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A Randomized Controlled Trial of an Online, Modular, Active Learning Training Program for Behavioral Activation for Depression

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Objective: This randomized-controlled trial assessed the efficacy of a trainer-led, active-learning, modular, online behavioral activation (BA) training program compared with a self-paced online BA training with the same modular content. ***Method:*** Seventy-seven graduate students (M = 30.3 years, SD = 6.09; 76.6% female) in mental health training programs were randomly assigned to receive either the trainer-led or self-paced BA training. Both trainings consisted of 4 weekly sessions covering 4 core BA strategies. Primary outcomes were changes in BA skills as measured by an objective role-play assessment and self-reported use of BA strategies. Assessments were conducted at pre-, post-, and 6-weeks after training. A series of longitudinal mixed effect models assessed changes in BA skills and a longitudinal model implemented with generalized estimating equations assessed BA use over time. ***Results:*** Significantly greater increases in total BA skills were found in the trainer-led training condition. The trainer-led training condition also showed greater increases in all core BA skills either at posttraining, follow-up, or both. Reported use of BA strategies with actual clients increased significantly from pre- to posttraining and maintained at follow-up in both training conditions. ***Conclusions:*** This trial adds to the literature on the efficacy of online training as a method to disseminate BA. Online training with an active learning, modular approach may be a promising and accessible implementation strategy. Additional strategies may need to be paired with the online BA training to assure the long-term implementation and sustainability of BA in clinical practice.

What is the public health significance of this article?
This study suggested that a trainer-led, online, BA training with active learning components effectively increases therapists' skills. This findings support the potential of online training as a method of disseminating BA to mental health providers.

Keywords: behavioral activation, training, implementation, psychotherapy, depression

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Although several evidence-based treatments (EBTs) for depression have been identified, the dissemination of these treatments into widespread clinical practice is not yet optimal. Access to EBTs for depression is limited across the world, particularly for complex psychotherapeutic interventions. Approximately 65% of adults with major depression in the United States do not receive adequate EBTs (González, Tarraf, Whitfield, & Vega, 2010). These data are worse for those in low-and-middle income countries where access to any mental health services can be extremely limited and approximately 90% of people who suffer from mental illnesses remain untreated (Demyttenaere et al., 2004; Sweetland, Oquendo, Carlson, Magidson, & Wainberg, 2016). This depression treatment gap has led to major public health concerns such as increased mortality and morbidity, decreased productivity, and significant financial burden for sufferers and their family members (Greenberg et al., 2003). The need for dissemination and implementation of EBTs for depression is widely acknowledged (Collins et al., 2011; World Health Organization [WHO], 2003). Dissemination is defined as the targeted distribution of information and intervention materials to a specific public health or clinical practice audience whereas implementation is the use of strategies to adopt and integrate evidence-based health interventions and change practice patterns within specific settings (NIH program announcement: PAR-13–055).

Behavioral activation (BA) is a well-established/efficacious EBT for depression (Chambless & Hollon, 1998) and several authors have proposed that BA may be feasible and appropriate for large scale implementation (Hollon, 2001; Kanter & Puspitasari, 2016; Sturmey, 2009). The efficacy and effectiveness of BA as an EBT for depression have been presented in several meta-analyses and systematic reviews (Cuijpers, Van Straten, & Warmerdam, 2007; Dimidjian, Barrera Jr, Martell, Muñoz, & Lewinsohn, 2011; Ekers, Richards, & Gilbody, 2008; Mazzucchelli, Kane, & Rees, 2009). Several effectiveness trials conducted in both high-income (Ekers, Dawson, & Bailey, 2013) and low- and middle-income countries (Chowdhary et al., 2015; Moradveisi, Huibers, Renner, Arasteh, & Arntz, 2013) indicate that BA is relatively easy to train and providers who did not have formal psychotherapy training can learn and deliver BA competently. Moreover, a recent randomized controlled trial found that BA was as effective as CBT but required less intensive and costly training (Richards et al., 2016). In fact, the World Health Organization (WHO) has identified BA as one of the recommended EBTs for depression particularly in low-resource settings (WHO, 2015).

The basic premise of BA is to help people with depression to reengage in activities that are meaningful and guided by their personal values, problem solve and cope with issues that maintain and perpetuate depressive symptoms effectively, and therefore increase the chance for people to reap rewards in their lives (Kanter, Busch, & Rusch, 2009). Attempts have been made to identify "BA core strategies" defined as specific behavioral strategies that occur across the multiple treatment protocols that have been published and empirically supported (Kanter et al., 2010). These core strategies include providing a BA rationale; activity monitoring and other assessment strategies (i.e., values assessment and activity monitoring); activity scheduling; and strategies to cope with avoidance and other barriers to activation. Previous studies have tested these BA strategies successfully in a wide array of clinical settings, client populations, treatment structures (e.g., individual and group psychotherapy), and diagnoses (Dimidjian et al., 2011).

Data on the feasibility of training to improve providers' knowledge of and competence with BA is primarily limited to the training of research therapists in efficacy trials (Ekers, Richards, McMillan, Bland, & Gilbody, 2011), so less is known about how to disseminate and implement BA more broadly. The majority of existing efforts to integrate BA into clinical practice are considered passive dissemination strategies (Rabin, Brownson, Kerner, & Glasgow, 2006), which mostly include publication of scientific findings, practice guidelines, and publication of treatment manuals (Kanter et al., 2009; Martell, Dimidjian, & Herman-Dunn, 2013) without data to support the effectiveness of such strategies. Less effort has been invested in the development of more active BA implementation strategies, such as continuing education (CE) training. Among other strategies (e.g., inclusion of BA training in graduate programs), CE training may be a promising method for introducing EBTs in general and BA specifically to practicing mental health providers or trainees. Given BA's solid evidence base and previous trials which suggest relative ease of training to a broad audience, BA may be a particularly appropriate approach with which to test the efficacy of CE training and active training strategies. Yet, there are existing gaps in the literature on the effectiveness of CE trainings, and active learning strategies within trainings, as a method of translating BA from research to practice.

Several recommendations have been proposed to maximize the effectiveness of EBT training and training research (Herschell, Kolko, Baumann, & Davis, 2010). First, training should minimize passive learning (e.g., didactic lectures) and maximize active learning strategies that allow for a more interactive learning process where providers have the opportunity to immediately learn concrete skills, practice the skills within and between training sessions, receive feedback, and reflect on their progress (Beidas & Kendall, 2010). A previous suicide prevention training study found that trainees who received active learning strategies demonstrated better skill at posttraining compared with those receiving standardized training (Cross et al., 2011). Several methods that may facilitate active learning are modeling of the EBT strategies by the expert trainer, practicing the strategies within training sessions, and applying the strategies in the providers' own life.

Second, it is recommended that EBT strategies are taught modularly, which allows providers to deliver the strategies with more flexibility depending on the structure of their clinical practice (Chorpita, Daleiden, & Weisz, 2005). For instance, when BA is taught modularly, providers will learn a specific BA strategy (e.g., activity monitoring and scheduling) that is not tied to a specific protocol (e.g., session-by-session guides for a typical short-term psychotherapy). Thus, providers who practice in a nontraditional psychotherapy setting, such as primary care clinic, can fit this BA strategy within the typical session structure in this setting.

The third recommendation is related to the delivery process of the training. When the goal is to reach trainees across geographical locations, it is important to consider a delivery strategy that is accessible and sustainable. Online training may be a viable option to increase access because providers can participate in the training from almost anywhere in the world (Fairburn & Cooper, 2011; Khanna & Kendall, 2015). This method may also be more cost-effective since travel time for both the trainers and the trainees is eliminated.

Lastly, to improve the quality of evidence for training as an EBT implementation strategy, researchers should adopt rigorous methodologies when designing their studies. Beidas, Cross, and Dorsey (2014) highlighted the importance of understanding effective training strategies and assessing treatment fidelity using measurement systems that are reliable, valid, and efficient. Randomized controlled trials could be utilized to compare the effects of different training strategies (e.g., passive vs. active-learning strategies; Cross et al., 2011). Diverse proxy indicators of successful training outcomes should be employed such as changes in trainees' attitudes, knowledge, skills, and eventually clinical outcomes (Herschell et al., 2010).

Puspitasari, Kanter, Murphy, Crowe, and Koerner (2013) developed an active-learning, modular, online BA training package for mental health providers and tested its preliminary outcomes in two open trials. The training was delivered in a webinar format to a group of community mental health providers (psychologists, psychiatrists, and social workers) by an expert BA trainer. The trainer and providers interacted live through web-cam technology. Active learning strategies were incorporated throughout the training sessions, which include modeling, practicing the skills within and between training sessions and immediate reflections on the practiced BA strategies. BA skills were assessed with a role play interaction between trainees and a research assistant who played a scripted depressed client (Beidas et. al., 2014). The interaction was recorded and coded independently by two raters. Results of these open trials indicated that providers who received this BA online training showed a significant increase in BA skills at posttraining and 6-week follow-up. Trainees in these studies also reported high satisfaction with the online BA training format.

This current project extends the previous preliminary studies by Puspitasari et al. (2013) into a randomized controlled trial for the first large-scale test of the training program. The sample consisted of graduate students in training programs across the United States. The focus on graduate students as the sample group was based on several factors. First, emerging data indicate that exposure to evidence-based practices (EBPs) early in graduate training is one of the strongest predictors of EBP implementation in future clinical practice (Cook, Schnurr, Biyanova, & Coyne, 2009). Second, to minimize the impact of negative attitudes toward EBPs on training outcome, we intentionally targeted graduate students because previous studies indicated that this group already have a more positive attitudes toward EBPs (Luebbe et al., 2007) and might gain more positive attitudes toward EBPs after a brief CE training (Bearman et al., 2015). Third, assuming that graduate students would have less clinical experience, including this specific sample explored whether less experienced therapists could learn BA quickly and effectively. Lastly, there has been limited research that specifically examined the role of providing specific EBT training during graduate training.

We incorporated training recommendations from the previous literature, which include implementing active learning strategies, distilling core BA strategies into distinct training modules, utilizing a train-the-trainer model, using advanced web-based technology to deliver the training, and using behavioral rehearsal to assess trainees' BA skills. To test the efficacy of the trainer-led BA online training, a control training condition was developed which consisted of the same training modules delivered as a self-paced, primarily passive learning BA online training package (i.e., audio-guided didactic presentations). This allowed us to provide a similar amount and quality of psychoeducational training content across both conditions but produced a trainer-led training that was longer than the control condition because it included the additional active-learning strategies.

The primary aim of this study was to evaluate the efficacy of the trainer-led online BA training program compared to the self-paced online BA training program. Primary outcomes included changes in overall and core BA skills as measured by blind-to-condition, independent raters using a structured role-play format, as well as self-reported use of BA strategies with clients. It was hypothesized that participants in the trainer-led online BA training would achieve significantly greater increases in overall and core BA skills compared with those receiving the self-paced BA training. It was also hypothesized that those in the trainer-led training would report greater use of BA strategies with their clients.

Method

Recruitment and Screening

The study protocol was approved by the Institutional Review Board at the University of Wisconsin-Milwaukee. Several recruitment strategies were implemented, including recruitment announcements on professional listservs (e.g., Association for Behavioral and Cognitive Therapies, American Psychological Association Division 12, American Association of Directors of Psychiatric Residency Training) and direct e-mails to directors of clinical training programs in clinical and counseling psychology, psychiatry, and nursing across the United States.

Study inclusion criteria were: (a) undergoing supervision with a licensed individual; (b) currently a graduate-level student in any of the following programs: clinical psychology, counseling psychology, social work, nursing, and psychiatry residency; (c) actively seeing depressed outpatient clients as part of his or her training during the study period; and (d) able to comply with study procedures (i.e., computer with high speed Internet access). During the recruitment and consent process, potential participants were informed that there was no incentive for participating in the study.

Graduate students who were interested in participating in the study were provided with the hyperlink to the online consent form and completed screening questions to assess eligibility. Those who did not meet the inclusion criteria were immediately informed after they completed the screener questions online. Those who were eligible provided their consent by entering their electronic signature online.

Randomization

The two training conditions focused on the same four core BA skills delivered via either the trainer-led online training or the self-paced online training. Although 98 participants expressed interest to participate and completed the consent form, 14 potential participants withdrew before randomization and seven participants were withdrawn before randomization because they stated they were not available, due to schedule constraints, to attend one of the trainer-led trainings if they were randomized to this training group. These participants automatically received the self-paced training but their data was excluded from the final analyses. Thus, of the 98 participants who provided consent, 77 participants were eligible to be randomly assigned to one of the two training groups. A stratified randomization procedure was used to ensure balance in

training conditions across type of graduate program using the random number generator provided by www.random.org.

Training Protocol

The BA training content was developed based on a review of previously published BA training protocols as summarized in Kanter et al. (2010). Four core BA skills were identified, defined in terms of behaviorally anchored microskills, and presented modularly in the training. These BA core strategies were (a) providing a BA rationale; (b) assessment in BA (i.e., activity monitoring and values assessment); (c) activity scheduling; and (d) strategies to target avoidance.

Two BA trainers with at least 5 years training and research experience in BA were recruited and trained. These trainers were PhD psychologists and completed a "train-the-trainers" training conducted by the second author. This training consisted of four 1-hr meetings delivered weekly that oriented the trainers to the training materials, content, and online training protocols. In addition to discussing the specific core BA strategies, the two BA trainers learned how to provide modeling, lead the practice sections, and provide immediate feedback. During the actual training, a trained observer was present online with a fidelity checklist to assure that trainers followed the scheduled training activities for each session (e.g., 15 min homework review, 15 min didactic, 15 min modeling, 30 min practice, 10 min general discussion). The observer also provided private written reminders regarding training time for the trainers to assure fidelity.

Prior to the first training sessions, all trainees from both groups were asked to complete several readings on BA (Kanter et al., 2010; Mazzucchelli, Kane, & Rees, 2010). The readings were intended to orient trainees to the history, theoretical background, and the rationale for each BA core skill and to minimize didactic training for those in the trainer-led training condition. The training content in the trainer-led and self-paced trainings were matched. The modular core BA skills were presented in this order: activity scheduling (Session 1); strategies targeting avoidance (Session 2); BA assessment (Session 3); and providing a BA rationale (Session 4). The BA strategies were presented in reverse to how they are typically presented in actual therapy, allowing more time to learn and practice BA skills that were considered more important and difficult.

Self-paced training. The self-paced online BA training consisted of four 40-min online presentations that were audio-guided by an undisclosed trainer. The self-paced presentations were presented via an Internet-based portal (i.e., Articulate) that delivered online training. The name and face of the BA trainer who provided the audio was not revealed to control for the effect of participant's perception of the trainer's expertise. Training sessions were delivered weekly and participants in this condition received a module at the beginning of each training week. Participants were asked to complete each module independently and at their own pace. Participants also had unlimited access to the self-paced materials. At the end of each training module, participants were encouraged to practice the newly learned BA skills on their own, integrate the skills in their lives, and implement the skills with their clients.

Trainer-led training. The trainer-led online BA training consisted of four 90-min trainer-led online sessions where the expert interacted with eight to 10 participants via a training web site provided by Practice Ground (http://www.practiceground.org). While the training content in this condition was kept the same as the self-paced condition, the training consisted of less didactic (15–20 min) and more active learning strategies. In each session, after the BA trainer provided a short didactic presentation, they modeled each BA core skill for the participants. The participants were then encouraged to practice the skill through a behavioral rehearsal. Participants received immediate feedback after the practice from both the trainer and other trainees. A discussion was conducted at the end of each training session, which allowed participants to ask questions on the learned BA skills. Participants were given between-session assignments to integrate the BA skills in their own lives and implement the skills in therapy sessions with their clients. Approximately 10 min were allocated at the beginning of each training session to discuss and give feedback on trainees' progress practicing BA skills between training sessions.

Measures

Demographic information. Demographic information was collected including participant's age, gender, race and ethnicity, type of graduate program, clinical experience, average hours providing psychotherapy weekly, extent of previous BA training (rated as *very low* to *very high* on Likert scale), and BA knowledge (total score ranged from 0–100).

Behavioral activation skills assessment (BASA). This role-play measure was developed to assess trainees' abilities to implement core BA skills with a scripted hypothetical depressed client acted by a trained assessor. An earlier version of the assessment was piloted and reported on previously (Puspitasari et al., 2013). Four BASA scenarios were created describing four hypothetical clients. Two scenarios described two women (a Caucasian and an Asian American) who represented withdrawn, inactive depressed clients, and two described men (a Black and a Caucasian) who represented active depressed clients who maintained activities that were not particularly rewarding or personally meaningful. In the BASA instructions, participants were provided with a brief synopsis, relevant clinical information and diagnosis of the hypothetical client. Participants were then prompted to implement four core BA strategies, including providing BA rationale, BA assessment, activity scheduling, and strategies targeting avoidance. Three undergraduate research assistants (two women and one man) were trained to be the BASA assessors. Several meetings were conducted for the assessors to learn and practice the BASA scenarios. The female RAs learned both hypothetical female client scenarios and the male RA learned both hypothetical male client scenarios. During the role play assessment these RAs were instructed to be reasonably compliant and cooperative.

Participants did not repeat the same role-play scenario across the three assessments (i.e., pretraining, posttraining, and 3-month follow-up) to control for practice effects. Rather, scenario order was determined at random. Participants received the BASA scenario and instructions via e-mail 1 day prior to the scheduled assessment. In the beginning of the role play assessment participants were asked to implement the four core BA strategies as best as they could even if they had no prior training in BA. On average, the role play assessments took 40 to 60 min to complete and were conducted over the phone. Assessments were audio recorded for coding purposes.

Participants' competency with the core BA skills during the role-play assessment was coded by trained coders using audiotapes of the role-play assessments and the BASA rating scale, which

consisted of 28 items and four subscales: providing the BA rationale (11 items); BA assessment (six items); activity scheduling (five items); and strategies targeting avoidance (six items). Each item was rated from 0 = *not at all competent* to 6 = *extremely competent*. The criteria for each level of competency for all of the items were concretely defined in the BASA rating sheet. Four coders were trained and training consisted of reading BA manuals, weekly didactic trainings for 6 weeks, and several coding practices. Prior to coding the actual study data, all coders rated three BASA recordings created to check coders' reliability when compared to the codes of a BA expert. Overall, the interrater reliability between each coder and the expert coder on total and subscale scores were high ranging from ICC = .89 to .98. Coders were blinded to both condition and assessment times (pre, post, or follow-up). To evaluate the internal consistency of the BASA scores for each core BA skill and for total BA skill, Cronbach's alpha was calculated. Results indicated acceptable internal consistency for all subscale and total scores (α values = 0.74, 0.72, 0.67, 0.61, and 0.83 for providing a BA rationale, BA assessment, activity scheduling, strategies targeting avoidance, and total BA score, respectively). In addition, to examine the degree to which the total scale score reflected the contribution of each of the subscale scores, we computed correlations between each skill and the total score (r values = 0.85, 0.76, 0.66, and 0.77, all p values $<.001$, respectively, for providing a BA rationale, BA assessment, activity scheduling, and strategies targeting avoidance).

Reported use of BA strategies. Participant's self-reported use of BA strategies was assessed at pretraining, posttraining, and 3-month follow-up. Participants were asked to indicate whether or not they implemented any of the core BA strategies with at least one client in the preceding week.

Training satisfaction questionnaires (TSQ). Participants completed the TSQ at the end of each training session. The TSQ consisted of six quantitative questions to assess participants' satisfaction with the session. The TSQ assessed perceived helpfulness, quality, usefulness, participants' likelihood to incorporate BA strategies, satisfaction with training duration, and satisfaction with training slides. Participants rated each question on a 5-point scale with 1 (*poor*), 2 (*fair*), 3 (*good*), 4 (*very good*), and 5 (*excellent*). Total TSQ scores ranged from 6 to 30. To produce a summary satisfaction score for each training session, the quality and usefulness ratings were averaged, and a total average of all six ratings was also produced. The internal consistencies of the average satisfaction scores for each training session were good (α values = 0.81, 0.83, 0.85, and 0.85 for Sessions 1 to 4, respectively).

Data Analyses

Potential differences in pretraining variables, as well as training satisfaction (TSQ) and adherence (mean number of training sessions completed, rates of individual session completion) between groups were investigated using independent-sample t tests (for continuous variables) and chi-square analyses (for categorical variables).

Longitudinal outcome models. All models were conducted on the intent-to-treat sample, with all randomized participants included in the analysis. For continuous outcomes (BASA total score and all subscales), a series of longitudinal mixed effects models were used in which mean scores in the outcome over time were simultaneously regressed on group, time, and Group × Time. Models were adjusted for baseline levels of the outcome variable, and pre-BA knowledge and included a random intercept. Models use a likelihood based approach to estimation and thus made use of all available data without directly imputing missing outcomes.

For self-reported use of BA strategies (dichotomous outcomes), a longitudinal model implemented with generalized estimating equations (GEE's) with robust standard errors, was used to test the association between group and the odds of BA strategy use over time adjusting for pre- BA knowledge. All available data were used for estimation without making assumptions about missing outcomes.

The effect of clustering by trainer on the association between group and outcome was assessed in a separate step in each model. However, there was no evidence of a significant change in effect of clustering and thus we present the simplified model that did not include this level of clustering. We adjusted for pre BA knowledge in all models because pre-BA knowledge was the only variable that differed by group ($p < .10$) pretraining, and model fit was improved when pre-BA knowledge was included.

Results

Recruitment and Retention

Of the 77 participants eligible for randomization, 37 were randomized to the trainer-led training group and 40 were assigned to the self-paced training group. In the trainer-led group, 31 participants completed the posttraining assessment (83.8% retention rate) compared with 33 participants in the self-paced group (82.5% retention rate). Furthermore, 21 participants in the trainer-led group (56.8% retention rate) and 20 participants in the self-paced group (50% retention rate) completed the follow-up assessment. Chi-square tests indicated no significant association between training type and completion, $\chi^2(1) = .023$, $p = .881$. For the complete flow of participants, refer to the consort diagram (see Figure 1) where data on participants who completed training sessions and assessments, dropped out from participation, and missed assessment points and training sessions are presented.

Demographic Characteristics

Baseline characteristics of the total sample are presented in Table 1. Participants were predominantly female (76.6%), Caucasian (71.4%), graduate students in psychology (54.5% clinical psychology, 14.3% counseling psychology) with a mean age of 30.32 (SD = 6.09) years.

There were no significant differences ($ps > .10$) found on any baseline variable (i.e., all variables listed in Table 1), except on pretraining BA knowledge. Pretraining BA knowledge was marginally higher in the trainer-led condition, $t(75) = 1.907$, $p = .58$) and is controlled for in final longitudinal models.

Training Adherence and Satisfaction

Completion rates for the first, second, third, and fourth session of the trainer-led training were 94.6%, 97.3%, 94.6%, and 86.5%, respectively. The Articulate web site recorded completion of self-

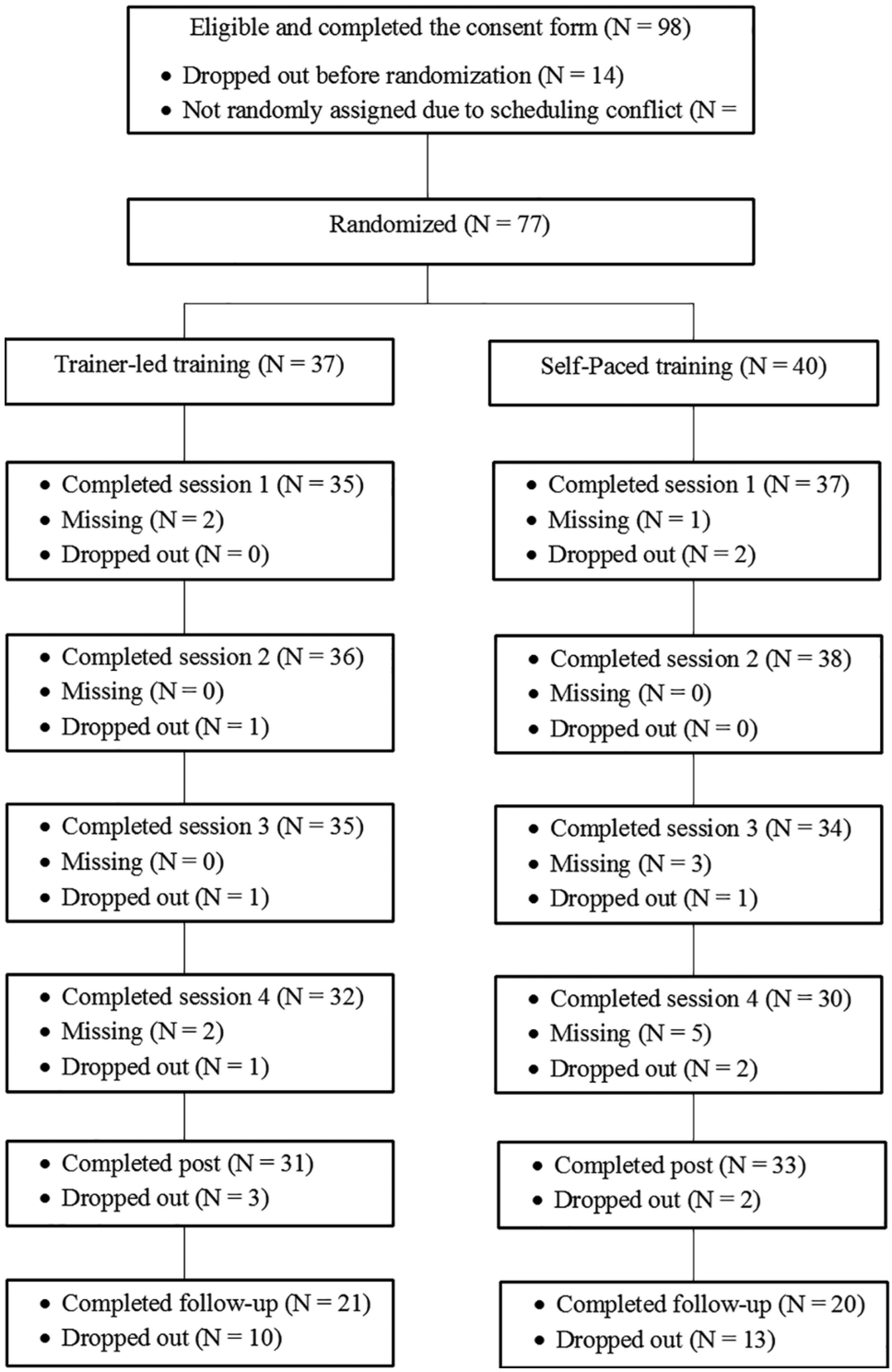

Figure 1. Consort Diagram.

paced sessions. The completion rates for the first, second, third, and fourth session of the self-paced training were 92.5%, 95%, 85%, and 75%, respectively. Chi-square tests indicated no significant differences between groups in individual session completion (all *p*s $>$ .05). The mean number of sessions completed by participants in the trainer-led and self-paced training were 3.73 (*SD* = .693) and 3.48 (*SD* = 1.012), respectively. The difference between the groups was not statistically significant.

Table 1
Baseline Characteristics of Participants

Characteristic	All Participants *n* (%)	Trainer-led training *n* (%)	Self-paced training *n* (%)
Demographic			
Age (*M* ± *SD*)	30.32 ± 6.09	30.95 ± 6.08	29.83 ± 6.12
Female	59 (76.6)	27 (73)	32 (80)
Male	18 (23.4)	10 (27)	8 (20)
Race or ethnicity			
White	55 (71.4)	24 (64.9)	31 (77.5)
Black	6 (7.8)	2 (5.4)	4 (10)
Non-White Hispanic	1 (1.3)	1 (2.7)	—
South Asian	2 (2.6)	1 (2.7)	1 (2.5)
Middle Eastern	1 (1.3)	—	1 (2.5)
East Asian	5 (6.5)	3 (8.1)	2 (5.0)
Southeast Asian	1 (1.3)	1 (2.7)	—
Native American	—	—	—
Pacific Islander	—	—	—
Other	1 (1.3)	1 (2.7)	—
Mixed	5 (6.5)	4 (10.8)	1 (2.5)
Graduate Program			
Clinical psychology	42 (54.5)	20 (54.1)	22 (55)
Counseling psychology	11 (14.3)	6 (16.2)	5 (12.5)
Social work	9 (11.7)	3 (8.1)	6 (15)
Psychiatry residency	15 (19.5)	8 (21.6)	7 (17.5)
Clinical			
Clinical experience			
1 year	29 (37.7)	12 (32.4)	17 (42.5)
2 years	16 (20.8)	6 (16.2)	10 (25)
3 years	13 (16.9)	7 (18.9)	6 (15)
4 years	9 (11.7)	6 (16.2)	3 (7.5)
5 years	9 (11.7)	6 (16.2)	3 (7.5)
≥6 years	1 (1.3)	—	1 (2.5)
Weekly psychotherapy (*M* ± *SD* Hours)	2.17 ± 1.04	2.19 ± 1.05	2.15 ± 1.05
Self-reported previous BA training			
Very low	37 (48.1)	20 (54.1)	17 (42.5)
Low	31 (40.3)	14 (37.8)	17 (42.5)
Average	9 (11.7)	3 (8.1)	6 (15)
High	—	—	—
Very high	—	—	—
BA knowledge (*M* ± *SD*)	86.8 ± 10.06	89.05 ± 8.57	84.75 ± 10.98
Reported use of BA strategies	22 (28.6)	11 (29.8)	11 (27.5)

Note. BA = behavioral activation.

Overall, there were no significant differences (all $p > .05$) on TSQ between groups for any of the four training sessions. The mean TSQ in the trainer-led group were: Session 1 ($M = 25.84$, $SD = 3.40$), Session 2 ($M = 24.73$, $SD = 4.00$), Session 3 ($M = 24.73$, $SD = 3.81$), and Session 4 ($M = 25.57$, $SD = 3.30$). The self-paced group had the following TSQ scores: Session 1 ($M = 25.30$, $SD = 3.11$), Session 2 ($M = 25.50$, $SD = 2.81$), Session 3 ($M = 25.05$, $SD = 2.91$), and Session 4 ($M = 26.13$, $SD = 3.17$). Thus, participants reported high satisfaction with all training sessions regardless of group.

Trainers Adherence to Training Protocol

The trainer-led online training consisted of five main training activities in each session: reviewing homework, didactic of core BA skills, modeling, practicing, and general discussion. The trainers in the trainer-led training provided two different training sessions each week (to different groups of trainees) and their adherence to the training activities were coded live by study personnel using a checklist. Adherence was defined as whether or not the trainer completed each main training activity for a particular training session. Overall, the trainers provided 98% of the training activities prescribed by the protocol.

BA Skills

Figure 2 depicts changes in adjusted BASA total scores and Figures 3a–d depict changes in adjusted subscale scores.

BASA Total

There was a significant increase in BASA total scores in the trainer-led group from both pretraining to posttraining (39.65, $SE = 5.25$, $p < .01$; representing a 1.4 point increase on the Likert scale) and pretraining to follow-up (37.20, $SE = 8.62$, $p < .01$; representing a 1.3 point increase on the Likert scale). There was a significant increase in BASA total scores in the self-paced group from both pretraining to posttraining (22.59, $SE = 5.07$, $p < .01$; representing a 0.8 point increase on the Likert scale) and pretraining to follow-up (20.31, $SE = 6.01$, $p = .001$; representing a 0.7

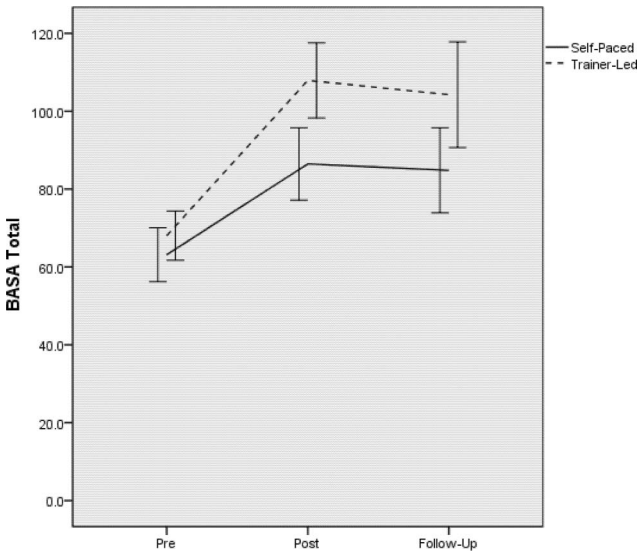

Figure 2. Adjusted Mean Behavioral activation skills assessment (BASA) Total Scores over Time by Group.

point increase on the Likert scale). There were significant between-groups differences in BASA total scores favoring the trainer-led group at both posttraining (mean difference at posttraining = 20.79, *SE* = 5.95, $p = .007$; representing a 0.7 point difference on the Likert scale) and follow-up (mean difference at follow-up = 18.33, *SE* = 7.41, $p = .0150$; representing a 0.7 point difference on the Likert scale).

Providing a BA Rationale

There was a significant increase in skill at providing a BA rationale in the trainer-led group from pretraining to posttraining (16.10, *SE* = 2.65, $p < .01$; representing a 1.5 point increase on the Likert scale) and pretraining to follow-up (11.81, *SE* = 4.30, $p = 001$; representing a 1.1 point increase on the Likert scale). There was a significant increase in providing a BA rationale skills in the self-paced group from pretraining to posttraining (8.37, *SE* = 2.56, $p = .001$; representing a 0.8 point increase on the Likert scale) and pretraining to follow-up (9.62, *SE* = 2.99, $p = .001$; representing a 0.9 point increase on the Likert scale). There was a significant between-groups difference at posttraining favoring the trainer-led group (mean difference at posttraining = 8.23, *SE* = 2.78, $p = .0038$; representing a 0.7 point difference on the Likert scale). There was not a significant between-groups difference in providing a BA rationale skills at follow-up ($p = .2622$).

BA Assessment

There was a significant increase in BA assessment skills in the trainer-led group from pretraining to posttraining (8.38, *SE* = 1.24, $p < .01$; representing a 1.4 point increase on the Likert scale) and pretraining to follow-up (7.45, *SE* = 2.05, $p < .01$; representing a 1.2 point increase on the Likert scale). There was a significant increase in BA assessment skills in the self-paced group from pretraining to posttraining (4.28, *SE* = 1.20, $p < .01$; representing a 0.7 point increase on the Likert scale) and pretraining to follow-up (3.27, *SE* = 1.43, $p = .02$; representing a 0.5 point increase on the Likert scale). There were significant between-groups differences favoring the trainer-led group at both posttraining (mean difference = 5.23, *SE* = 1.44, $p = .0005$; representing a 0.9 point difference on the Likert scale) and follow-up (mean difference = 4.30, *SE* = 1.79, $p = .0179$; representing a 0.7 point difference on the Likert scale).

Activity Scheduling

There was a significant increase in activity scheduling skills in the trainer-led group from pretraining to posttraining (10.64, *SE* = 1.14, $p < .01$; representing a 2.1 point increase on the Likert scale) and pretraining to follow-up (10.48, *SE* = 1.87, $p < .01$; representing a 2.1 point increase on the Likert scale). There was a significant increase in Activity Scheduling skills in the self-paced group from pretraining to posttraining (5.98, *SE* = 1.10, $p < .01$; representing a 1.2 point increase on the Likert scale) and pretraining to follow-up (6.22, *SE* = 1.31, $p < .01$; representing a 1.2 point increase on the Likert scale). There were significant between-groups differences favoring the trainer-led group at posttraining (mean difference = 4.50, *SE* = 1.33, $p = .0010$; representing a 0.9 point difference on the Likert scale) and follow-up (mean difference = 4.34, *SE* = 1.65, $p = .0098$; representing a 0.9 point difference on the Likert scale).

Strategies Targeting Avoidance

There was a significant increase in strategies targeting avoidance skills in the trainer-led group from pretraining to posttraining (9.59, *SE* = 1.87, $p < .01$; representing a 1.6 point increase on the Likert scale) and pretraining to follow-up (12.00, *SE* = 3.05, $p < .01$; representing a 2 point increase on the Likert scale). There was a significant increase in strategies targeting avoidance skills in the self-paced group from pretraining to posttraining (9.40, *SE* = 1.81, $p < .01$; representing a 1.6 point increase on the Likert scale) and pretraining to follow-up (7.33, *SE* = 2.12, $p < .01$; representing a 1.2 point increase on the Likert scale). There were no significant between-groups difference in strategies targeting avoidance skills at posttraining ($p = .18$); however, there was a significant between-groups difference at follow-up favoring the trainer-led group (mean difference = 5.08, *SE* = 2.51, $p = .0453$; representing a 0.8 point increase on the Likert scale).

Use of BA Strategies

The use of BA strategies increased significantly from pretraining (28%) to posttraining (67%; *OR* = 5.77, 95% CI [2.34, 14.21]) and from pretraining to follow-up (68%) in the trainer-led group (*OR* = 5.83, 95% CI [2.38, 14.32]). The use of BA strategies increased significantly from pretraining (29%) to posttraining (71%; *OR* = 5.12, 95% CI [1.93, 13.60]) and from pretraining to follow-up (71%) in the self-paced group (*OR* = 5.45, 95% CI: 2,07–14.35). However, there were no significant group differences in the rates of use of BA strategies at post ($p = .70$) or follow-up ($p = .77$).

Discussion

Research on the development of effective and efficient training strategies is important to improve EBTs implementation in prac-

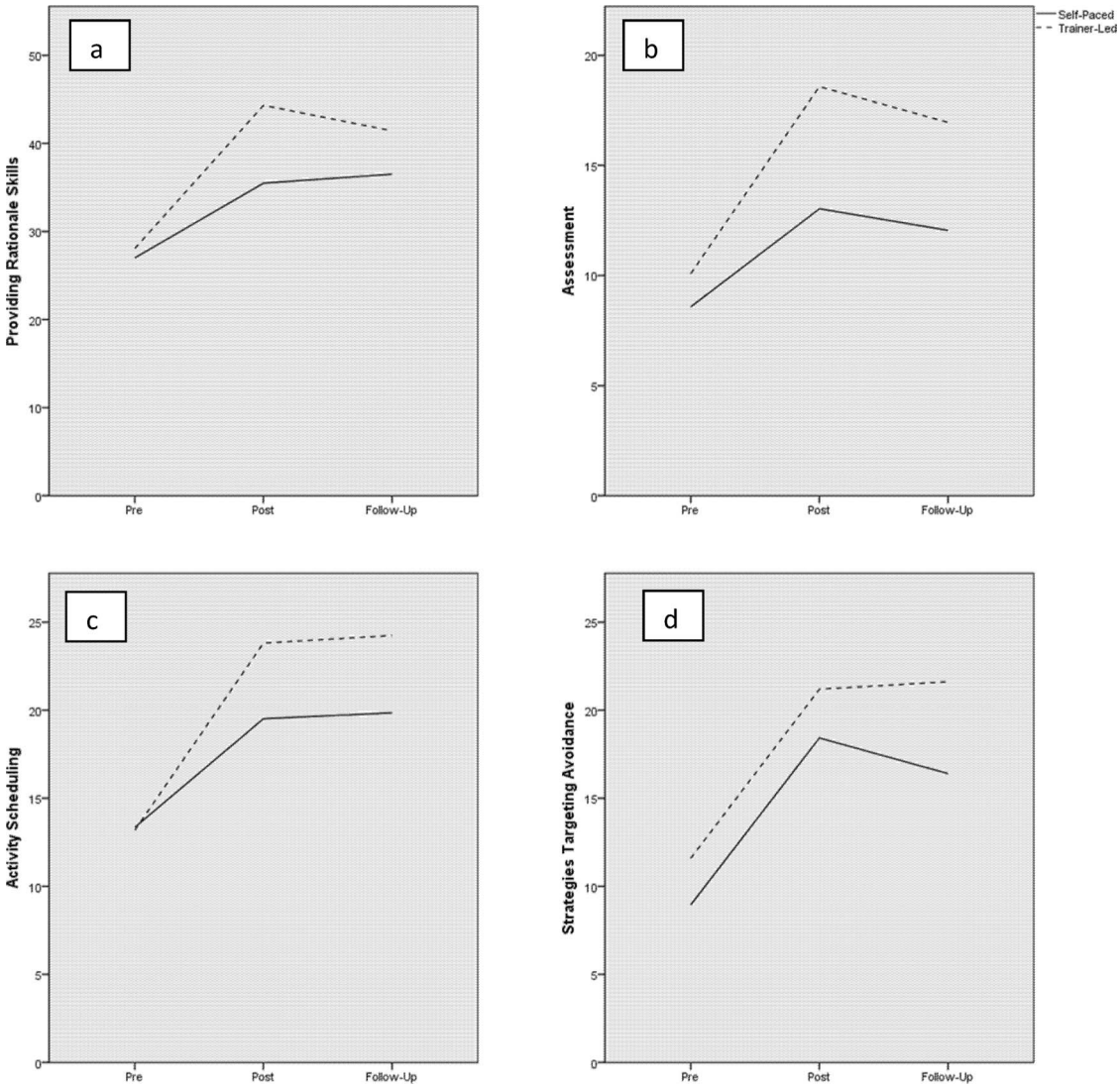

Figure 3. Adjusted Mean Behavioral activation skills assessment (BASA) Sub-Scale Scores over Time by Group.

tice. The current study aimed to evaluate the efficacy of a trainer-led, active-learning, modular, online BA training program in comparison with a self-paced, online BA training program that relied mainly on didactic presentation. Changes in trainees' BA skills and self-reported use of BA strategies were examined immediately after the training and at a 3-month follow-up. Overall, findings indicated that both trainings resulted in significant increases in BA skills, maintained at follow-up, although participants who received the trainer-led BA trainings demonstrated larger improvements than participants who received the self-paced training on overall BA skills and core BA strategies. Comparable significant increases in use of BA strategies with clients were also found in both training groups, suggesting that both groups were employing BA strategies more frequently, but the trainer-led training group may have been doing so with more skill. Lastly, participants in both groups reported high satisfaction with the online BA training that they received.

Changes in BA Skills

Findings from this study indicated that trainer-led online BA training outperformed self-paced online BA training with respect to overall BA skill improvements, with a moderate effect size, and similar differences were observed with respect to almost all specific core BA skills either at post, follow-up or both. Based on these findings, the first hypothesis that the trainer-led online training would produce greater increases on BASA total and subscale scores was supported.

The results in this study were consistent with previous EBT training studies that found training with active learning strategies produced better outcomes than control conditions in improving trainees' EBT skills (Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Sholomskas et al., 2005). There were, however, several logistical differences between the trainer-led BA online training and these previous EBT training packages. First, the training conditions in the previous studies utilized active learning strategies delivered in-person in a workshop

format. Second, both previous studies included multiple consultation sessions after the workshop where participants received more practice and feedback regarding the newly learned therapeutic skills. On the other hand, all contact in the current BA training study occurred online and total training time led by the BA trainers was considerably shorter than that of the previous two studies. This is important to highlight because developing training strategies that maximize outcomes yet minimize resources is desirable from an implementation stand point.

The BA training implemented several strategies that may have been influential with respect to improving skills in a relatively brief period of training time, and there may be some advantages with respect to the content of BA itself as it was modularized in this training. First, based on previous findings emphasizing the importance of active learning strategies, we tried to limit the didactic (passive learning) portion of the training and maximize active learning strategies such as modeling, practice, and feedback. We likewise minimized time spent on theory and research behind BA. Furthermore, from its beginnings (Dimidjian et al., 2011), BA was seen as promising in part because of its parsimony, straightforward techniques and simple rationale, and the current approach attempted to maximize those qualities for the sake of efficient and clear training. Core strategies emblematic of BA (Kanter et al., 2010) and necessary for implementation of its mechanism of action (Manos, Kanter, & Busch, 2010) were identified and defined in terms of concrete and behaviorally anchored microskills, and these skills formed the content of both the trainer-led and passive training conditions. For example, to implement activity scheduling, participants learned five microskills: (a) collaboratively work with client to identify activities to work on, (b) consider task difficulty and break assignments into smaller parts, (c) schedule activity concretely, (d) identify obstacles, and (e) identify solutions to obstacles. After explaining these microskills through didactics, participants immediately observed the trainer model the skills, practiced the skills with each other, and received immediate feedback on the practiced skills from both the trainer and other trainees.

Although the trainer-led BA online training outperformed the self-paced online training, the self-paced online training appeared to be beneficial as well. This study suggests that receiving a shorter, less interactive, self-paced BA training in these modular skills could improve participants' competency in implementing the core BA strategies with a hypothetical depressed client. To learn BA, self-paced training may be a viable initial strategy but should be followed by other training strategies that allow further active learning. In addition, because the self-paced training in the current study only included passive learning strategies, adding more interactive features (e.g., case vignettes, quizzes that prompt participants to choose BA skills to implement) to the training modules may increase effectiveness with respect to gains in skill.

While the data on improved BA skills after training even without additional consultation is encouraging, we want to highlight the current evidence indicating the importance of consultation to facilitate therapist adherence and skills maintenance (Beidas, Edmunds, Marcus, & Kendall, 2012). Because the current article is an initial step in assessing the effectiveness of different BA training strategies, our primary outcome was the effect of short-term training on skill acquisition. It may be the case that ongoing consultation is needed for effective implementation of BA in routine clinic settings, as this is considered the gold standard strategy of pairing training with ongoing consultation (Edmunds, Beidas, & Kendall, 2013). Additional research is necessary to examine the role of consultation sessions to augment BA skill acquisition after trainer-led BA training.

Reported Use of BA Strategies

Our hypothesis that those in trainer-led group would report higher use of BA strategies was not supported. Results indicated that both groups reported increased use of BA strategies from pretraining to posttraining and this increase was maintained at follow-up. While these data are encouraging, it should be highlighted that we only assessed dichotomously whether or not participants used at least one BA strategy with a client in the previous week. Thus, the definition of BA use is very limited and the extent, frequency, and regularity with which these strategies were implemented remains unknown.

Limitations and Future Directions

The first limitation of the study was the hybrid research design that might have improved external validity but somewhat compromised the internal validity of the findings. While the study consisted of features found in efficacy studies (e.g., random assignment and comparative condition), there were aspects of the study that were not highly controlled. For instance, the amount of training time between the groups was different. Those in the trainer-led training group received approximately 360 min of training time whereas participants in the self-paced training received approximately 160 min of training time. Thus, the results may have been impacted by the amount of time spent in training, which was not controlled across conditions. Future studies should include stricter control conditions and assure equivalence on potentially confounding variables, such as the total amount of time and trainer contact. One potential strategy to balance the amount of time is to include independent reading materials and quizzes to increase the time for the self-paced training. Moreover, to further assure internal validity and the role of training dose (Kiluk et al., 2011), future studies should also include a more systematic measure to assess completion of training materials (e.g., time spent reviewing self-paced materials and active learning participation for those in the trainer-led trainings).

Our primary finding, that the online BA training results in improvements in objectively assessed BA skills, was based on performance during a role play assessment with a hypothetical client. Although this in itself is a substantial improvement with respect to measurement of training outcomes, and the use of standardized role play assessments as a proxy for actual clinical interaction is a specifically recommended measurement strategy (Fairburn & Cooper, 2011), it still limits our ability to understand the impact of training on actual clinical practice. To further assess the impact of BA training strategies, future studies should consider more diverse outcome indicators such as therapists' BA fidelity in actual practice, client outcomes, and cost-effectiveness of the two BA training strategies. Measuring both BA skills and client outcomes will allow for analyses of the relations between competence and outcomes in BA. Collecting data on the cost of trainer-led versus self-paced trainings will allow for determination of an implementation strategy that is not only effective to improve BA skills but also more affordable.

The third limitation of the current study was the absence of longer-term follow-up data and the high attrition rate. It is important to

examine the effectiveness of the trainings in maintaining participants' skills and sustaining implementation of BA strategies in clinical practice. While improvements in BA skills were observed at post- and six weeks after training, it remains unknown whether this level of competency would be retained long term. A previous review concluded that skills tend to deteriorate after a few months if there is no follow-up contact to sustain outcomes (Herschell et al., 2010). Because the current BA training did not include any follow-up training sessions or consultation with participants, skills might decrease after some time. Additional caution should also be taken when interpreting the follow-up data because only 53% of the participants completed follow-up. Although there is no differential attrition between the two training conditions, this low rate of completion might have decreased the interpretability of follow-up findings. This high attrition at follow-up is consistent with a previous training study that used role-play assessment as an outcome measure (Dorsey et al., 2016). Future studies should include longer-term follow-up to examine BA skills maintenance in clinical practice as well as strategies to improve retention.

Fourth, because the BASA used in this study was still in development, no benchmarking data were available. It is unknown if the BASA total score improvements observed in the trainer-led condition, of approximately 60% of the maximum score, are adequate to conclude that participants met an expected competency standard, and it likewise is difficult to conceptualize the clinical meaningfulness of the more modest gains evidenced by those in the control condition. Future benchmarking studies are needed to examine the sufficient BASA scores that need to be achieved to predict successful outcomes in actual clinical practice. Future studies also should examine how different samples (e.g., BA expert, BA clinicians) perform on the BASA to further validate this assessment method. Lastly, to analyze the construct validity of the BASA, future studies should analyze the degree to which BASA scores are correlated with other BA competency measure such as the Quality of Behavioral Activation Scale (Dimidjian, Hubley, Martell, Herman-Dunn, & Dobson, 2012).

Lastly, because we only included graduate students in training, no firm conclusions can be made about the differential effects of trainer-led versus self-paced BA training for mental health providers who are not in training. Previous BA training studies, however, provided preliminary evidence that more experienced mental health providers also showed significant increases on BA skills after receiving the online training (Puspitasari et al., 2013). Furthermore, because the use of and comfort level toward online technology are different between generations (Zickuhr, 2011), it is possible that the positive effect of both training formats was driven by the fact that this study only included graduate students who presumably are more familiar with online technology. Future studies should assess the external validity of the BA online training by including mental health providers with diverse ranges of experiences and clinical settings.

Conclusion

In summary, the strength of this study is the randomized comparison between trainer-led versus self-paced BA online training and the use of objective measurement of BA skills. Both training methods were found to be effective methods of disseminating BA to mental health trainees in diverse geographical locations. Those who received the trainer-led training consisting of active learning strategies showed greater improvement in overall BA skills. While current findings point to the effectiveness of a modular, online BA training as an implementation method, further studies are still needed to examine effective strategies that will lead to the implementation and sustainment of BA in clinical practice.

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