Journal of Contextual Behavioral Science 16 (2020) 9–16

Contents lists available at ScienceDirect

Journal of Contextual Behavioral Science

journal homepage: www.elsevier.com/locate/jcbs

Using acceptance and commitment training to enhance the effectiveness of behavioral skills training

Alexandra Little[a], Jonathan Tarbox[b,*], Khaled Alzaabi[a]

[a] University of Southern California and Learning and Behavioral Center, United States
[b] University of Southern California and FirstSteps for Kids, United States

ABSTRACT

The purpose of this study is to investigate the use of acceptance and commitment training (ACT) to enhance the effectiveness of behavioral skills training (BST) used within a train-the-trainer model, in the context of an autism clinic. The study utilized an ABC design embedded within a multiple baseline across staff trainer participants, who were working in applied behavior analysis staff trainer jobs. Each participant received an initial BST training on how to use BST to train junior-level staff, for whom they were responsible for training. ACT training was then added in order to evaluate whether it would enhance the effectiveness of BST. The addition of ACT was found to be effective in enhancing the performance of staff trainers, the results generalized across staff and clients who were not present during ACT training, and maintained after ACT training was terminated.

A substantial amount of research has established the effectiveness of applied behavior analytic (ABA) interventions for individuals with autism (Virués-Ortega, 2010). This research has led to laws requiring insurance companies to fund ABA treatment, resulting in a large and rapid expansion in the demand for ABA services (Glass, 2015). As the field grows, so does the need for quality therapists and the training of behavioral therapists is therefore more important today than perhaps ever before. While substantial research has shown which training procedures are effective, many ABA clinics do not implement empirically validated models consistently.

Behavior skills training (BST) is among the most scientifically supported procedures for training staff (Parsons, Rollyson, & Reid, 2012). Behavior skills training (BST) involves a three-step model (Nigro Bruzzi & Sturmey, 2010). The first step is verbal instruction in which the trainer provides a description of a skill, discusses the importance or rationale, and when to and not to use it. The second step consists of the trainer modeling how to perform the skill. The third step consists of role-play rehearsal with feedback, which allows the individual to practice the skills and receive immediate feedback from the trainer. During this step, the trainer provides praise for correct responses and corrective feedback for incorrect responses. Role-play with feedback is generally continued until the trainee demonstrates accurate performance according to a predetermined criterion, for example, at least 90% correct implementation.

A substantial amount of research shows the effectiveness of BST in training a variety of ABA skills. Sarokoff and Sturmey (2004) evaluated the use of BST to train three special education teachers working with a child with ASD to implement discrete trial training (DTT). The results show that BST produced rapid improvements in the teachers' implementation of DTT (Sarokoff & Sturmey, 2004). Additionally, previous research used BST to teach staff to implement most-to-least prompting, as well as how to use manual signs for communication with clients (Parsons et al., 2012). In this study, the researchers provided a written description of the target skill during the verbal explanation phase, as is often done in BST. Following the intervention all participants showed an increase in proficient use of most-to-least prompting as well as signing skills.

Substantial research such as that described above provides evidence for the effectiveness of BST, but it may be difficult to use a standard BST model to train a sufficient number of staff in a rapid enough manner to meet the demand. An alternative to having one expert trainer use BST to directly train all staff in an organization, is to use a train-the-trainer model. The train-the-trainer model involves training mid-level staff to use BST to train lower-level employees, thus expanding the efficiency of training in the organization. Train-the-trainer programs are used in multiple fields such as public health, safety, education, and health care (Yarber et al., 2015). There are multiple advantages to the train-the-trainer programs, however the largest and most applicable to the field of ABA is the ability to train a larger number of people per unit of time (Yarber et al., 2015). BST has been used with senior staff to teach them how to implement BST when training new staff within the work setting (Parsons, Rollyson, & Reid, 2013). However, previous research has focused on training senior staff members to train another staff member in a small number of work-related skills. In many ABA clinics, it is

* Corresponding author.
E-mail address: jtarbox@usc.edu (J. Tarbox).

https://doi.org/10.1016/j.jcbs.2020.02.002
Received 21 October 2019; Received in revised form 7 January 2020; Accepted 19 February 2020

necessary for new incoming staff to be trained in a variety of work-related skills. This task however can be daunting to senior staff preparing to train as they are expected to not only provide effective therapy, but to also provide effective training. Additional research may therefore be needed on ways to enhance the effectiveness of a BST train-the-trainer model, when this model alone does not produce sufficient behavior change.

Implementing BST inside of a train-the-trainer model can be difficult for staff. The job of ABA therapists and trainers working with families with autism is inherently stressful and research suggests burnout can be a significant problem in this discipline (Hurt, Grist, Malesky, & McCord, 2013). It is not common for ABA training approaches to address private events, but staff often report that private events play a role in the difficulty of implementing effective staff training. For example, trainers may report that they experience private events such as stress, feelings of fatigue or frustration, and thoughts that they are unprepared or inadequate to the task of training. If treated as hypothetical internal causes of behavior, these covert variables are of little use in a science of behavior. However, when treated as private environmental events, for example as aversive stimuli and maladaptive rules or discriminative stimuli, it should be possible to address them in a behavioral approach to staff training and performance. If private events are simply behavior and/or environment, then they should be amenable to analysis and intervention according to the same behavior analytic principles that govern everything else we do in behavior analysis, in addressing functional relations between overt behavior and environment (Skinner, 1974).

1. Behavior analytic perspective on acceptance and commitment training

Acceptance and commitment training (ACT) is a contemporary behavior analytic approach to addressing the unhelpful role that private events sometimes have in influencing socially meaningful overt behavior. ACT was originally developed as a behavior analytic approach to psychotherapy and is still called acceptance and commitment *therapy* when implemented in that setting. More recently the term acceptance and commitment *training* has been used to refer to ACT when it is applied in non-psychotherapeutic settings. ACT is a mindfulness-based approach to behavior change that focuses on increasing behavioral flexibility. A foundational conceptual functional analysis at the foundation of ACT is that sub-optimal performance often involves behavior that is maintained by escape from or avoidance of aversive private events, referred to "experiential avoidance" in the ACT literature (Hayes, 2004). As an alternative to escape-maintained behavior, ACT aims to train individuals to function effectively in the presence of challenging private events by behaving more flexibly and toward overt, larger and long-delayed positive reinforcers, referred to as "values" in the ACT literature.

Interventions informed by ACT target six component repertoires of behavior (referred to as "processes" in the ACT literature), all of which interact with one another, to achieve socially meaningful overt behavior change (Hayes, Pistorello, & Levin, 2012). The terms comprising the hexaflex are not technical terms in behavior analysis, but all are intended to be understood functionally. Each refers to both: 1) a skill repertoire consisting of complex functional relations between behaviors and environmental events, and 2) procedures used to strengthen these behavioral repertoires (much in the same way as the term "reinforcement" refers both to a relation between behavior and consequences that strengthen it, as well as to procedures used to reinforce behavior in practice).

Values. From a functional analytic standpoint, the term values refer to large classes of verbally constructed, highly potent, long-term positive reinforcers. For example, seeing a child succeed in school, hearing a parent tell you that they are able to take their child out to eat at a restaurant for the first time, and seeing that child make friends and succeed socially, may be in a hierarchical relational class with values statements such as "making a difference as a behavior analyst." As procedures, values-based interventions involve statements or rules that function as verbal motivating operations (i.e., augmentals), that increase or decrease the effectiveness of stimuli as reinforcers or punishers, in turn supporting committed action in the form of overt behavior. For example, within a staff training model, the clinical director may ask the staff trainer "What drives you to come into work each day?" The staff trainer may say something along the lines of "I care about helping kids with autism be able to be more independent and reach their fullest potential." The clinical director could then link the importance of providing quality training to new staff with that trainer's value of helping children. For example, "I can draw a direct line between each hour that I put into training staff and the outcomes their clients are going to have in the future. If I do a great job at training, it could literally make the difference for a kid being able to learn the words to say, 'I love you' to his mom for the first time." Contacting "values" verbal stimuli such as these may work by making training, itself, less aversive or more positively reinforcing, through transformation of stimulus functions, in accordance with the verbal network involved in the previously contacted augmental.

Present moment attention. Present moment attention as a behavioral repertoire can be described as an individual's behavior of attending to stimuli in the present moment *more* and attending to one's own verbal behavior surrounding the past, future, or imagined events *less*. For example, in the context of providing staff training, a strong repertoire of present moment attention for the trainer would consist of most of her attending behavior being oriented to the trainee, the client, and other relevant variables of the training situation. A relatively weaker present moment repertoire for the trainer could involve more of her attending behavior being directed to private stimuli, such as the thought "If I tell this person they aren't doing a good job, they might not like me, or they might quit."

In addition to paying attention to the present moment, present-moment-attention behavior involves learning to attend to one's own attending behavior, which becomes, itself, part of the array of present moment stimuli to which one attends. This can involve noticing and tacting one's own attending behavior, including when it is in the present, versus when it wanders, which can then serve as a discriminative stimulus for redirecting one's attention back to the present moment. Put differently, present moment attention involves building the repertoire of self-managing one's own attending behavior. For staff trainers, a strong present moment repertoire could involve noticing when they are actually paying attention to the staff member they are training, versus when they are attending to their own problematic private events (e.g. "Am I good enough at ABA to be teaching it?"). The behavior of tacting one's attention to one's own private events may then serve as a discriminative stimulus for the staff trainer to return to the present moment, much like the behavior of noticing oneself not paying attention while driving may help one orient one's attention back to driving. When one is more engaged in attending to one's own difficult private events, this may encourage behaviors that avoid situations that evoke those private events, for example, avoid giving a new staff member meaningful feedback. Put another way, it seems plausible that practicing present moment attention strengthens present moment attention repertoires of behavior, resulting in a person engaging in that repertoire relatively more frequently, therefore leaving relatively less time to engage in attending to evaluative verbal private events.

Acceptance. As a behavioral repertoire, acceptance can be conceptualized as the behavior of staying present (as opposed to avoiding or escaping) when presented with aversive stimulation and perhaps even actively moving toward the aversive stimulus. For example, if a trainer experienced the aversive thought (private verbal behavior that produces private verbal stimulation) "The trainee doesn't think I am qualified to train her," rather than engaging in avoidance behavior, such as canceling their training session, an acceptance repertoire could

include purposefully observing the thought and then showing up for the training session. Acceptance training often involves practicing observing, noticing, and "making room for" aversive private events. Acceptance as a behavioral repertoire, then, involves contacting aversives.

As a procedure, acceptance training involves prompting and reinforcing multiple exemplars of exposure to aversive stimuli without engaging in escape behaviors. For example, if a staff trainer has the thought "She's going to freak out if I give her corrective feedback," rather than avoiding giving feedback, the trainer might write the thought on a piece of paper and hold it in her hands. Or when checking her email, instead of avoiding reading a message from an angry staff member, the trainer might read the message and notice how her heart rate elevates, skin feels warm, or how she feels angry or annoyed. The rationale for acceptance is that, if one's repertoire of escaping aversives is weakened, it can provide more opportunity to engage in a variety of other behaviors that could lead to positive reinforcement (e.g., having a meaningful, constructive training session with a trainee). In this way, a previously aversive private event that may lead to avoidance or escape behavior may now be an occasion to access positive reinforcement by engaging in a values-directed behavior.

Defusion. As a behavioral repertoire, defusion can be described as a weakening of rigid rule control over behavior. Behavioral repertoires labeled as "defused" consist of broader, more flexible responding to aversive private events, particularly those involving unhelpful rules describing avoidance behavior. It is often useful to contrast defusion (an adaptive repertoire of behavior) with "fusion," a maladaptive repertoire of behavior that defusion is meant to weaken. Behavior that is labeled as "fused" involves responding rigidly and in an overly "compliant" way with one's own unhelpful rules regarding aversive stimuli. For example, overly rigid responding to the thought "I am an introvert" when providing staff training might encourage the trainer to avoid giving feedback. A more defused repertoire might involve noticing the thought "I am an introvert" and then trying a few different ways to respond to that thought in the context of training (e.g., sometimes staying silent, sometimes giving feedback, sometimes asking the trainee a question).

To strengthen these flexible defusion repertoires of behavior, defusion procedures teach a trainee a variety of flexible ways of responding to their own private events. For example, if a staff trainer has the thought, "Why did I get promoted? People are going to find out that I'm not really ready for this job," the trainer may engage in a technique that disrupts the inflexible private event that may lead to escape-maintained behavior. For example, she might pause for a moment and imagine that those words are written on leaves floating down a stream. Or she might repeat the same words back in the voice of a radio announcer, in super slow motion, or in a chipmunk voice, etc. The goal is for the staff trainer to interrupt their own avoidance behavior in order to engage in flexible alternative behaviors, to create room to potentially engage in more values-directed behavior.

Self-as-context. A self-as-context repertoire of behavior involves variable and flexible perspective taking behavior with respect to oneself and one's relation to others. For example, a staff trainer who labels themselves as "too shy of a person," may "believe" this rule by rigidly following it and avoiding assertive training interactions with staff. This pattern of avoidance behavior could prevent that individual from contacting their long-term positive reinforcers (e.g. becoming experienced in staff training). A more flexible perspective-taking repertoire would involve noticing self-judgments about shyness as one of many different labels one could place on oneself and even noticing the act of placing labels as just one of many different behaviors one can engage in toward oneself.

As procedures, self-as-context exercises prompt and give the individual reinforcement for practicing looking beyond particular self-labels or judgments and identify multiple possible labels and descriptions of themselves. Self-as-context exercises often involve metaphors for looking at oneself as a context or a place, rather than a thing. For example, "Life sometimes feels like a game of chess. But what if you weren't one of the pieces. What if, no matter how good or bad of a day you were having, you weren't the queen or the pawn. What if you were the board?" Self-as-context exercises also involve prompting people to look from other perspectives, such as "What if you were from a different culture, would you be considered shy?" or "How do you think your grandmother sees you?" or "What if you were me, would you think you were shy?" Overall, self-as-context procedures introduce variability and flexibility around how people see themselves, and strengthen more flexible verbal behavior oriented toward oneself, such as "I may be shy but I'm going to use BST and train this person because of my value of making a difference."

Committed action. Helping to support committed action is the purpose of the other five components of the ACT model. As a repertoire of behavior, committed action consists of stating which behaviors one is going to engage in, which long-term positive reinforcers (i.e., values) these behaviors help bring about, and then actually engaging in the overt behaviors. For example, a staff member might state to the director of the clinic, "I care about making a difference for families of children with autism, so I'm going to apply for the staff trainer position" and then actually submit their application. This repertoire of behavior likely often involves the relational responding that functionally defines rule-governed behavior, including tracking and augmenting and is relevant to the general behavioral literature on goal-setting, outside of ACT-specific contexts (O'hora & Maglieri, 2006).

As a procedure, committed action interventions involve the ACT trainer or therapist helping the individual to make goals for specific overt behaviors they can engage in and how those behaviors connect them to their values. For example, with a director providing ACT training to a staff trainer, the director might give the trainer a worksheet that prompts them to write down specific overt behavioral goals that move them toward their stated values. The staff trainer may then write something such as *I want to provide quality training in ABA so that my clients can benefit and live a better life. In order to provide quality training, I have to give constructive feedback.* Lastly, the staff trainer might set realistic goals for herself to target in future situations, such as writing, *I will provide immediate constructive feedback after teaching a new skill, at least five times per session that I observe a new ABA therapist* and then commit to that goal with someone else (e.g., tell their director or another trainer).

The six component behavioral repertoires described above can be analyzed and addressed separately, as was done above, but the purpose of all of them is to support committed values-directed action. For example, if one is willing to experience difficulty (acceptance), then one can have the opportunity to do hard things that they care about. If one contacts their values directly in the moment (e.g., "I care more about helping kids with disabilities than I do about feeling comfortable"), then doing the hard work that committed action involves can actually be less aversive. If one takes their own negative self-thoughts less seriously (defusion), then one is less likely to rigidly follow them as rules and therefore one has more opportunity to engage in overt committed action. In short, strengthening all of the six repertoires involved in ACT can come together to help individuals gain more adaptive ways of responding to their own aversive private events, in turn changing overt behavior and providing an individual with more access to the positive reinforcement that values-directed action can bring about.

2. ACT for training therapists

A variety of research and books have investigated the effects of ACT training on stress and therapist skills in various clinical environments (Bond, Lloyd, Flaxman, & Archer, 2016). A recent study evaluated the effects of a verbal and written performance feedback intervention in addition to ACT, which demonstrated an increase in active treatment and technical performance following the intervention (Pingo, Dixon, &

Paliliunas, 2019). Given that ABA practitioners are under significant levels of stress in their day-to-day interactions with clients, the addition of having to train a new employee could add to those stress levels, decreasing their effectiveness in training.

Research has investigated the effects of ACT training on stress and therapist skills in a clinical psychology setting (Pakenham, 2015). Pakenham investigated how ACT training effects stress levels, as well as therapist skills and attributes. Results showed that ACT training had benefits for both skill development, as well as personal benefits for the clinical therapists, overall providing a strong connection between ACT processes and the clinical trainee's professional and personal outcomes.

A recent study by Chancey et al. (2018), used a series of workshops to have direct caregivers engage in mindfulness techniques, as well as to educate the participants on the definition and purpose of mindfulness. The results showed that mindfulness techniques are effective at improving caregiver interactions towards clients. In addition, the use of committed action techniques has been shown to increase instances of engagement with adult clients in a day treatment program (Castro, Rehfeldt, & Root, 2016). The experimenters conducted a series of ACT training workshops with direct service professionals, engaging in exercises that focused on work centered values. Results showed that interactions with their clients increased from an average of 11 interactions per session at baseline to 16 interactions per session following intervention.

Previous research has shown the effectiveness of the train-the-trainer approach, as well as the integration of a train-the-trainer approach to teaching staff to conduct behavioral skills training. However, little or no previous research has evaluated the possibility that adding ACT could enhance the effectiveness of a train-the-trainer model of BST. As such, the purpose of this study was to apply ACT to a train-the-trainer model to enhance of BST use by staff trainers when training new staff in the context of an ABA clinic for children with autism.

3. Method

3.1. Participants and setting

Three staff trainers who worked with children with autism at an ABA clinic participated in this study. Trainer 1 was a 50-year-old female who had worked in the field of ABA for 13 months, trainer 2 was a 36-year-old female who had been working in the field of ABA for more than ten years, and trainer 3 was a 24-year-old female who had been working in the field of ABA for 6 years. All the participants were promoted to staff trainer positions around 2 weeks prior to the start of this study. The participants had not received training in how to train new staff members prior to this study. As is common within the organization site, the staff members were not instructed in how to train new employees until they were promoted to training positions. The three participants were chosen for this experiment based on their high level of performance in executing applied behavior analytic interventions directly with clients. All participants gave informed consent to be a part of this study.

All sessions took place in a center-based ABA clinic that provided intensive ABA treatment services to children with autism. Observations of staff trainer participants were conducted while they conducted their normal daily job, training junior-level staff in the center while those junior-level staff worked with children with autism. Experimenter-implemented BST and ACT training sessions were conducted one-on-one, in a designated training office. All BST and ACT training sessions were conducted by the same experimenter (first author) and took place outside of the staff trainer participant's regular work hours.

3.2. Response measurement

Primary dependent variable. The dependent variable was the percentage of opportunities in which staff trainer participants implemented BST while working with junior level staff. The definition of BST implementation included: 1) the trainer participant verbally describing the skill to the junior level staff, 2) the trainer participant demonstrating how to implement the skill with the client, 3) having the junior level therapist implement the skill with the client, and 4) the trainer participant giving feedback on the junior level staff's implementation of the skill with the client. An opportunity was defined as an instance when the senior staff member began verbally describing a skill, technique, or intervention to a trainee. For instance, if the senior staff member began to verbally describe mand training to a new trainee, this would then be considered an opportunity and data would begin to be collected.

Psychological flexibility. Staff trainer participants were asked to complete the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) before and after ACT training.

Social Validity Measure. A social validity measure was used in this experiment in which the senior staff members were asked to rate various questions on a scale of 1–5, 1 being strongly disagree and 5 being strongly agree. Some questions included were, “I believe that this study has improved my ability to train staff members,” “I approve of the acceptance and commitment training exercises,” and “I care about becoming more effective at training using behavior skills training.”

Interobserver agreement. IOA data were collected on 35% of sessions for trainer 1, 33% of sessions for trainer 2, and 32% of the sessions for trainer 3. Measures of agreement were calculated by dividing the total number of opportunities in which both observers scored exactly the same data by the total number of opportunities and multiplied by 100. The overall inter-observer agreement averaged 87% for data collected with trainer 1, 94% for data collected with trainer 2, and 90% for data collected with trainer 3.

3.3. Procedures

Baseline. During the baseline condition, all staff trainer participants were assigned a new staff member to train during regularly schedule sessions with clients who were children with autism. Each baseline session was 20 min in duration. The staff trainer participants were told to conduct their work normally and to provide training to the junior-level staff member. None of the participants had received BST on how to implement BST or any kind of ACT training before this condition. No feedback was delivered by the experimenter during this condition. The experimenter positioned herself in-view but unobtrusive. Observing staff performance during regular ABA sessions in the clinic was a normal daily part of the experimenter's job, so observation for the purpose of this study did not differ substantially from what the staff regularly observed her doing on a daily basis.

Behavioral Skills Training. At the beginning of this phase, each staff trainer participant received behavioral skills training with the experimenter in a 1:1 setting in which they were trained to use BST with new staff. The experimenter utilized BST to teach the staff trainer participant how to use BST to train junior-level staff. Each participant was given a behavioral skills training worksheet. The worksheet contained an area for the participants to write down the definitions of each aspect of behavioral skills training as it was being verbally described to them. The experimenter then modeled to the participant how to use BST to teach a skill to a new staff member. In order to achieve this the experimenter acted as the staff trainer participant while the staff trainer participant acted as the junior-level staff. Then the two switched roles and the experimenter acted as a junior level staff and the trainer participant acted as themselves. During role-play the participant was prompted to engage with their worksheet which included an area for them to self-identify when they were correctly implementing each step of BST. Feedback was provided, consisting of praise for correctly implemented training techniques and constructive feedback for incorrectly implemented techniques. This training continued until the participant demonstrated at least 90% correct implementation of BST in

role-play with the experimenter, resulting in approximately 1 h for each participant.

After the training, and on the same day as the training, the experimenter observed the participant doing their regularly schedule job of observing and training junior-level staff, as in baseline. As in baseline, the experimenter simply observed the participant unobtrusively and did not provide feedback.

Acceptance and Commitment Training. The experimenter conducted a 1-h one-on-one ACT training with each participant. Before beginning this training, each participant was told that the purpose of this training was to help them to become an even stronger trainer (the experimenter did *not* say that the purpose of training was to increase BST use). The training included exercises commonly reported in the ACT literature, as briefly described below.

Present moment attention. Participants were led through the *Notice Five Things* and *Drop the Anchor* exercises, as described in Harris (2007). These exercises were used to train individuals to pay attention to their sensory experience in the present moment. The participants were encouraged to practice these exercises before their training sessions, as well as any time they experienced difficult private events.

Values identification. Participants were then led through the *Quick Look at Your Values* exercise as described in Harris (2009). Within this exercise participants were given a list of 60 common values, asked to take notes on their relative importance, and lastly, to write down the six values that were most important to them in their job as a staff trainer.

Committed action. Finally, the experimenter led the participant through completing the *Willingness and Action Plan* as it relates to their job as a trainer (Harris, 2007). This worksheet involved the participant writing down their most important work value, a goal they would like to achieve in moving toward that value, private events that they were "willing to make room for" that may occur in the process of attempting to achieve this goal, and finally, the time, day, and date that they will take the first small step toward that goal. All participants identified using BST more consistently in their jobs as their committed action, although the experimenter never suggested this.

Approximately 24 h after the ACT training, participants were again observed during sessions in which they were responsible for training junior-level therapists, as in the Baseline and Behavioral Skills Training phases. Immediately before the first two sessions, the participants were prompted via text message to read over their committed action plan. No more prompts were given after the second session in the ACT phase. Similar to the BST condition, the experimenter positioned herself unobtrusively and did not provide feedback.

In order to assess generalization, the staff trainer participants were observed training junior-level therapists with new clients who had not been present previously in the study or during sessions in which they were tasked with training new junior-level staff that they had not previously trained. Trainer 1 was observed with two different junior-level staff members and a new client during generalization probes. Trainer 2 was observed with two different clients, as well as one new junior-level therapist, and trainer 3 was observed with two different junior-level staff members.

4. Results

The resulting number of staff who received training at each level are depicted in Fig. 1. The experimenter used both BST and ACT to train the three participant trainers. Participant Trainers 1, 2, and 3, then trained six junior-level staff. Not depicted in the flowchart is the fact that those junior level staff worked with 11 total children with autism. Therefore, at a cost of approximately 6 h of total experimenter training time, 20 staff and clients were affected by the training.

The effects on the primary dependent variable for all participants are displayed in Fig. 2. During baseline, Trainer 1 engaged in behavior skills training in 0–14% of opportunities. The behavioral skills training condition produced an immediate increase, followed by a decrease and

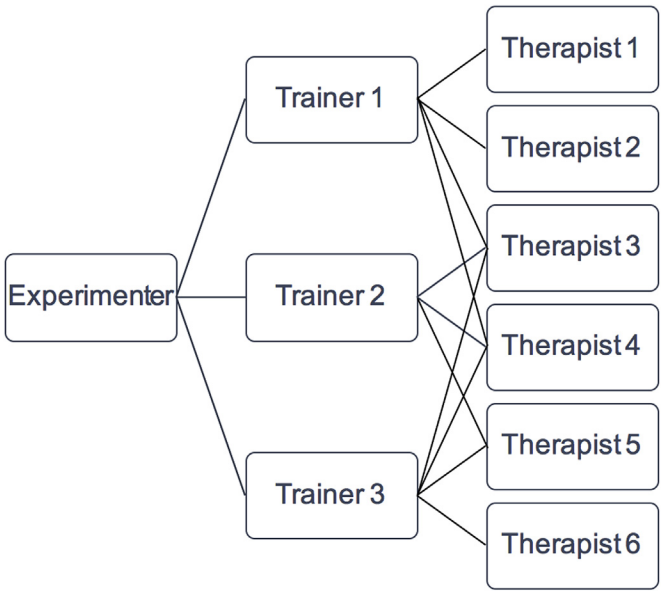

Fig. 1. Flowchart showing the sequence of training and the number of staff involved in the study.

BST use stabilized at 45–50% from sessions 10–13. Following session thirteen, the ACT condition was introduced. No immediate effect was observed, however in the second session of the ACT condition, session fifteen, behavior skills training use increased to 100% of opportunities and remained stable for the remainder of the study, including during all generalization probes.

Trainer 2 engaged in behavioral skills training in 0% of opportunities during baseline. During the behavioral skills training phase, Trainer 2 engaged in behavioral skills training during 50–66% of opportunities. Following the ninth session, the ACT condition was introduced. There was an immediate effect observed during the ACT condition and the dependent variable remained at 100% for the remainder of the study, aside from session 13.

Trainer 3 engaged in behavioral skills training in between 0 and 33% of opportunities in the baseline phase. An immediate increase was seen during the behavioral skills training phase, eventually stabilizing around 50–66% of opportunities. During the ACT phase, the dependent variable immediately increased to 100% of opportunities and remained stable through the end of the study.

Results for the social validity measures are displayed in Table 1. Overall, the results of the social validity measure suggest that the participants approved of the goals, procedures, and outcomes of the study. The lowest score, a score of 3 ("Neither agree nor disagree"), was obtained for Trainer 3 in response to the question about whether they felt more relaxed after the ACT training.

No systematic changes were observed on the AAQ. Trainer 1's AAQ score change from 39 in baseline to 37 at the end of the study. Trainer 2's scores changed from 36 in baseline to 41 at the end of the study. Trainer 3's scores changed from 43 in baseline to 34 at the conclusion of the study.

5. Discussion

The purpose of this study was to investigate whether the addition of ACT to previously researched BST procedures results in increased performance, in this case BST use itself, by staff trainers responsible for training new staff in an ABA clinic. Using BST alone to train trainers resulted in the trainers using BST to train junior-level staff in approximately 50–60% of opportunities, which was a substantial increase from baseline. These results support the conclusions of previous research on BST and show that BST alone is effective. However, when a

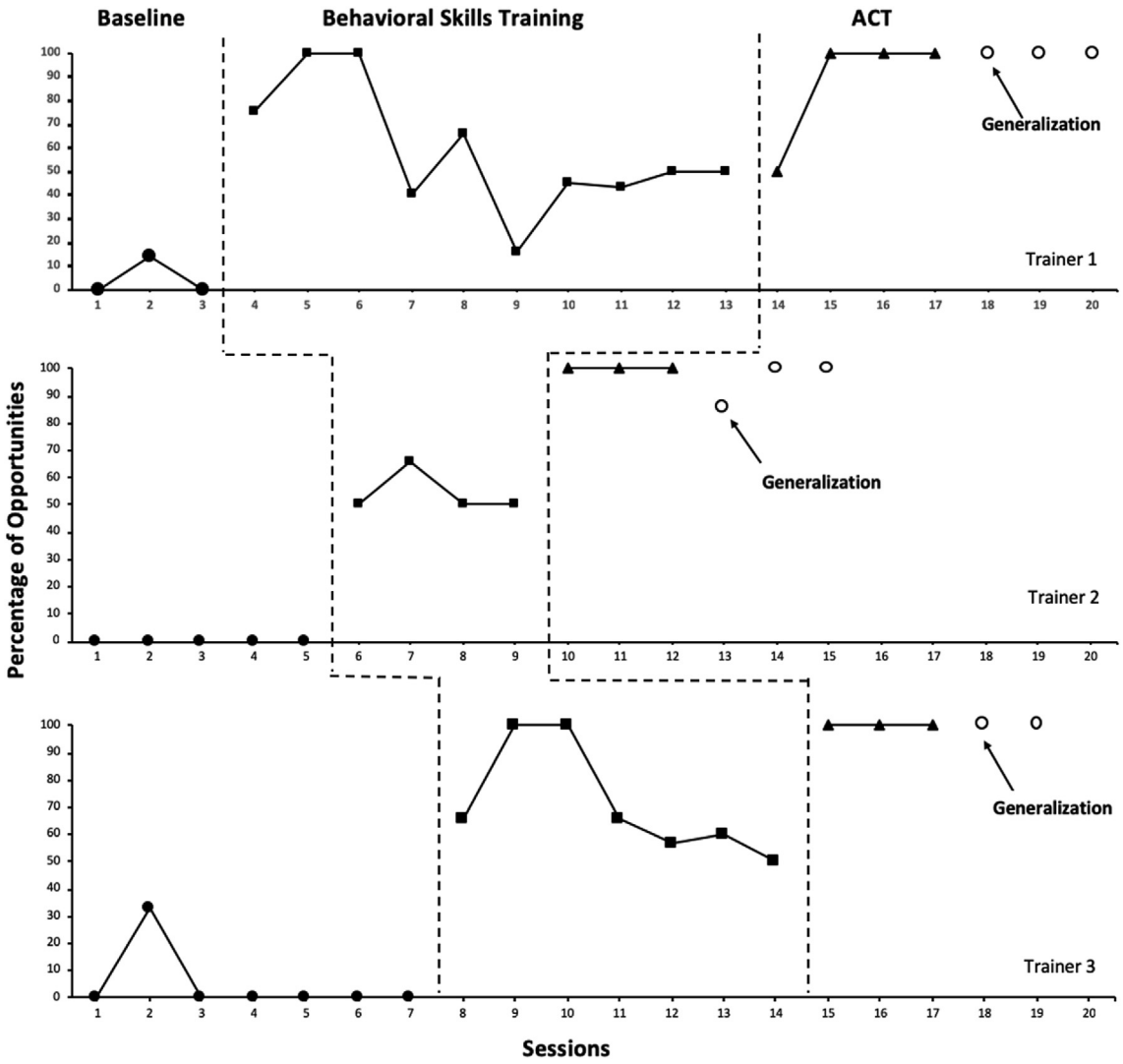

Fig. 2. Percentage of opportunities trainer participants implemented behavioral skills training with junior-level staff across all phases of the study.

single hour of ACT training for trainers was implemented, it resulted in a substantial increase in BST use across all trainers and the results generalized across junior-level staff and clients. Overall, the results support previous research showing that BST is effective and add to the literature by suggesting that the addition of ACT may substantially increase the effectiveness of BST when training trainers.

No systematic changes were observed on the AAQ measure of psychological flexibility. However, since the measure was implemented only one time during baseline and one time at the end of the study, it is not possible to evaluate any changes in the context of an experimental design and a sample of only three participants precludes any statistical analysis of the data. It is interesting to note, however, that Participant 1's scores did not change, Participant 2's scores worsened somewhat, and Participant 3's scores improved, despite the fact that the effect of the ACT intervention was similar across all three. Although the sample size is far too small to draw any firm conclusions, it appears as though the AAQ change scores in this study were not meaningfully related to response-to-treatment or to performance at the end of the study.

As the field of applied behavior analysis continues to grow, so does the need for quality training within ABA agencies. Previous research has supported the effectiveness of train-the-trainer models as well as behavioral skills training. Perhaps the most encouraging implication of the current study is that ACT may contribute to making rapid training and dissemination procedures more effective. It also seems plausible that these implications have relevance outside the practice of ABA. Many other helping professions suffer from a lack of dissemination of evidence-based practices and it is possible that the 1 h ACT training for trainers evaluated in this study could be tested for training trainers in

Table 1
Social Validity Results. Questions were rated from 1 = Strongly Disagree, to 5 = Strongly Agree.

Questions	Trainer 1	Trainer 2	Trainer 3	Average
I believe that this study has improved my ability to train staff	5	5	4	4.6
I believe I am training staff members more effectively	4	5	4	4.3
I approve of the behavioral skills training instruction	5	5	5	5
I approve of the mindfulness exercises and training	5	5	5	5
I care about becoming more effective at training using behavioral skills training	5	5	5	5
After the ACT training, I feel as though I am more relaxed during my training session	4	5	3	4

other fields, such as psychotherapy, nursing, social work, and other professions that require trainers to perform in the context of stress, self-doubt, and other challenging private events.

Some anecdotal observations are worth mentioning. Participants reported at the end of the study that they felt calmer during training sessions. Changing private events, such as anxiety, is not the goal of ACT generally, nor was it the target of the current ACT training for trainers. Nevertheless, it may be a desirable side-effect that could enhance the social validity of ACT for those who receive the training. It is also worth noting, however, that feeling more calm was the question on the social validity questionnaire that received the lowest rating, a rating of 3 from one participant. In addition, the experimenter anecdotally observed that the trainer and trainee appeared less stressed, more relaxed, and the session "flowed better" towards the end of the study. From a functional standpoint, if a trainer was attending more to the session and less to her own aversive private events as a result of present moment training, it seems plausible that she would be better able to respond rapidly and with greater nuance to subtle cues provided by the therapist and client's behavior. In other words, if the trainer is less distracted by irrelevant stimuli, it follows that she could perform more fluently as a trainer. No data were collected on this potentially important qualitative aspect of the trainer's performance but future research should consider attempting to measure it.

If the basic premise of this study, that ACT can enhance BST, continues to be born out, then future research might attempt to enhance the effectiveness of BST in other areas for which BST is already supported, such as abduction prevention, gun-play prevention, as well as sexual abuse prevention (Miles & Wilder, 2009). In addition, future researchers might try to identify skills and/or contexts in which BST has historically *not* been sufficiently effective, in order to evaluate whether adding ACT can salvage the effectiveness of BST. It should be noted that the current study did not, however, measure improvements in the *accuracy* of BST use, nor the *effectiveness* of BST used by the participants after the ACT condition induced them to use BST more frequently. Future research might also attempt to measure these outcomes.

One potential limitation of the current study was the presence of the experimenter and experimenter expectancy during experimental sessions. It is possible that the presence of the experimenter served as a prompt for the trainer participants to engage in behavioral skills training with the junior-level staff members. However, this potential limitation is present for most published staff training studies that do not employ surreptitious observation (and few do). In order to minimize this potential limitation, the participants were not given feedback during the observation sessions in any condition of the study. Additionally, as described previously, the experimenter always positioned herself in a way that she was not fully included in the ongoing therapy sessions. It is also worth repeating that it was a regular part of the experimenter's job to observe the trainer participants in the center in which the study was conducted. Finally, the possible influence that reactivity may have had on the trainer participant behavior of implementing BST would likely have been present for the baseline and BST conditions, not only the ACT condition, and yet still a substantial improvement was observed during the ACT condition.

An additional potential limitation is the lack of a component analysis regarding which components of ACT were necessary. The current 1-h training included exercises that focused on training present moment, values, and committed action skills. In addition, the *Willingness and Action Plan* that was used at the end of the training asks the participant to identify challenging private events that they are willing to experience while they engage in committed action, so it might be reasonable to say that acceptance skills were briefly touched on as well, although they were not a focus of the training. A future component analysis could be conducted to determine which of the components of the training were necessary. From the standpoint of basic behavioral processes, such a component analysis would be interesting and would be in-line with Baer, Wolf, and Risley's (1968) call for being both *conceptually systematic* and *analytic*. However, from a practical standpoint, it is worth noting that the entire duration of the ACT workshop was 1 h, so it seems unlikely that there was a large amount of unnecessary intervention.

The current study would also have been stronger if treatment integrity data were collected on the experimenter's implementation of the 1-h ACT training. The training followed exercises that are well-documented in the ACT literature and fairly well protocolized. Still, data that directly measure the experimenter's implementation of ACT would make future research stronger.

An additional potential limitation to the study is the possibility that some variable that is not central to ACT contributed to the effectiveness of the ACT condition. For example, subsequent to the 1-h ACT training and immediately before the next two observations, the experimenter sent text message reminders to the participants to read over their committed action plans. Given that the participants had written commitments to engage in BST in their committed action plans, reading these plans could have functioned as a prompt to engage in BST. It is therefore possible that these text messages were functioning as experimenter prompts to engage in BST and this could have contributed to the results. Although prompting, per se, is not a central component of ACT, an ACT trainer reminding a trainee to revisit their own commitments to valued action is by no means outside of the overall ACT model. In addition, these texts were only sent on two occasions, so it seems unlikely that they, alone, were responsible for the effects observed in the ACT condition. Still, since the study did not contain an ACT condition implemented *without* reminders, it is not possible to rule out entirely that the reminders functioned as prompts and therefore contributed to the effectiveness of the intervention through prompting.

When researching and practicing ACT in the context of ABA, it is important to remain close to a functional analytic understanding of the procedures and the behavior changes they bring about. This is critical, both for maintaining philosophical and theoretical integrity with the defining elements of ABA (Baer, Wolf, Risley, 1968), but also because a functional analytic approach to language and cognition has always been the foundation of ACT (Hayes, 2004). As is common in much previously published ACT literature, no functional assessment was conducted in this study which then directly pointed to particular function-based procedures within the ACT training for trainers. Instead, the training was based on the general conceptual analysis that training newly hired staff almost inevitably involves aversive private events, as described in the behavioral conceptual analysis of ACT in the introduction. We attempted to make the training evaluated in the current study functionally relevant to participant behavior by identifying individualized values for each trainer participant and discussing how specific committed actions may help lead the participant toward those values. In doing so, the ACT training attempted to support behaviors that would result in augmented positive reinforcers in the context of training that were unique to each individual participant, thereby attempting to approach each participant's behavior at a functional level. Still, future research should attempt to functionally assess each participant's behavior with greater precision and tie ACT training procedures to the results of those assessments more rigorously.

A final potential limitation that warrants discussion is found in the operational definition of the dependent variable. Because an opportunity to implement BST was defined as the trainer participant talking to the junior-level therapist about any aspect of their ABA implementation, not based on some other more objective evaluation of when an opportunity was really necessary clinically, it is possible that they implemented BST when it was not clinically necessary and/or they failed to initiate any type of interaction, when it would have been clinically beneficial. The rationale for using this definition for opportunity is that the true nature of the opportunity for a trainer to give feedback to a junior-level therapist in real-life implementation of ABA services is highly subtle and complex. During any given 20-min therapy period, there were at least 20–30 different programs the therapist could

implement with the client and therefore be trained by the trainer on. Therefore, the researchers could not possibly identify *a priori* which specific programs should be implemented and use that as the definition of opportunity for BST. In addition, there are likely hundreds of details that make ABA therapy unique to each individual child with autism, since the therapy is defined functionally, not operationally. For example, the "correct" way to deliver praise to a child depends on what has worked in the past to reinforce that child's behavior and on subtle moment-to-moment cues that the child delivers (e.g., the child smiles and makes eye contact when the therapist praises her). It would be impossible for the experimenters to be aware of all such variables for each client at the outset of the study. Since no manner of contriving a definition of an opportunity appeared socially or clinically valid to the research team, we chose to define it as a situation in which the trainer, herself, deemed it appropriate to talk to the therapist about their implementation. Although this definition is imperfect, it is also consistent with the purpose of the study, which was not to improve the trainers' ability to discriminate *when* to give feedback, but rather, to increase the extent to which trainers used BST when they did choose to give feedback.

The experimenter served as both the BST trainer for the participants in the study, as well as the ACT trainer. This was done simply because the experimenter was the actual real-life trainer in the clinic and had learned how to implement ACT training and was therefore in a clinically relevant position to do it in the context of this study. However, this may not always be the case. Some clinics may compartmentalize training, relegating standard BST to some trainers and ACT or other specialized topics to other trainers. It seems possible that embedding ACT training into the daily real-life trainer-trainee interactions of a clinic, as was done in this study, may be an effective model for combining BST and ACT. It seems possible that the collegial rapport and shared history that the trainers and trainees often already share outside of specialized ACT training may provide opportunities for ACT trainers to further customize and fine-tune their ACT trainings. Future research may attempt to compare effectiveness of ACT-enhanced BST, as implemented by one trainer versus separate trainers, or as implemented by in-house trainers versus outside consultants.

Future research should evaluate a group format for providing ACT training to trainers. The train-the-trainer model used in the current study was more efficient than if the experimenter directly trained all junior level-staff herself but it potentially could have been even more efficient if the ACT training was provided in small groups, for example, for three trainers at once. Other avenues for enhancing efficiency, such as eLearning self-instruction formats, might also be investigated.

One interesting anecdotal observation was that some of the trainer participants were observed talking to other therapists about values, outside of the context of this study. For example, a therapist not involved in the study was overheard expressing distress about traffic to one of the trainer participants and the participant was then overheard saying to the therapist, "Sometimes it's helpful to connect with what we really care about in this job. What is it that brings you to this work?" No attempt was made in this study to induce the trainer participants to incorporate any ACT methods into their interactions with others but this anecdotal observation suggests that may have occurred. Future research might try to measure this directly. It seems unlikely that after only 1 h of ACT training, that a trainer would then be qualified to provide ACT training to others. However, small components, such as simply talking about what one truly cares about at work, may actually represent a very small but potentially meaningful generalization of ACT skills from self-management (for the trainer, herself), to managing others.

This study provides initial evidence that the inclusion of ACT techniques into a train-the-trainer model was effective at further increasing the use of behavioral skills training by trainers in the context of their real-life jobs. This study, as well as other studies incorporating ACT into staff training, represent a step toward addressing problematic private events within the scope of practice of applied behavior analysis. With the inclusion of ACT training for trainers, training may have the potential to begin to not only take care of the needs of new staff but also address the needs of more senior staff as well. As the field of applied behavior analysis continues to grow, so will the need for quality training and this study represents a small step towards helping ensure quality training during that continued growth.

Declaration of competing interest

The authors state that they have no conflicts of interest to declare.

References

Bond, F. W., Lloyd, J., Flaxman, P. E., & Archer, R. (2016). *Psychological flexibility and ACT at work*.

Castro, M., Rehfeldt, R. A., & Root, W. B. (2016). On the role of values clarification and committed actions in enhancing the engagement of direct care workers with clients with severe developmental disorders. *Journal of Contextual Behavioral Science, 5*(4), 201–207.

Chancey, C., Weihl, C., Root, W. B., Rehfeldt, R. A., McCauley, D., Takeguchi, K., et al. (2018). The impact of mindfulness skills on interactions between direct care staff and adults with developmental disabilities. *Journal of Contextual Behavioral Science, 12*, 160–169.

Glass, B. (2015). *US behavior analyst workforce: Understanding the national demand for behavior analysts*.

Harris, R. (2007). *Acceptance and commitment therapy (ACT) introductory workshop handout.* [Handouts and Worksheets].

Harris, R. (2009). *The complete set of client handouts and worksheets from ACT books.* [Handouts and Worksheets].

Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy, 35*(4), 639–665.

Hayes, S. C., Pistorello, J., & Levin, M. E. (2012). Acceptance and commitment therapy as a unified model of behavior change. *The Counseling Psychologist, 40*(7), 976–1002.

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., et al. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record, 54*, 553–578.

Hurt, A. A., Grist, C. L., Malesky, L. A., Jr., & McCord, D. M. (2013). Personality traits associated with occupational 'burnout'in ABA therapists. *Journal of Applied Research in Intellectual Disabilities, 26*(4), 299–308.

Miles, N. I., & Wilder, D. A. (2009). The effects of behavioral skills training on caregiver implementation of guided compliance. *Journal of Applied Behavior Analysis, 42*(2), 405–410.

Nigro-Bruzzi, D., & Sturmey, P. (2010). The effects of behavioral skills training on mand training by staff and unprompted vocal mands by children. *Journal of Applied Behavior Analysis, 43*(4), 757–761.

O'hora, D., & Maglieri, K. A. (2006). Goal statements and goal-directed behavior: A relational frame account of goal setting in organizations. *Journal of Organizational Behavior Management, 26*(1–2), 131–170.

Pakenham, K. I. (2015). Effects of acceptance and commitment therapy (ACT) training on clinical psychology trainee stress, therapist skills and attributes, and ACT processes. *Clinical Psychology & Psychotherapy, 22*(6), 647–655.

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2012). Evidence-based staff training: A guide for practitioners. *Behavior analysis in practice, 5*(2), 2–11.

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2013). Teaching practitioners to conduct behavioral skills training: A pyramidal approach for training multiple human service staff. *Behavior analysis in practice, 6*(2), 4–16.

Pingo, J., Dixon, M., & Paliliunas, D. (2019). Intervention enhancing effects of acceptance and commitment training. *Behavior Analysis in Practice.* https://doi.org/10.1007/s40617-019-00333-w.

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis, 37*(4), 535–538.

Skinner, B. F. (1974). *About behaviorism.* NY: Knopf.

Virués-Ortega, J. (2010). Applied behavior analytic intervention for autism in early childhood: Meta-analysis, meta-regression and dose–response meta-analysis of multiple outcomes. *Clinical Psychology Review, 30*(4), 387–399.

Yarber, L., Brownson, C. A., Jacob, R. R., Baker, E. A., Jones, E., Baumann, C., et al. (2015). Evaluating a train-the-trainer approach for improving capacity for evidence-based decision making in public health. *BMC Health Services Research, 15*(1), 547.