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## Evaluating the Effects of Guided Coaching Calls on Engagement and Outcomes for Online Acceptance and Commitment Therapy

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Evaluating the effects of guided coaching calls on engagement and outcomes for online  
acceptance and commitment therapy

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### Abstract

Previous research indicates mixed results for guided support with online interventions. The current secondary analysis evaluated the effects of phone coaching from a dismantling trial of online acceptance and commitment therapy (ACT) in a sample of 136 distressed college students randomized to one of three versions of an ACT website. Participants were randomized to receive email prompts alone (non-coaching condition) or email plus phone coaching (coaching condition). Results indicated no differences between the coaching and non-coaching conditions on program engagement, program satisfaction, mental health outcomes, and almost all psychological flexibility processes. However, participants in the coaching condition reported stronger pre- to posttreatment improvements in psychological inflexibility than the non-coaching condition. This effect was moderated by ACT component condition, with larger pre- to posttreatment effects from coaching on psychological inflexibility in the values/committed action condition and weaker improvements from coaching in the acceptance/defusion condition. Overall, results indicate online self-guided ACT interventions with email prompts are sufficient for addressing college student mental health and that phone coaching provided minimal additional benefit.

*Keywords:* eHealth, Internet interventions, Guided self-help, Therapist guidance, Acceptance and commitment therapy.

## Evaluating the effects of guided coaching calls on engagement and outcomes for online acceptance and commitment therapy

Self-guided, online interventions have the potential to reach a wider audience than traditional in-person psychotherapy by offering a highly scalable intervention, that can be conveniently and privately accessed, with minimal resource costs per end user. These online interventions have shown effectiveness in treating issues such as depression, anxiety, and general mental health (e.g., Richards & Richardson, 2012; Newman, Szkodny, Llera, & Przeworski, 2011). However, the impact of online self-guided interventions is also limited due to challenges with engaging and retaining users.

This may be due in part to the lack of personal contact and guidance from a provider when using online self-guided interventions. Early meta-analyses indicated superior outcomes when programs included guided support from a paraprofessional or professional (e.g., Richards & Richardson, 2012; Spek et al., 2007). Based on these findings and the theorized benefits of personal contact to enhance adherence to otherwise self-guided interventions (Mohr et al., 2011), many studies have supplemented online programs with additional guided support through mediums such as email or phone calls.

More recently, research has directly compared online programs with or without guidance, with mixed results (Shim et al., 2017). In some studies, no differences were found between online programs that include guided support or not on treatment outcomes, program engagement and program satisfaction (e.g., Dear et al., 2015; Fledderus et al., 2012; Titov et al., 2016). Other studies have found the addition of guided support improves one or more of these factors (e.g., Aardoom et al., 2016; Ivanova et al., 2016; Kass et al., 2014; Mohr et al., 2013), but results are typically still mixed within individual trials. For example, in some studies the addition of text or

phone-based support did not improve treatment outcomes, but did improve engagement (e.g., Ivanova et al., 2016; Mohr et al., 2013) or satisfaction (e.g., Aardoom et al., 2016). The mixed effects from guided support may be attributable to factors such as the types of support provided, target populations, and treatment approach, which vary by study. Evaluating the contexts in which it is necessary, or not, to include guided support for online interventions is critical given the additional resources such support requires, which may reduce reach or increase costs.

One treatment approach that has received limited research to-date on the effects of guided support is acceptance and commitment therapy (ACT; Hayes, Strosahl & Wilson, 2012). ACT has successfully been adapted to online self-guided interventions, with positive results in clinical trials for a range of mental health concerns (Thompson et al., in press). However, few studies have directly tested the additive effects of guided support with ACT. Two studies found that the addition of guided text-based support from a therapist did not improve treatment outcomes for online ACT for depression (Fledderus et al., 2012) or anxiety (Ivanova et al., 2016), although guided support did enhance program engagement in the latter study (Ivanova et al., 2016). Theoretically, self-guided online ACT interventions may be adequately engaging to users without guided support due to the heavy emphasis on experiential exercises (rather than more didactic psychoeducation) and values as a motivational context for using the program and engaging in behavior change efforts. That said, a meta-analysis suggested that studies including guided support were more efficacious than purely self-guided interventions (Thompson et al., in press). Thus, results are preliminary and mixed for guided support with online ACT. No studies to-date have evaluated the additive effects of guided support via phone coaching for online ACT.

The current study examined the effects of phone coaching within a previously reported self-guided online ACT intervention for college student mental health (*Citation removed for*

*blind review*). Using a dismantling trial design, 181 distressed college students were randomly assigned to a waitlist or one of three versions of an ACT website; a full ACT website, the Open components of ACT (i.e., acceptance, defusion), or the Engaged components (i.e., values, committed action). Participants were also randomly assigned to receive only email prompts or to receive email prompts plus phone coaching to improve adherence. Participants had equal, moderate engagement rates in each ACT website condition, with 75% completing at least half of sessions and 44% completing all 12 sessions. Participants in each ACT condition improved on mental health symptoms and positive mental health relative to the waitlist, although the Open condition had somewhat weaker effects. All three ACT conditions generally improved on psychological flexibility processes of change, although the Full condition had the largest and most consistent effects on process measures. Overall, these findings indicated each component of ACT was effective and had adequate engagement rates. However, it is unclear whether phone coaching was necessary for or augmented the effects of online ACT or if similar outcomes would be achieved without resource intensive coaching.

In this secondary analysis study, the additive effects of phone coaching were examined for program engagement, satisfaction, mental health outcomes, and processes of change. We predicted that participants who received phone coaching would have higher engagement rates in the online ACT program, report higher program satisfaction, and would report greater improvements in mental health and psychological flexibility processes of change relative to those who did not receive phone coaching.

## **Methods**

### **Participants**

This secondary analysis study examined the sub-sample of 136 distressed college students who were assigned to one of three ACT conditions from the dismantling trial (excluding the waitlist condition; *citation removed*). Inclusion criteria were: being 18 years or older, a current college student, and meeting the cutoff for clinical significance on at least one subscale of the Counseling Center Assessment of Psychological Symptoms (CCAPS-34; Locke et al., 2012). The only exclusion criteria was reporting significant suicidal or homicidal thoughts on the CCAPS-34. Participants were largely White (92.8%), female (72.4%), and of a typical age for college students in the US ( $M = 22.27$ ,  $SD = 5.08$ ). Detailed participant demographics are available in the article reporting the primary results of this trial (*citation removed*).

### **Procedures**

After completing an online baseline survey, participants were first randomized to either use a self-help website focused on full ACT (Full condition), the Open (acceptance and defusion) components of ACT (Open condition), the Engaged (values and committed action) components of ACT (Engaged condition), or to a waitlist condition. Participants assigned to an ACT condition were asked to use their assigned website over the next six weeks. These participants were further randomized to either receive phone coaching for six weeks (coaching condition) or to only receive email prompts for six weeks (non-coaching condition). All participants completed a posttreatment survey six weeks after baseline, and a follow-up survey 10 weeks after baseline.

A detailed description of the intervention conditions is available in *citation removed*. In brief, all active conditions used a self-help website hosted on Qualtrics, which included 12 sessions, each estimated to require approximately 15-30 minutes to complete. The website sessions were interactive and incorporated reflection questions, writing exercises, audio/video,

text description and metaphors, and varied examples. Content was developed by ACT experts and written from a transdiagnostic perspective to address a wide range of concerns.

All participants in active conditions received regular email reminders to help with consistent engagement, whether or not they also received phone coaching. These reminders were sent at least once each week, but were sent more frequently (two-three times per week) for participants who fell behind in completing website sessions. Email reminders were brief and formulaic (i.e., they could be automated), but did include some elements of human support such as reinforcing adherence and normalizing difficulties with engagement.

Participants randomly assigned to the coaching condition received phone coaching calls on a regular basis to further support motivation, engagement, and adherence. The coaches in this study were two doctoral students in clinical/counseling psychology who had received at least one year of training in basic counseling skills. Coaching followed a protocol adapted from a well-established phone coaching protocol for internet interventions (Duffecy, Kinsinger, Ludman, & Mohr, 2011) based on the supportive accountability model for web-based health interventions (Mohr, Cuijpers, & Lehman, 2011). This model posits that human support can lead to increased adherence to web-based interventions by establishing accountability. A personal bond with a coach who is perceived to have useful expertise and care about the individual being coached is considered a prerequisite to effective, meaningful accountability. Accountability itself incorporates establishing expectations, goal setting, and collaboratively monitoring engagement.

In this study, phone coaching included an initial 10-15 minute phone call which focused on enhancing motivation, establishing expectations in regard to the self-help program and phone coaching, goal setting, and eliciting commitment to the program. The protocol also included follow-up 5-10 minute phone coaching calls approximately once each week, which focused on



reviewing whether goals were met, reinforcing engagement, enhancing motivation, collaborative problem-solving to address nonadherence and/or barriers encountered, and further goal-setting. The phone coaching protocol emphasized the principles of supportive accountability, including establishing the coach as legitimate and benevolent, framing coaching as a reciprocal relationship, holding participants accountable for their engagement, fostering intrinsic motivation, and respecting autonomy.

### **Measures**

The primary outcome of mental health symptoms was measured with the CCAPS-34 distress index (Locke et al., 2012), which is calculated as an average of 20 individual items assessing common symptoms among college students related to depression, various forms of anxiety, academic distress, and hostility. The secondary outcome of positive mental health was measured with the Mental Health Continuum-Short Form (MHC-SF; Keyes, 2006), which assesses facets of emotional, psychological, and social well-being.

A series of measures assessed improvement on relevant ACT processes of change based on the psychological flexibility model. The 7-item Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) was used to assess overall psychological inflexibility. The 7-item Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) was used to assess cognitive fusion (the process of engaging with thoughts literally such that they have excessive influence on behavior). The 10-item acceptance subscale of the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008) was used to measure mindful acceptance. The Valuing Questionnaire (VQ; Smout et al., 2010) has two subscales assessing values processes, one measuring progress toward personal values and one measuring obstruction

of progress toward values. The 8-item Committed Action Questionnaire (McCracken, Chilcot, & Norton, 2015) was used to assess committed action.

The 10-item System Usability Scale (SUS; Brooke, 1996) assessed program usability and acceptability. Four novel items assessed satisfaction with coaching on a scale from one (*Strongly disagree*) to six (*Strongly agree*). One open-ended question (*Did you not like anything about the coaching sessions? If so, why did you not like this and how could we address these issues in the future?*) sought open feedback on how coaching could be improved.

Internal consistency was adequate for all of the included measures in the current sample (CCAPS  $\alpha = .88$ ; MHC  $\alpha = .92$ ; AAQ-II  $\alpha = .86$ ; CFQ  $\alpha = .93$ ; PHLMS  $\alpha = .87$ ; VQ Progress  $\alpha = .81$ ; VQ Obstruction  $\alpha = .80$ ; CAQ  $\alpha = .85$ ; SUS  $\alpha = .76$ )

## Results

### Preliminary analyses

There was a relatively equal distribution of participants assigned to coaching and non-coaching across ACT conditions (Open coaching  $n = 22$ , non-coaching  $n = 23$ ; Engaged coaching  $n = 24$ , non-coaching  $n = 22$ ; Full coaching  $n = 22$ , non-coaching  $n = 23$ ). There were no differences between the coaching and non-coaching conditions on demographic variables or outcome/process measures at baseline.

Posttreatment assessment completion rates were 90% for the coaching condition and 87% for non-coaching. Follow-up assessment completion rates were 88% for coaching and 78% for non-coaching. Assessment completion rates were equivalent between conditions. All statistical tests used a criterion of  $p < .05$ . No family-wise correction was made for the multiple analyses conducted to maintain adequate power to detect potentially meaningful effect sizes.

Rates of coaching call completion varied due to participants missing calls, not responding to scheduling requests, or discontinuing all program engagement. The mean number of coaching calls completed was 3.66 ( $SD = 1.92$ ). Of those assigned to receive coaching, 12% did not complete any coaching calls, 3% completed one, 13% completed two, 12% completed three, 17% completed four, 25% completed five, and 18% completed six.

### **Coaching call satisfaction**

Participants reported modest satisfaction with the coaching calls as indicated by self-reported overall satisfaction ( $M = 4.77$ ,  $SD = 1.23$ , 88%  $\geq 4$  “slightly agree”), perceived helpfulness ( $M = 4.30$ ,  $SD = 1.32$ , 78%  $\geq 4$  “slightly agree”), and perceived importance of coaching calls ( $M = 4.08$ ,  $SD = 1.49$ , 65%  $\geq 4$  “slightly agree”). However, participants also slightly agreed on average that “the website would have been just as helpful without any phone coaching” ( $M = 4.03$ ,  $SD = 1.57$ , 38%  $\leq 3$  “slightly disagree”). Thus, participants appeared to be modestly satisfied with the calls, but did not think they were necessary.

Participants provided open feedback on aspects of coaching they did not like. Twenty-three responses were provided and analyzed for themes. The most common themes in open feedback about what was disliked were that 1) coaching was unnecessary or did not add benefit relative to the website ( $n = 4$ ), wanting more depth from the coaching calls ( $n = 4$ ), feeling awkward or uncomfortable during coaching ( $n = 4$ ), finding it repetitive ( $n = 3$ ), having difficulty scheduling ( $n = 3$ ), finding that calls did not help ( $n = 3$ ), and feeling unsure about their role and what they should talk about in coaching calls ( $n = 3$ ).

### **Coaching effects on program engagement and program satisfaction**

There were no differences between the coaching and non-coaching conditions on number of sessions completed (out of 12 total),  $t(134) = .26$ ,  $p = .798$ ; Coaching  $M = 8.51$ ,  $SD = 3.81$ ;

Non-Coaching  $M = 8.34$ ,  $SD = 4.20$ ,  $d = .04$ . There were also no differences between coaching and non-coaching conditions on the rate of participants completing all 12 sessions ( $\chi^2 = .12$ ,  $p = .730$ ; Coaching 43% vs. Non-Coaching 46%), or half (6) of the 12 sessions ( $\chi^2 = .16$ ,  $p = .692$ ; Coaching 76% vs. Non-Coaching 74%).

There was also no difference between the coaching and non-coaching conditions on self-reported program usability based on the SUS,  $t(117) = .56$ ,  $p = .579$ ; Coaching  $M = 86.50$ ,  $SD = 8.94$ ; Non-Coaching  $M = 85.47$ ,  $SD = 11.24$ ,  $d = .10$ . Similarly, there were no differences between the coaching and non-coaching conditions on a series of program satisfaction items including overall satisfaction, perceived helpfulness, ease of use, and intentions to use the program again ( $p > .10$ ). Results were equivalent when examining coaching versus non-coaching effects on program engagement or satisfaction separately by website condition (Open, Engaged, or Full).

### **Coaching effects on mental health outcomes**

A series of MMRM analyses tested for time by coaching condition effects on mental health outcomes and processes of change. Analyses included two levels for the coaching variable (coaching, non-coaching) and three levels for the time variable (baseline, posttreatment, follow-up). The time by condition interaction was not significant for either mental health symptoms (CCAPS) or positive mental health (MHC), indicating no difference in outcomes between coaching and non-coaching versions of online ACT (see Tables 1 and 2).

Rates of reliable change on the CCAPS distress index at posttreatment were calculated using established reliable change index values for this scale (CCMH, 2012). A chi-square test indicated no difference in the rates of reliable change between the coaching (43%) and non-coaching conditions (32%),  $\chi^2 = 1.39$ ,  $p = .24$ .

### **Coaching effects on processes of change**

A similar series of MMRM analyses tested for time by coaching condition effects on process of change measures (see Tables 1 and 2). A significant time by condition effect was found for psychological inflexibility (AAQ-II), such that participants in the coaching condition improved more than the non-coaching condition at posttreatment with a significant medium effect size ( $d = .59$ ), but this decreased to a non-significant small effect size at follow up ( $d = .27$ ). No time by condition effects were found for other process of change measures (CFQ, PHLMS, VQ, CAQ).

### **Differences in the effects of coaching by ACT component condition**

An exploratory series of MMRM analyses tested whether ACT condition (Open, Engaged, Full) moderated the effects of coaching condition on outcome and process variables over time (Table 2). A significant time by coaching by ACT condition interaction was found for psychological inflexibility (AAQ-II; Figure 1). In the Engaged condition (i.e., values and committed action only), a large pre to posttreatment effect size was found between coaching and non-coaching conditions ( $d = 1.11$ ), which reduced to a small between condition effect at follow up ( $d = .22$ ). In contrast, effect sizes approached zero in the Open condition (i.e., acceptance and defusion only) between coaching and non-coaching conditions from pre to posttreatment ( $d = .19$ ) and pre to follow up ( $d = .17$ ). In the Full condition (i.e., combining components), a medium effect size was found for coaching versus non-coaching from pre to posttreatment ( $d = .52$ ), which maintained at follow up ( $d = .49$ ). Overall, this pattern suggested stronger effects for coaching on the AAQ-II in the Engaged condition and weaker effects in the Open condition. There were no other moderation effects by ACT condition for other outcome or process measures.

### **Correlations between number of coaching calls and outcomes**

Exploratory analyses examined whether number of coaching calls related to outcomes in the coaching condition. Zero order correlations indicated that number of coaching calls were significantly related to number of sessions completed ( $r[69] = .68, p < .001$ ), such that participants who completed more calls also completed more sessions. Coaching calls did not correlate with any program satisfaction items ( $p > .10$ ). Partial correlations controlling for relevant baseline outcome/process scores as well as number of sessions completed indicated that number of coaching calls was significantly related to posttreatment mental health symptoms (CCAPS;  $r[58] = -.30, p = .02$ ), such that participants who completed more calls reported greater improvements in mental health. Coaching calls were not related to other posttreatment outcome or process variables.

### **Discussion**

This study examined the effects of phone coaching with an online ACT program for college student mental health. There were no differences on program engagement, program satisfaction, mental health outcomes, and almost all psychological flexibility processes between the phone coaching and non-coaching conditions. Participants in the coaching condition improved more than the non-coaching condition from pre- to posttreatment on a key measure of psychological inflexibility (AAQ-II), but differences were no longer present at follow-up. Results for coaching were largely equivalent between versions of the ACT websites, except for psychological inflexibility. Overall, results suggest that online self-guided ACT with email prompts is sufficient for addressing college student mental health, with little additional benefits from phone coaching.

This study adds to the growing literature evaluating methods to improve engagement and outcomes from online interventions. Early meta-analyses clearly suggested that the addition of guided support is necessary for online interventions, or at least substantially improves outcomes (e.g., Richards & Richardson, 2012; Spek et al., 2007). However, these guided support components add substantial resource costs and complexity for implementation, particularly with synchronous communication methods like phone coaching. Mixed results have been found when studies directly compare online interventions with or without guided support (Shim et al., 2017), indicating the need for evaluating the populations, settings, and treatments for which these resource-intensive methods are necessary to include.

The largely null results from phone coaching in the current study might highlight potential factors that could help account for mixed results (Shim et al., 2017). There are a variety of factors that may influence when guided support is needed, and similarly a variety of factors that may account for the limited benefits of phone coaching in this specific study. One key characteristic was the use of ACT. It could be that ACT requires less guided support due to factors such as the heavy emphasis on experiential exercises, which may be more engaging to users than psychoeducational content, or values work, which may increase intrinsic motivation to engage in the program. For example, previous studies have found guided support elements with online ACT do not improve outcomes (Fledderus et al., 2012; Ivanova et al., 2016), and that ACT methods can increase treatment seeking (e.g., Lannin, Vogel & Heath, 2017) and treatment adherence (e.g., Luoma, Kohlenberg, Hayes & Fletcher, 2012). Research has also suggested that more advanced and engaging program features may reduce the need for guided support (e.g., Ivanova et al., 2016), and it may be that the heavy interactive and tailored focus of the online ACT program reduced the need for phone coaching to maintain engagement. However,

adherence rates in the current study were relatively modest (approximately 70% of sessions completed on average) and mirrored those found in other online ACT studies (average of 76% sessions completed; Thompson et al., in press), suggesting this explanation is unlikely.

Another key characteristic was the broad college student sample. It may be that university students require less personal contact to remain engaged in online interventions. However, some previous studies have found greater effects for online interventions when adding personalized contact with college students (e.g., Kass et al., 2014). It may also be that the phone format is less relevant to college students. For example, when college students were given a choice, 83% chose guided self-help through email rather than phone (Wojtowicz, Day & McGrath, 2013). However, those who chose the phone format engaged more in the online intervention, making the pros and cons of phone coaching with students unclear. Although the study required meeting a clinical cutoff on at least one dimension of mental health symptoms based on the CCAPS, it may also be that this sample had more mild to moderate symptoms, which reviews have suggested may require less guided support (Newman et al., 2011). Consistent with this, a previous ACT trial found no benefit from added coaching with subthreshold depression (e.g., Fledderus et al., 2012).

Of note, a variety of other potential factors relevant to this and other studies, including level of expertise, human versus automated support, delivery mode, and intensity of support, do not seem to consistently predict differences in the efficacy of coaching based on the limited studies that have tested these factors directly (Shim et al., 2017). Thus, although the unique features of this study might ultimately support identification of predictors for coaching effectiveness, there are no obvious explanations based on the existing literature. Future research is needed to more systematically evaluate who, when, and in what format coaching can augment online interventions for college student mental health. Many of the current coaching approaches



are fairly general and do not tailor to individual participants and contexts. Such a “one size fits all” approach is unlikely to be maximally effective and may contribute to the weak and inconsistent results from coaching. Trials with larger samples could examine predictors and moderators of coaching effectiveness to further guide such efforts.

It may also be that the phone coaching provided in this study specifically was less effective. This phone coaching protocol was based on a well-established protocol (Duffecy et al., 2011) and underlying supportive accountability model (Mohr et al., 2011). We have found this phone coaching protocol effective in multiple RCTs with overweight/obese adults when combined with self-guided ACT interventions (*citation removed*). For example, a RCT compared online ACT with this phone coaching protocol relative to a waitlist condition in a sample of 79 overweight adults, with improvements in dietary behaviors from ACT plus coaching relative to waitlist (*citation removed*). Of note, participants reported being satisfied with phone coaching in this study, although they also reported that the website would have been just as helpful without phone coaching. Another RCT compared an ACT self-help book with this phone coaching protocol, ACT without phone coaching, and a waitlist condition in a sample of 55 adults high in weight self-stigma (*citation removed*). In this study, ACT with or without phone coaching largely performed similarly, although in a few cases stronger effects were found when phone coaching was added. Thus, there is promising support for this phone coaching protocol, but also some mixed findings, in line with the current study results.

Other research has evaluated protocols that more actively integrate ACT into coaching (Fledderus et al., 2012; Ivanova et al., 2016; Räsänen et al., 2016). For example, an alternate coaching protocol has coaches develop case conceptualizations with participants that inform tailored suggestions for using ACT and provide weekly feedback based on ACT principles

(Räsänen et al., 2016). Although the isolated effects of this coaching protocol have not been evaluated, combining this coaching with online ACT for college student mental health has been found efficacious (Räsänen et al., 2016). Two other studies have tested the additive effects of coaching protocols that integrate ACT, although less intensively. These studies have found that a coaching condition, which included discussing experiences practicing ACT strategies, how to apply ACT strategies, and answering questions about ACT, did not improve outcomes relative to a more self-guided intervention (Fledderus et al., 2012; Ivanova et al., 2016). That said, we are not aware of any studies testing coaching protocols that explicitly apply ACT to target adherence. Future research might continue to adapt and directly test coaching protocols that integrate ACT strategies to target adherence (e.g., values work to increase motivation, targeting cognitive affective barriers with acceptance and defusion).

Adherence to coaching was fairly modest, which might also have limited effects. Previous research indicates that a greater degree of coaching contact predicts greater outcomes (e.g., Dryman, McTeague, Olino & Heimberg, 2017). Similarly, we found number of calls correlated with number of sessions completed and improvements in mental health symptoms. Greater adherence to coaching calls may have resulted in larger effects in the coaching condition.

Although there was largely no effect from coaching, it is worth noting that a key process of change for ACT, the AAQ-II, improved more in the coaching versus non-coaching condition. The AAQ-II was the strongest mediator for the treatment effects of ACT in this trial (*citation removed*), further highlighting the significance of coaching augmenting effects from pre- to posttreatment. That said, by follow up there was only a non-significant small effect, suggesting the benefits from phone coaching were fleeting. Interestingly, this was moderated by website condition, such that effects from pre- to posttreatment were particularly large in the Engaged

condition (targeting values and committed action) and were particularly weak in the Open condition (targeting acceptance and defusion). This maps onto other trial results in which the AAQ-II did not improve or mediate treatment effects in the Open condition (*citation removed*). The poor effects on the AAQ-II in the Open condition may have been due to coaching not augmenting intervention outcomes for this variable. It is possible that coaching may be less relevant when targeting the Open components of ACT alone, although the mechanism accounting for that is unclear.

The non-coaching condition still received email prompts, which could be automated. Previous research suggests that including automated emails increases program adherence and treatment outcomes relative to self-guided programs without email prompts (Titov et al., 2013). Simple, automated email prompts may be sufficient for online interventions for college student mental health. Future research could explore how in-depth coaching could also be automated through a chatbot that leverages natural language processing and machine learning to increase adherence (e.g., Perski, Crane, Beard & Brown, 2019). Universities are struggling to meet the high demand for mental health services among their students, but also have limited available resources to provide guided self-help (e.g., LeViness, Bershada, & Gorman, 2017). Online programs that are highly scalable and require minimal resources to implement are needed, and thus preferably can be delivered without requiring resource intensive phone coaching procedures.

There were limitations to the study that may have reduced the effectiveness of phone coaching or the ability to evaluate its effects. The study did not include a fidelity or competence assessment for phone coaching. Thus, it is unclear the degree to which graduate students adhered to the protocol and implemented it effectively. In addition, only two graduate students provided coaching, which might have compounded any potential fidelity issues present. Although the

sample was relatively large ( $n = 136$ ), it was not adequately powered to detect small effect sizes, which would still be meaningful from a public health perspective. Consistent with this, non-significant small effect sizes were consistently observed favoring the coaching condition on most variables. Effect sizes might have been further limited by the relatively low adherence rates to coaching calls.

Overall, this study suggests that online interventions, and more specifically online ACT for college student mental health, may not always require more intensive guided support features. This study adds to a growing body of research that online ACT may be effective and engaging through the use of simple automated emails, and that more intensive coaching may have modest additional benefits.

### **Disclosure of interest**

The authors report no conflict of interest.

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Table 1. Estimated marginal means based on MMRM results with the full intent-to-treat sample.

	<u>Coaching (n = 68)</u>			<u>Non-Coaching (n = 68)</u>		
	Pre <i>M(SE)</i>	Post <i>M(SE)</i>	FU <i>M(SE)</i>	Pre <i>M(SE)</i>	Post <i>M(SE)</i>	FU <i>M(SE)</i>
<i>Outcome Variables</i>						
CCAPS	1.74 (.08)	1.07 (.08)	.94 (.09)	1.88 (.08)	1.29 (.08)	1.20 (.09)
MHC	52.72 (1.60)	60.97 (1.60)	62.15 (1.72)	49.00 (1.60)	53.92 (1.62)	55.53 (1.76)
<i>Process Variables</i>						
AAQ	29.40 (.96)	22.26 (.98)	21.63 (1.11)	29.27 (.96)	25.56 (.99)	23.34 (1.14)
CFQ	32.81 (1.06)	24.47 (1.09)	23.30 (1.19)	34.24 (1.06)	27.96 (1.10)	25.44 (1.22)
PHLMS	35.60 (.91)	27.12 (.98)	25.83 (1.07)	35.79 (.91)	30.24 (.99)	28.12 (1.10)
VQ-Obs	21.25 (.77)	15.83 (.78)	14.87 (.73)	22.00 (.77)	18.05 (.79)	16.90 (.75)
VQ-Pro	22.18 (.70)	25.22 (.72)	25.74 (.73)	20.18 (.70)	23.56 (.73)	23.80 (.75)
CAQ	35.66 (.87)	39.49 (.81)	39.66 (.87)	33.96 (.87)	38.10 (.82)	38.58 (.89)

Table 2. MMRM results for interaction effects.

	Time*Coaching <i>F</i>	Between Condition Effect Sizes		Time*Coaching*Component <i>F</i>
		Pre-Post <i>d</i> (95% CI)	Pre-Follow Up <i>d</i> (95% CI)	
<i>Outcome Measures</i>				
CCAPS	.61	.15 (-.21, .50)	.20 (-.16, .56)	.89
MHC	1.70	.33 (-.03, .68)	.27 (-.09, .64)	.75
<i>Process Measures</i>				
AAQ-II	5.70**	.59 (.23, .94)	.27 (-.10, .63)	2.49*
CFQ	1.24	.26 (-.10, .62)	.09 (-.28, .45)	.97
PHLMS	2.40	.39 (-.03, .74)	.26 (-.11, .62)	.63
VQ-Obs	1.13	.25 (-.11, .60)	.24 (-.12, .60)	2.12
VQ-Pro	.10	.07 (-.29, .42)	.01 (-.35, .37)	.05
CAQ	.12	.04 (-.31, .40)	.08 (-.28, .44)	.38

Notes: \* $p < .05$ ; \*\* $p < .01$ . Component = Full, Engaged, or Open ACT condition. Positive effect sizes are scored such that Coaching improved more than Non-Coaching.

Figure 1. Changes in mental health symptoms between coaching and non-coaching conditions by ACT component condition.

