of when, where, why and how psychotherapy works are usually assessed via mediators and moderators of therapy outcomes (Kazdin, 2007).

Mediators are intervening variables that may statistically account for the relationship between treatments and their outcomes (Kazdin, 2007). Hence, mediators may suggest *why* the treatment condition does better than the control group, and imply how treatment outcomes could be improved (e.g., by more directly targeting critical mediators; Lemmens et al., 2016). For example, there is some evidence that cognitive-behaviour therapy improves depression by reducing the frequency and intensity of negative automatic thoughts (Quilty et al., 2008). Lemmens and colleagues (2016) conducted a systematic review of psychological mediators in different forms of treatment for depression. They found better therapeutic outcomes when therapists created a strong alliance, reduced worry, reduced rumination, reduced negative

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automatic thoughts, and reduced dysfunctional attitudes (Lemmens et al., 2016). It is possible that a warm therapeutic relationship attenuates these negative thoughts, but the review provided preliminary evidence (4 studies) that learning skills may be a causal mechanism upstream of the reduced negative thoughts (Lemmens et al., 2016). That is, when clients learn skills in therapy (e.g., mindfulness skills, thought challenging, behavioural management skills), they can use those skills to manage difficult thoughts (e.g., worry, rumination, negative automatic thoughts), which, in turn, leads to reduced depression. If skills acquired in therapy were a mediator, then interventions could preferentially focus on these skills as an upstream predictor of outcomes.

Learning Skills in Psychotherapy

Learning is described as the process by which changes in behaviour arise because of experiences interacting with the world (Harvey et al., 2014). In psychotherapy, learning could be conceptualised as a process which involves learning skills and acquiring knowledge about oneself that might lead to behaviour changes during and after therapy. Therefore, it may be that learning in therapy can be enhanced by applying those skills in real life situations. In cognitive behaviour therapy (CBT), clients update their beliefs about themselves and the world, and learn skills for better navigating life (Beck, 1979). For example, clients can learn to notice their body's response in panic attacks, use calm breathing to relax, and maintain progress by practicing realistic thinking. These skills may or may not be retained, and may or may not transfer to settings outside the therapy room. As a result, variability in skill acquisition may explain differences in the benefits some clients get from therapy. It may also explain the differences between the weaker effects for less structured forms of therapy (e.g., supportive counselling) compared with more manualised ones (e.g., CBT; Barth et al., 2013).

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Furthermore, learning capacity—that is, the capacity of the client to learn new skills in therapy—was found to influence outcomes in CBT for depression (Bruijniks et al., 2019). Bruijniks and colleagues (2019) suggested learning is a critical mechanism in CBT outcomes, explaining why clients with learning difficulties struggle with CBT. CBT may operate via cognitive change (e.g., addressing dysfunctional thinking, changes in negative automatic thoughts and core beliefs), but that change is created by implementing behavioural (e.g., activity monitoring, activity scheduling, skills training) and cognitive skills (e.g., thought challenging, thought distancing). Implementing those skills may allow for functional coping over the long-term (Strunk et al., 2013). While this explanation is intuitive, it has received limited attention in comparison to other mediating factors like alliance and empathy (Wampold, 2015). We hypothesise that alliance may facilitate skill development, but that skill development is a necessary and sufficient mechanism of therapeutic change. Specifically, we hypothesise that the effects of psychological treatments on depression are fully mediated by effects on skills.

To assess this hypothesis, our review explored if skill development mediates the relationship between cognitive therapies and treatment outcomes. We hypothesised that psychological treatments would lead to an increase in client reported skills, and that doing so would lead to decreased depression. To robustly assess this hypothesis using a comprehensive review of the literature, we conducted a systematic review.

Methods

Protocol and Registration

The study was registered on PROSPERO (CRD42020156554).

Eligibility Criteria

The included studies were selected based on the following eligibility criteria:

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1. **Participants.** Participants aged 18 years or above, who are diagnosed with Major Depressive Disorder (MDD) according to formal classification systems or clinically significant scores on questionnaires.
2. **Interventions.** Skill based therapeutic approaches in which clients are encouraged to learn new skills in session and apply them in real life. We aimed to review cognitive therapies (CT, CBT and MBCT) in which clients acquire cognitive, behavioural and mindfulness skills.
3. **Comparisons.** Randomised trials were included to maximise the internal validity of conclusions, but any comparison was eligible as long as it did not focus on skill development.
4. **Outcomes.** Studies needed to include at least one measure of skills learned in therapy.
5. Both published and unpublished studies were included to reduce the influence of publication bias. For logistical reasons, the search was restricted to studies that were written in English or had English translations available.

Information Sources and Search Terms

A search of titles, abstracts and keywords was conducted in PsycINFO, Scopus, Medline, and Web of Science databases. These databases were chosen due to their comprehensive date coverage and their use in related systematic reviews (Bruijniks et al., 2019; Lemmens et al., 2016; Stockton et al., 2019). To search those databases, we used the following terms: (*learning OR knowledge OR skill**) AND (*depress* OR “depressive disorder” OR “MDD”*) AND (*therapy OR treatment OR intervention OR trial*) AND (*mediator* OR mechanism* OR “process of change” OR “active treatment component”*). To increase the specificity of searches, we limited results to psychology, sociology, and medicine, where subject-area filtering was relevant

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(e.g., Scopus). We searched reference lists of included articles for any additional studies that would be eligible. We also used Google Scholar to conduct forward searching of articles that cited included studies.

Study Selection

Titles and abstracts were screened by two authors, independently and in duplicate. Two authors then screened full texts, independently and in duplicate, recording reasons for exclusion. Any discrepancies were resolved via discussion or adjudicated by a third author.

Data Collection Process and Data Items

One author extracted the following data for all studies: study design, intervention, study population, and outcomes. A second author randomly audited 30% of the studies by extracting data for those studies in duplicate; no substantive errors were found so we deemed single-extraction sufficient. Quantitative results for key outcomes were all extracted in duplicate. Key quantitative outcomes were intervention effects on skills and depressive symptoms, and the correlations between skills and symptoms. Where values were missing, we contacted the authors of the included studies to obtain the raw correlations between variables. Lastly, we used mid-point skills measurements and end-point depression scores to allow for causal ordering in our mediation model.

Risk of Bias in Individual Studies

The Cochrane Risk of Bias assessment was used because it has greater validity, sensitivity, and specificity than quantitative measures of bias (Higgins et al., 2011). Two reviewers independently completed risk of bias judgments. Disagreements were resolved by discussion and adjudicated by a third author if necessary.

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Summary Measures and Synthesis of Results

The primary method for synthesis of results was via summary tables. These tables presented the results of each study that tested the effects of therapy on both skills and depression. Exploratory, Two-Stage Structural Equation Models (Cheung, 2014) were conducted to calculate a pooled mediation estimate. This approach meta-analytically assessed whether skill-acquisition mediated the link between therapy and lower depression. After calculating pooled correlations and fitting a mediation model, both direct and indirect paths were calculated as summary measures. Analyses were exploratory because of both a small number of studies and heterogeneous study characteristics (participants, interventions, comparisons, measures).

Results

Study Selection

The full results of the study selection process are outlined in the PRISMA flow diagram (Figure 1). After duplicates were removed, 4,506 papers were screened by two authors at the title and abstract level; 28 full texts were reviewed. Of those, eight studies were excluded as they were not RCTs (e.g., Strunk et al., 2013), 4 studies did not measure skills (e.g., Vittengl et al., 2014), 2 articles were reviews (e.g., Garland & Scott, 2002) and in one study, participants were not diagnosed with depression (Bruijniks et al., 2018). This left a total of 13 studies which met the criteria to be included in the qualitative synthesis.

Figure 1*PRISMA Flowchart*

Study Characteristics and Results

Characteristics of RCTs included in the systematic review and meta-analysis are presented in Table 1. The included studies tended to use one of three interventions: mindfulness based cognitive therapy (MBCT), cognitive therapy (CT) and CBT. Results are presented in Table 2 and described below.

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Table 1

Characteristics of Included Studies

Author, year	Country	Participants (n)			Age (M ± SD)	Baseline depression	Intervention		Comparison	Duration	Mediating Skill	Depression Instrument
		Tot.	Trt.	Ctrl.			Framework	Format				
Batink et al., 2013	Netherlands	130	64	66	43.9 (9.6)	> 7 or higher on the HDRS (M=7.75, SD=5.08)	MBCT + TAU	Group	TAU	8 weeks	KIMS	HRSD
Cladder-Micus, et al., 2018b	Netherlands	115	63	52	47.53 (11.67)	Depressive symptoms (BDI, M=13.12, SD= 7.43)	MBCT	Group	TAU	8 weeks	KIMS	HRSD
Cladder-Micus et al., 2018a	Netherlands	106	49	57	47.1 (10.25)	Current depressive episode (IDS-SR ≥ 21)	MBCT + TAU	Group	TAU	8 weeks	Five Facet Mindfulness Questionnaire	IDS-SR
Crits-Christoph et al., 2017	USA	237	119	118	36.2 years (SD not reported)	Moderate (>11 on QIDS)	CT	Individual	Supportive-expressive psycho-dynamic therapy	16 Sessions or 5 months	WOR, WOR-SR	HRSD
Forand et al., 2017	USA	89	59	30	33 years (SD for total N not reported)	Moderate–severe (PHQ9 M = 17.07, SD = 4.34; HRSD M = 21.12, SD = 5.19).	CBT	Online	Waitlist	8 weeks	CCTS-SR, BADSF-SR,	PHQ9, HRSD
Hoet et al., 2018	USA	39	22	17	38.10 (12.81)	Severe (BDI-II M = 34.71, SD = 9.15)	CBT	Individual	Self-system therapy	16 sessions	Open-ended Reports of Skill Use	BDI II
Neimeyer et al. 2008	USA	46	46	n/a	47 (SD not reported)	Severe (BDI M=22.3, SD=8.47)	CBT	Group	Mutual support therapy	10 sessions	Daily mood logs	BDI, HRSD, HSCL-58
Neimeyer & Feixas, 1990	USA	63	32	31	46.5 (11.6)	Moderate (BDI M = 24.03;	CBT	Group	No homework group	10 sessions	Thought Record Skills Assessment	BDI, HRSD

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Powers et al., 2008	USA	90	90	n/a	66.96 (5.77)	SD = 7.33; HRSD M = 17.27; SD = 5.89) Mild–moderate (> 17 BDI and > 14 HRSD)	CT	Individual	Behavioural and brief psycho-dynamic	16 sessions	Post-Therapy Evaluation	BDI, HRSD
Strunk et al. 2007	USA	35	35	n/a	42.0 (12.6)	MDD diagnosis (via SCID) and >20 on HRSD	CT	Individual	Paroxetine, augmented by lithium carbonate or desipramine hydrochloride	16 weeks	WOR, Performance of CT Strategies	HRSD
Segal et al., 2019	Canada	166	82	84	MBCT 40.85 (11.99); CT 40.41 (11.61)	Mild/remitted depression > 12 on HRSD-17	CT	Group	MBCT	8 sessions	Home practice records	HRSD
Terides et al., 2018	Australia	148	68	80	iCBT 46.31 (12.64); waitlist 43.24 (12.84)	> Mild (PHQ-9 ≥ 5)	CBT	Online	Waitlist	5 lessons	FATS	PHQ-9
Vittengl et al., 2020	USA	276	276	n/a	42.6 (12.2)	Remittent / dysthymic disorder; ≥ 14 on the HRSD	CT	Individual	Pill Placebo and Fluoxetine	20 sessions	SoCT	HRSD

Note. TAU = Treatment as Usual; CBT = Cognitive Behavioural Therapy; CT= Cognitive Therapy; MBCT = Mindfulness Based Cognitive Therapy; BDI = Beck Depression Inventory; CCTS-SR = Competencies of Cognitive Therapy Scale–Self-Report (CCTS-SR); FATS = Frequency of Actions and Thoughts Scale; HRSD = Hamilton Rating Scale for Depression; HSCL-58 = Hopkins Symptoms Checklist-58; IDS-SR = Inventory of Depressive Symptomatology-Self-Report; KIMS = Kentucky Mindfulness Inventory Scale; PHQ9 = Patient Health Questionnaire – 9; SoCT = Skills of Cognitive Therapy Scale; BADS-SR = Behavioural Activation for Depression Scale–Short Form (BADs-SF); WOR = Ways of Responding; WOR-SR = Ways of Responding Self Report

Table 2*Summary of Results*

Author, year	Effects of intervention on depression	Mediating effect of skills on depression
Batink et al., 2013	Depression reduced significantly more for the intervention and the control condition. Intervention pre-post HAMD change = -3.2 (4.7) vs. control = -.5 (4.3)	All four mediators (negative affect, mindfulness skills, worry, positive affect) were significant and they explained between 44 and 61% of the variance in reduced depressive symptoms.
Cladder-Micus et al., 2018b, Netherlands	Depression reduced significantly more for the intervention. Patients in the MBCT group reported lower depressive symptoms (HAMD) (group difference: -2.88, 95% CI [-4.76, -1.01], $F(1,107) = 9.26, p = .003$, Cohen's $d = .57$) when compared to baseline. MBCT group reported a significant decrease in depressive symptoms (baseline HAMD M = 7.73, post HAMD M = 5.95, $t(62) = 2.60, p = .012$),	Patients in the MBCT group showed more mindfulness skills (group difference: +13.96, 95% CI [9.331, 18.60], $F(1, 105) = 35.702, p < .001$, Cohen's $d = .87$) compared with the TAU group at the end of treatment and when compared to baseline. Mediation analysis was conducted: the reduction of cognitive reactivity appeared to mediate the association between MBCT/TAU and decrease depressive symptoms.
Cladder-Micus et al., 2018a, Netherlands	Depression reduced significantly more for the intervention group when compared to the control group. The MBCT + TAU condition showed lower levels of depressive symptoms than TAU, with small to medium effect sizes.	MBCT + TAU condition had significant effects on mindfulness skills. Formal mediation analysis was not conducted. MBCT + TAU participants reported lower rumination and increased quality of life, mindfulness skills, and self-compassion compared to participants receiving TAU only.
Crits-Christoph et al., 2017, USA	Depression scores improved significantly over time for both treatment groups. For the CT group, the depression mean total scores were 21.08 (baseline) and 16.06 (estimated endpoint), and for the SE group, 21.05 (baseline) and 16.89 (estimated endpoint).	Initially, CT group's positive compensatory skills improved. Skills were significantly associated with improvement in depressive symptoms, but in the supportive-expressive psychodynamic therapy group, this effect was not significant. Average change in the WOR positive from baseline to month 2 was small ($d = -.08$). Change in the WOR positive was important for driving subsequent change in depressive symptoms. However, many patients in CT group did not report change in positive compensatory skills, at least during the first 2 months of treatment. Increases in positive compensatory skills were associated with subsequent change in depressive symptoms in cognitive ($r_p = -.36, p = .003$), but not in dynamic therapy ($r_p = .11, p = .386$).

Author, year	Effects of intervention on depression	Mediating effect of skills on depression
Forand et al., 2017, USA	Intervention had a big effect on depression. In a linear mixed model using the HRSD, there was a significant effect of time, $b = -3.65$, $t = -3.29(74.4)$, $p < .01$, and Time $\times$ Treatment, with iCBT being superior to waitlist, $b = -9.40(75.2)$, $t = -6.96$, $p < .001$, Hedges' $g = 1.56$. The iCBT treatment also had lower depression scores at posttreatment, $b = -9.84(77)$, $t = -6.96$, $p < .001$, Hedges' $g = 1.56$.	Effects of iCBT on depression were mediated by changes in cognitive skills, not changes in behavioural activation. There was still a strong residual effect meaning much of the variance is unexplained by either.
Hoet et al., 2018, USA	Positive Affect Aggregate was 0.120 (SE 0.043) and Negative Affect Aggregate was -0.086 (SE= 0.035).	On days when participants reported greater use of therapy skills, they reported improvement in depression scores. Formal mediation analysis was not conducted. Results imply that participants in the CBT condition reported using more cognitive skills, whereas participants in the SST condition reported using more self-regulation skills.
Neimeyer et al. 2008, USA	Depressive symptoms were significantly reduced at posttreatment. Pre-treatment Measure of BDI: $M = 22.30(8.35)$ and HRSD: $M = 17.57(4.36)$ and HSCL-59: $M = 123.02(24.46)$ to Posttreatment - BDI: $M = 11.23(9.82)$, HRSD: $M = 7.14(5.36)$, HSCL-58: $M = 98.17(24.52)$	The combined homework process score (willingness, homework compliance ratings, and cognitive skill acquisition) predicted change in BDI scores ($b = .37$, $p < .05$) and HSCL-58 score ($b = .39$, $p < .05$) with the use of patient reported homework compliance. The amount of variance was ($R^2 = .40$). Mediation analysis was not conducted.
Neimeyer & Feixas, 1990. USA	Intervention influenced depression. There was a substantial reduction in BDI scores across time ($F(1, 45) = 34.43$, $p < .0001$).	Thought Record skills doubled the variance explained by the pre-therapy BDI alone. Although overall differences between homework and no-homework conditions were not robust, participation in groups in which homework was completed, did contribute to the prediction of improvement in depressive symptoms. Formal mediation analysis was not conducted.
Powers et al., 2008, USA	The number of skills clients used was positively correlated with depressive symptoms up to 6 months posttreatment as measured by the BDI and up to 3 months posttreatment as measured by the HRSD.	Use of skills was negatively correlated with depression (HAMD) at 6 months ($-.33$) but once controlling for hopelessness, pattern reverse. For people who feel equally hopeless, those who were more depressed used more skills. Authors hypothesised this was in response to increases in symptoms, rather than skill use causing depression. Formal mediation analysis was not conducted.
Segal et al., 2019, Canada	Relapse rates were 18/74, 24% in CT and 15/75, 20% in MBCT. Results imply that posttreatment growth in regulatory capacity is prophylactic against depression relapse/recurrence.	Greater practice of skills learned in therapy predicted a reduced risk of relapse. Posttreatment growth was linked to the frequency with which therapy skills are practiced after treatment. Formal mediation analysis was not conducted.

Author, year	Effects of intervention on depression	Mediating effect of skills on depression
Strunk et al. 2007, USA	Patients' acquisition of coping skills learned in cognitive therapy and patients' independent use of the material learned in CT predict risk for relapse following successful treatment.	Formal mediation analysis was not conducted. Both competence in and demonstrated performance of material learned in cognitive therapy were found to be independent significant predictors of the sustained positive effects of cognitive therapy.
Terides et al., 2018, Australia	Depressive symptoms reduced at posttreatment when compared to controls. Between-group effect sizes for symptoms of depression at posttreatment were small (.38, CI [.04, .71]).	Mediation analysis was conducted. PHQ-9 total via Frequency of Actions and Thoughts Scale: Total effect was 2.47, SE of indirect effect was .42 (95% CI [.57, - 2.23]). This means that the treatment group's PHQ-9 score is on average 2.47 lower than the control group. Between-group effect sizes for the overall Frequency of Actions and Thoughts Scale and statistically significant subscales were small to moderate.
Vittengl et al., 2020, USA	Pre-treatment HRSD was $M=20.45$ ($SD=4.09$). Posttreatment HRSD was $M=9.77$ ($SD=6.22$). Among patients who completed and responded to cognitive therapy, relapse within 32 months was 32.2%.	If the client learned cognitive skills, they responded to therapy regardless of the number of stressful life events. If the client failed to learn skills from therapy, then they struggled to cope with stressful life events: if they experienced stressors, they were very likely to remain depressed.

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Risk of Bias Within Studies

The Cochrane Risk of Bias for Randomized Controlled Trials was used to assess the risk of bias in the RCTs; results are presented in Table 3. Bias in each study is assessed as low, high or unclear risk across the domains of bias. Most of the studies were rated as high or unclear risk. For example, participants were blinded in only 40% of the studies and only three reported concealing their allocation process.

Skills Acquired in MBCT

Batink and colleagues (2013) examined the role of mindfulness skills, rumination, worry and affect, and the interaction between these factors in MBCT for residual depressive symptoms. These four mediators together explained between 44 and 61% of the variance in reduced depressive symptoms, but the amount due to mindfulness skills was unclear. Similarly, Cladder-Micus and colleagues (2018) found MCBT significantly increased mindfulness skills and reduced depressive symptoms, compared with treatment as usual. Mediation analysis found cognitive reactivity (i.e., the degree to which people can control dysfunctional thoughts in response to negative affect) to be a mediator. The authors proposed mindfulness skills as another working mechanism of MBCT, which may have interacted with other working mechanisms. Another study by Cladder-Micus and colleagues (2018) found MBCT led to increased mindfulness skills, higher chance of remission, lower depression, and higher levels of self-compassion. Based on the findings mentioned above, learning mindfulness skills in MBCT seem to either mediate levels of depression (Batink et al., 2013), or interact with other mediators of positive therapeutic outcomes.

Table 3

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Regulatory Skills

Regulatory skills practice improved treatment outcomes in two studies (Hoet et al., 2018, Segal et al., 2019). When clients practiced skills after treatment finished, they were more likely to demonstrate post-treatment growth (Segal et al., 2019). Hoet and colleagues (2018) measured skill use on a day-to-day basis. On days when participants reported greater use of skills, they also reported higher positive affect, lower negative affect, better cognitive functioning, and engaging in more satisfying activities. Both of these studies found that therapy led to acquiring more cognitive and mindfulness skills resulting in a reduction of depressive symptoms.

Skills acquired in CT

Crits-Christoph and colleagues (2017) found that gains in positive compensatory skills—generating alternative explanations for negative thoughts and problem solving—led to reduced symptomatology. This was not true for negative compensatory skills (e.g., leaving or ignoring the situation, focusing blame on the self, acting out). Similarly, cognitive therapy coping skills and use of CT strategies independently reduced the risk of relapse posttreatment (Strunk et al., 2007). Results suggested that CT’s prophylactic effects seem to be linked to specific therapy skills: behavioural activation, automatic thought challenging, and core belief challenging. Furthermore, Powers and colleagues (2008) found that using cognitive skills after treatment led to decreased depressive symptoms. Lastly, stressful life events predicted non-response to therapy only in patients who reported weaker skills, but not for those with stronger CT skills (Vittengl et al., 2020). Strong cognitive therapy skills may have “neutralised” the risk of stressful life events on depression (Vittengl et al., 2020). In summary, one study found a mediating effect of skills on depressive symptoms (Crits-Christoph et al., 2017), and other four studies suggest that acquisition of cognitive skills was associated with reduction of depressive symptoms.

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Skills acquired in CBT

Out of thirteen studies included in this review, five studies investigated acquisition of cognitive skills in CBT for depression. Forand and colleagues' (2018) meditation analysis implied that early improvement in cognitive skills mediated change in subsequent depression scores. Participants improved their cognitive skills in the first three weeks of therapy reported a long-term decrease in depressive symptoms. Change in behavioural activation did not mediate change in depressive symptomatology. iCBT emphasises cognitive strategies early in treatment, and authors hypothesise behavioural activation was not as useful if clients did not have the prerequisite cognitive skills (Forand et al., 2018).

Terides and colleagues (2018) found that an increased use of cognitive skills mediated symptom reduction in iCBT for depression and anxiety. Posttreatment scores on the total Frequency of Actions and Thoughts Scale—along with its cognitive restructuring, rewarding behaviours and activity scheduling subscales—each significantly mediated the treatment effect on depression and anxiety outcomes (Terides et al., 2018).

Cognitive skill acquisition predicted self-rated maintenance of treatment gains in the 6-month-follow up (Neimeyer & Feixas, 1990). Cognitive restructuring skill acquisition predicted group CBT depression outcomes (Neimeyer et al., 2008). Homework improved short-term skill acquisition which did lead to reduced symptomatology (Neimeyer et al., 2008).

Quantitative Synthesis of Results

Ten studies reported data that could be used in a quantitative synthesis, with a combined sample of 1,020 participants. Therapy significantly increased the use of skills ($\beta_{\text{therapy-skills}} = .22$, 95% CI [.10; .34]). Both the direct and indirect effects of skills on depression were in the expected direction but barely included zero (see Figure 2): the use of skills predicted lower

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depression ($\beta_{skills-depression} = -.19$, 95% CI $[-.39; .00]$) and therapy decreases depression via change in skills ($\beta_{therapy-skills-depression} = -.04$, 95% CI $[-.10; .00]$). Controlling for this indirect effect, the residual effect of therapy on depression was not significant ($\beta_{therapy-depression} = -.15$, 95% CI $[-.33; .04]$). These findings should be interpreted with caution due to the heterogeneity in study characteristics, and the small number of studies may mean analyses are underpowered. Nevertheless, they support the notion that skills explain a proportion of the effects of therapy on depression.

Figure 2

Two-Stage Structural Equation Model Testing Exploratory Meta-Analytic Mediation

Discussion

The current review found that skill acquisition in cognitive therapies is a potential mechanism through which therapy alleviates depression. While few studies were low risk of bias, they did find consistent effects in favour of mediation. Mediation analyses were conducted in five studies, four of which investigated skills as a mediator. All four studies suggested that skills learned in cognitive therapies had a mediating effect on depression. Learning mindfulness

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skills in MBCT was found to mediate levels of depression (Batink et al, 2013) and to be associated with a decrease in depressive symptoms (Cladder-Micus et al., 2018a, Cladder-Micus et al., 2018b). Also, cognitive skills were found to either have a mediating effect on depressive symptomatology (Crits-Christoph et al, 2017, Forand et al., 2017, Terides et al., 2018), or were associated with reduced depressive symptoms (Hoet et al., 2017, Strunk et al., 2007, Powers et al., 2008). Furthermore, skill development was found to be predictive of positive therapeutic outcomes in patients with recurrent depression (Segal et al., 2019; Vittengl et al., 2020). Lastly, homework assignments completed between CBT sessions improved skill acquisition leading to a reduction of symptom severity (Neimeyer & Feixas, 1990, Neimeyer et al., 2008). To summarise, cognitive and mindfulness skills learned in therapy were consistently found to be a useful mechanism of change in treatment for depression.

This finding is largely consistent with previous systematic reviews on therapeutic learning in depression. Bruijniks and colleagues (2019a) suggested that a client's learning capacity could moderate treatment effects, where those who have cognitive impairments appear to respond more slowly to therapy. Our review shows why that might be the case: a large component for why therapy works is that it helps clients learn new ways of responding. We verified the causal role skills play in treatment effectiveness by assessing their roles as mediators. We also synthesized results from a range of interventions, including CBT, CT, MBCT, so it may be that cognitive change comes from using skills learned in these therapies. In concert, these two reviews show that learning is critical in therapy.

As a result, more attention should be directed toward pedagogy in therapy, and implementing memory support strategies (Zieve et al., 2019). Previous research found that therapeutic alliance mediated therapy outcomes in depression (Flückiger et al., 2018; Lemmens

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et al., 2016). Also, cognitive processes, such as automatic thoughts, rumination, and dysfunctional attitudes (Johansson & Høglend, 2007; Lemmens et al., 2016), have been found to have a mediating effect on therapy outcomes. So, it is plausible that skill acquisition is ‘up-stream’ of these cognitive processes, and that the implementation of those skills may lead to lower depression. These findings may explain why online interventions—where there is no therapeutic alliance—still demonstrate comparable effects with face-to-face interventions (Davies et al., 2014). All these therapeutic approaches (online and face-to-face CBT, CT and MBCT) help to build skills, which then may reduce depressive symptoms.

If learning is a strong mediator, then the question of *how* we teach clients new skills in therapy becomes crucial for their recovery from depression. When patients were asked to think about skills learned between sessions, less than half of thoughts were accurate accounts of the material presented in sessions (Gumport et al., 2015). In addition, poor memory for treatment content was found to be associated with poorer treatment outcomes (Dong et al., 2017). To facilitate learning in therapy, Zieve and colleagues (2019) identified several memory support strategies drawn from educational literature. The simplest of these are repetition strategies, such as reminding clients of what was discussed (e.g., “as we mentioned earlier”), reminding clients between sessions (e.g., text messages), praising recall (e.g., “yes, good memory!”) or asking clients to restate what was learned (e.g., “what were the key things you took from today?”). More advanced, constructive learning strategies involved categorizing ideas (e.g., “what other ways can we distance ourselves from our thoughts?”) or questions to promote transfer (e.g., “when is another time you might use this breathing strategy?”). When therapists helped patients construct new ideas and connections in response to these strategies, those patients reported greater recall of treatment content, including insights and skills from therapy. Importantly, in a mediation

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analysis, constructive learning behaviour was found to be mechanisms through which intervention results in enhanced memory (Zieve et al., 2019). This means encouraging patients to express ideas, inferences, and connections about treatment points may be memory support strategies that improve therapeutic outcomes.

These findings also point to therapeutic benefits that may emerge from multidisciplinary applications of robust findings from educational psychology. For example, psychologists may consider using interventions shown to be effective from systematic reviews of adult learning (e.g., Schneider & Preckel, 2017). Drawing from the effect sizes in that meta-review, clinicians could, for example:

- provide clearer goals for what they hope clients learn (large effect; $d = 0.75$)
- ask open ended questions of the client about what they are learning (as discussed earlier; large effect; $d = 0.73$)
- provide visuals that complement the new skills being learned by clients (moderate effect; $d = .38$, 95% CI [0.24, 0.53])
- encourage clients to construct concept maps about what they are learning in therapy (moderate effect; $d = 0.36$, 95% CI [0.28, 0.44])
- negotiate or provide an agenda at the start of each therapy session (small effect; $d = 0.26$, 95% CI [0.08, 0.44])
- avoid or remove distracting or tangential discussions in therapy (moderate effect; $d = 0.30$, 95% CI [0.37, 0.22])

Some of these may also be familiar to clinicians (e.g., negotiating an agenda) but others may seem unorthodox (e.g., learning goals, concept maps, visualisations). Taken to an extreme, these pedagogical strategies could harmfully disrupt the collaborative therapeutic context, where

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the therapist assumes a directive ‘teacher role’. This is not an extreme we would advocate. Nevertheless, these ideas from educational psychology may point to innovations that could complement a collaborative process where client and therapist work together to learn new ways to overcome important problems. Based on our results, implementing pedagogical strategies like the ones here may improve the outcomes clients get from therapy.

In a similar vein, the educational philosophy of ‘feedback on the basis of assessment’ could also help clinicians focus their therapy more effectively and leverage patient strengths. For example, therapists may benefit from measuring patient skills at different timepoints in therapy. Doing so would allow the therapist to identify areas of strength and weakness. Clients do better when they frequently use skills they already possess, and clinicians can be more efficient if focusing on critical skills that clients currently lack (Hundt et al., 2013).

Limitations of the Included Studies and of This Review

Included studies generally demonstrated high risks of bias (Higgins et al., 2011), so there remain doubts about causal treatment effects. Only five studies reported conducting a formal mediation analysis, so it remains unclear if reported associations are actually explaining significant variance. Lastly, reported mediators might have been correlated but not simultaneously entered into mediation models. Hence, future research may need to focus on disentangling the unique influence of skills and the interaction with other mediators.

Furthermore, although an effort has been made in the inclusion criteria to reduce heterogeneity, few studies reported the same combination of participants, interventions, mediators, and outcomes. Only 13 of over 200 randomised trials on therapy for depression (see Barth et al., 2013) assessed skills as a mediator. Meta-analytic estimates were exploratory because of the small number of studies and heterogenous study characteristics. Although patterns

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were relatively consistent across studies, replication of these studies would clarify how robust the findings really are. Heterogeneity of the available studies may be problematic. While depression outcomes were sufficiently comparable, studies used many measures of skills and many types of intervention. Heterogeneous skills measure risk grouping so called 'apples and oranges.' All the interventions assess in the included studies were similar, but with more studies assessing skills using similar measures (e.g., the 'Ways of Responding' questionnaire; Crits-Christoph et al., 2017; Strunk et al., 2007) would allow future reviewers to moderate these analyses for the skills measure.

Conclusion

The current review found that acquisition of skills in psychotherapy is a potential mechanism through which intervention works. Skills learned in psychotherapy were found to have a mediating effect on depression and were associated with positive therapeutic outcomes. Stronger skills were also associated with, and predictive of a reduction of depressive symptomatology. Results highlight the importance of skill-acquisition in effective treatment for depression.

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Data Availability Statement

The data and analysis code that support the findings of this study are openly available on the Open Science Framework at <https://osf.io/9j6ax/>

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