



Empirical research

Evaluating the effects of Acceptance and Commitment Training on the overt behavior of parents of children with autism[☆]Evelyn R. Gould^{a,*}, Jonathan Tarbox^a, Lisa Coyne^b^a FirstSteps for Kids, Inc. and The Chicago School for Professional Psychology, Los Angeles, United States^b McClean Hospital, Harvard Medical School, United States

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ABSTRACT

Behavioral parent training is a critical component of treatment for children with autism, however, engaging parents effectively can be challenging. Despite evidence that private events can strongly influence parent behavior and training outcomes, the topic has received minimal attention in the behavioral literature thus far. Acceptance and Commitment Training (ACT) is a contemporary behavioral approach to increasing adaptive, flexible repertoires of behavior, by reducing control by problematic rule-deriving and rule-following. This study is the first to examine the effects of ACT on values-directed overt behavior in parents of children with ASD. A nonconcurrent multiple baseline design across participants was used to evaluate treatment effectiveness. Notable increases in overt values-directed parent behavior were observed for all participants. Gains maintained post-training, with the greatest effects observed more than 6 months post-training. Exploratory data suggested possible decreases in parental experiential avoidance and increases in self-compassion.

1. Introduction

Raising a child with autism involves chronic challenges consistently associated with high levels of psychological distress in parents (Eikeseth, Klintwall, Hayward, & Gale, 2015; Estes et al., 2009; Grindle, Kovshoff, Hastings, & Remington, 2009; Hayes & Watson, 2013). Such distress can significantly impact a parent's ability to manage their child's behavior and reduce the effectiveness of behavioral interventions (Osborne, McHugh, Saunders, & Reed, 2008; Robbins, Dunlap, & Plienis, 1991; Strauss et al., 2012). From a behavior analytic perspective, “psychological distress” might be conceptualized as experiencing high levels of aversive private events evoked by environmental stressors. The term “private events” refers to any covert stimulus (e.g., thought, image, physical sensation, emotion) or response (thinking, visualizing, remembering) (Skinner, 1974). Private events, like public events, can have an impact on future behavior and are undoubtedly an important aspect of parent experience. The role of private events in parenting, however, has been largely ignored in the parent training literature thus far (Coyne & Wilson, 2004; Snyder, Lambert, & Twohig, 2011).

2. Private events and parenting

Whereas contingency-shaped behavior is controlled by direct exposure to environmental contingencies (e.g., burning one's hand when touching a hot stove), rule-governed behavior (RGB) is under the control of contingencies that are verbally described. Put simply, the person engages in a particular behavior because they were told to do so, rather than learning by consequences. Previous research suggests that RGB can be problematic, since it is much less sensitive to environmental contingencies than contingency-shaped behavior, and can override or modify control by programmed contingencies (e.g., Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986; Rosenfarb, Newland, Brannon, & Howey, 1992). Humans (including parents) can thus continue to behave in narrow, inflexible ways, in accordance with a verbal rule, even when environmental contingencies indicate that their behavior is ineffective or even harmful. For example, when faced with their child engaging in a highly disruptive tantrum in public, a parent may fail to implement a planned ignoring procedure due to the influence of verbal rules regarding social disapproval (e.g., “They'll think I'm a bad parent if I don't do anything”), their parenting abilities (e.g., “Good parents don't have children who behave like this”) or ability to face the challenge (e.g., “I can't stand this!”), all of which are likely

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occurring in the presence of accompanying aversive emotional states (e.g., anxiety, embarrassment). The presence of such private verbal and emotional stimuli may lead to the parent not following through with an effective intervention.

Another verbal process that may play a role in maladaptive parent behavior is referred to in the ACT literature as *cognitive fusion* (Coyne & Wilson, 2004; Murrell, Wilson, LaBorde, Drake, & Rogers, 2009). A parent who is “fused” with their thoughts will respond to them as if they are literal, rather than “just thoughts.” For example, if a parent is fused with the thought “I’m not good enough,” they will experience the thought literally (i.e., “I” = “not good enough”). The literal content of this thought may dominate the parent’s behavior (e.g., “I can’t do this [behavior procedure] because I’m not good enough”). In addition to insensitivity to direct contingencies, cognitive fusion may increase experiential avoidance, further narrowing the parents behavioral repertoire, resulting in increasingly “unworkable” patterns of behavior over time (Coyne & Wilson, 2004).

Behaviors that attempt to avoid or terminate aversive private events are referred to as *experiential avoidance* in the ACT literature (Hayes, Strosahl, & Wilson, 2003). In effort to escape contact with aversive thoughts and feelings, a parent may avoid doing things that are important to them and their child. For example, to avoid feeling anxious, a parent may increasingly avoid meeting with their child’s clinical team. Parent involvement or compliance issues might thus be related to parental avoidance of uncomfortable emotions or self-generated rules that accompany engagement in treatment. Previous research suggests that excessive experiential avoidance is associated with higher levels of parent stress and mental health issues in parents of children with autism (Hastings et al., 2005; Lloyd & Hastings, 2008).

3. Acceptance and Commitment Therapy

ACT (Hayes et al., 2003) is a contemporary behavior analytic approach to addressing problematic private events, founded in radical behaviorism, functional contextualism, Relational Frame Theory (RFT; Barnes-Holmes, Hayes, Barnes-Holmes, & Roche, 2002), and Applied Behavior Analysis (ABA). The goal of ACT is to create psychological flexibility in service of valued living. Psychological flexibility can be considered a behavioral repertoire that is sensitive to the presence and function of private events, but that is characterized by adaptive, flexible, and creative responding with respect to those private events (Blackledge & Drake, 2013). Recent research has suggested that parenting-specific psychological flexibility may be related to more adaptive parenting behaviors associated with lower levels of child problem behavior (Brassell et al., 2016; Williams, Ciarrochi, & Heaven, 2012). A number of behavioral repertoires described in the ACT literature as core processes may be particularly relevant to parents of children with autism.

3.1. Values identification

From a behavioral standpoint, values can be conceptualized as verbal statements that alter the degree to which consequences function as reinforcers or punishers (Hayes et al., 2003). Values exercises in ACT are thus designed to support rule-following repertoires that are oriented toward larger, longer-term positive reinforcers (e.g., “being a supportive father”), versus smaller, shorter-term experiential avoidance (Blackledge & Drake, 2013). For example, the presence of the value, “Being an advocate for my family” may increase the likelihood that a parent will attend and participate in clinic meetings, even if doing so involves experiencing uncomfortable private events.

3.2. Mindfulness

Mindfulness training in ACT is intended to reduce contingency insensitivity and control by previously established verbal rules, by

strengthening one’s repertoire of attending to stimuli in the present moment environment (McHugh, Procter, Herzog, Schock, & Reed, 2012; McHugh, Simpson, & Reed, 2010). Mindfulness training may help parents observe and respond more effectively to difficult private events, decreasing the likelihood that they will continue to repeat unhelpful patterns of parent behavior (Cachia, Anderson, & Moore, 2016; Duncan, Coatsworth, & Greenberg, 2009; Singh et al., 2006, 2014). Increasing attention to present moment stimuli may also help adaptive parent behaviors be reinforced by natural consequences (e.g., child smiles or attempts at communication), that might otherwise be missed if most of the parent’s attending is oriented toward avoiding or problem-solving their own difficult private events.

3.3. Defusion

Defusion procedures aim to reduce cognitive fusion by disrupting the narrow, rigid functions that one’s thoughts currently have and establish a broader, more flexible repertoire of responding to one’s own thoughts as private stimuli (Snyder et al., 2011). For example, rather than always turning on the television in response to the thought, “I can’t deal with my child right now,” a parent might play with, read to, or engage their child in an educational activity.

3.4. Acceptance

Acceptance can be conceptualized as “an approach response and/or the absence of an escape response in respect to aversive stimulation – unconditioned, conditioned, or derived” (Blackledge & Drake, 2013). In parent training, acceptance exercises would aim to decrease control by problematic private events by supporting a parent’s behavior of contacting uncomfortable thoughts and emotions, when necessary to execute overt behaviors that contribute to valued longer-term outcomes (Hayes et al., 2003). The process of acceptance may be particularly relevant for parents of children with autism, since the challenges they face are often chronic (Blackledge & Hayes, 2006; Grindle et al., 2009).

3.5. Committed action

The ultimate goal of ACT for parents of children with autism would be to increase adaptive parent behaviors, in the service of parent values. While values provide the incentive for action, committed action is achieved through skill acquisition, shaping, self-management, behavior contracts, goal-setting, etc. (Coyne, McHugh, & Martinez, 2011). The behavioral practitioner would assist parents in identifying specific overt behaviors (e.g., playing with their child for 10 min a day) that would move them in the direction of their own parenting values (“Providing a loving, fun life for my child.”) They would then support parents to use their newly acquired ACT skills when difficult private events arise that might otherwise derail their action plan.

A substantial body of research supports the application of ACT across a diverse range of populations and issues (see Gaudio, 2011, for a recent review), however, research examining the use of ACT with parents, especially those with children with autism, remains in its infancy (Coyne et al., 2011). One study, by Blackledge and Hayes (2006), used a within-subject, repeated measures design to evaluate the effects of a two-day ACT workshop for parents of children with autism. Results indicated small but statistically significant reductions in parental stress, depression and improvements in mental health from pre- to post-intervention, and 3-months later at follow-up. Statistically significant improvements in psychological flexibility were also observed at 3-months follow-up. This study suggests that a brief ACT intervention may benefit the psychological wellbeing of parents of children with autism.

A small number of recent studies have highlighted the potential additive benefits of combining ACT with traditional behavioral parent-training programs for parents of children with other health conditions.

For example, Whittingham, Sanders, McKinlay, and Boyd (2014) combined ACT with Stepping Stones Triple P (SSTP; Sanders, Mazzucchelli, & Studman, 2004) for parents of children with cerebral palsy. Results indicated that parents receiving SSTP with ACT reported statistically significant reductions in child behavior problems, as well as reductions in dysfunctional parenting styles at 6-month follow-up.

Preliminary research involving mindful parenting interventions more generally (i.e., non-ACT specific) have shown increases in positive parenting interactions and decreases in child behavior problems (Duncan et al., 2009; Singh et al., 2007). Singh et al. (2007) trained mindful parenting techniques to parents of children with autism exhibiting aggressive behavior and significant deficits in social behavior. Results indicated observable decreases in child aggression and increased social interactions between children and their siblings. Parents also reported increased parenting satisfaction, and satisfaction with parent-child interactions.

The study by Singh et al. (2007) is particularly noteworthy given that the authors utilized direct behavioral measures to track outcomes. Only a small number of studies have attempted to analyze the impact of ACT on specific overt behaviors (e.g., Twohig, Hayes, & Masuda, 2006). Since meaningful behavior change is the ultimate goal of ACT, more research utilizing experimental designs that incorporate direct behavioral measures is essential. Further, since parents of children with autism are likely to continue experiencing stress, even as they engage in more adaptive parenting behavior, positive changes may be seen in overt behavior, while minimal change might be seen on measures of psychological variables.

In summary, parents of children with autism frequently experience high levels of psychological distress and such distress likely impacts their ability to engage in values-directed overt behavior. Despite the potential importance of addressing private events in training parents of children with autism, little previous research has done so. The current study used a multiple baseline across participants design to investigate the effects of a brief ACT protocol on values-directed overt parent behavior.

4. Method

4.1. Participants and setting

All sessions were conducted by the first author in the participant's home. Three mothers with one child diagnosed with autism participated. Parents' primary language was English. Participants were receiving in-home ABA services from a community-based treatment

Table 1
Examples of values-directed behavior for Sarah, Gemma, and Hannah.

Participant	Value	Values-Directed Behavior	Examples
Sarah	Child autonomy	Any instance of child engaging in an activity independently outside the home (in the absence of parent).	Child going to different isles in a store, using a public restroom, waiting in the car, going to a friend's house, walking around the neighborhood, without supervision.
Gemma	Quality joyful moments together as a family	Any instance of both parents engaging in a leisure, social event, or family routine together, with both children.	Eating dinner together, playing together at home, going for walks in the neighborhood, having a BBQ, going to a community event.
	Having a sense of personal achievement and satisfaction	Any instance of Gemma making a choice about her future or being assertive, or engaging in self-care (in absence of child).	Researching career options, discussing concerns with Program Director or husband, saying "No" to requests from family and friends, accepting respite care, spending time with friends or going to an exercise class, making an appointment with the Doctor or Dentist, taking a bath alone.
	My sons being independent, resilient, and happy	Any instance of Gemma following through with recommended behavior management and teaching strategies	Stating clear "first/then" contingencies and following through with demands, using priming or other recommended antecedent strategies, following toilet-training protocol.
Hannah	Creating a balanced parenting partnership	Any instance of husband taking care of child, without Hannah's supervision Any instance of both parents spending "quality time" together outside of home, in absence of child.	Husband putting child to sleep, playing with child, feeding child breakfast without supervision. Going for dinner, going for a walk, going to a friend's wedding.
	Taking time for myself	Any instance of Hannah engaging in a leisure, social, or self-care activity, in absence of child.	Taking an exercise class, getting a manicure, getting a massage, spending time with friends (in the absence of child)

provider, and were referred for training by senior clinical staff. Parents had no prior exposure to ACT and did not receive any other psychotherapeutic or ACT services during the study. Participants were not currently receiving psychotropic medications and there were no major changes in behavioral interventions or services for their children during the course of the study.

Sarah was a 52-year-old, Caucasian, married mother of a 12-year-old boy diagnosed with autism named Ben. Sarah had completed graduate-level education (Master's degree) and she and her husband were working fulltime, while sharing childcare responsibilities. At the time of receiving ACT training, Ben had graduated from an intensive in-home ABA program, and was placed in a general education classroom with minimal support. Sarah was receiving only "as needed" behavioral consultation from the ABA program.

Gemma was a 35-year-old, Caucasian married mother of two children: Oisín, a 5-year-old boy diagnosed with autism, and his typically developing sibling, Connor, aged 2 years. During the ACT training phase, Gemma became pregnant with her third child. Gemma's son Oisín had begun receiving 20–25 h per week of home-based ABA services approximately 2 months prior to beginning ACT training. Gemma had completed graduate level education (Doctor of Law degree) and had left her job to care for her children at home full-time.

Hannah was a 37-year-old Caucasian – Hispanic married mother of a 4-year-old boy named Sam. In addition to a diagnosis of autism, Sam suffered from severe food and environmental allergies, and had a history of hospitalizations and intensive medical treatment. Hannah had completed college-level education (bachelor's degree) and was caring her child full-time at home.

5. Research design

A non-concurrent multiple baseline across participants design was used (Kazdin, 2011), consisting of four phases: Baseline, Training, Post-training, and follow-up. In addition, pre- and post- training self-report measures were collected.

6. Measures

6.1. Direct observation data

The dependent variable was frequency of values-directed parent behaviors per calendar day. Values-directed behavior was defined as any action resulting in a tangible outcome directly related to an individual parent-identified value. The specific topography of behaviors

Table 2
ACT skills targeted with exercise examples for training sessions 1–6.

Session	Primary Skill Targeted	Exercise Examples	Homework
1	Valuing	The Three Wishes	Data tracking
2	Mindfulness	Notice 5 things	Connecting to values
3	Defusion	Mindfulness of Breath Having the Thought Leaves on stream	Mindfulness Defusion
4	The Matrix: Tracking	The Dandelion The Matrix	Identifying behavior function Tracking outcomes
5	Committed Action	Holding a Pen Eighty-Year Old You Tiniest steps	Parenting Commitment
6	Acceptance (With Self-compassion)	Talking and Listening Healing Hand Parenting Manifesto (Brene Brown, 2012)	Parenting Commitment and Self-care

varied across participants depending on the parent's individual values and goals. The parent and ACT trainer identified target behaviors during an initial interview, prior to collecting baseline behavior data. Table 1 provides a summary of the parent values and behaviors selected by Sarah, Gemma and Hannah. Behavior data were collected by parents outside of training sessions, using a journal or specially designed data sheet. Participants tallied frequency data on occurrences of values-directed behavior each day, in addition to taking narrative notes (e.g., duration, nature of event, location). Data were shared with the ACT trainer on at least a weekly basis but participants were encouraged to share data on a daily basis, when possible.

6.2. Self-report measures

Assessments for clinical psychological conditions (e.g., depression or anxiety) were not conducted since this study was not intended to address such conditions. Exploratory data were collected pre- and post-training, and at follow-up using the scales below.

6.2.1. Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011)

The AAQ-II is a 7-item Likert scale designed to measure psychological flexibility in adults. Higher overall scores on the AAQ-II suggest increased psychological inflexibility or greater experiential avoidance, whereas lower scores equate to greater levels of psychological flexibility or acceptance.

6.2.2. Self-Compassion Scale (SCS; Neff, 2003)

This is a 26-item Likert-scale designed to measure self-compassion in adults. Higher scores indicate greater self-compassion.

6.2.3. Family Impact of Childhood Disability Scale (FICD; Trute, Hiebert-Murphy, & Levine, 2007)

The FICD is a 20-item Likert-scale assessing parents' appraisal of the impact of having a child with a disability on the family, including both positive and negative impacts. Higher scores indicate greater negative impact of the child's disability on the family.

7. Interobserver Agreement (IOA)

Interobserver agreement was obtained for parent-collected behavior data. Verification was obtained only for behavior occurrences, not for non-occurrences. Given that researchers could not directly monitor parent behavior outside of training sessions, independent verification of parent values-directed behaviors was obtained from a third person (significant other, friend, therapeutic instructor, nanny, etc.), in

addition to other permanent products indicating that the event had occurred (e.g., photograph with time / date / location stamp, service receipt, credit card statement).

IOA was calculated for each occurrence of the behavior, by comparing parent data to data recorded by an independent observer or to permanent products. Mean IOA was calculated by dividing the number of agreements by the sum of agreements and disagreements, and multiplying by 100. Baseline IOA was not calculated for any participants, nor for Sarah's training phase, since values directed behavior did not occur. IOA was calculated for 67% of Sarah's post-training behaviors, and 54% of follow-up behaviors. IOA was 92% for post-training, and 100% for follow-up. For Gemma, IOA was calculated for 46% of training occurrences and 49% of post-training occurrences. IOA was 100% for training and 100% for post-training. For Hannah, IOA was calculated for 70% of training occurrences, 85% of post-training occurrences, and 59% of follow-up occurrences. IOA was 100% for training, 90% for post-training, and 100% for follow-up.

8. Procedures

Sessions were scheduled on a day and time convenient to the parent. Since research on ACT for parents of children with autism is extremely limited, there is currently no "gold standard" in terms of training duration or format. Parents of children with autism often have extremely full schedules, thus training was limited to six, 90-min sessions. Delivery on a 1:1 basis was chosen since this is the model of parent training most typically utilized within ABA treatment settings. The 1:1 format also enabled the trainer to individualize content, which is foundational to the flexible approach characteristic of ABA treatment (Cooper, Heron, & Heward, 2007).

8.1. Baseline

As described in the measures section above, the trainer met with the parent to identify values and overt values directed behaviors. Parents then collected data for at least two weeks prior to beginning training.

8.2. Training

All six sessions touched on values identification, mindfulness, defusion, acceptance, and committed action, but each session emphasized one particular ACT skill. Table 2 provides summary of ACT skills targeted during each session with exercise examples. Exercises and treatment components were standard, or variations of those commonly used by ACT practitioners (see Harris, 2009; Stoddard & Afari, 2014). All sessions included lecture, discussion, modeling, role-play, and practice. Supplemental homework activities related to session content were assigned and completed between sessions and reviewed at the beginning of every session. In addition, the ACT trainer provided a single between-session prompt, in the form of an email reminder sent mid-week, recapping the parent's homework goals, and providing a handout of "tips" or exercises related to the previous session's content. The complete ACT training manual used in this study is available upon request from the first author, and was adapted from a group protocol for parents of children with autism developed by the third author.

8.2.1. Session 1

The initial session was designed to review the purpose of training and the ACT approach. The trainer provided psychoeducation (derived from current research) related to parenting a child with autism and parenting stress. Parents were then engaged in a discussion and values exercise, designed to help clarify parent values related to their child, themselves, and their family.

8.2.2. Session 2

The first skills-training session focused on establishing basic

mindfulness skills, and introduced parents to the nature and problem of “control” strategies (i.e., experiential avoidance). At the end of the session, the trainer assisted parents in identifying ways that they might integrate moments of mindfulness into their daily life over the next week.

8.2.3. Session 3

The third session focused on establishing basic defusion skills. Parents were engaged in a variety of defusion exercises designed to facilitate willingness and acceptance, and undermine control (i.e., experiential avoidance) strategies. Parents were asked to practice simple defusion techniques, in addition to ongoing practice of mindful awareness and acceptance, over the next week.

8.2.4. Session 4

The third skills-training session introduced parents to the concept of

“workability” via *The Matrix* (Polk, Schoendorff, Webster, & Olaz, 2016). The Matrix is a visual tool commonly used to help clients track the short- and long-term outcomes of their behavior and determine behavior function (i.e., notice when they are engaged in experiential avoidance versus “living by their values.”) At the end of the session, parents were asked to continue tracking “towards versus away moves” over the next week.

8.2.5. Session 5

This session focused on values clarification, as well as acceptance and committed action in the context of difficult parenting situations. Parents completed a variety of values clarification and committed action exercises. Parents were invited to take at least one small step in the direction of their values during the next week.

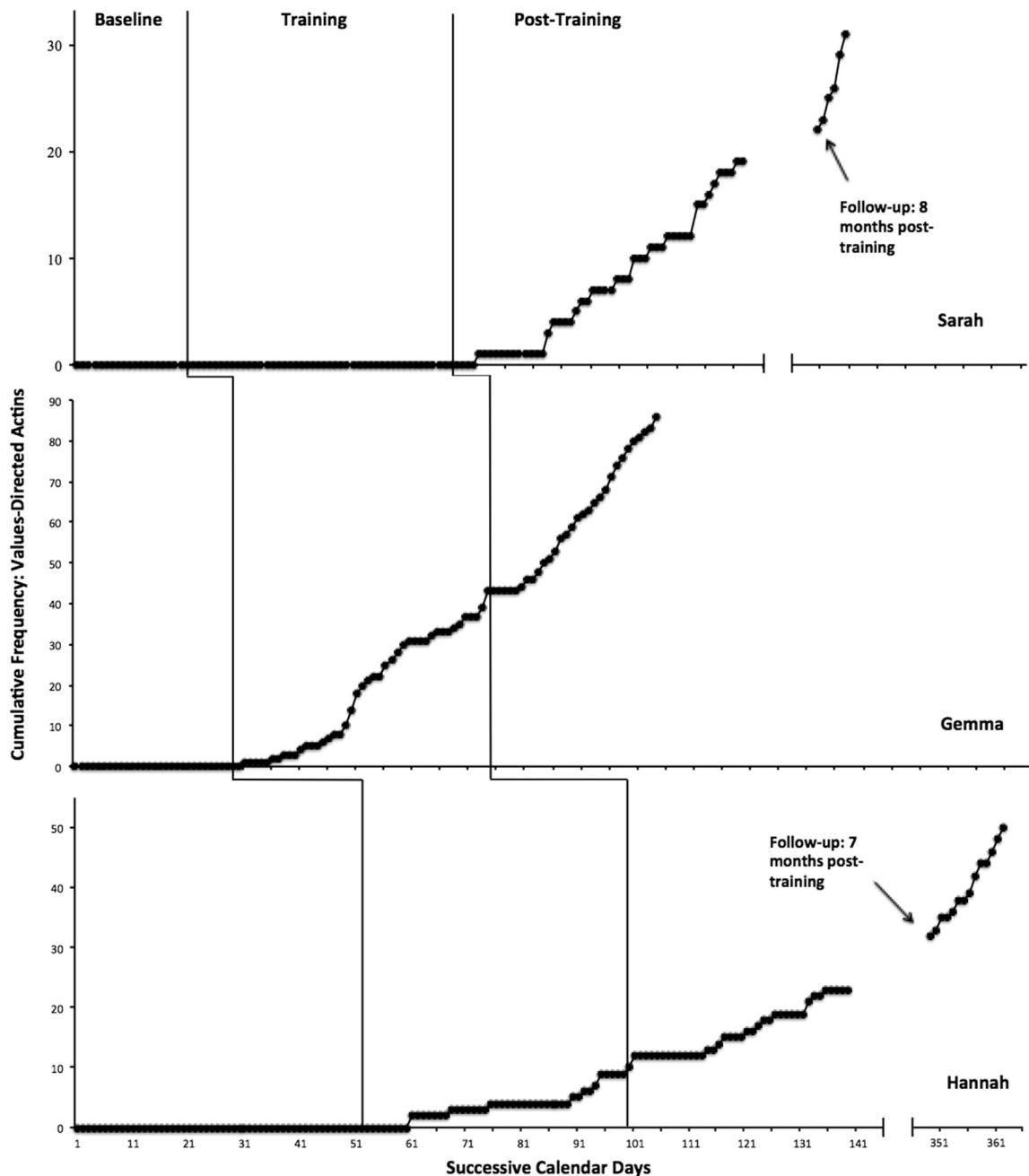


Fig. 1. Cumulative frequency of overt values-directed behaviors across participants.

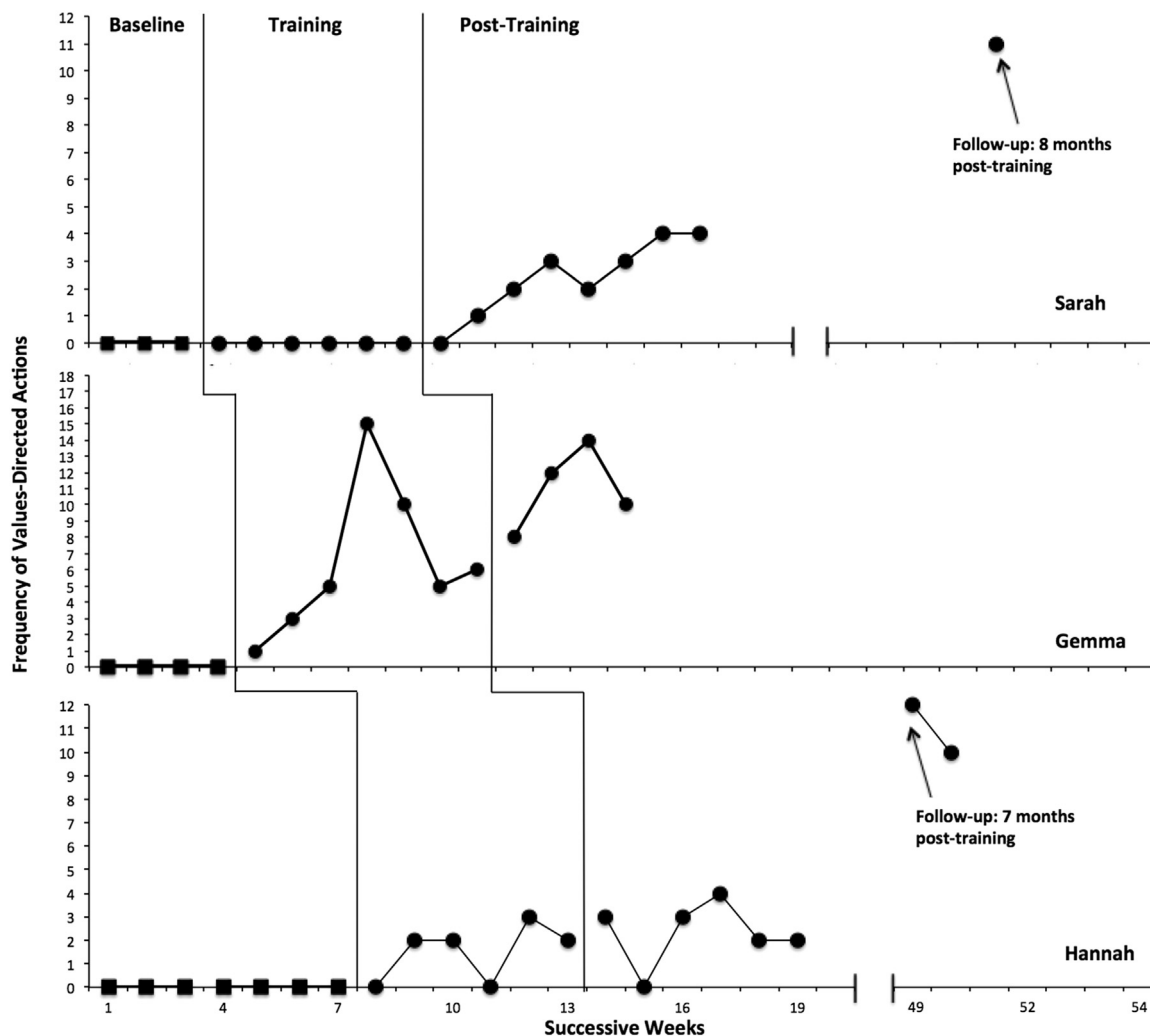


Fig. 2. Frequency of overt values-directed actions per week across participants.

8.2.6. Session 6

The final training session focused on exercises to promote self-care, including self-compassion, and defusion. Parents also discussed and engaged in problem-solving with respect to potential barriers to the maintenance and generalization of newly acquired ACT skills. At the end of the session, parents were invited to re-commit to engagement in values-directed behavior over the next month.

8.2.7. Post-training and follow-up

Approximately one month post-training, the trainer met with the parent invited them to share their experiences since completing training, and discuss potential strategies for overcoming barriers moving forward. Follow-up data were collected over two weeks for Sarah, at 8 months post training, and over one week for Hannah at 7 months post-training.

9. Results

Fig. 1 depicts cumulative rates of values-directed behavior across successive calendar days and Fig. 2 depicts frequency of behaviors per week, during baseline, training, post-training and follow-up. Weekly and cumulative rates of behavior were steady (at zero levels) for all three participants throughout a 3–7 week baseline ($M = 0$). During the 6 –7 week training phase, Gemma and Hannah began to engage in values-directed behaviors ($M = 6.54$ and $M = 1.49$, respectively). Sarah's data did not change during training. During the post-training

phase, Sarah, Gemma, and Hannah showed substantial increases in values-directed behavior ($M = 2.5$, $M = 10.75$, and $M = 2.39$, respectively). Large increases were observed during follow-up for Sarah and Hannah ($M = 11$ and $M = 11$, respectively). Follow-up data were not available for Gemma.

Table 3 depicts results of exploratory psychometric measures. Sarah reported a 43% reduction on the AAQ from pre- to post-training, and a 54% reduction from pre-training to follow-up. Hannah reported a 29% reduction from pre- to post-training, and a 32% reduction from pre-training to follow-up. Gemma reported minimal change on the AAQ from pre- to post-training.

Sarah reported a 23% increase on the SCS from pre- to post-training, and a greater increase from pre-training to follow-up of 48%. Similarly, Hannah reported a 29% increase on the SCS from pre- to post-training,

Table 3
Participant scores on psychological functioning and process measures.

Participant	Sarah			Gemma			Hannah		
	Pre	Post	Fu	Pre	Post	Fu	Pre	Post	Fu
AAQ	37	21	17	12	13	-	34	24	23
FICD	68	60	55	65.5	60	-	68	65	67
SCS	2.54	3.32	3.77	3.69	4.29	-	2.36	3.33	3.32

Note. Pre = Pre-training; Post = Post-training; Fu = Follow-up. AAQ = Acceptance and Action Questionnaire; FICD = Family Impact of Childhood Disability scale; SCS = Self-Compassion Scale. Dash within a cell indicates that data were not collected.

with these gains maintaining at follow-up. Gemma reported a 14% increase on the SCS from pre- to post-training.

Sarah reported a small reduction on the FICD from pre-training to post-training (reduction of 12%), and a greater reduction from pre-training to follow-up (reduction of 19%). Gemma also reported a small reduction in FICD score from pre- to post-training (reduction of 8%). Hannah's FICD scores changed minimally.

10. Discussion

The results of the current study suggest that a six-week ACT protocol may produce robust increases in values-directed overt behaviors in parents of children with autism. This study is the first (to our knowledge) to use ACT to produce changes in clinically meaningful overt behaviors in parents of children with autism. Furthermore, increases in values-directed behavior were maintained and even accelerated at follow-up, suggesting long-term maintenance of gains, with cumulative benefits over time. These findings add to previous studies (conducted with other adult populations) that have reported somewhat variable maintenance of behavioral gains over time (e.g., [Twhig et al., 2006](#)). Overall, the current findings support previous literature suggesting ACT can have a positive impact on overt parent behavior ([Blackledge & Hayes, 2006](#); [Singh et al., 2007](#)). The study also suggests that ACT may be a beneficial compliment to community-based ABA service delivery models. The short-term training package may be accessible (and thus acceptable) to a wide range of parents, in addition to being cost-effective, and relatively easily disseminated across families.

The current findings also contribute to the extremely limited literature on behavior analytic interventions aimed at addressing problematic private events. From the very beginning of the science of behavior analysis, Skinner intended for a complete science of behavior to include private events ([Skinner, 1945](#)), and yet very little behavioral empirical research has attempted to do so. ACT is an approach that explicitly targets private events and incorporating ACT into traditional behavior analytic settings (e.g., ABA for children with autism) may contribute to expanding the science of behavior analysis into a more comprehensive science that includes private events.

More research utilizing direct measures of behavior in ACT treatment research is needed. The goal of ACT is to increase values-directed behaviors, and thus the outcome of greatest importance may be changes in values-directed behaviors, not solely reports of feelings or indirect measures of valued living. Participants directly measuring their own overt behaviors was selected as the primary dependent variable for this reason, and it is hoped that this study provides a model for how such measures might be used and further improved in future ACT research.

The current protocol aimed to establish core ACT skills that might be applied to any problematic private event or situation encountered by a parent. Modeling, feedback, and multiple exemplar training were also used to encourage parents to develop their own ACT metaphors and techniques, in order to increase buy-in and test for an understanding of the underlying ACT concepts. Unfortunately, data on parent application of ACT skills outside of training sessions were not collected. All parents reported practicing their own newly created ACT strategies outside session, but it remains unclear how often those skills were being applied and to what extent the out-of-session practice was instrumental in producing increases in overt values-directed behavior. Future research should attempt to measure parent application of ACT skills, (both directly trained and derived skills) outside of ACT sessions.

In addition to the overt values-directed behaviors captured in the dependent variable, parents reported other collateral effects of training. For example, Gemma reported falling asleep more easily. Sarah reported that her child was "loving his new autonomy" and that her son now had an established group of friends as a result of being more independent of her. Gemma and Hannah also reported positive changes in their relationships with their spouse. For example, Hannah expressed she no longer felt resentment towards her husband (due to increased

sharing of childcare duties), and that he had commented on how much "nicer" (i.e., less critical) she was. Gemma reported that her husband had started to initiate activities with her two boys without her (e.g., going for walks around the neighborhood), which he had actively avoided in the past. Future research should attempt to measure collateral effects with formal data.

It is interesting to note that the initial point of behavior change differed for each participant. Previous ACT researchers using behavioral measures with adult populations have made similar observations (e.g., [Twhig et al., 2006](#)). A variety of parent or child factors may have influenced these results. For example, having an older child, as in Sarah's case, might entail a longer history of avoidant parent behavior, which may be more resistant to change. It is also possible that engaging in some parent behaviors was simply more challenging than others.

Although not the primary goal of the study, changes were observed on exploratory self-report measures. Sarah and Hannah reported large reductions in experiential avoidance from pre- to post-training, and at follow-up. The lack of change in scores for Gemma may be due to a floor effect, since she reported low levels of experiential avoidance prior to training ([Blackledge & Hayes, 2006](#)). Changes on the AAQ for Sarah and Hannah may support recent literature suggesting AAQ scores might reflect actual behavior change ([Brassell et al., 2016](#); [Williams et al., 2012](#)). Increases in self-compassion (as measured by the SCS) were also observed post-training for all three participants. Parents of children with autism often report experiencing chronic guilt, shame, and self-blame ([Neff & Faso, 2014](#)). In the general psychology literature, self-compassion has been shown to be a strong positive predictor of quality of life and overall psychological health (e.g., [Baer, Lykins, & Peters, 2012](#); [Van Dam, Sheppard, Forsyth, & Earleywine, 2011](#)). The changes observed on the pre-post measures should be interpreted with caution. Administering the measures only once before and once after intervention excludes them from being considered as part of the multiple baseline design and therefore no experimental conclusions can be drawn about them.

The potential limitations of parent-collected data are worth noting. Self-recording of parent data was the only feasible means of "round the clock" tracking of parent behavior. Although participant-collected data may be less accurate than researcher-collected data, several variables likely strengthened the accuracy of the parents' data. First, the vast majority of overt behaviors parents recorded were discrete and likely therefore easy to detect and record. For example, it is fairly unambiguous to detect whether one has left one's child at a friend's house for a play date. Second, parents were trained in data collection during the initial meeting and the trainer reviewed data collection during every session and encouraged parents to ask questions. Finally, IOA data suggested that data were generally accurate. It should be noted that since data were not collected for nonoccurrences (i.e., no second person was asked to confirm that zero values-directed behaviors occurred during days in which the parent reported zero), the IOA procedures used in this study are somewhat unconventional. This limitation should be explored and addressed in future research. Some anecdotal evidence suggests participants may have occasionally under-reported instances of values-directed behaviors. For example, during the training phase, Gemma casually mentioned several additional instances of values-directed actions that she had not recorded on her data sheet.

The generalizability of the current findings warrants discussion. This study involved three mothers, referred for training on a clinical need basis by the child's ABA supervisor. Results may thus not be representative of all parents of children with autism. Fathers, grandparents, caregivers recruited outside of an ABA treatment setting, families receiving ACT as a mandatory part of regular treatment services, etc., might all benefit differently from training. The parent's treatment history, education level, social support, socioeconomic status, and child's autism severity, may also impact effectiveness ([Najdowski & Gould, 2014](#)).

It is possible that components of the intervention not specific to ACT contributed to treatment effects, such as the 1:1 relationship with the trainer, goal setting, self-monitoring, etc.). However, it should be noted that goal-setting was specifically implemented with respect to ACT skills only (e.g., “practice mindfulness at least twice while showering this week”), and not with respect to the dependent variable, therefore, it is less likely that goal setting was directly responsible for changes in the dependent variable. Future research should include component analyses, however, to address possible multitreatment effects, and determine which components are most crucial for achieving desired outcomes. Such analyses might also enable researchers to determine whether the order in which treatment components are presented to participants might affect treatment outcomes.

A final limitation worth noting is that treatment integrity data were not collected. The trainer followed a manualized protocol and received training from a recognized expert in training ACT professionals (third author) prior to beginning the study. In addition, the trainer in the study reviewed the manual prior to each session and used it as a guide while delivering training. However, future research should directly measure treatment integrity.

This study sought to investigate whether ACT might effectively increase adaptive, flexible repertoires of parent behavior. Findings suggest that a brief protocol may result in increased engagement in a variety of overt values-directed parent behaviors. Behavioral gains were maintained over time, with gains most pronounced at follow-up over 6-months post-training. More research is needed, however, findings suggest that ACT may be an effective and efficient way to increase adaptive parent responding across various areas of family life. ACT for parents of children with autism may also have indirect positive effects beyond the specific behaviors targeted. Further, ACT might create a context for further engagement in adaptive parent behavior over time.

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