Evaluating acceptance and commitment therapy and mindfulness-based stress reduction self-help

books for college student mental health

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Abstract

**Objectives:** Self-help has the potential to improve access to mental health resources for college students. However, solutions are needed to improve sustainable delivery, cost-effectiveness, and to know which resources are most useful. **Methods:** A sample of 109 college students were randomly assigned to read either an Acceptance and Commitment Therapy (ACT) or Mindfulness-Based Stress Reduction (MBSR) self-help book through the University library website over 8 weeks with assessments at baseline, midtreatment (4-weeks), and posttreatment (8-weeks). **Results:** The majority of participants reported reading over half of their assigned book and high satisfaction ratings were given for both books. Both conditions demonstrated equivalent medium to large effect sizes for improvements over time on outcomes (psychological distress, positive mental health, academic distress) and processes of change (psychological inflexibility, mindfulness, cognitive fusion). However, the ACT condition produced improvements on obstruction with valued action more quickly than MBSR. Across conditions, baseline to midtreatment improvements in psychological inflexibility, valued action, cognitive fusion, and mindfulness all predicted baseline to posttreatment improvements in psychological distress. Improvements in psychological inflexibility more strongly predicted improvements in positive mental health in the MBSR condition. **Conclusions:** Overall, results suggest the potential benefits of both ACT and MBSR self-help books for improving student mental health and the potential promise of delivering these books through online university library systems.

*Keywords:* Bibliotherapy, Self-help, eHealth, Acceptance and commitment therapy, Mindfulness-based stress reduction.

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Mental health problems are prevalent among college students (ACHA, 2018; Blanco et

al., 2008). Although treatment is available through college counseling centers, their resources are

limited and directors report ongoing challenges with meeting the mental health needs of students

(Gallagher, 2015). Innovative solutions are needed that can increase access to mental health

services within the limited resources available.

One promising approach is to provide self-help resources that students can access on their

own, privately, whenever is convenient. Such self-guided resources have been found to be

effective for college students (Lattie et al., 2019) and to be of interest to students, including those

who otherwise might not seek services (Levin, Krafft & Levin, 2018). Research in this area has

primarily focused on web and mobile programs, which theoretically is highly scalable due to

minimal cost per end user once the platform is developed. However, such research efforts have

not translated into a suite of publicly available programs (e.g., Torous, Levin, Ahern & Oser,

2017), possibly due to the costs, technical challenges, and other complexities in developing,

implementing, and sustaining online programs.

In contrast to the challenges with online self-help programs, a large number of self-help

books have already been developed and disseminated to the public, providing a readily available

set of resources to offer students. These books could be offered widely to students online through

university library websites to maximize cost effective scaling. Yet, many of the available

self-help books have not been evaluated (Rosen & Lilienfeld, 2016). Research is needed to test

the efficacy of self-help books for college student mental health and the feasibility of

implementing through library websites.

Two therapeutic approaches that are promising for delivery in a self-help format are

mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990) and acceptance and commitment

therapy (ACT; Hayes, Strosahl & Wilson, 2012). These approaches focus on therapeutic

procedures and processes that are effective for a broad spectrum of presenting problems that may

be of relevance to college students (A-Tjak et al., 2015; Goldberg et al., 2018).

A number of studies have evaluated ACT and mindfulness delivered in online self-help

formats (Spijkerman, Pots & Bohlmeijer, 2016), including with college students more

specifically (e.g., Hintz, Frazier & Meredith, 2015; Levin et al., 2014; Levin et al., 2017;

Räsänen et al., 2016). To-date there have only been a few published studies evaluating

mindfulness or ACT for college student mental health in book formats, all of which evaluated

books relative to only a waitlist. This includes one RCT on ACT for international college

students (Muto, Hayes & Jeffcoat, 2011) and three RCTs on mindfulness-based books for

college students (Hazlett-Stevens & Oren, 2017; Taylor, Strauss, Cavanagh & Jones, 2014;

Wimberley, Mintz & Suh, 2016).

ACT and MBSR target theoretically overlapping, but also distinct processes of change

and have not yet been directly compared in an outcome study. Theoretically, MBSR and ACT

may be equally effective at improving mindfulness, acceptance, and defusion given their shared

emphasis on mindfulness-related procedures and processes (Hayes et al., 2011). However,

MBSR could hypothetically engage these processes more effectively due to the focus on

intensive mindfulness meditation practice. Conversely, ACT is distinct from MBSR in its

emphasis on values clarification and behavior change (Hayes et al., 2011). Thus, research is needed to test if ACT affects valued action more, and if MBSR lead to greater effects on mindfulness. As both approaches have been found to improve mental health (e.g., A-Tjak et al., 2015; Goldberg et al., 2018), differences are not expected on these outcomes, but the processes that account for changes may differ. Comparing these approaches could help clarify if and when ACT and MBSR are effective and the degree to which these procedures engage distinct processes of change.

The current randomized controlled evaluated the feasibility, efficacy, and processes of change for ACT and MBSR self-help books for college student mental health. The first hypothesis was that delivering self-help books through the university library website would be feasible as indicated by high self-reported satisfaction and book usage. The second hypothesis was that both books would be efficacious as indicated by equivalent improvements over time on mental health outcomes. The third hypothesis was that the books would work through distinct processes of change with changes in mindfulness more strongly predicting improvements in outcomes with MBSR and changes in valued action and psychological inflexibility more strongly predicting outcomes with ACT.

## Method

### Participants

The study included a sample of 109 college students at a mid-sized university in the Mountain West of the United States. Participants were recruited via online advertisements, the SONA participant pool for psychology courses, and flyers posted on the university campus. Interested individuals completed an initial online screening questionnaire to determine study

eligibility. Eligibility criteria included: a) aged 18 years or older; b) current student enrollment at the target university; c) no previous participation in other self-help studies run by the research group; and d) self-reported interest in using a self-help book for improving mental health and wellbeing. A participant flow chart is provided in Figure 1. An a priori power analysis was not used to determine the target sample size, but the final sample of 72 participants who completed the posttreatment assessment (66% of enrolled participants) provided adequate power (.80) to detect a small effect size ($d = .30$) for a time by condition interaction with three time points and two conditions.

The majority of the sample (65.1%) identified as female with the remaining 34.9% identifying as male. The vast majority of the sample (88.1%) identified as non-Hispanic, White, with the remaining identified as Hispanic White (3.7%), American Indian/Alaska Native (3.7%), Black/African American (1.8%), Asian (1.8%), and Native Hawaiian/other Pacific Islander (.9%). The median age was 20 ($M = 20.94$, $SD = 3.76$, range = 18-43). In terms of year in school, 53.2% were in their first year of college, 17.4% second year, 18.3% third year, 7.4% fourth year or higher, and 3.7% were a graduate student. Although the vast majority of participants were taking classes on the main local campus (87.2%), 12.8% were taking classes primarily online or at a regional campus. Based on recommended cutoff scores for the Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995), 29% had no elevated depression, anxiety, and/or stress symptoms, 12% had mild symptoms, 19% moderate symptoms, 14% severe symptoms, and 26% extremely severe symptoms.

**Procedure**

All study procedures, including assessments and delivery of interventions, were completed online through email, Qualtrics, and the University library website. After providing consent online, participants completed an online baseline assessment and were then randomized automatically through Qualtrics to either the ACT or MBSR condition. Participants were randomized equally (1:1) in continuous blocks of 10 to ensure similar numbers in each condition over time. Upon being randomized participants were provided information on how to access their assigned book online through the university library and received a recommended eight-week reading schedule. Participants completed additional online assessments after four weeks (midtreatment) and after eight weeks (posttreatment).

Participants assigned to the ACT condition received an electronic copy of *The Happiness Trap* (Harris, 2007), a self-help book that provides coping strategies for issues such as depression, anxiety, stress, and general mental health/wellbeing. Key ACT coping skills covered in the book include cognitive defusion, acceptance, mindfulness, self-as-context, values clarification, and committed action. Additionally, homework activities are provided in the book so that the reader can practice learned coping skills in their daily life.

Those in the MBSR condition received electronic access to *A Mindfulness-Based Stress Reduction Workbook* (Stahl & Goldstein, 2010), a self-help book that introduces key MBSR topics such as practicing mindfulness meditations, basic yogic exercises, self-compassion, and responding to stress with mindfulness-based techniques (e.g. mindful breathing, body scans). Homework activities include reflective writing on progress with meditative techniques and exercises for responding to stressors in daily life. The book makes heavy use of audio recorded

mindfulness exercises, which were not included online through the library, but were made available by the researchers through a cloud-based storage link.

Researcher contact consisted of weekly email reminders of the suggested reading, technical troubleshooting, and minimal encouragement/motivation if the participant reported encountering barriers to reading the self-help book. Participants only received relatively standardized email contacts from researchers to encourage ongoing engagement with the readings.

**Measures**

**Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995).** The primary outcome was the 21-item DASS, which assesses depression, anxiety, and stress symptoms. The total score combining the three symptom subscales was used in the current study given the focus was not on a particular symptom subgroup. Each DASS item is rated on a 4-point scale from "did not apply to me at all" to 3 "applied to me very much, or most of the time." Previous research indicates the DASS is reliable and valid (Lovibond & Lovibond, 1995) and improves through self-guided acceptance and mindfulness-based interventions (e.g., Levin et al, 2014). In this study, the internal consistency of the DASS was $\alpha = .94$.

**Mental Health Continuum – Short Form (MHC-SF; Keyes, 2005).** The 14-item MHC-SF was included as a secondary outcome of positive mental health. The MHC-SF assesses emotional, psychological and social wellbeing. Each item is rated on a 6-point scale from "never" to "every day." Previous research indicates the MHC-SF is reliable and valid (Keyes, 2005) and sensitive to detecting the effects of self-guided acceptance and mindfulness

interventions (e.g., Levin et al., 2017). In this study, the internal consistency of the MHC-SF was α = .94.

**Counseling Center Assessment of Psychological Symptoms-Academic Distress Subscale (CCMH, 2012).** The 5-item CCAPS academic distress subscale from the CCAPS-62 was used as a secondary outcome measure to assess academic functioning. Items are rated on a 5-point scale ranging from 0 "not at all like me" to 4 "Extremely like me." Previous research indicates the CCAPS is reliable and valid (CCMH, 2012) as well as sensitive to detecting the effects of self-guided acceptance and mindfulness-based interventions (Levin et al., 2017). In this study, the internal consistency of the 5-item CCAPS was α = .79.

**Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006).** The primary process of change measure for the MBSR condition was the 39-item FFMQ. The FFMQ assesses five facets of mindfulness: observing, describing, acting with awareness, being nonjudgmental, and nonreactivity. Items are rated on a 5-point scale ranging from 1 ("never or very rarely true") to 5 ("very often or always true"). Previous research indicates the FFMQ is reliable and valid, including when calculated as a total score (Baer et al., 2006). In this study, the internal consistency of the FFMQ total score was α = .90.

**Valuing Questionnaire (VQ; Smout et al., 2014).** The VQ was included as a primary process measure for ACT given its unique focus on valued action relative to MBSR. The VQ is a 10-item measure with two subscales assessing obstruction (i.e., difficulty engaging in valued action due to psychological barriers) and progress (i.e., engagement in valued patterns of activity). Each item is rated on a 7-point scale from 0 "not at all true" to 6 "completely true."

Research indicate adequate reliability and validity for the VQ (Smout et al., 2014). In this study, internal consistency was adequate for the VQ obstruction ($\alpha$=.83) and VQ progress ($\alpha$=.89).

**Acceptance and Action Questionnaire-University Students (AAQ-US; Levin et al., 2019).** The AAQ-US, which assesses psychological inflexibility among university students, was also included as a primary process measure for ACT.  The AAQ-US is a recently developed 12-item measure designed to assess ACT processes in the context of university academic experiences. Items are rated on a 7-point scale ranging from 1 "never true" to 7 "always true." Although this is a new scale, preliminary research supports its reliability and validity (Levin et al., 2019). Concerns have been raised regarding whether the AAQ-II, the broader measure of psychological inflexibility upon which the AAQ-US is based (Bond et al., 2011), discriminates between negative affect and psychological inflexibility (Rochefort, Baldwin & Chmielewski, 2018). However, the AAQ-US has been found to be more weakly related, although still correlated, with measures of psychological distress and to be a stronger predictor of psychosocial functioning in school relative to the AAQ-II (Levin et al., 2019). In this study, internal consistency was adequate for the AAQ-US ($\alpha$ =.93).

**Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014).** The CFQ, a measure of cognitive fusion (i.e., the degree to which cognitions overly dominate one's experiences and actions), was included as a secondary process measure relevant to both the ACT and MBSR conditions. The CFQ is 7-item measure with each item rated on a 7-point scale ranging from 1 "never true" to 7 "always true." The CFQ has been found to be reliable and valid in previous research with college students (Gillanders et al., 2014). In this study, internal consistency was adequate for the CFQ ($\alpha$=.94).

**Adherence, Satisfaction, and Implementation Questions.** Participants were asked a series of questions at post to assess use of the book, satisfaction with the book, and factors relevant to implementation of the books. These questions were designed for the current study based on previous, similar research (e.g., Abramowitz et al., 2009; Levin et al., 2017). To assess adherence, participants were asked to select which chapters they had read. To assess satisfaction, participants rated their assigned book on a 6-point scale from "Strongly disagree" to "Strongly agree" with 4 "Slightly agree" or higher indicating a positive response. Items assessed dimensions such as ease of use, perceived helpfulness, fit, and interest in future use. Participants were also asked implementation-related questions such as experiences using the book online, need for a coach, and how the book might affect interest in therapy. Open ended questions gathered further input on program experiences. Finally, participants were asked about their reasons for not completing the full program (if they did not complete it) to assess common barriers to use.

## Results

### Preliminary analyses

Overall, 73% completed the midassessment and 66% completed the postassessment. There were no differences between conditions on rates of midassessment and postassessment completion. There were also no differences between conditions at baseline on outcome measures or demographics. The DASS total score were significantly skewed and kurtotic at midassessment and postassessment. A square root transformation was employed for each time point to approximate a normal distribution.

### Self-reported book usage

Self-reported use and satisfaction with the self-help books was examined among the 72 participants who completed the postassessment. On average participants reported reading more than half of the book (ACT $M = 65\%$, $SD = 35\%$; MBSR $M = 70\%$, $SD = 30\%$), with no difference between conditions on amount read ($p > .10$). In both conditions, 100% reported reading at least some of the book, with 41% reading the entire ACT book and 37% reading the entire MBSR book. In terms of self-reported low adherence, 35% read less than half of the ACT book and 26% less than half of the MBSR book.

Zero-order correlations were examined between self-reported book usage and outcome, process of change, and baseline demographic variable. The only significant correlates with book usage were baseline motivation questions: "I would personally benefit from using a self-help book like the one being tested in this study" ($r = .31$, $p < .01$), "I am interested in learning new strategies for improving my mental health and well-being" ($r = .29$, $p < .05$), and "I am interested in using a self-help book" ($r = .24$, $p < .05$). In each case, greater motivation was correlated with reading more of the book at posttreatment assessment.

**Satisfaction and implementation feedback**

Participants rated their assigned book on a 6-point scale with 4 (*slightly agree*) or higher indicating some degree of satisfaction. Equivalent high satisfaction ratings were found between conditions for ease of use (ACT $M = 4.92$, $SD = .77$; MBSR $M = 4.78$, $SD = 1.25$), perceived helpfulness for other students (ACT $M = 4.92$, $SD = .97$; MBSR $M = 4.86$, $SD = 1.13$), fit (i.e., the book was made for someone like me; ACT $M = 4.28$, $SD = 1.23$; MBSR $M = 3.92$, $SD = 1.57$), and recommendation to other students with mental health problems (ACT $M = 4.81$, $SD = 1.09$; MBSR M = 4.65, SD = 1.06). Participants rated the ACT book higher on two items:

personal helpfulness (ACT $M = 4.67$, $SD = 1.10$; MBSR $M = 4.03$, $SD = 1.26$; $t[71] = 2.31$, $p = .02$) and interest in using the book again in the future (ACT $M = 4.50$, $SD = 1.34$; MBSR $M = 3.73$, $SD = 1.63$; $t[71] = 2.20$, $p = .03$).

Participants also gave feedback regarding implementation factors. With regards to the use of an online library to deliver the books, participants gave equal positive ratings regarding the ease of reading the book through the library website (ACT $M = 4.44$, $SD = 1.28$; MBSR $M = 4.92$, $SD = 1.30$). Participants were neutral with regard to the statement "I preferred using the library website to read the book online, rather than a printed copy" (ACT $M = 3.39$, $SD = 1.70$; MBSR $M = 3.24$, $SD = 1.66$).

With regards to the need for coaching or how the book interacts with therapy, participants equally agreed that they would have engaged more with the book if they had a therapist or coach supporting them using it (ACT $M = 4.22$, $SD = 1.29$; MBSR $M = 4.41$, $SD = 1.32$) and the book would have been more helpful if they could discuss it with a therapist/coach (ACT $M = 4.28$, $SD = 1.32$; MBSR $M = 4.35$, $SD = 1.18$). Participants in both conditions agreed that this book was a good alternative to receiving help instead of seeing a therapist (ACT $M = 4.11$, $SD = 1.21$; MBSR $M = 4.16$, $SD = 1.32$), and were neutral with regards to this book making them more interested and willing to go to therapy (ACT $M = 3.63$, $SD = 1.46$; MBSR $M = 3.49$, $SD = 1.30$). Thus, overall participants found the book to be easy to read online, that they would have benefited more if they used it with a therapist/coach, and that the book was a good alternative to seeing a therapist.

Participants were asked why they did not read the entire book from a selection of common reasons. The most commonly endorsed reason was not having enough time (ACT =

54%, MBSR = 63%). Other reasons included the book being too long and/or boring (ACT =

14%, MBSR = 23%), difficulty accessing the book (ACT = 14%, MBSR = 11%), not being

interested in the book (ACT = 11%, MBSR = 11%), not seeming helpful (ACT = 3%, MBSR =

14%), and already knowing what was covered (ACT = 3%, MBSR = 9%). These results suggest

that both books were perceived as useful and accessible, but that time was the main factor

interfering with their use.

When asked about their least favorite part of using the book, participants in the ACT and

MBSR conditions expressed similar themes, such as the length of the book ("some of the

chapters seemed long/boring," "the author was long-winded," "the time it took to read"),

repetitive content ("it was repetitive in some areas," "redundant passages," "the chapters were all

very similar to one another"). Additionally, multiple participants implied that having a physical

copy of the book would have been helpful ("I prefer paperback," "I would have read more if it

was a physical book," "reading online was kind of hard to stay on track," "Couldn't write in it").

Overall, the most commonly reported barrier for using the self-help books was difficulty

balancing using the book with school-related obligations ("all of my other schoolwork and trying

to balance everything," "it wasn't at the top of my priority list," "too busy with all my other

responsibilities to do all of the assigned readings"). Again, these findings suggest that the books

were found to be acceptable, but that time was a limiting factor.

**Mental health outcomes**

A series of mixed-model repeated-measures (MMRM) analyses were conducted with the

full intent-to-treat (ITT) sample, irrespective of whether all assessment points were completed.

MMRM analyses tested for the effects of time, condition, and time by condition interactions on

outcomes (see Tables 1 and 2). There were no significant time by condition effects on the

primary outcome of psychological distress (DASS) or secondary outcomes of positive mental

health (MHC-SF) or academic concerns (CCAPS). However, significant time effects were found

for each of these variables indicating improvements over time in both conditions with primarily

medium to large effect sizes.

**Processes of change**

A series of MMRM analyses tested for effects on process of change measures (see Tables

1 and 2). A significant time by condition effect was found for VQ obstruction. Although both the

ACT and MBSR condition demonstrated similar pre- to post-assessment improvements, the ACT

condition achieved these effects sooner (ACT pre- to mid-assessment within condition effect $d =$

.72; MBSR pre to mid effect $d = .13$). There were no other significant time by condition effects

for cognitive fusion (CFQ), psychological inflexibility (AAQ-US), valued progress (VQ-Pro), or

mindfulness (FFMQ). However, significant time effects were found for each of these variables

indicating medium to large within condition effect sizes for both conditions improving from pre-

to post-assessment.

Analyses tested if the processes of change that lead to improved outcomes differed

between the ACT and MBSR conditions. A series of linear regression analyses tested whether

condition moderated the relation between pre- to mid-assessment change scores on each process

measure and postassessment outcomes controlling for baseline scores. Each model was run

separately with one pre- to mid-assessment process change score and postassessment outcome

score, with predictors including baseline outcome, condition, and process change score in the

first step, and the interaction of condition and process change score in the second step. The only

significant condition by process interaction was for the AAQ-US in predicting positive mental health ($b = .58$, $\Delta R^2 = .04$, $\Delta F(1, 63) = 5.24$, $p < .03$) such that improvements in the AAQ-US were only correlated with improvements in positive mental health in the MBSR condition ($r = .54$, $p < .001$) and not the ACT condition ($r = .10$, $p > .10$). There were no other condition by process interactions on predicting changes in mental health outcomes.

A series of partial correlations were conducted collapsing across conditions given the lack of differences between conditions (see Table 3). Improvements on the AAQ-US from baseline to mid-assessment consistently predicted improvements on post-assessment outcomes controlling for baseline scores. Other pre- to mid-assessment process measures only predicted improvements on the primary outcome, DASS psychological symptoms. The only exception was the VQ progress subscale, which did not predict improvements in any outcome measures.

## Discussion

This study sought to evaluate the feasibility, efficacy, and processes of change for ACT and MBSR self-help books with college students. Results supported the potential feasibility of delivering self-help through a university library website with the majority of participants reading over half of their assigned book and high satisfaction ratings given for both books. Support was also found for the efficacy of both books, with equivalent improvements over time on psychological distress, positive mental health, and academic distress. Mixed results were found for expected differences in processes of change between the two books. Consistent with predictions, ACT produced larger improvements mid-treatment in valued action relative to MBSR, but other processes of change improved equally between conditions over time. Improvements in psychological inflexibility predicted improvements in outcomes across

conditions with the exception of positive mental health, where effects were stronger for MBSR

surprisingly. Other processes of change equally predicted improvements in psychological

distress across both conditions.

This study highlights a potential immediate, cost effective way to increase students'

access to evidence-based self-help materials online. It is commonplace for university libraries to

have access to digital versions of books through their websites, and these subscriptions can

include self-help books. This allows students to access resources in a free, convenient, and

private modality, including for students who are not willing to see a counselor currently, are

waiting to see a counselor, are working with a counselor, or who have terminated with a

counselor. In other words, these resources can increase access broadly for a variety of needs

ranging from those who otherwise would not receive mental health resources to increasing

supports for those in treatment. These points are familiar to those made for other online

web/mobile interventions, with the important distinction being that self-help books can be

implemented immediately by universities at low cost and with minimal resources, while few

online web/mobile interventions are readily available to college campuses, and those that are

typically have substantial resource costs.

Results from this study support the feasibility of the online library approach to

disseminating self-help resources. Among participants who completed the postassessment, the

majority read over half of the book and 37%-41% read the entire book. This is comparable to

rates found in other self-help book studies (e.g., Hazlett-Stevens & Oren, 2017; Taylor et al.,

2014) and online intervention studies that do not include a coach (Levin et al., 2017; Spijkerman

et al., 2016). Participants gave high satisfaction ratings, including the ease of reading the book

through the library website and a lack of preference for a printed copy. However, some students

did provide open feedback that a printed copy would have been more helpful (e.g., preference for

reading physical copies, wanting to write in the book), suggesting the online approach may not

be effective for all students. Consistent with aims of increasing access to resources, participants

viewed this resource as being a good alternative to seeing a therapist, but they also recognized

that the resource would be more effective if they were working with a therapist or coach.

Previous research indicates that self-help resources are a desired alternative for a segment of

students who are not willing to see a therapist (Levin et al., 2018). These resources can also

provide an alternative to students who have limited access to services (e.g., regional campuses,

center waiting lists). Yet, the majority of students would prefer to see a therapist rather than use

self-help resources, and research suggests students prefer to use such resources in the context of

working with a therapist (e.g., Levin et al., 2018). This is also consistent with research indicating

self-help is more effective when combined with a therapist or coach providing guidance

(Richards & Richardson, 2012). Overall, this pattern suggests that offering self-help could

expand the portfolio of resources available to students, reaching a segment who otherwise would

not get help and enhancing supports for students seeking services.

This study also identified potential barriers to engaging in self-help books. The most

commonly reported barrier was not having enough time to read, due in part to difficulty

balancing the book with school-related obligations. In open responses, a common theme across

books was that some students thought they were too long or repetitive. These barriers are

consistent with those noted by students in other web-based interventions (e.g., Levin et al.,

2017). It may be beneficial to adopt and evaluate shorter self-help books to see if they have

higher engagement and potential efficacy in meeting the challenges and preferences of at least some students in using self-help.

Interestingly, baseline levels of distress and psychological inflexibility did not predict how much of the book was read, suggesting the presence of mental health problems did not necessarily lead to greater engagement. However, baseline motivation to learn psychological skills and read the book did predict engagement. This suggests two potential implementation considerations: 1) targeting only students that are actively interested in using self-help materials, or 2) providing initial motivational interventions to increase engagement among a broader range of students.

Participants improved equivalently over time on outcomes in the ACT and MBSR conditions with mostly medium to large effect sizes. Although the sample was not selected for by level or type of distress, the majority had moderate or greater depression, anxiety, and/or stress symptoms, which improved over time. In addition to distress, students also reported improvements in positive mental health and in academic concerns, suggesting these self-help resources can also assist students in flourishing and being more effective in their roles. Thus, these types of resources may serve useful not only for students seeking help for distress, but also students seeking to enhance their life functioning. This is consistent with previous research on ACT and MBSR-based self-help for college students, in which positive results have been found on mental health symptoms as well as on academic performance and positive psychological functioning (e.g., Hazlett-Stevens & Oren, 2017; Levin et al., 2017; Muto et al., 2011; Räsänen et al., 2016; Taylor et al., 2014; Wimberley et al., 2016).

This study tested two readily available books that could be offered now to students through library websites at minimal cost and without concerns regarding current and ongoing availability. Evaluating self-help books is critical for ensuring resources are evidence-based and known to be helpful, and not harmful, for student mental health (Rosen & Lilienfeld, 2016). Comparing distinct books can also serve to inform what books might be offered to students, and with larger samples to power moderation analyses, even what books to offer to what students. Yet, it is likely impractical to evaluate every book for every relevant context with all available control conditions. An emphasis on books that target distinct processes of change might provide a generalizable knowledge base that can inform evidence-based self-help resources lists (e.g., when to offer books that target mindfulness and valued action versus mindfulness alone).

In this study, we chose to compare two books that use somewhat distinct procedures to target a shared process of change (mindfulness and its sub-processes), and in which one book includes distinct procedures to target valued action as an additional process of change. ACT and MBSR have not been previously compared in a published RCT. With regards to between group effects, results suggested ACT is more effective than MBSR at improving valued action, at least with regards to producing effects early in treatment. Surprisingly there was a lack of differences between conditions however with regards to what processes of change accounted for improvements in outcomes over time. For the most part, across MBSR and ACT, psychological inflexibility was the most consistent process that predicted improvements in outcome. Despite this being a more ACT-focused process of change, psychological inflexibility was actually a stronger predictor of improvements in the MBSR condition for positive mental health. Psychological inflexibility measures, including the AAQ-US, tend to emphasize the

mindfulness-related processes (i.e., cognitive fusion, experiential avoidance) more than the valued action processes, so results are consistent with the focus of MBSR. Consistent with that, previous research has found psychological inflexibility to mediate outcomes for mindfulness interventions (Gu et al., 2015). More surprising was that other processes (i.e., valued action, cognitive fusion, mindfulness) only predicted changes in the psychological distress outcome, and did so equally between the ACT and MBSR conditions. Taken together, these results suggest that although the ACT book led to greater improvements in valued action, the procedures in the ACT and MBSR books might similarly engage mindfulness-related processes of change, which are the primary processes relevant to improvements in student mental health.

**Limitations and Future Research**

This study had notable limitations. The comparison of two active, distinct interventions provides a powerful control for each approach, but the unsurprising lack of differences on outcomes also raises the question of how effective these approaches would be in relation to a waitlist control or psychological placebo. In other words, similar to open trial designs, it is unclear the degree to which improvements over time across conditions are accounted for by reading the books versus other sources of variance (e.g., demand characteristics, regression to the mean, measure reactivity).

The study purposefully used broad inclusion criteria to better represent the range of students who might benefit from self-help resources. A variety of recruitment methods were also used, including through the SONA research pool in which students receive course credit for participation in relevant psychology classes. In combination, this heterogeneity might have reduced statistical power in detecting differences between self-help approaches and limited

precision with regards to what populations the books were evaluated in. It is unclear for example

whether both of these books are *specifically* effective for non-distressed students participating for

course credits, distressed students looking for services, or specific forms of presenting concerns.

Rather this study sought to evaluate the broader question of whether these self-help books are

generally useful for college student mental health. Future research is needed to test the efficacy

of books for more specific implementation methods, presentations, and populations.

This study was limited by the use of only self-report measures. Common method bias due

to all variables being assessed through self-report may have inflated observed relations between

treatment outcomes and processes of change due to confounding factors such as social

desirability (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Similarly, concerns have been

raised regarding the degree to which self-report process measures, particularly the Acceptance

and Action Questionnaire-II (Bond et al., 2011), fail to discriminate between negative affect and

psychological inflexibility (Rochefort et al., 2018). Although the AAQ-US has been found to be

more weakly related to psychological distress and more strongly related to academic functioning

than the AAQ-II (Levin et al., 2019), this limitation may be relevant to the processes of change

used in this study. Future research would benefit from including behavioral measures or

assessment data from other informants to provide a more rigorous assessment of mental health

outcomes, processes of change, and their relations.

There were also limitations related to assessing the effects of the MBSR book. The study

only examined percentage of the book read as a measure of adherence and did not include an

assessment of meditation practice time, which is a core aspect of MBSR adherence (Parsons,

Crane, Parsons, Fjorback & Kuyken, 2017). Self-reported adherence to reading the book may

have been more sufficient for assessing engagement in the ACT intervention than MBSR,

particularly given the MBSR book also included a set of meditation audio files that participants

were expected to frequently follow, but that were not tracked to assess adherence. Thus, it is not

entirely clear the degree to which this approach to delivering MBSR is feasible given there was

no assessment of whether students adhered to the expected regular meditation practice.

In addition, the study included limited assessment of mindfulness processes of change,

using only the FFMQ to assess self-reported facets of mindfulness (Baer et al., 2006). Although

self-reported mindfulness is one established process of change for MBSR, additional targeted

processes of change relevant to MBSR and meditation more broadly were not included such as

attentional control, relevant domains of cognitive functioning, emotion regulation, emotional

awareness, reward processing, rumination, and mindfulness practice (Creswell, 2017; Wielgosz,

Goldberg, Kral, Dunne & Davidson, 2019). These processes include variables that are less

directly linked to the procedure of practicing mindfulness, that are assessed through more

objective means, and that are defined at a more basic level of analysis (e.g., neuroscience, basic

cognitive processes), which are valuable to furthering our understanding of how interventions

work. This may have contributed to the relative lack of differences in processes of change found

between ACT and MBSR. The authors' primary area of expertise is in ACT, which contributed

to the greater emphasis on assessing ACT processes of change relative to MBSR. This allegiance

effect could have also reduced sensitivity to detecting any stronger effects for MBSR on mental

health relative to ACT.

Overall, this study suggests the potential effectiveness of providing ACT and

MBSR-based self-help books broadly for student mental health through university library

websites. There is a critical need among college campuses for effective mental health resources that overcome current barriers for students (e.g., stigma, access, convenience). Although new online programs are a promising trend for college campuses, students can begin to access online services now through books made available for free, convenient, and private use on library websites. This can also lead to a new wave of much needed research evaluating the effectiveness of books that are already disseminated to the public and in need of empirical examination. Over time, this could lead to building evidence-based lists guiding practitioners and consumers to know what book might be effective for what individuals.

**Compliance with Ethical Standards**

Conflict of interest statement: The authors have no conflicts of interest to declare.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The study was approved by the Utah State University Institutional Review Board.

Informed consent:  Informed consent was obtained from all individual participants included in the study.

**Author Contributions**

MEL: Designed the study, supervised data collection, conducted data analyses, and was the primary author of the manuscript. WA: Assisted with designing the study, conducted data collection, oversaw day-to-day management of the study, and assisted with writing the manuscript. CD: Assisted with designing the study, data collection, and writing the manuscript. MPT: Assisted with designing the study and writing the manuscript.

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Table 1. Estimated descriptive statistics with the ITT sample from MMRM analyses.

|  | ACT Self-Help Condition | | | MBSR Self-Help Condition | | |
|---|---|---|---|---|---|---|
|  | Pre *M* (*SE*) | Mid *M* (*SE*) | Post *M* (*SE*) | Pre *M* (*SE*) | Mid *M* (*SE*) | Post *M* (*SE*) |
| *Outcome Variables* | | | | | | |
| DASS | 6.05 | 5.06 | 4.52 | 6.08 | 4.96 | 4.62 |
|  | (.28) | (.30) | (.29) | (.27) | (.29) | (.28) |
| MHC-SF | 55.00 | 60.36 | 61.18 | 55.66 | 62.03 | 62.66 |
|  | (1.86) | (1.83) | (1.97) | (1.81) | (1.77) | (1.94) |
| CCAPS | 1.76 | 1.24 | 1.23 | 1.59 | 1.42 | 1.34 |
|  | (.11) | (.12) | (.11) | (.11) | (.11) | (.11) |
| *Process Variables* | | | | | | |
| AAQ-US | 114.02 | 123.97 | 125.99 | 115.98 | 123.21 | 128.81 |
|  | (2.68) | (2.95) | (3.19) | (2.60) | (2.85) | (3.14) |
| VQ-Obs | 19.96 | 16.26 | 17.11 | 18.38 | 17.71 | 15.31 |
|  | (.88) | (.90) | (.90) | (.85) | (.87) | (.89) |
| VQ-Pro | 22.23 | 25.05 | 25.47 | 22.38 | 24.70 | 25.47 |
|  | (.87) | (.85) | (.87) | (.85) | (.81) | (.86) |
| CFQ | 31.45 | 26.73 | 23.24 | 28.73 | 23.28 | 21.78 |
|  | (1.33) | (1.44) | (1.37) | (1.30) | (1.39) | (1.35) |
| FFMQ | 114.02 | 123.97 | 125.99 | 115.98 | 123.21 | 128.81 |
|  | (2.68) | (2.95) | (3.19) | (2.60) | (2.85) | (3.14) |

Notes: DASS = Depression, Anxiety and Stress Scale, MHC-SF = Mental Health Continuum – Short Form, CCAPS = Counseling Center Assessment of Psychological Symptoms-Academic Distress Subscale, AAQ-US = Acceptance and Action Questionnaire-University Students, VQ-Obs = Valuing Questionnaire - Obstruction, VQ-Pro = Valuing Questionnaire – Progress, CFQ = Cognitive Fusion Questionnaire, FFMQ = Five Facet Mindfulness Questionnaire. DASS scores have a square root transformation.

Table 2. MMRM results for time by condition and time effects.

| | Time*Condition *F* | Time *F* | Pre-Post Within Condition *d* [95% CI] | |
| | | | ACT | MBSR |
| --- | --- | --- | --- | --- |
| *Outcome Variables* | | | | |
| DASS | .19 | 37.81*** | .96*** | .92*** |
| | | | [.65, 1.27] | [.61, 1.22] |
| MHC-SF | .14 | 21.92*** | .62*** | .71*** |
| | | | [.31, .94] | [.40, 1.02] |
| CCAPS | 2.66 | 14.60*** | .72*** | .34* |
| | | | [.42, 1.03] | [.04, .64] |
| *Process Variables* | | | | |
| AAQ-US | 1.77 | 19.59*** | .69*** | .65*** |
| | | | [.39, .99] | [.35, .95] |
| VQ-Obs | 4.86* | 14.26*** | .53** | .57*** |
| | | | [.22, .84] | [.26, .88] |
| VQ-Pro | .10 | 21.40*** | .64*** | .61*** |
| | | | [.32, .95] | [.30, .92] |
| CFQ | 1.04 | 39.36*** | 1.04*** | .88*** |
| | | | [.73, 1.35] | [.57, 1.18] |
| FFMQ | .85 | 26.84*** | .76*** | .82*** |
| | | | [.45, 1.08] | [.50, 1.13] |

Notes: *$p < .05$; **$p < .01$; ***$p < .001$. Positive effect size scores indicate improvements over time.

Table 3. Partial correlations between pre to mid changes in processes and post outcomes controlling for baseline outcome.

|        | AAQ-US | VQ-Obs | VQ-Pro | CFQ  | FFMQ |
|--------|--------|--------|--------|------|------|
| DASS   | .29*   | .37**  | .01    | .30* | .30* |
| MHC-SF | .28*   | .24    | .17    | .21  | .18  |
| CCAPS  | .33**  | .14    | .09    | .15  | .17  |

All correlations scored such that positive correlations indicate relation in expected direction between changes in processes and changes in outcomes.

*Figure 1. Participant flow diagram*