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Examining processes of change for acceptance and commitment therapy and cognitive behavioral therapy self-help books with depressed college students

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Abstract

Given the prevalence of depression, it is worthwhile to consider a variety of treatment approaches to reach as many sufferers as possible, including highly accessible formats such as self-help books. Books based in acceptance and commitment therapy (ACT) and cognitive behavioral therapy (CBT) propose to treat depression through distinct processes of change, though the degree to which these treatments are distinguishable in this format is unclear. Furthermore, it is possible that some individuals may respond better to therapeutic processes from one approach over the other based on personal preferences. We tested the effects of ACT and CBT self-help books on processes of change in a sample of 139 depressed college students in which some participants were given a choice of treatment and others were randomized. Cognitive fusion, which improved better in the ACT group, was the only process of change that distinguished the two treatments. Additionally, early improvements in cognitive fusion were associated with less depression-related stigma at posttreatment. Lastly, randomization, instead of choosing a treatment, led to greater improvements in almost all processes of change. We discuss how these findings inform personalized care, tangible differences between ACT and CBT, and effective practices for treating depression at large scale.

Keywords: *cognitive behavioral therapy, acceptance and commitment therapy, processes of change, self-help books, client preferences*

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Introduction

Around 5% of all adults are estimated to meet criteria for depression (World Health Organization, 2023), with even higher rates among college students, of whom nearly a quarter endorse having received a diagnosis over their lifetime (American College Health Association, 2019). In addition to the emotional and behavioral effects of depression, judging oneself for experiencing depression, or self-stigma, can compound suffering (Barney et al., 2010). Given this multifaceted impact of depression, providing as many effective and easily accessible treatment options as possible is essential, including self-help resources. Clients and clinicians alike may become overwhelmed, however, by the number of treatments currently available, especially in the realm of self-help. While these resources are typically more accessible than in-person interventions and can lead to improvements in both psychological symptoms (Karyotaki et al., 2015) and stigma (Mills et al., 2020), it can be difficult to discern the best self-help option to fit a particular person and situation.

Importantly, different interventions are theorized to treat depression through different processes of change. Two of the most common approaches are cognitive behavioral therapy (CBT) and acceptance and commitment therapy (ACT). Generally, CBT (Beck, 1979) claims to work by identifying thought patterns that maintain depression and then challenging them, reframing them, replacing them with more positive thoughts, or otherwise altering these cognitions to reduce their emotional burden. Using these strategies, the successful recipient of CBT should be able to reduce the frequency and severity of depressive thoughts and thus reduce

emotional barriers to behaviors impeded by depression. The CBT approach to depression has a strong evidence base, including when adapted to self-help formats (Webb et al., 2017).

ACT approaches depression through a theoretically distinct mechanism than CBT in which the way a client relates to a depressive thought or emotion is more influential than the specific content of that internal experience (Hayes et al., 2011). From an ACT perspective, relating to depression in a manner that leads it to exert a high degree of influence over day-to-day behaviors (i.e., psychological inflexibility) will lead to more suffering. This includes responding to depressive thoughts as if they were literally true, which is defined as cognitive fusion. ACT treats depression through learning to respond more flexibility to depressive thoughts and feelings while engaging in meaningful life activities (i.e., values-based behavior change) even when they are present, which in combination are defined as psychological flexibility.

While self-help is a viable way to influence processes of change related to both CBT and ACT (Domhardt et al., 2021), a largely unanswered question is whether ACT and CBT self-help interventions produce distinct effects on therapeutic processes for depression in line with their theoretical models. In an effort to help as many sufferers as possible, one might consider how an individual could respond better or "match" with one treatment approach (and its associated processes) over another. For example, some people may be more readily able to implement cognitive restructuring as an effective coping skill whereas others may prefer to use mindfulness to manage aspects of their depression. Calls for using a process-based therapy approach emphasizes the matching of specific change processes to individuals and their unique context (Hofmann & Hayes, 2019).

If the fit between individuals and specific therapeutic approaches for depression is important, it follows that clients should have greater choice over the treatments they receive.

This is particularly relevant to self-help, given the great variety of treatments available to clients. Choice as a factor in treatment is generally understudied, with limited evidence from in-person trials indicating that providing a choice leads to lower dropout and better outcomes (Swift et al., 2018), while other research shows mixed findings, including choice leading to lower treatment engagement in some cases (Szuhany et al., 2022). There is a lack of research on providing choices for self-help depression treatments, which is significant given the extremely high burden of depression and the mass availability of resources. Clients, as well as institutions such as universities and clinics that provide self-help options to clients, would benefit from knowing whether it is more beneficial to offer a variety of treatment options versus simply assigning one.

To begin to address these questions, we analyzed data from a randomized controlled trial of CBT and ACT self-help books for depression with a college student sample in which a subset of participants was randomized to one of the two interventions, while another subset was able to choose between them. The original trial (Davis et al., 2023) showed evidence of a slight advantage for ACT in reducing depression severity over a ten-week treatment period. Additionally, students who were randomized to either book were, unexpectedly, more adherent to the intervention than those who chose a book themselves (Davis et al., 2023). These preliminary findings call into question the function of client choice on engagement with treatment and leave unanswered questions as to the effect of choice on other factors such as therapeutic processes. Specifically, if someone chooses a treatment approach that fits them personally, they may be more responsive to the mechanisms of that treatment compared to an approach they did not select. Clarifying the relationship between client choice and treatment processes would answer important questions concerning individualized care, the practical

differences between common approaches such as CBT and ACT, and best practices for implementing self-help for depression within systems of care.

Therefore, in this study, we assessed the processes of cognitive reappraisal and frequency of depressive thoughts (relevant to CBT) as well as psychological flexibility, cognitive fusion, and values-based behavior change (relevant to ACT). We predicted that greater improvements would be seen on process measures that were theoretically associated more with the intervention being used, whether it was randomly assigned or chosen by the individual. We also predicted that participants choosing either of the two books would improve more on their associated processes of change than those who were randomly assigned to the book. Finally, we predicted that regardless of which intervention was used or how it was assigned, individuals who improved more on change processes early in treatment would have better clinical outcomes at the end of treatment. Therefore, we tested the effects of intervention and client choice on change processes generally, in addition to testing whether improvements in treatment mechanisms led to ultimately better outcomes for individuals using self-help for depression.

Methods

Participants

Analyses were conducted using data collected from a randomized trial of ACT and CBT self-help books for depression (Davis et al., 2023). The sample consisted of 142 university students meeting the following criteria: 1) 18 years of age or older; 2) current enrollment at the authors' institution in the Mountain West region of the USA; 3) no prior participation in a self-help trial with authors; 4) interest in trying a self-help book; and 5) score of 10 or above (moderate depression) on the Depression, Anxiety, and Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995). There were no additional exclusion criteria beyond meeting these

requirements. Participants were recruited through various sources including an online research study pool, online advertisements through the university, community flyers, class announcements, and the college counseling center. Recruitment occurred between January 2019 and February 2020 and participants received research participation credits for completing study assessments. The final sample comprised 139 participants after three were removed for self-reported random responding to survey questions.

Procedures

The original clinical trial was preregistered through ClinicalTrials.gov (*identifier masked for blind review*) and all procedures were approved by the university Institutional Review Board (#9766). Both study assessments and self-help books were accessed online. Measures were administered to participants through Qualtrics, a secure assessment platform. All interested participants completed informed consent and eligibility questionnaire, followed immediately by a baseline assessment. After completing baseline, participants were randomized automatically in Qualtrics to either the ACT book, CBT book, or their choice of the two. Randomization was implemented in blocks of nine with a 3:3:3 allocation ratio to each of the three possible conditions. Allocation was concealed to the researcher and based on computerized random number generation. Participants themselves were not masked to experimental condition because they were aware of what book they were assigned or whether they had a choice of book.

Participants who were randomized to the choice condition were asked to select either the ACT or CBT after being presented with a brief description of each. For the purposes of analysis, participants were considered to be part of one of four experimental groups: ACT-Randomized, ACT-Choice, CBT-Randomized, and CBT-Choice. Self-help books were accessed online through the university library. All participants received a 10-week reading schedule to spread out

reading by 1-2 chapters per week. While students could engage in face-to-face psychotherapy during the study, they were asked to not use other self-help books or programs. Twice weekly email reminders were used to encourage adherence to the reading schedule for both books.

Following baseline, three additional online assessments were sent to all study participants according to the following schedule: midtreatment (5 weeks), posttreatment (10 weeks), and final follow-up (5 months, or 22 weeks). Email reminders and phone calls were used to promote adherence to assessments.

Interventions

The ACT book given to participants was *The Mindfulness and Acceptance Workbook for Depression: Using Acceptance and Commitment Therapy to Move Through Depression and Create a Life Worth Living* (Strosahl & Robinson, 2008). The CBT book was *The Cognitive Behavioral Workbook for Depression: A Step-by-Step Guide to Overcoming Depression* (Knaus, 2006). While the two books presented distinct interventions for depression, they were chosen for their similarity on other factors. The two books were released by the same publisher and thus used a similar style in teaching either ACT or CBT principles and exercises. Furthermore, both books were around 325 pages so that the number of pages suggested each week was nearly equal.

Measures

ACT processes. Psychological flexibility, cognitive fusion, and values-based behavior change were assessed as three ACT processes of change relevant to depression. The **Acceptance and Action Questionnaire-II** (AAQ-II; Bond et al., 2011) measured overall psychological inflexibility. The AAQ-II has evidence of reliability and validity (Bond et al., 2011) and internal consistency was good in this sample ($\alpha = .87$). The **Cognitive Fusion Questionnaire** (CFQ;

Gillanders et al., 2014) assessed cognitive fusion. The CFQ has demonstrated strong reliability and validity among college students (Gillanders et al., 2014). Internal consistency in our sample was excellent ($\alpha = .93$). The **Behavioral Activation for Depression Scale** (BADS; Kanter et al., 2007) assessed the degree to which participants pursued values-based behavioral goals. The BADS additionally measures whether one responds to emotional barriers to behavioral goals in a psychologically flexible manner. Internal consistency was good in our sample ($\alpha = .89$).

CBT processes. Frequency of automatic depressive thoughts and cognitive reappraisal were assessed as two CBT processes of change. The **Automatic Thoughts Questionnaire** (ATQ; Hollon & Kendall, 1980) assessed how often negative automatic thoughts occurred (e.g., "what's wrong with me?"), with higher scores indicating more frequent automatic thoughts. The ATQ has shown good reliability and validity (Hollon & Kendall, 1980), and has also been shown to predict depressive symptoms in college students (Buschmann et al., 2018). Internal consistency was excellent in our sample ($\alpha = .97$). The **Thought Control Questionnaire Subscale** (TCQ; Wells & Davies, 1994) assessed cognitive reappraisal, or the process of changing subjective evaluations of negative emotions, which has been identified as an important component of cognitive therapy for depression (Dryman et al., 2018). The TCQ has shown good reliability and validity in depressed samples (Reynolds & Wells, 1999), although internal consistency was marginal in this sample ($\alpha = .67$).

Depression outcomes. Symptom severity of depression and anxiety was assessed using the **DASS-21** depression and anxiety subscales (Lovibond & Lovibond, 1995). The DASS-21 has been shown to be reliable and valid among college students (Zanon et al., 2020), and internal consistency was good to excellent in this sample (Cronbach's $\alpha = .93$ for depression and .83 for anxiety). The **Self-Stigma of Depression Scale** (SSDS; Barney et al., 2010) measures several

components of depression-related stigma: shame, self-blame, social inadequacy, and help-seeking inhibition. The SSDS has shown good reliability and validity (Barney et al., 2010). We made an error, consistent across all timepoints, in transcribing the SSDS to an online format using a seven-point scale ranging from 1 ("Strongly agree") to 7 ("Strongly disagree"), instead of the published 1 to 5 scale (Barney et al., 2010). Therefore, total SSDS scores range from 16 to 112 as opposed to 16 to 80, with higher scores indicating higher levels of stigma. Internal consistency was excellent in this sample ($\alpha = .93$).

Analytic Plan

A priori power analysis was conducted in G*Power to select an appropriate sample size. It was determined that a sample of 150 participants would allow for adequate statistical power (0.80) to detect small effect size differences (d=0.20) consistent with previous studies of online bibliotherapy (e.g., Krafft et al., 2020; Levin et al., 2020). While 142 participants were ultimately recruited, due to significant attrition only 65 completed the posttreatment assessment. Therefore, the final sample was underpowered in detecting treatment effects.

First, descriptive statistics of process of change variables were calculated for each timepoint. The effect of book and assignment method (i.e. random book versus choice of book) on psychological process variables was tested with a series of mixed-effects models. Using the full intent-to-treat sample at all four time points, each model comprised a random intercept at the participant level in addition to random slopes. Main effects for time, book, and assignment method were examined in addition to two-way interactions for time by book, time by assignment method, and book by assignment method. Lastly, we ran a three-way interaction of time, book, and assignment method to test whether a participant chose or randomly received a book moderated the association between time and book in predicting process variables. Each model

was created using the lmer function in R (Kuznetsova et al., 2017) using standardized regression coefficients for ease of interpretation and to estimate effect sizes.

We also examined how changes in process variables affected clinical outcomes over time. A series of mixed effects models tested whether changes in process variables from baseline to midtreatment predicted posttreatment outcomes in depression, anxiety, and depression-related stigma while controlling for baseline outcome scores.

Finally, to test whether any potential relationships between therapeutic processes and outcomes were associated more strongly with either the ACT or CBT book, an additional series of mixed-effects models were created. In these models, a three-way interaction of time, book, and the relevant process measure was tested as a possible predictor of clinical outcomes. Thus, the models tested whether any associations between process and outcome variables over time were theoretically consistent (i.e., whether improvements in CBT process were associated with positive clinical outcomes for those using the CBT book compared to those using the ACT book, and vice versa, regardless of how the participant was assigned to the book).

For all parameter estimates in mixed-effects models, the maximum likelihood method was used, which can accurately estimate models even when rates of missing data are high (Newman, 2003). Maximum likelihood provides an intent to treat analysis even when some observations are missing, as in our case where we suffered from notable attrition at posttreatment. To handle missing data, distributional assumptions are imposed on incomplete cases until a set of parameters is found which maximized the likelihood function (Grund et al., 2019).

Results

Preliminary Results

Full participant demographic information is presented in the primary outcome paper (Davis et al., 2023). Importantly, of the 139 students included in analysis, a majority were female (78.4%), white (92.8%), and non-Hispanic (91.4%). Furthermore, a majority of our sample were not currently engaged in psychotherapy (82.7%) nor prescribed psychiatric medication (61.2%). Regarding depression severity at baseline, 34.5% of our sample endorsed symptoms as moderately severe or higher at time of enrollment. Of note, the study experienced generally low adherence to assessments, with 51.8% of participants completing midtreatment, 44.6% completing posttreatment, and 49.6% completing follow-up, though there were no significant differences in study retention based on study condition (Davis et al., 2023).

Treatment Effects on Processes of Change

Figure 1 displays changes in each therapeutic process variable across the four timepoints, divided into separate graphs by study condition. A significant time effect was found for psychological flexibility, cognitive fusion, values-based behavior change, and automatic thinking, with all variables moving in the expected direction between 0.39 and 0.46 SDs per timepoint (all ps < .001; see Table 1). Cognitive reappraisal, however, did not change significantly over time (p > .05).

The two-way interaction of time by book was significant for cognitive fusion only. Participants using the ACT book reduced cognitive fusion by 0.17 standard deviations more than those reading the CBT book (p = .04). Post hoc tests revealed large effects on cognitive fusion during treatment for both ACT (d = -.95, 95% CI [-1.38, -.53]) and CBT (d = -.97, 95% CI [-1.45, -.48]). Between posttreatment and follow-up, however, effects were negligible for ACT (d = -.10, 95% CI [-.59, .39]), while for CBT a small effect indicated increased cognitive fusion (d

= .21, 95% CI [-.31, .72]). Between-group effects were negligible at both timepoints (ds = .01-

.07). No other process variable showed a significant time by book interaction (ps > .05).

The two-way interaction of time by assignment method was significant for all process

variables except cognitive reappraisal. Specifically, participants who were randomized to their

book had greater reductions in psychological inflexibility, cognitive fusion, frequency of

automatic thoughts, and greater increases in values-based behavior change, compared to

participants who chose a book (ps = .007-.46). Therefore, being randomly assigned to a book,

rather than choosing a book, was associated with more positive changes in all but one

psychological process variables, contrary to our prediction.

The three-way interaction of time, book, and assignment method was a significant

predictor for both psychological flexibility and values-based behavior change. For both

processes, randomization led to greater improvements over time for students reading the ACT

book, whereas among those reading the CBT book, having a choice of book produced greater

improvements (p = .051 for psychological flexibility and .046 for values-based behavior change).

Our results suggested, then, that these two ACT-related processes functioned the best if someone

randomly received an ACT book, or, alternatively, if they intentionally chose a CBT book.

Processes of Change Predicting Outcomes

A series of mixed effects models, combining participants in all intervention and

assignment method conditions, assessed whether changes in process variables from baseline to

midtreatment predicted posttreatment outcomes in depression, anxiety, and depression-related

stigma while controlling for baseline outcome scores (see Table 2). That is to say, we examined

whether movement in therapeutic processes early in treatment was associated with better clinical

outcomes at the end of treatment.

Changes in automatic thinking from baseline to midtreatment significantly predicted all three outcomes at posttreatment, with one standard deviation in change score associated with 0.37, 0.33, and 0.35 standard deviation reductions in depression, anxiety, and depression-related stigma, respectively (all ps < .05). However, the possibility should be considered that automatic depressive thinking as measured by the ATQ may have been conflated with depression symptom severity, given that there was a strong correlation between baseline ATQ and DASS-21 depression scores (r = .79). This suggests that the ATQ, by assessing frequency of various negative thought patterns, may have been measuring depression itself as opposed to a distinct therapeutic process in our sample.

Changes in both cognitive fusion and values-based behavior change were significantly associated with depression-related stigma at posttreatment. One standard deviation change in CFQ and BADS scores, both in the expected directions, were associated with 0.25 and 0.33 standard deviation reductions, respectively, in depression-related stigma (all ps < .05). This indicates that improvements in these two ACT-related processes led to reductions in experiences of depression-related stigma. However, changes in AAQ-II or TCQ-R scores were not predictive of any outcome at posttreatment (all ps > .05).

Finally, we tested whether any of these relationships between therapeutic processes and outcomes were associated more strongly with either the ACT or CBT book, to determine whether books functioned according to their theorized processes of change. In a final series of mixed effect models, the three-way interaction of time, book, and each process measure was tested as a possible predictor of relevant outcome measures. Thus, the models tested whether the overall trends described between changes in processes and eventual outcomes differed between the two books, irrespective of assignment method. Book was found to be a significant moderator

in one instance, in which changes in cognitive fusion more strongly predicted changes in depression-related stigma over time among those receiving the ACT book relative to the CBT book (β = -0.24, p = .03). Which book a participant used did not significantly moderate the relationship between any other processes changes or outcomes (all ps > .10).

Discussion

The purpose of this study was to examine if two self-help treatments for depression differed in their effect on therapeutic processes. Additionally, we aimed to understand how allowing participants a choice between books affected these processes compared to those who were randomized. It is important to determine whether depression treatments target their theorized mechanisms, and ideally produce a superior effect relative to other distinct treatments. Because some individuals may respond to certain therapeutic processes more than others, it follows that providing clients with a choice in the approach they receive could be beneficial. These questions are further important in the context of self-help books, in which research can help to clarify whether it matters which evidence-based book a client uses and if their choice in book might be the most important factor.

One notable finding was that ACT had a stronger impact on reducing cognitive fusion, a key ACT process of change, compared to CBT in our sample. Furthermore, improvements in cognitive fusion early in treatment were associated with improvements in depression-related stigma later in treatment, with this relationship being significantly stronger in the ACT condition compared to CBT. Taken together, these findings suggest that cognitive fusion served to differentiate the two interventions more than any other therapeutic process, including as a significant predictor of depression-related stigma.

Changes in cognitive fusion have previously been associated with better outcomes in depression and general distress following in-person ACT treatment (Bramwell & Richardson, 2018), as well as general wellbeing when ACT is adapted to an online format (Viskovich & Pakenham, 2018). Furthermore, a study testing ACT and CBT online self-help books for social anxiety, in a similar format to our study, found that changes in cognitive fusion were predictive of more positive clinical outcomes, though this association was equally strong across both interventions (Krafft et al., 2020). Our study is the first, to our knowledge, to establish cognitive fusion as a key distinction between ACT and CBT for depression in a self-help book format, which is meaningful given the widespread access to this treatment approach.

Prior research has also found cognitive fusion is associated with stigma in a variety of clinical populations (Pyszkowska et al., 2021; Valvano et al., 2016; Vatanasin & Dallas, 2022). Overall, it seems that rigid attachment or fusion with stigmatizing personal evaluations can compound mental suffering. There is a lack of research, however, on the link between cognitive fusion and self-stigma in depression specifically. Possessing stigmatizing attitudes about one's personal experience with depression can exacerbate affective symptoms (Barney et al., 2010). Previous studies have also found that self-help interventions can be effective vehicles to lessen depression-related stigma (Mills et al., 2020). Our results help establish a potential specific pathway: that influencing cognitive fusion can reduce depression-related stigma, and that this can be accomplished through self-help. It is meaningful that a low-intensity and self-guided treatment can influence this important secondary feature of depression. It is especially promising that since self-stigma is associated with lower rates of in-person treatment seeking for depression (Barney et al., 2010), using a book could be an acceptable and effective way of reducing self-stigma.

Apart from our findings on cognitive fusion, there were no differences between books in other therapeutic processes. Interestingly, the first ever study of ACT versus CBT for depression, conducted in 1986 and reanalyzed later, also identified cognitive fusion as a process of change that distinguished the two (Zettle et al., 2011). Later studies comparing ACT and CBT for depression, however, have been less consistent in establishing processes that distinguish the interventions. One study found that experiential avoidance mediated outcomes in ACT but not CBT, whereas several other theorized processes for each treatment did not have distinguishable effects (A-Tjak et al., 2021). Another study had similar results in experiential avoidance being differentially affected by ACT, but other processes moving equally among the two treatments (Losada et al., 2015). Notably, a comparison of ACT and CBT self-help books for social anxiety (Krafft et al., 2020) found a similar trend as our study in cognitive fusion distinguishing the treatments, suggesting these two interventions may function similarly when delivered in such a format for depression and anxiety. In sum, it appears difficult across studies to reliably differentiate ACT from CBT by assessing processes of change. At the same time, cognitive fusion has distinguished ACT from CBT in a number of trials, including ours, and may be especially relevant to describing how ACT works in a self-help book format.

A more reliable predictor of process-level changes in our sample was not, in fact, which intervention someone received, but rather how they were assigned to it. Participants who were randomly assigned either the ACT or CBT intervention experienced greater improvements in all process variables, with the exception of cognitive reappraisal, compared to those who selected a treatment themselves. This trend stands in contrast to our prediction that if someone chose their own treatment approach, they would respond better to the psychological processes that the treatment is purported to act on. At the same time, our results are consistent with the unexpected

findings from the primary outcome study, which found that randomization to either ACT or CBT led to both greater adherence and greater reductions in anxiety when compared to choosing one of the two (Davis et al., 2023). Taken together, this pattern of results suggests that the content of either an ACT or CBT self-help intervention may be ultimately less impactful than the way it is assigned to someone and that, surprisingly, randomization may produce more benefits than choice.

Our unexpected results regarding client choice and therapeutic processes could reflect a genuine lack of distinction between ACT and CBT techniques from a client perspective. Alternatively, there may be methodological difficulties in assessing change processes in a comparable way across the two approaches. For example, learning to evaluate and reappraise the content of a depressive thought in CBT is distinct from the ACT approach to depression, which teaches skills to relate more flexibly and openly to thoughts so that they have a less restrictive impact on one's behavior. However, from the perspective of someone practicing these techniques, both approaches, if implemented successfully, could lead to a similar sense of relief from the impact of depressive cognitions (Arch & Craske 2008). Similarly, practicing awareness of repetitive depressive thought patterns in CBT could be likened to practicing mindfulness skills in ACT, which help one attune more closely to thought patterns broadly. Considering these potential overlaps, it is possible that both CBT and ACT influence a higher-order process of general cognitive flexibility (Wang et al., 2019). This notion is consistent with an extended evolutionary meta model (EEMM) of psychological change processes (Hayes et al., 2020). In an EEMM, a broad coping process such as cognitive flexibility could be developed and maintained through variation, selection, retention, and sensitivity to context (Hayes et al., 2020).

Alternatively, the issue may have more to do with how change processes are conceptualized and assessed across the two treatment approaches. ACT is an intervention that was developed through a process-based approach, i.e., through identifying basic behavioral processes and then translating them into a set of coherent behavior change strategies (Hayes et al., 2006). CBT, in contrast, can be difficult to define consistently and comprises a variety of cognitive techniques assembled into various intervention packages over a long period of time (Arch & Craske 2008). While ACT and CBT have been found to be generally equally effective in treating depression (Twohig & Levin, 2017), ACT may lend itself more to examination on the level of specific, transdiagnostic treatment processes than CBT, thus making them hard to compare through these means.

Our findings regarding the effects of ACT and CBT self-help books (and how the books are assigned to users) on therapeutic change processes could have several clinical implications. It is a promising sign that cognitive defusion, a clinical skill commonly taught through experiential exercises, was measurably impacted through a bibliotherapy format. Clinicians may use ACT self-help books to enhance the teaching of this skill. Self-stigma among sufferers of depression is underemphasized in clinical research compared to other outcomes. However, clinicians treating depression see the impact of the condition on one's self-image and identity up-close. Using bibliotherapy to reduce self-stigma, such as through the skill of cognitive defusion as our results indicate, could be a valuable clinical tool to improve overall client wellbeing. More broadly, our findings indicate that easy-to-distribute resources such as books can have meaningful impacts on key clinical processes. For overburdened counseling centers, or other clinical settings, taking the utility of evidence-based self-help books more seriously could both improve patient outcomes and reduce provider burnout.

Limitations

        The generalizability of our results is limited by the high rate of attrition we experienced in this study. Considering that our posttreatment assessment rate was less than 50%, our findings carry the risk of not replicating with larger samples. It would be valuable to replicate our study with larger samples and other ACT an CBT-based interventions to see if similar patterns of process variables hold. Furthermore, given the unexpected association between randomization and influence on change processes, it would be meaningful to attempt to replicate this effect specifically. In addition to attrition, the generalizability of results is further limited by our use of a college student sample that was largely homogenous in regards to gender, race, and ethnicity. To understand how ACT and CBT self-help books could address depression at larger scale, it is important to study therapeutic processes with more diverse samples. Additionally, our sample was heterogenous in treatment status, in that it combined participants who were presently engaged in psychotherapy and those who were not. While for a majority of our sample, the self-help book was the only treatment they were using, it would be valuable to further clarify the function of change processes when books are used as a standalone versus an adjunctive intervention.

        Related to challenges in comparing process of change measures between ACT and CBT, a measurement issue with the ATQ may have contributed to automatic thinking being significantly associated with depression outcomes. Specifically, the ATQ was strongly correlated with depression severity at baseline ($r = .79$, $p < .001$), more so than any of the other process variables (rs = .58-.72). It is possible that the ATQ, by assessing frequency of various negative thought patterns, may in fact have been measuring depression itself as opposed to a distinct

therapeutic process. More closely examining the potential overlap between the content of process measures and clinical measures may have averted this issue.

Similarly, there was a notable difference in the age of the process measures we used for each intervention which could have contributed to issues in comparing them directly as the understanding around therapeutic process has evolved. The ATQ was developed and validated in 1980 and the TCQ in 1994. Comparatively, all three ACT measures that we used were developed from 2007 onwards. Related to these measures coming out of different eras, the two CBT measures read more similarly to symptom checklists as opposed to attempting to capture transdiagnostic therapeutic processes as the ACT measures do.

Lastly, our study likely suffered from researcher bias in deciding how various processes of change were measured. As primarily-ACT-oriented researchers, we are very familiar with selecting ACT-relevant measures and and understanding how they perform in various clinical contexts. We are less experienced with selecting the most appropriate CBT measures for a given population and research design. A research team with greater expertise in CBT may have selected process measures that better captured unique features of the CBT intervention and that did not suffer from the issues of correlation and age described above.

A multipronged effort is needed to address the widespread impact of depression, such as delivering a variety of evidence-based behavioral interventions in multiple formats that are accessible to as many individuals as possible. Importantly, this should also include evaluating which processes of change are most relevant to depression and which treatments most effectively act on them. Our study revealed cognitive fusion as a process that is more distinct to ACT and that may have a particularly meaningful impact on the stigma one feels towards themself when depressed. Additionally, we found that individuals who were randomized to a treatment

experienced greater gains in almost all therapeutic change processes we measured. This suggests that teaching effective processes of change broadly may be more important that matching individuals with the "right" treatment.

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